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Lucie Piaser

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POUR OBTENIR LE GRADE DE

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Spécialité Sciences Économiques

Par **Lucie Piaser**

Inégalités et violences : une étude de cas du Mexique

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Thèse soutenue le 13 décembre 2022

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Title: Inequality and Violence: A Case Study of Mexico

Abstract: By shedding new light on the link between inequality and violence in Mexico, this thesis aims to explore further that relationship and deepen its understanding. Chapter 1 examines the impact of income inequality on several types of criminal behaviours at the municipal level in the country. As the deleterious effects of inequality may not stop at actual crime rates, Chapter 2 studies the effect of local inequality (of income and education) on individuals' fear of crime. The two first chapters of the thesis rely on theories assuming that individuals are aware of actual inequality levels and correctly process them. Nevertheless, we believe that individuals' perception and understanding of inequality is important for the analysis of their beliefs and attitudes towards violence and ultimately its prevalence. This reflection is at the core of the last two chapters. Thanks to an innovative quantitative index, Chapter 3 gauges the perceived levels of gender inequality among Mexican students (from high school to doctorate levels) and analyses their individual correlates. It is completed by a qualitative approach in Chapter 4, to better understand Mexican students' perception of gender inequality and intimate partner violence in their society. Based on in-depth semi-structured interviews, we analyse their discourses to take stock of their knowledge, understanding and beliefs about these two phenomena. We also look at how these two perceptions are related.

Keywords: Inequality, Inequality Perception, Crime, Violence, Fear of Crime, Intimate Partner Violence, Mexico.

Titre : Inégalités et violences : une étude de cas du Mexique

Résumé : En apportant un nouvel éclairage sur le lien entre inégalité et violence au Mexique, cette thèse vise à explorer davantage cette relation et à en approfondir la compréhension. Le Chapitre 1 examine l'impact de l'inégalité de revenu sur plusieurs types de comportements criminels à l'échelle municipale. Les effets délétères de l'inégalité ne se limitant pas aux taux de criminalité observés, le Chapitre 2 étudie l'effet de l'inégalité locale (de revenu et d'éducation) sur la peur du crime des individus. Les deux premiers chapitres de la thèse reposent sur des théories supposant que les individus sont conscients des niveaux d'inégalité réels et les traitent correctement. Cependant, nous pensons que la perception et la compréhension de l'inégalité par les individus sont importantes afin d'analyser leurs croyances et attitudes à l'égard de la violence et, en définitive, sa prévalence. Cette réflexion est au cœur des deux derniers chapitres. Grâce à une mesure quantitative innovante, le Chapitre 3 mesure les niveaux perçus d'inégalités de genre parmi les étudiants mexicains (du lycée au doctorat) et analyse ses corrélats individuels. Il est complété par une approche qualitative dans le Chapitre 4 afin de mieux comprendre la perception qu'ont les étudiants mexicains de l'inégalité de genre et des violences conjugales dans leur société. Sur la base d'entretiens semi-structurés, nous analysons leurs discours pour faire le point sur leurs connaissances, leur compréhension et leurs croyances concernant ces deux phénomènes. Nous examinons également comment ces deux perceptions sont liées.

Mots-clés : Inégalité, Perception de l'Inégalité, Criminalité, Violence, Peur du crime, Violences Conjugales, Mexique.

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Je souhaiterais en premier lieu remercier les différents membres du jury qui ont accepté d'évaluer mon travail.

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General Introduction

Inequality is still a key problem worldwide. Reducing it is one of the 17 Goals of the United Nations to transform our world and reach sustainable development. Indeed, beyond the intrinsic issues of justice and fairness, inequality has many adverse effects in society. Among others, it deteriorates individual health (Pickett & Wilkinson, 2015), erodes social trust (Rothstein & Uslaner, 2005), reduces social interactions (Alesina & La Ferrara, 2000) and life satisfaction (Ferrer-i-Carbonell & Ramos, 2012), worsens educational achievement (Thorson & Gearhart, 2018), slows down economic growth (Stiglitz, 2015) and makes it less durable (Berg, Ostry, & Zettelmeyer, 2012). A harmful impact of inequality is as well expected on violence and crime. Theoretically, more unequal societies may be more violent, facing higher crime rates. Empirically, numerous studies have tested this relationship. This thesis is part of that literature. By shedding new light on the link between inequality and crime, this work aims to explore further that relationship and deepen its understanding. In that respect, Mexico is a promising case study as its society combines both very high levels of inequality and crime. The following two sections of the general introduction offer some keys to describing and understanding these two social phenomena in the country.

0.1. Income and gender inequalities: some historical and spatial considerations in Mexico

Mexico exhibits a high level of income inequality, ranking top among OECD members, with a Gini index of 0.469 in 2018 according to the latest official estimations of the National Institute of Statistics and Geography (*Instituto Nacional de Estadística y Geografía*, INEGI). Although a general downward trend has been observed since the second half of the 20th century, the temporal evolution of income disparities is rather complex and uneven.

After a surge of inequality in the 1950s (Székely, 2017), the rapid economic growth allowed a reduction of income disparities through the 1960s and 1970s, even if at a slow pace (Cortés, 2013; Stern, 1994). Following the debt crisis from 1982, the government implemented drastic structural adjustment measures under the supervision of the International Monetary Fund (IMF) and started to open its economy. Important austerity economic reforms followed, with severe cuts in the size of the civil administration, the privatisation of state-owned companies

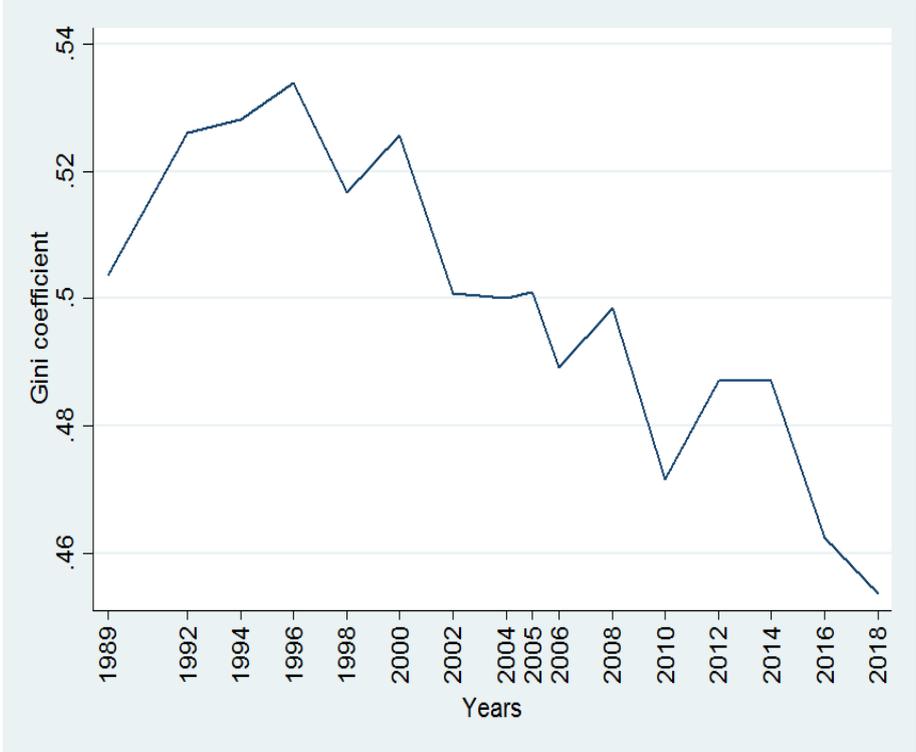
and monetary restrictive policy (del Castillo Negrete Rovira, 2017). The so-called “lost decade” from 1984-1994 was characterised by a reduction in wages as well as an increase in unemployment and inequality. Over the period, the widening gap in returns to education, with falling returns to low education (as the level and distribution of basic education improved) and rising skill premiums to college education, may explain this increase in income inequality (Bouillon, Legovini, & Lustig, 2003). This evolution was also favoured by an increase in the relative demand for skilled workers (Campos, Esquivel, & Lustig, 2012). Finally, a sharp decrease in coffee price on the world market deteriorated the terms of trade for this major crop, affecting primarily rural and southern regions compared to the rest of the country (Bouillon et al., 2003).

Figure 0.1 depicts the evolution of inequality at the national level over the 1989-2018 period. In the second half of the 1990s, inequality started to decline thanks to a combination of market and state interventions (Campos et al., 2012; Esquivel, 2010; Lustig, Lopez-Calva, & Ortiz-Juarez, 2013). First, wage inequality slumped as the supply of highly educated workers rapidly outpaced demand, decreasing the premium to skilled workers. At the same time, demand for unskilled labour soared, leading to higher relative wages for low qualified workers. Second, the implementation of two important social programs in the last decade of the 20th century resulted in more generous and progressive governmental cash transfers. Launched in 1993, *Procampo* was designed to help farmers’ transition during trade opening (which was hastened in 1994 by the NAFTA) with income compensatory aid. This was followed by *Progresa* in 1997, a conditional cash transfer program aiming to fight extreme poverty through investments in education, health and nutrition. Lastly, remittances received by low-income households in rural areas increased, reducing disparities between rural and urban households. However, this is not clear whether the fall of income inequality lasted until 2010 (Campos et al., 2012; Lustig et al., 2013) or stagnated since 2006 (El Colegio de México, 2018). The last estimates provided by Lambert and Park (2019) highlight a rise of income inequality between 2010 and 2014, followed by a further drop.

Nevertheless, some authors qualify these results. According to Cortés (2013), the income distribution of 2010 remains highly similar to the one of 1984 and the lack of empirical evidence doesn’t allow one to conclude on a fall of inequality over the period. Re-estimating income inequality while adjusting the data from household surveys, del Castillo Negrete Rovira (2017) even finds an increasing trend of inequality since the mid-1980s, a result confirmed by Székely (2017) for the 1996-2004 period. It may also be that the decline in

income inequality has been rather driven by economic shocks reducing the income share of the richest 10% than by an improvement in the conditions of the poorest households relative to the rest of the population (Cortés & Vargas, 2017; Yúnez, Arellano, & Méndez, 2009).

Figure 0.1: Trend in inequality levels (household per capita income) in Mexico (1989-2018).



Source: Author’s calculations based on the SEDLAC (Socio-Economic Database for Latin America and the Caribbean) elaborated by the CEDLAS (*Centro de Estudios Distributivos, Labores y Sociales*) and the World Bank.

This national trend also hides important geographical socio-economic disparities, notably between Mexican states (Mendoza-Velázquez, Ventosa-Santaulària, & Germán-Soto, 2019). Southern rural territories have always been marginalised, with lower income, education levels and higher poverty. Rey and Sastré-Gutiérrez (2010) observe that regional disparities dropped over the 1940-2000 period but the income gap between Mexican states mainly declined during the first two decades and stagnated since the 1960s. Tello and Ramos (2012) even notice an upturn in wage inequality across regions since the mid-1980s. Trade liberalisation, and in particular economic integration with the NAFTA, exacerbated the disparities favouring the northern border and centre territories compared to the agrarian southern region (Chiquiar, 2005; Sánchez-Reaza & Rodríguez-Pose, 2002; Tello & Ramos, 2012). Because of their remote geographic location, the latter suffered from connection and mobility problems, making the provision of public infrastructures and services difficult, limiting their insertion into the global market. On the contrary, northern territories, initially richer and with more

modern productive facilities, benefited from the implementation of manufacturing firms (*maquiladoras*), enjoying reduced transportation costs, investments and exportation opportunities. Southern states, where agriculture (mainly for subsistence farming) is the main source of economic activity, are also highly affected by meteorological risks (CONEVAL, 2018). In addition, Rodríguez-Pose and Ezcurra (2010) identify political decentralisation, in particular of fiscal policy, as an intensifier of regional disparities in low and medium income countries as the transfer of authority and resources to subnational entities often benefits the most prosperous regions.¹ In Mexico, political decentralisation accelerated in the 1980s and 1990s (Rodríguez, 1997).

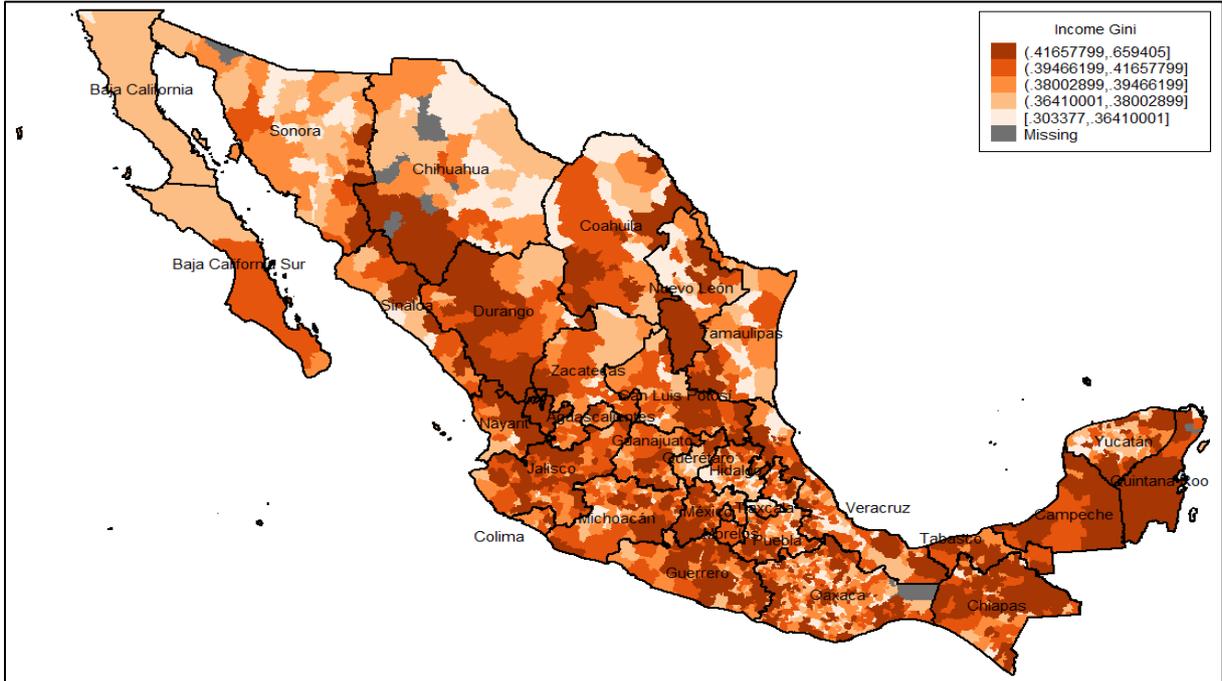
Undeniably, spatial income inequality is also to connect to ethnic segregation (Ezcurra & Rodríguez-Pose, 2017), especially in the Mexican context where “historically, indigenous populations concentrated diverse social, economic and territorial disadvantages which hinder their opportunities to participate in different environment” (CONEVAL, 2018, p. 10). Geographically, indigenous populations are mainly concentrated in the Yucatan peninsula (Quintana Roo, Yucatan and Campeche), in the southern states of Guerrero, Oaxaca and Chiapas, as well as in the centre states of Puebla and Hidalgo (Rojas Lomelín, Aguad Revilla, & Morrison, 2019) (see Figure A0.1 in the Appendix).

At a more disaggregated scale, even if a slow convergence of mean household income was observed among Mexican municipalities for the 1990-2005 period, inter-municipal income inequality remained persistent (Modrego & Berdegué, 2015). Intra-municipal income inequality is also of interest. Figure 0.2 maps the latest official available estimates calculated by the National Council for the Evaluation of Social Development Policy (*Consejo Nacional de Evaluación de la Política de Desarrollo Social*, CONEVAL). No clear geographical pattern emerges, confirming previous findings obtained with older data (Székely, López-Calva, Melendez, Rodríguez-Chamussy, & Rascón, 2007; Yúnez et al., 2009). Nonetheless,

¹ “In the short term, the transfer of the powers to tax downwards from the central state will yield greater rewards to territories with a more developed economic fabric and thus a greater tax base. In the medium and long-term a more dynamic and subtle mechanism of political influence may kick in and contribute to perpetuate and enhance existing territorial disparities. The process of decentralisation will almost certainly unleash a competition for the scarce resources emanating from the central government, with subnational authorities bidding for an ever greater share of the national economic cake. [...] However, the playing field in this competition for resources is not level, with richer, stronger, and/or larger states likely to wield a greater influence over central decision-making than lagging, poor, or remote states. Such influence can be used in order to extract a more discretionary allocation of funds from the central government, to the detriment of formula-based solutions—which are more likely to be favourable to those territories with greater needs or endowment shortages—as has been the case in Mexico [...]” (Rodríguez-Pose & Ezcurra, 2010, p. 623).

lower (relative) levels of intra-municipal inequalities are observed in northern states (Baja California, Sonora and Chihuahua). Likewise, even if the states of Quintana Roo, Campeche, Chiapas and some parts of Durango and Chihuahua concentrate many high-inequality municipalities, clusters of municipalities with strong income disparity can be observed all over the territory.

Figure 0.2: Spatial repartition of the income Gini index for 2015.

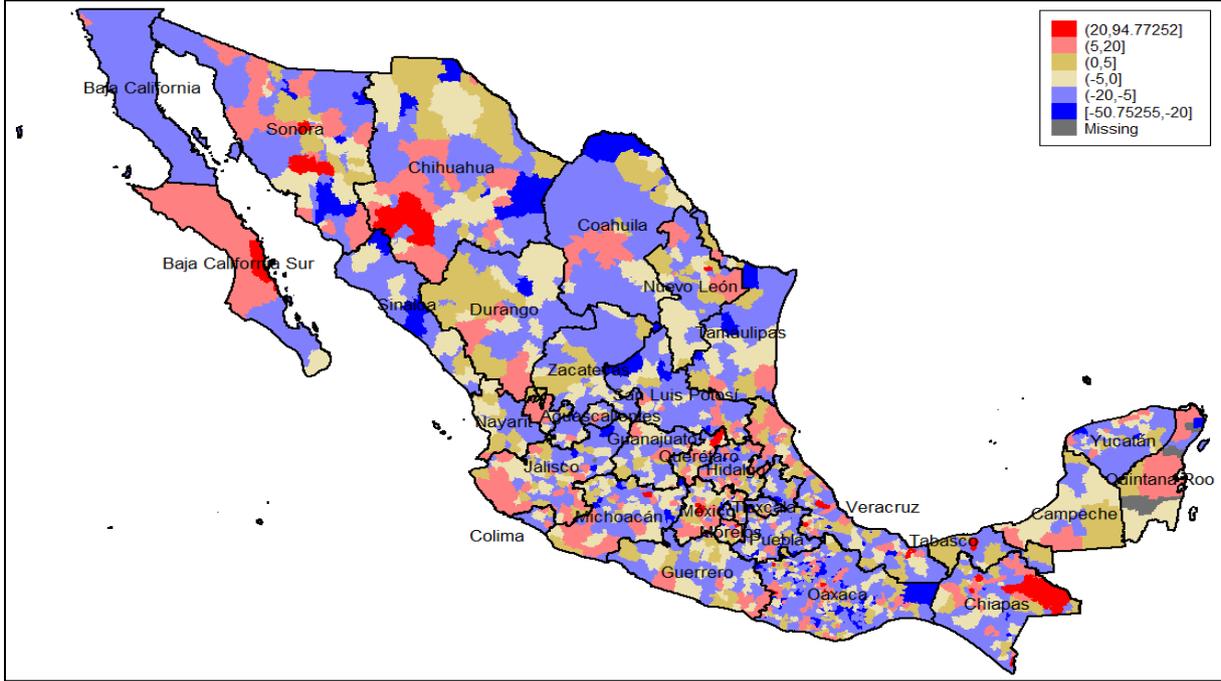


Source: Author’s calculations based on CONEVAL data.

From a dynamic perspective and actualizing the work of Yúnez et al. (2009), the evolution of the Gini index at the municipal level for the 1990-2010 period is depicted in Figure 0.3. Unfortunately, in 2015 the CONEVAL’s estimation methodology was updated, breaking comparability with past estimates and making comparisons over a longer period impossible. The beige colours indicate a minimal change over the period in the level of intra-municipal inequality, whether positive or negative (between -5% and +5%). The blue colour shows a decrease and the red colours an increase of income disparities at the municipal level. Even if 58% of the municipalities (accounting for 69% of the Mexican population) experienced a drop in their income inequality level, Mexico didn’t achieve a massive nationwide reduction of its intra-municipal disparities. Indeed, 30% of the municipalities see almost no improvement in their situation (24% of the population) and 12% of them (7% of the population) even suffer

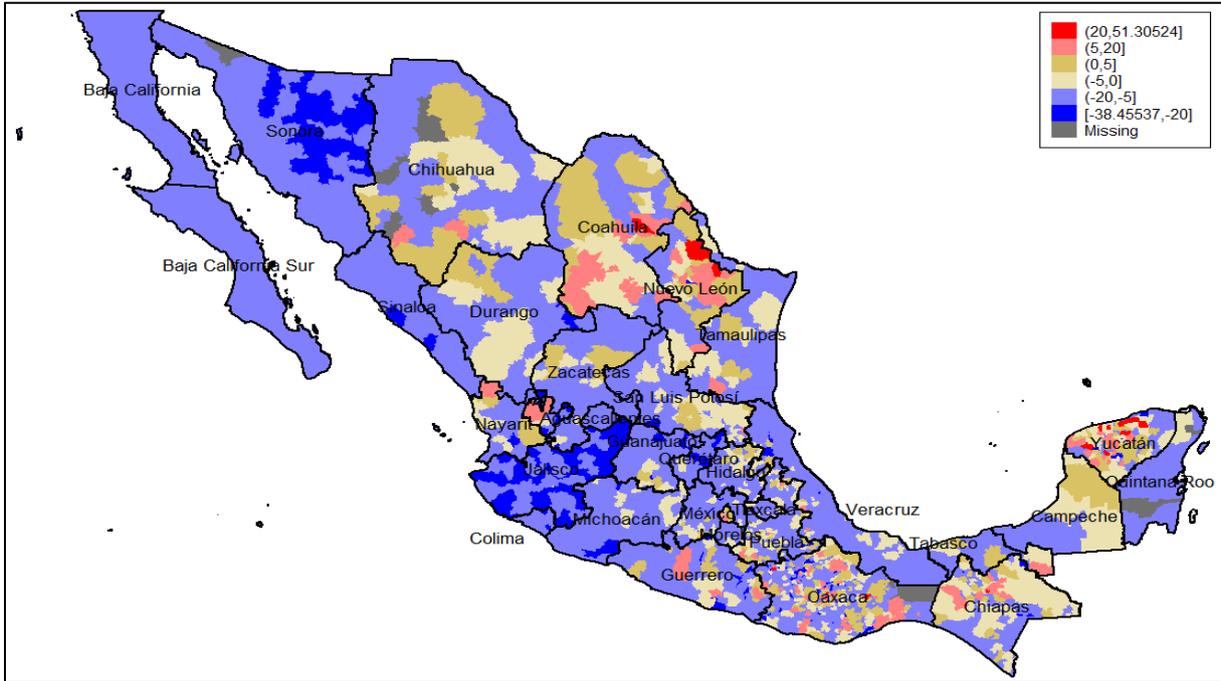
from an increase in their Gini coefficient. Besides, there is absolutely no clear spatial rationale for this temporal evolution.

Figure 0.3: Evolution of the income Gini index between 1990 and 2010 (percentages).



Source: Author’s calculations based on CONEVAL data.

Figure 0.4: Evolution of the income Gini index between 2010 and 2015 (percentages).



Source: Author’s calculations based on CONEVAL data.

In order to allow for comparison with the most recent 2015 estimates, the Gini indices for 2010 have been revised with the new methodology. Figure 0.4 maps the evolution of intra-municipal inequality for the 2010-2015 period. This recent evolution is more encouraging as

71.7% of the municipalities (accounting for 71.2% of the Mexican population) reduced their inequality level and only 5.7% of them (2.8% of the population) experienced an increase in their Gini coefficient. These latter are concentrated for the most part in the border states of Coahuila and Nuevo Leon and in the southern states of Yucatan, Chiapas, Oaxaca and Guerrero. However, still 22.6% of the municipalities (25.9% of the population) stagnated, seeing no clear improvement in their level of income disparities.

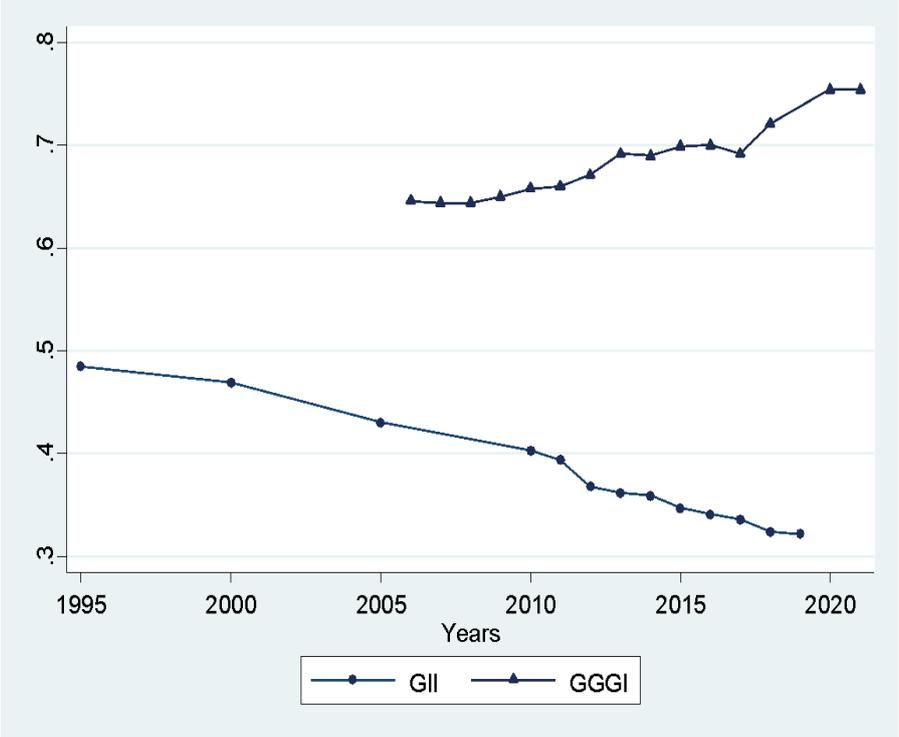
Income inequality is part of a wider set of socio-economic inequalities affecting Mexican society. Gender inequality is one of them and their study is all the more relevant given women's low status in the country. Several international institutions have documented their reduction at the national level, computing different composite indicators. For example, the Gender Inequality Index (GII) from the United Nations Development Programme (UNDP), a measure reflecting inequality in achievement between women and men in three dimensions (reproductive health, empowerment and the labour market) showed a steady decline of gender inequality in Mexico between 1995 and 2019 (Figure 0.5). Indeed, the index fell from 0.485 to 0.322 over the period, with a value of 0 indicating that women and men fare equally in all dimensions.² The Global Gender Gap Index (GGGI) calculated by the World Economic Forum displays similar evidence (Figure 0.5). The index scores on a 0 to 100 scale and is interpreted as the distance to parity (a score of 100). It considers four dimensions: economic participation and opportunity, health and survival, education attainment and political empowerment. Between 2006 and 2021, Mexico closed its overall gender gap by a further 11.1 percentage points, reaching a parity level of 75.7%. The UNDP office in Mexico also provided an in-depth study of the evolution of gender inequalities at the state and municipal levels between 2000-2005 and 2008-2012 (PNUD México, 2009, 2014). The results at these two geographical levels are in line with the national downward trend in inequality between women and men but hide disparities between states and municipalities.

This decline is the result of important efforts led in Mexico to reduce gender inequality and promote women's rights. For example, equality of opportunity and treatment between genders was enacted in 2006 with the General Law for Equality between Women and Men. These advances were all the more concrete when in 2014, gender parity in the registration of candidates for the Federal and States Congresses was enshrined in the Constitution. In addition, with the latest 2020-2024 National Programme for Equality between Women and Men (PROIGUALDAD), six priority objectives have to be taken into account while

² On the contrary, a value of 1 indicates that women or men fare poorly compared to the other.

elaborating national policies to reach substantive gender equality. All in all, in 2021, Mexico has reached 34th place among 156 countries in terms of gender parity (World Economic Forum, 2021).

Figure 0.5: The evolution of gender inequality in Mexico.



Source: Author’s calculations based on the database from the Human Development Report Office (for the GII) and the different Global Gender Gap Reports published by the World Economic Forum (for the GGGI).

Mexican institutions do not compute such composite indices to measure gender inequality. In fact, official data on gender inequality have only been provided since recently. During the 1995 Fourth World Conference on Women, Mexico³ presented a work related to gender biases and limitations of statistical information to measure them.⁴ Two years later, the INEGI started to publish an annual report describing the situation of women and men in different areas of life. Based on several surveys (most of the time representative at the national and regional levels), this report contains multiple indicators related for example to education and culture, health and nutrition, poverty, paid and unpaid work, political participation and decision making, time-use distribution or reproductive rights. A further step forward was the creation of the National Women’s Institute (*Instituto Nacional de las Mujeres*, INMUJERES)

³ in collaboration with the United Nations Development Fund for Women (UNIFEM, now UN Women).
⁴ Instituto Nacional de Estadística, Geografía e Informática (INEGI) - Fondo de Desarrollo de las Naciones Unidas para la Mujer (UNIFEM), *La mujer mexicana: un balance estadístico al final del siglo XX*, México, INEGI/UNIFEM, 1995, 161 pp.

in 2001, a decentralised public body of the Federal Public Administration aiming at, among others, promoting the basis for facilitating the generation of gender statistics. Implementing a gender perspective in statistical information was then made mandatory in 2006 with the General Law for Equality between Women and Men. Table A0.1 displays some selected indicators computed by the INMUJERES in several dimensions and their evolution since the early 2000s.

Nevertheless, empirical studies going beyond the descriptive aspect of previous statistics and focusing at a more disaggregated level of analysis such as the municipal one are scarcer. If so, they focus in particular on economic inequality and the wage gap between women and men despite the multidimensionality of this phenomenon. For example, Arceo-Gómez and Campos-Vázquez (2014) showed that the gender wage gap decreased in Mexico between 1990 and 2010. Considering only urban areas, the latter decreased from 14.2 to 7.8% over the period, a trend mostly driven by a fall in the differential at the top of the wage distribution. This drop seems to have stopped as between 2008 and 2018, although significant educational progress has been made for women, this has not translated into a more equal insertion in the labour market nor a reduction in the gender wage gap (CONEVAL, 2021). In 2018, for every 100 pesos earned by a male worker, a female one received 90 pesos. This ratio remained almost similar to the one of 2008 which stood at 87 pesos for every 100 pesos. Nevertheless, the magnitude of the gender wage gap varies according to the characteristics of the population considered (such as the state and size of locality of residence, the sector of activity and the level of schooling) (INMUJERES, 2016). It is also important to mention that transfers (such as pensions, scholarships, donations, remittances and government benefits) make up a larger share of women's income than men's (INMUJERES, 2016).

Despite these advances, gender equality is far from being reached and many challenges still need to be faced, notably in terms of women's economic participation and opportunity (but not exclusively). Among others, in 2021, only 41.7% of adult women were in the labour force,⁵ a stagnating number since 2005 (INEGI. Encuesta Nacional de Ocupacion y Empleo, 2021) and only 22.2% of municipal heads were women (SEGOB - INAFED. Sistema Nacional de Información Municipal, 2021). Furthermore, even if the amount of federal expenditures allocated to actions and programmes promoting equality between women and men increased by 20% between 2020 and 2021, several programmes, whose main purpose is

⁵ For comparison, in 2020 this rate was 56.8% in Colombia and 52.5% in Chile (data extracted on the 25 of May 2022 from OECD.Stat).

to promote equality and eradicate gender-based violence,⁶ faced reductions in the funds received whereas the contribution of other recipient programmes to gender equality is uncertain and unverifiable (Benumea et al., 2020). Finally, the implementation gap between formal (what is officially enacted) and substantive (what is actually achieved) equality persists, a challenge made even more difficult when considering more disaggregated levels such as the federal or municipal ones.⁷

0.2. Mexico, a country plagued by violence

Mexico ranks among the most violent countries in the world. In 2018, a macabre record was reached as the homicide rate peaked at 29.1 per 100,000 inhabitants (according to the UNODC, *United Nations Office on Drugs and Crime*), the country's highest level recorded since 1990.

Crime and violence have tremendous individual and societal costs.⁸ By causing physical injury or death, violence is a major public health concern in Mexico. In 2019, 34,648 victims of intentional homicides were registered by the Executive Secretary of the National System for Public Security (*Secretariado Ejecutivo del Sistema Nacional de Seguridad Pública*, SESNSP) and homicide was the first cause of death among the 15–44-year-olds.⁹ However less visible, the psychological consequences of violence such as anxiety, depression or post traumatic disorders are equally harmful (Krug, Mercy, Dahlberg, & Zwi, 2002). As a result, violence may reduce labour productivity, causing a substantial loss of income for individuals. At the macro level, violence may also hinder trade, business creation and investments (Cabral, Mollick, & Saucedo, 2016), deter access to education, reduce institutional trust (Corbacho, Philipp, & Ruiz-Vega, 2015; Malone, 2010), cooperation between individuals and lead to population displacements (see Cantor (2014) and Rios Contreras (2014) for organised crime induced migration in Mexico). By generating extra policing, military, judicial, medical and private security expenditures, violence also diverts resources from more productive activities or public services investments which favour long term economic growth (Iqbal, Bardwell, & Hammond, 2021). In 2019, the economic impact of violence was estimated at 4.57 trillion

⁶ Such as the National Commission for the Prevention and Eradication of Violence Against Women (*Comisión Nacional para Prevenir y Erradicar la Violencia Contra las Mujeres*, CONAVIM), the INMUJERES and the National Centre for Gender Equity and Reproductive Health (*Centro Nacional de Equidad de Género y Salud Reproductiva*, CNEGySR).

⁷ <https://lac.unwomen.org/en/donde-estamos/mexico> (accessed 06/13/2022).

⁸ In this thesis, the terms crime and violence will be used interchangeably.

⁹ https://www.inegi.org.mx/contenidos/programas/mortalidad/doc/defunciones_registradas_2019_nota_tecnica.pdf

pesos (US \$238 billion) in Mexico, or 21.3 percent of the country's GDP (Institute for Economics & Peace, 2020).¹⁰ Thus, violence is a major obstacle to development.

Even if drug related crime in Mexico often makes the headlines, violence and insecurity in today's Mexico cannot be reduced to drug trafficking alone. Violence is rooted in Mexico's history, shaped by a long tradition of social and political conflicts. Armed forces have been involved in political affairs long before the 1910 Revolution, favouring strong ties between crime, violence and governance and resulting in a high militarization of the state (Foster, 2010). Yet, the beginning of the 20th century was a critical period as the post-revolutionary state-building process, which was based on violence and coercion, institutionalised it definitively in the Mexican political system (Davis, 2012).

After the dictatorship of Porfirio Diaz (1876-1911), a period of relative political stability (even though marked by a severe military state repression), the revolution broke out announcing a new era of violence and predation. Between 1914 and 1929 the country was bruised by successive uprisings led by different revolutionary factions fighting for power. During this civil war, purges, repressions and suppression of political opponents were common practices of governance. The police and the army were the tools of this state coercion (Davis, 2012) and corruption was heavily used by the different political leaders to gain support or maintain loyalty of the military officers and police forces. In order to curb the constant crisis over presidential succession, the National Revolutionary Party (*Partido Nacional Revolucionario*) was created in 1929, sealing the birth of an authoritarian single party regime that would rule the country until 2000. State repression remains extremely violent all over the century. Military actions were carried out against the political opposition in the 1940s and labour movements during the 1940s and 1950s (Kirkwood, 2010, Chapter 10; Sherman, 2010). In the 1960's, criticisms against the single party, considered undemocratic, corrupted and clientelist, became increasingly virulent. For two decades (70s and 80s), the state engaged in the "Dirty War", using the army to fight left-wing political

¹⁰ "The global economic impact of violence is defined as the expenditure and economic activity related to "containing, preventing and dealing with the consequences of violence." The estimates include the direct and indirect cost of violence as well as an economic multiplier [...]. Direct costs are the costs of crime or violence to the victim, the perpetrator, and the government, including those associated with policing, medical expenses, funerals or incarceration. Indirect costs accrue after the fact. These include physical and psychological trauma and the present value of future costs associated with the violent incident, such as the consequential lost future income. There is also a measure of the impact of fear on the economy, as people who fear that they may become a victim of violent crime alter their behaviour. [...] The multiplier effect calculates the additional economic activity that would have accrued if the direct costs of violence had been avoided" (Institute for Economics & Peace, 2020, p.85).

dissidents and especially social movements led by students and rural guerrilla groups (Foster, 2010, Chapter 10). During this period, the role of the army in maintaining social order increased, accentuating the already high militarization of public security and resulting in many victims.

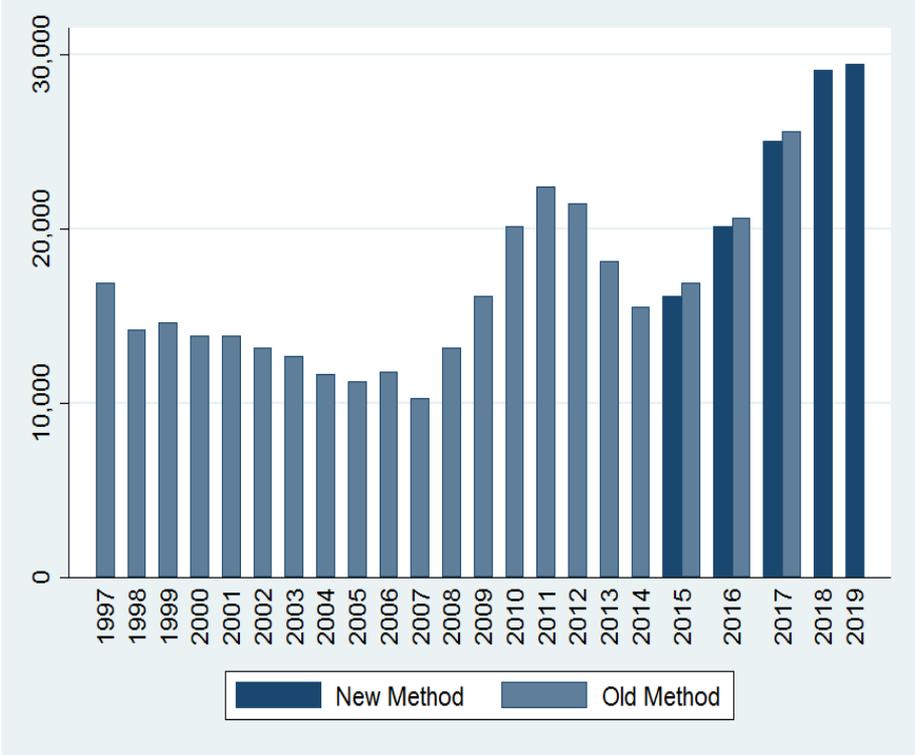
In the 1970s, drug trafficking organisations (DTO) became particularly powerful as demand for illicit drugs was exploding since the 1960s in the United States and Mexico already had a viable poppy and marijuana production. Their influence grew even more in the late 1980s as the country became an alternative overland trafficking route to channel cocaine from Colombia to the United States when the US Drug Enforcement Administration closed the Colombia-Florida route (Russell, 2010, Chapter 26). As a result, in the late 1980-early 1990s, the first joint efforts of the Mexican and American governments to curb drug trafficking organisations were carried out.

Under the political domination of the authoritarian single party, DTO have blithely benefited from a dense network of corruption involving politicians and law enforcement agencies, allowing them to operate without major hindrance. Yet, the election of an opposition candidate for the first time on the eve of the 21st century shattered these balance of informal arrangements and an upsurge of violence followed. Under the administration of Vicente Fox (2000-2006), facing the escalating drug production and violence in the country, pressure from the authorities continued to increase, with the army systematically destroying illegal poppy and marijuana crops and targeting trade routes. In 2006, efforts to clamp down DTO intensified as they were becoming increasingly powerful and uncontrollable. Newly elected President Felipe Calderón launched the war on drugs, deploying 45,000 armed forces all over the territory. However, the kingpin strategy (capture or execution of cartels' leaders) pursued by the army did not have the expected effects. By increasing competition among DTO, it led to an escalation of violence (Calderón, Robles, Díaz-Cayeros, & Magaloni, 2015; Lindo & Padilla-Romo, 2018). As internal conflicts emerged over succession, major big cartels fragmented into many smaller organisations fighting against each other for control of strategic areas for the production, transportation and distribution of drugs.

Figure 0.6 depicts the evolution of the number of intentional homicides cases recorded by the SESNSP since 1997 and sums up this evolution of violence. Despite a slow but steady decrease in lethal violence over the 1997-2007 period, the number of intentional homicides

soared between 2008 and 2011. Since 2015, the number of intentional homicides has started to rise again, reaching unprecedented levels.

Figure 0.6: Number of intentional homicides cases recorded in Mexico.



Notes: As the SESNSP introduced a new counting methodology in 2015, both figures are reported.
 Source: Author’s calculations based on SESNSP data.

Following the war on drugs, different criminal organisations lost power and were less able to take part in the transnational drug trafficking. To diversify their sources of revenue they engage in other illicit activities such as kidnapping, extortion or robbery. Rather than solely being DTO, they became organised crime groups. Thus, even if lethal violence is the most commented (notably for its sensationalism) and homicide rate is the most frequently reported crime statistic, other types of violence should not be neglected as they plague Mexican society as well.

Corruption which is pervasive in the Mexican political and institutional system since centuries, reaching the highest governmental levels,^{11,12} keeps violence at very high levels in

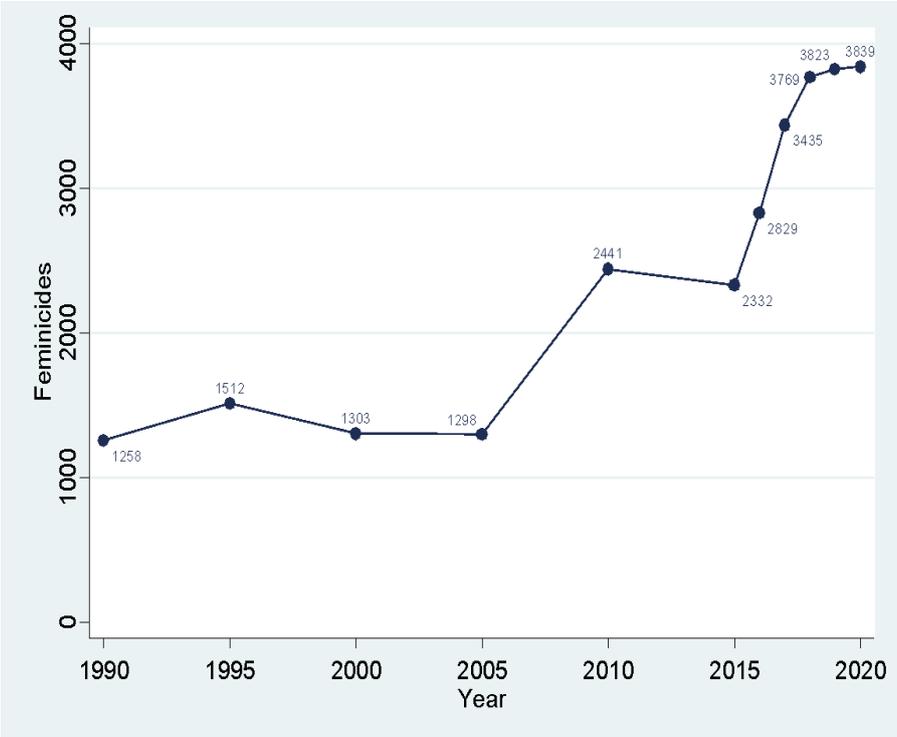
¹¹ Relative to the quality of governance, the country had an index of *control of corruption* of -0.8 in 2019. The *control of corruption* index is calculated by the World Bank and “captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests”. Estimates give the country’s score on the aggregate indicator and range from -2.5 to 2.5, with score tending to 2.5 indicating better practices (Kaufmann, Kraay, & Mastruzzi, 2010).

¹² An example among many others is provided by Coerver et al.: “An army officer, General Jesús Gutiérrez Rebollo, was made Mexico’s antidrug chief [in 1996]. Two months after assuming his new position, the general

the country. By lowering government revenue (through increased tax evasion and informality), perpetuating unequal access to public services and reducing the effectiveness of public policies, corruption weakens institutions (OECD, 2017). As an example, the Mexican law enforcement and judicial systems suffer from insufficient capacity due to a lack of investments and low levels of professionalisation, allowing widespread criminal impunity in the country (Justice in Mexico, 2020). According to the 2020 ENVIPE survey, 92.4% of the crimes were not reported nor prosecuted in 2019.

In the context of extreme violence described above (whether political or related to organised crime groups), men are thought as the prime victims. But women are not spared and are even particularly affected by different types of gender violence. These latter can be physical, psychological, sexual, economic or patrimonial and can be carried out in the family, intimate, professional, school, community or institutional environment. The most extreme form of violence remains the femicide, i.e., the murder of a woman because of her gender. Tragically in 2020, more than 10 women were murdered every day (Graph 7), a steadily increasing figure since 2015.

Figure 0.7: The evolution of femicides.



found himself under arrest on charges of taking a bribe from the leader of one of Mexico’s biggest drug cartels, Amado Carrillo Fuentes. General Gutiérrez proclaimed his innocence but at the same time accused several other high-ranking army officers of taking bribes to protect drug dealers” (Coerver, Pasztor, & Buffington, 2004, p. 147).

Besides being a major human right violation as it tramples their fundamental freedoms, violence against women impedes the achievement of equality, peace and development. For that reason, ending all forms of violence against women and girls is part of the 5th goal defined in the 2030 Agenda for Sustainable Development.

At the level of the Mexican government, the first actions in favour of the recognition of and fight against gender violence date back to the mid-1980s. In 1998, the Inter-American Convention on the Prevention, Punishment and Eradication of Violence against Women (or Convention of Belém do Pará) was ratified by the Senate of the Republic. The main legal advance in the country to achieve the elimination of violence was the enactment of the General Law on Women's Access to a Life Free of Violence (*Ley General de Acceso de las Mujeres a una Vida Libre de Violencia*, LGAMVLV) in 2007. Its main purpose is to establish coordination between the federation, states and municipalities to prevent, address, punish and eradicate violence against women. At present, all 32 states have their own LGAMVLV, have issued a corresponding regulation and implemented coordination mechanisms with governmental institutions (INMUJERES, 2015). However, given the federal nature of the state, marked differences can be observed between states, both in terms of formally promulgated laws and the extent of their implementation.

Intimate partner violence (IPV), which is any type of gender violence perpetrated by a current or former partner, remains the most widespread form of violence against women worldwide. According to the World Health Organisation, one in four women has suffered physical, sexual or psychological violence by a current or former intimate partner at least once in her lifetime (WHO, 2021). IPV has serious negative physical (injury, death), mental (decrease of well-being, depression, anxiety, post-traumatic stress disorder) and reproductive health consequences (sexually transmitted diseases, unintended pregnancy, miscarriage) (Campbell, 2002). IPV not only affects women, but it also has ripple effects throughout family, community and society at large. Because of its serious socioeconomic costs (in terms of justice, health, social services, education, business and employment) (Day, McKenna, & Bowlus, 2005) and detrimental effects on human capital, productivity, health and welfare consumption (Duvvury, Callan, Carney, & Raghavendra, 2013), IPV is a real obstacle to growth and development.

In Mexico, despite the recent governmental involvement towards ending violence against women, IPV remains an endemic problem. According to the last available data (ENDIREH, 2016), 44% of women (aged 15 and over) have been the victim of violence by an intimate partner or ex-partner in their lifetime in 2015. Emotional and economic violence are the most common (with respectively 40% and 21% of women having experienced such violence), followed by physical (18%) and sexual (6.5%) violence. Nevertheless, these figures greatly underestimate reality because of an under-reporting bias (Espinosa-Torres, Fernández-Ortega, García-Pedroza., & Irigoyen Coria, 2009).

Quite ironically, nationally representative statistics related to gender violence and IPV in particular are sparse, collected here and there without temporal regularity. The National Survey on the Dynamic of Household Relationships (ENDIREH, *Encuesta Nacional sobre la Dinámica de la Relaciones en los Hogares*) captured IPV among women aged 15 and more for the first time in 2003. Unfortunately, it only had four waves (2003, 2006, 2011 and 2016) and the survey has not been repeated since then. IPV among adolescents and young adults was also measured occasionally in 2007 with the National Dating Violence Survey (ENVIN, *Encuesta Nacional sobre Violencia en el Noviazgo*) and in 2010 with the National Youth Survey (*Encuesta Nacional de la Juventud*). Thus, it seems that the enthusiasm of the 2000s has quickly faded.

0.3. Outline of the dissertation and contributions

The literature examining the links between inequality and violence is rooted in the broader analysis of the determinants of crime and of the adverse consequences of inequality. Although rich, this literature is extremely segmented whether by discipline, types of inequality and/or violence considered, and the methodologies used. Initially theorised by sociologists (Merton, 1938; Shaw & McKay, 1942) and then taken up by criminologists (Agnew, 1985), the relationship between inequality and crime originally relies on the deleterious effect of between-individuals economic disparities. Becker's economic theorization of criminal behaviour (1968), based on a rational cost-benefit calculation, has further strengthened the focus of investigations on income inequality. The effect of education (Sabates, Feinstein, & Shingal, 2011) or racial (Blau & Blau, 1982) inequalities, while not totally neglected, has somehow received much less attention. Furthermore, the homicide rate is the main measure of violence employed, often relegating to the background other types of crime, such as theft, robbery, assault or kidnapping. The interest of research in violence against women came later

in the late 1970s. Thanks to the work of feminist researchers (Dobash & Dobash, 1979; Fox, 1988; Yllö & Bograd, 1988), violence against women and in particular intimate partner violence received more attention and was now analysed as a consequence of gender inequality. In terms of areas of study, the United States rapidly became the privileged field of investigations, followed by other high-income countries. For the analysis of the effect of inequality on crime, quantitative analysis and in particular econometric tools are a reference. Nevertheless, a multitude of methodologies are used, such as cross-section (Elgar & Aitken, 2011; Kelly, 2000), panel (Hipp & Kane, 2017; Soares, 2004) or spatial (Vilalta & Muggah, 2016) analysis. Nonetheless, studies at a highly disaggregated level of analysis, focusing on low- and middle-income countries or using alternative methods remain less frequent.

Based on the very high levels of inequality and violence observed in Mexico, this thesis is structured around these two pressing social issues and follows a guiding thread that was unrolled throughout the dissertation, one research question leading to another. At the crossroads of development economics, criminology and sociology, the different chapters focus on the link between inequality and violence related issues, each chapter adopting a specific angle. This dissertation not only enriches our understanding of these two phenomena in Mexico. It provides as well an empirical and theoretical contribution to the analysis of the link between inequality and violence. First, it expands the existing literature by examining the effect of inequality on both effective crime and fear of crime. The contribution is also methodological as we use innovative quantitative and qualitative data and analytical tools. Third, we integrated the concept of inequality perception to the study of the inequality-violence link. Finally, we give this literature a deeper gender perspective by analysing in particular intimate partner violence and gender inequality.

The idea for the first chapter came from an observation. The causes of violence in Mexico have been regularly analysed since the early 2010s, highlighting among others the role of unemployment and education (de Hoyos, Gutiérrez Fierros, & Vargas M., 2016), weapon trafficking and availability (Dube, Dube, & García-Ponce, 2013; Perez Esparza, Johnson, & Gill, 2020) or law enforcement (Guerrero-Gutiérrez, 2011; Osorio, 2015). Given the specific organised-crime context, the Mexican war on drug and lethal violence received particular attention. Although the influence of inequality levels on crime has been largely examined, focusing extensively on cross-country comparisons, the United States or other high-income countries, it received less attention in Mexico. The rare exceptions are the studies of Enamorado et al. (2016), Lacombe and Flores (2017) and Vilalta and Muggah (2016).

Nevertheless, none of them takes simultaneously into account crimes other than homicides, spatial dependencies, endogeneity issues and a large number of municipal observations. The aim of the first chapter is to fulfil this gap.

Chapter 1 examines more precisely the impact of inequality on crime at the municipal level in Mexico. Using several datasets, it provides complementary longitudinal and spatial analyses. As a preliminary approach, we first study the dynamic relationship between income inequality and homicide rate between 2000 and 2010. The findings emphasise a positive and significant impact driven by the 2005-2010 period, a result that may be explained by an upsurge in drug related violence that followed the war on drug launch in 2006. As criminality is not randomly distributed throughout Mexican territory (positive spatial autocorrelation), the panel results are then completed with an in-depth spatial analysis of criminality for the year 2017. Considering the total criminal incidence, intentional homicide, intentional injury and theft, this work enriches past empirical studies for multiple reasons. First, by encompassing several types of crimes, we do not underestimate other forms of criminality, which are just as harmful in the country, and broaden the spectrum of analysis. Second, different measures of income inequality (income Gini and income polarisation) are combined in the investigation. Third, this is to our knowledge the first study in the case of Mexico to control simultaneously for spatial dependence and endogeneity issues while assessing the effect of income disparity on crime. Finally, we update scarce empirical evidence at the municipal level for Mexico and bring additional findings for middle income countries, where less research was conducted until now. The findings are only conclusive for the homicide rate, highlighting a positive direct effect and a negative spillover effect of income inequality. As the level of income inequality in one municipality increases, the intentional homicide rate in that same location heightens and the intentional homicide rate in neighbouring municipalities decreases, highlighting a transfer of lethal violence towards more unequal municipalities. All in all, the total impact is positive and non-negligible since a one-point increase in the Gini index leads to a rise of 2.4 intentional homicides per 100,000 inhabitants in 2017.

Despite the important number of direct victims of crimes, an even larger number of individuals may be afraid of it. If violence has tremendous individual and collective costs, fear of crime may have equally harmful consequences. In a society, its levels are even often higher than actual crime rates (Hale, 1996). In 2020, in Mexico, 70.3% of the survey respondents from the ENVIPE declared feeling unsafe living in their municipality because of delinquency. Nonetheless, fear of crime may be unrelated to the level of criminality or at least

to a lesser extent than previously stated in the literature (Franklin, Franklin, & Fearn, 2008; Taylor & Hale, 1986; Vieno, Roccato, & Russo, 2013). Other factors would therefore come into play. These observations are the starting point of the second chapter of this thesis. We hypothesised that the deleterious effects of inequality do not stop at actual crime rates but could extend to fear of crime.

Chapter 2, rooted in the social disorganisation theory, explores the effect of local inequality (of income and education), a main community structural factor, on individuals' fear of crime in Mexico. The contributions of this chapter are threefold. We first build a new composite index of fear of crime combining its emotional, cognitive and behavioural dimensions. For that purpose, we use a multiple correspondence analysis and the 2017 National Survey on Victimization and Perception of Public Security (ENVIPE). Second, we construct representative measures of education and income inequalities at the municipal level. For income inequality, we rely on small area estimation and combine data from the 2015 Inter-Census Survey (EIC) and the 2016 National Survey of Household Income and Expenditure (ENIGH). Third, controlling simultaneously for individual and contextual characteristics as well as endogeneity bias, we assess the causal effect of inequalities on fear of crime with a two-stage least squares (2SLS) multilevel model. We find that municipal income inequality significantly deteriorates the feeling of safety of its residents (emotive dimension) and favours the adoption of constrained behaviours and protective measures against crime (behavioural dimension). Regarding education inequality, the results are less stable but indicate that higher levels reduce as well the feeling of safety (emotive dimension) but to a smaller extent, and increase the perceived risk of victimisation (cognitive dimension).

The two first chapters of the thesis investigate the detrimental effect of inequality on respectively different violent criminal behaviours and fear of crime. Yet, the theories mobilised rely on the assumption that individuals are aware of actual inequality levels and correctly process them. Contextual factors are also expected to influence individual behaviours, but we know little about the underlying mechanisms at work. Individuals are influenced by the social context they are embedded in. They make sense of the world based on their assumptions and experiences of it, mediated by their ideology and other social norms (Gimpelson & Treisman, 2018). In that sense, their perception of their social environment can help explain their attitudes towards reality as they are the expression of such perceptions (Castro & Riquer, 2003). Studying how individuals perceive, evaluate and experience inequality could increase our comprehension of how the latter relates to different individual

behaviours. This reflection is at the core of the last two chapters of the dissertation. Academic studies have already focused on economic inequality perception, showing that beliefs are often inaccurate (Hauser & Norton, 2017; Norton & Ariely, 2011) and depend on several factors. Gender inequality perception, its measurement and determinants received much less attention despite the fact that gender inequality is a pressing problem worldwide and in Mexico in particular. The ambition of the third chapter is to fulfil this gap and also reflects the desire to integrate a gender perspective into our work and the literature.

Chapter 3 proposes to gauge gender inequality perception among Mexican students and analyse its individual determinants. For this purpose, we led a quantitative survey with 220 students from high school to doctorate levels in Mexico. After designing the questionnaire, we collected the data during May and June 2021 through a self-administered online survey. We then created an innovative measure of gender inequality perception in the following manner. Respondents were asked several questions related to women's attainment in three fields (economy, education and politics), at the national level in 2020. Each question corresponded to an indicator composing a gender equality index. Their answers to each of these questions constitute their estimation of the different indicators. From their answers, we were therefore able to calculate a *perceived* gender equality measure representing their perception of gender equality. The latter is then compared to the *real* measure of gender equality computed with actual data for 2020. This methodology overcomes limitations of past empirical measures as it allows us to simultaneously take into account several dimensions of gender inequality, quantify perceived levels of gender inequality, infer the accuracy of estimates and make between-individuals comparisons. Overall, the results of the extensive descriptive analysis show that students misperceive gender inequality. Even if they recognize that gender inequality exists in Mexican society, they underestimate its magnitude. Surprisingly, inequality is the most underestimated in the economic dimension, where women are actually the most discriminated against. On the contrary, the estimates of political gender inequality are the closest to reality. Thanks to a multivariate analysis, we also find that the effect of individual determinants is dimension-specific. Depending on the type of gender inequality considered, different individual factors matter for explaining perceptions. However, the level of education appears to be the strongest predictor of perceived gender inequality levels. As their education increases students perceive higher levels of global, educational and political inequality between women and men. Their estimates are also more accurate.

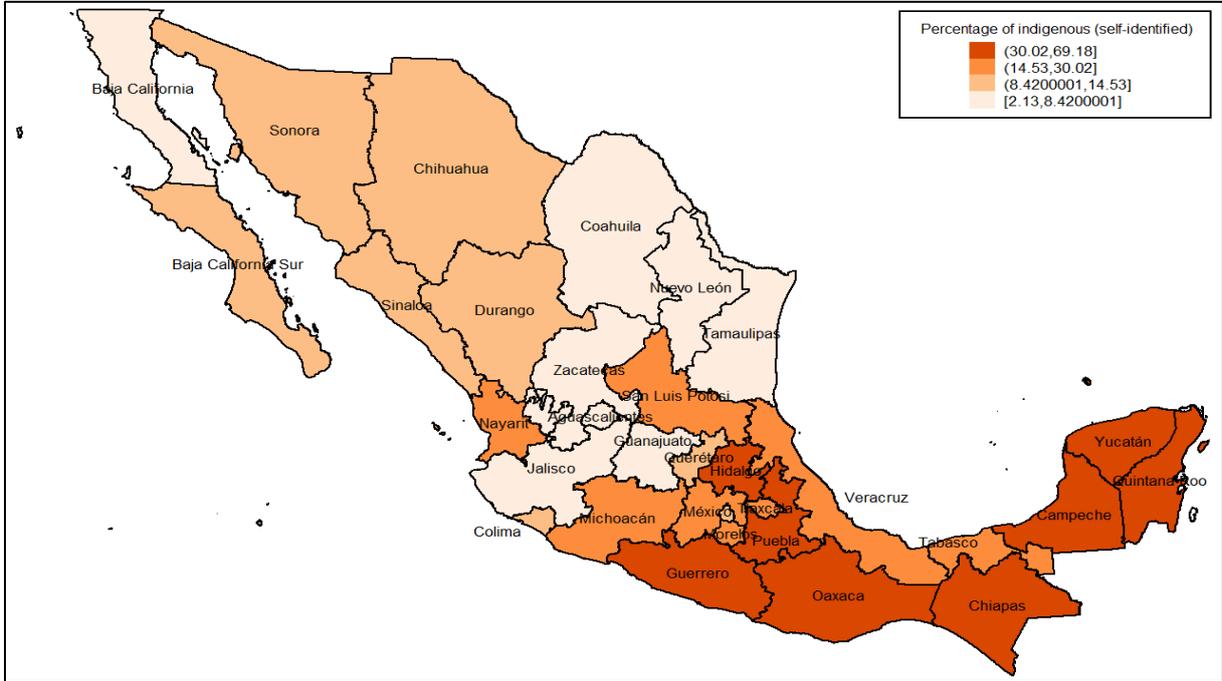
Despite the more refined analysis of gender inequality perception enabled by the index constructed in the third chapter, perceptions remain a complex phenomenon, difficult to grab. A single quantitative analysis may not be sufficient, and the use of a qualitative approach may considerably enrich our understanding of inequality perception. Indeed, the latter allows capturing detailed descriptive information on thoughts, feelings, and beliefs, which are difficult to measure. For that reason, we led a complementary qualitative field work to deepen the results of the third chapter. This was also the opportunity to close the loop and echo the first chapter of the thesis by reintegrating the issue of violence. We wanted to zoom in on intimate partner violence, a critical problem in Mexico. In the feminist perspective, patriarchy is believed to cause intimate partner violence. We believe that beyond the direct influence of actual levels of gender inequality in a society, individuals' perception and understanding of it may be important for the analysis of their beliefs and attitudes towards intimate partner violence and ultimately its prevalence. The underlying hypothesis is that the effect of patriarchy on intimate partner violence may be mediated by the way individuals perceive structural gender inequality.

Chapter 4's purpose is to better understand Mexican students' perception of gender inequality and intimate partner violence in their society. Based on 19 in-depth semi-structured interviews, we first analyse their discourses to take stock of their knowledge, understanding and beliefs about these two phenomena. Second, we looked at how the two perceptions are related and more specifically, if any type of discourse about gender inequality may be systematically associated with its counterpart about intimate partner violence. The qualitative content analysis provides three main empirical results. First, gender inequality is a fuzzy, catch-all concept even for university students and there is an apparent confusion between sexism, gender roles and gender inequality. Globally, a consensus emerges about the main dimensions making up (what they consider to be) gender inequality in Mexican society. It includes gender inequality in the economic/professional sphere, within family as well as through violence women are victims of. However, what students perceive and label as gender inequality represents in fact sexism (without calling it as such) and gender roles manifestations, which they have a good knowledge and perception of, rather than structural gender inequality. Second, and as an extension of the previous result, gender inequality is rather analysed by the students from an individual and socio-cultural perspective than from a structural one. Put differently, they tend to perceive more the ideological than the structural foundations of the phenomenon. Finally, the perception of intimate partner violence overlaps

in many ways with their perception of gender inequality. More precisely, students are leaning towards individual/couple and socio-cultural (such as machismo, romantic love and religion) explanations of violence rather than structural ones.

Appendix

Figure A0.1: Percentage of the population self-identified as indigenous (2020).



Source: Author’s calculations based on INEGI data.

Table A0.1: Selected indicators of gender inequality.

| Health | | | | | | | | | | | | | | | | | | | |
|-----------------------------------------------------------|-------|-------|-------|-------|--------------------------------------------------------------------|-------|-------|-------|------|-----------------|------|------|------|------|------|------|------|------|------|
| | 2000 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| <i>Teenage fertility rate (per 1000 women aged 15-19)</i> | | | | | | | | | | | | | | | | | | | |
| | 64.20 | 63.82 | 62.79 | 61.85 | 61.01 | 60.26 | 66.84 | 66.55 | 66.2 | 65.9 | 65.7 | 65.7 | 65.3 | 65.2 | 65.0 | 69.4 | 68.5 | 67.6 | 66.9 |
| | | | | | | | | | 6 | 9 | 5 | 5 | 7 | 1 | 5 | 6 | 3 | 9 | 2 |
| <i>Percentage of births at gynaecobstetric risk</i> | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 29.85 | 30.04 | 29.9 | 29.9 | 29.6 | 29.0 | 28.7 | 28.6 | 28.8 | 28.5 | 27.9 | | |
| | | | | | | | | | 9 | 9 | 3 | 2 | 6 | 6 | 8 | 6 | 2 | | |
| Education | | | | | | | | | | Time use | | | | | | | | | |
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | 2002 | 2009 | 2014 | 2019 | | | | | | |
| <i>School attendance rate (% 6-24 years)</i> | | | | | <i>Average number of hours per week spent on unpaid activities</i> | | | | | | | | | | | | | | |
| Women | | 65.11 | 66.43 | 68.77 | 68.89 | Women | | | | 56.8 | 43.5 | 40.4 | 41.9 | | | | | | |
| | | | | | | | | | | 2 | 6 | | 8 | | | | | | |
| Men | | 67.34 | 67.28 | 69.72 | 68.22 | Men | | | | 27.8 | 24.5 | 20.0 | 22.2 | | | | | | |
| | | | | | | | | | | 6 | 5 | 6 | 9 | | | | | | |
| <i>Average years of schooling (% 15 years and more)</i> | | | | | | | | | | | | | | | | | | | |
| Women | 7.20 | 7.90 | 8.45 | 9.01 | 9.60 | | | | | | | | | | | | | | |
| Men | 7.70 | 8.40 | 8.79 | 9.33 | 9.81 | | | | | | | | | | | | | | |
| <i>Literacy rate (% 15 years and more)</i> | | | | | | | | | | | | | | | | | | | |
| Women | 88.60 | 90.04 | 91.11 | 92.57 | 94.30 | | | | | | | | | | | | | | |
| Men | 92.47 | 93.01 | 93.69 | 94.77 | 95.83 | | | | | | | | | | | | | | |
| Economy | | | | | | | | | | | | | | | | | | | |
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | | |
| <i>Labour force (% 15 years and more)</i> | | | | | | | | | | | | | | | | | | | |
| Women | 40.08 | 41.47 | 42.02 | 42.40 | 41.65 | 42.24 | 41.43 | 42.80 | 42.7 | 43.1 | 42.4 | 42.9 | 42.8 | 42.6 | 43.6 | 44.9 | 41.6 | | |
| | | | | | | | | | 5 | 4 | 9 | 2 | 4 | 2 | 8 | 4 | 6 | | |
| Men | 80.26 | 80.39 | 79.97 | 79.94 | 78.74 | 78.37 | 77.73 | 78.27 | 77.6 | 78.1 | 77.6 | 77.1 | 77.4 | 77.0 | 76.9 | 76.4 | 74.2 | | |

| | | | | | | | | | | | | | | | | | | | |
|---------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|--|--|
| | | | | | | | | | 8 | 6 | 4 | 5 | 4 | 9 | 3 | 1 | 3 | | |
| <i>Percentage of employed earning more than 5 minimal wages</i> | | | | | | | | | | | | | | | | | | | |
| Women | 7.87 | 8.92 | 8.91 | 8.77 | 8.58 | 6.96 | 7.17 | 7.41 | 6.58 | 5.8 | 6.06 | 5.19 | 4.29 | 3.77 | 2.56 | 2.14 | 1.9 | | |
| Men | 12.26 | 13.69 | 14.19 | 14.66 | 12.95 | 11.04 | 10.74 | 10.05 | 9.5 | 8.96 | 8.78 | 7.56 | 6.99 | 5.74 | 4.43 | 3.78 | 2.9 | | |
| <i>Percentage of employed as officials and managers in the public, private and social sectors</i> | | | | | | | | | | | | | | | | | | | |
| Women | 1.61 | 1.63 | 1.59 | 1.52 | 1.59 | 1.51 | 1.68 | 1.64 | 1.46 | 1.55 | 1.68 | 1.58 | 1.64 | 1.75 | 1.61 | 1.76 | 1.73 | | |
| Men | 2.31 | 2.42 | 2.39 | 2.47 | 2.19 | 2.18 | 2.14 | 2.12 | 2.02 | 1.85 | 1.89 | 1.72 | 1.95 | 1.86 | 1.90 | 1.89 | 1.81 | | |
| <i>Percentage of employed women with at least one child who do not have access to childcare</i> | | | | | | | | | | | | | | | | | | | |
| | . | . | . | . | . | 78.60 | 78.81 | 79.70 | 80.2 | 80.2 | 80.4 | 81.2 | 80.5 | 80.9 | 80.8 | 79.8 | 77.7 | | |
| | | | | | | | | | 3 | 6 | 5 | 9 | 8 | 0 | 0 | 3 | 7 | | |

Decision power

| | 1995 | 2000 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|-------------------------------------------------------------------|------|------|------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <i>Percentage of female municipal heads</i> | | | | | | | | | | | | | | | | | | | | | |
| | 3.52 | 3.48 | 3.71 | . | 3.55 | . | 3.91 | 94.71 | 5.21 | 5.25 | 5.95 | 6.84 | 6.88 | 7.31 | 9.43 | 14.1 | 14.2 | 15.9 | 22.7 | 21.7 | 22.1 |
| | | | | | | | | | | | | | | | | 8 | 2 | 7 | 5 | | 8 |
| <i>Percentage of female state secretary</i> | | | | | | | | | | | | | | | | | | | | | |
| | . | . | . | . | . | . | 21.05 | . | 15.7 | 15.7 | . | 17.6 | . | . | . | 11.1 | 16.6 | 16.6 | 36.8 | 42.1 | 36.8 |
| | | | | | | | | | 9 | 9 | . | 5 | . | . | . | 1 | 7 | 7 | 4 | 1 | 4 |
| <i>Percentage of female managers in the public administration</i> | | | | | | | | | | | | | | | | | | | | | |
| | . | . | . | . | . | . | . | . | . | 36.5 | 35.7 | 36.5 | 37.3 | 38.7 | 37.4 | 38.5 | 37.7 | 38.1 | 39.5 | 40.3 | 40.8 |
| | | | | | | | | | | 5 | 7 | 9 | 8 | 9 | 6 | 3 | 9 | 7 | 2 | 5 | 3 |
| <i>Percentage of female local deputy</i> | | | | | | | | | | | | | | | | | | | | | |
| | . | . | . | 17.21 | 20.91 | 20.44 | 20.90 | 20.77 | 21.9 | 21.7 | 22.3 | 22.8 | 25.3 | 26.1 | 34.6 | . | 41.7 | 48.3 | 49.2 | 50.6 | 53.6 |
| | | | | | | | | | 0 | 2 | 7 | 7 | 2 | 1 | 0 | . | 0 | 0 | 0 | 3 | 1 |

Source: Author's computation based on the Gender Indicators System (*Sistema de Indicadores de Género, SIG*) from the INMUJERES.

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1.1 Introduction

Despite almost 15 years of consistent decline in income inequality, between 1994 and the 2010s, Mexico is still one of the most unequal OECD members with a Gini index of 0.469 in 2018 (INEGI). After the “lost decade” (1984-1994), income disparities started to decline thanks to a combination of market and state interventions (Campos, Esquivel, & Lustig, 2012; Esquivel, 2010; Lustig, Lopez-Calva, & Ortiz-Juarez, 2013). Wage inequality slumped, remittances received by low-income households increased and two important social programs with generous and progressive governmental monetary transfers were implemented (*Procampo* in 1993 and *Progresa* in 1997). However, according to Cortés (2013), the income distribution of 2010 is highly similar to the one at the beginning of the crisis in 1984 and there is no empirical evidence that inequality effectively declined over the period. Likewise, every drop of income inequality may have been the result of economic crises that reduced the income share of the richest 10% and not of an improvement in the conditions of the poorest households relative to the rest of the population (Cortés & Vargas, 2016; Yúnez, Arellano, & Méndez, 2009). The last available estimates highlight a rise of income inequality between 2010 and 2014 (Lambert & Park, 2019), followed by a further drop until 2018 (SEDLAC).

This national trend nevertheless hides important geographical disparities (CONEVAL, 2018; Mendoza-Velázquez, Ventosa-Santaulària, & Germán-Soto, 2019). Southern territories have always lagged behind in terms of economic and social development. Even if regional disparities dropped over the 1940-2000 period, the income gap between Mexican states mainly declined during the first two decades and has stagnated since the 1960s (Rey & Sastré-Gutiérrez, 2010). An upturn in wage inequality across regions has even been observed from the mid-1980s onward, mainly due to the unequal effects of trade liberalisation and economic integration (Tello & Ramos, 2012). At a more disaggregated geographical level, a slow convergence of mean household income was observed among Mexican municipalities for the 1990-2005 period but inter-municipal income inequality remained persistent (Modrego & Berdegué, 2015). More recently, between 2010 and 2015, intra-municipal disparities in Mexico have tremendously declined. Indeed, 71.7% of the municipalities (accounting for 71.2% of the Mexican population) experienced a drop in their income inequality level and only 5.7% of them (2.8% of the population) suffer from an increase in their Gini coefficient. Nevertheless, the situation in 22.6% of the municipalities (25.9% of the population) did not improve.

In addition, Mexico has to face other social issues as the country ranks among the most violent countries in the world. In 2018, the homicide rate peaked at 29.1 per 100,000 inhabitants (according to the UNODC, *United Nations Office on Drugs and Crime*), the country's highest level recorded since 1990. Yet, crime and violence have tremendous individual and societal costs which hinder social and economic development. By generating extra policing, military, judicial, medical and private security expenditures, violence diverts resources from more productive activities or public services investments favouring long term economic growth. For example, in 2019, the economic impact of violence in Mexico was estimated at 4.57 trillion pesos (US\$238 billion) representing 21.3% of the country's GDP (Institute for Economics & Peace, 2020).¹³

In the country, criminality is highly related to drug trafficking and violence levels soared in 2006 when newly elected President Felipe Calderón took drastic measures to clamp down drug trafficking organisations (DTO). Indeed, the kingpin strategy (capture or execution of cartels' leaders) pursued by the army did not have the expected effects. By increasing competition among DTO, it led to an escalation of violence (G. Calderón, Robles, Díaz-Cayeros, & Magaloni, 2015; Lindo & Padilla-Romo, 2018). As internal conflicts emerged over succession, major big cartels fragmented into many smaller organisations fighting against each other for control of strategic areas for the production, transportation and distribution of drugs. Moreover, as different DTO lost power, they were less able to take part in transnational drug trafficking activities and started to diversify their sources of revenue with other illicit activities such as kidnapping, extortion or robbery. Rather than solely being DTO, they became organised crime groups (OCG). Thus, even if lethal violence is the most commented on (notably for its sensationalism) and homicide rate is the most frequently reported crime indicator, other types of violence should not be neglected as they plague Mexican society as well. Finally, even if OCG played a major role in overall crime trends in

¹³ “The global economic impact of violence is defined as the expenditure and economic activity related to “containing, preventing and dealing with the consequences of violence.” The estimates include the direct and indirect cost of violence as well as an economic multiplier [...]. Direct costs are the costs of crime or violence to the victim, the perpetrator, and the government, including those associated with policing, medical expenses, funerals or incarceration. Indirect costs accrue after the fact. These include physical and psychological trauma and the present value of future costs associated with the violent incident, such as the consequential lost future income. There is also a measure of the impact of fear on the economy, as people who fear that they may become a victim of violent crime alter their behaviour. [...] The multiplier effect calculates the additional economic activity that would have accrued if the direct costs of violence had been avoided” (Institute for Economics & Peace, 2020, p.85).

recent years (*Organized Crime and Violence in Mexico: 2020 Special Report*, 2020), violence and insecurity in today's Mexico cannot be reduced to drug trafficking alone.

There are many commonly accepted determinants of violence in Mexico, such as unemployment and education (Gomez Ayala & Merino, 2012; de Hoyos, Gutiérrez Fierros, & Vargas M., 2016), weapon trafficking and availability (Dube, Dube, & García-Ponce, 2013; Perez Esparza, Johnson, & Gill, 2020), non-economic factors (effect of temperature mediated by psychological and physiological factors) (Baysan, Burke, González, Hsiang, & Miguel, 2019) or law enforcement in an organised-crime context (Guerrero-Gutiérrez, 2011; Osorio, 2015). Drug-related corruption of political and law enforcement institutions is also an important dimension. Nonetheless, given the importance of inequality and violence as two major societal issues in Mexico, this study analyzes the causal impact of income inequality on crime. The empirical contributions are multiple. First, the investigation encompasses several types of crimes, namely intentional homicides, intentional injuries and thefts to not underestimate the other forms of criminality in Mexico which are just as harmful. It enriches the empirical literature as previous studies focus mostly on homicide rates. Second, different measures of income inequality (income Gini and income polarisation) are also considered. Finally, this is to our knowledge the first study in the case of Mexico to control simultaneously for spatial dependence and endogeneity issues while analysing the effect of income inequality on crime.

Using several datasets and multiple econometrics methods, this study provides both a longitudinal and a spatial analysis of the inequality-violence link at the municipal level. In a first step, using panel data on homicide rate between 2000 and 2010, the findings emphasise a positive and significant impact of income inequality on homicide rate driven by the 2005-2010 period. Secondly, trying to compensate for several gaps in the literature, a detailed spatial analysis of criminality is run for the year 2017. The result highlights a positive causal impact of income inequality on intentional homicide rate. This effect is non-negligible since a one-point increase in the Gini index leads to a rise of 2.4 intentional homicides per 100,000 inhabitants in 2017. If the results for intentional homicides are robust to the different inequality measures employed, for total criminal incidence and theft rate, results are less stable.

The rest of the study is structured as follows. Section 2 reviews the theoretical and empirical literature on the link between inequality and violence. Section 3 is dedicated to the panel analysis whereas Section 4 displays the spatial analysis. Finally, Section 5 concludes.

1.2 Literature review

The study of violence and its determinants is a transdisciplinary topic, bringing together different fields such as economics, sociology and criminology. In the current literature, three theories of individual criminal behaviour mobilising inequality are among the most influential.

The first theoretical reflections appear with the strain theory developed by Merton (1938), stating that delinquency results from the inability of individuals to achieve positively valued goals through legitimate channels. Agnew (1985) extended the seminal work of Merton (1938) with the general strain theory. Community characteristics are considered as the source of individual strain, and in particular goal blockage. Because of high levels of inequality, poverty or unemployment, the social structure fails to provide sufficient legal opportunities to achieve the prescribed cultural goals,¹⁴ increasing one's feeling of relative deprivation and generating anger and frustration. As a result, a set of prohibited behaviours such as fraud, corruption, crime or violence may appear as viable (or at least more acceptable) alternatives, as reaching the prescribed goals is more important than the means employed. Thus, through its influence on the goals pursued by its residents, their ability to achieve them and their perception of goal blockage, the level of income inequality in a community may explain variations in crime rates. Shaw and McKay (1942) proposed an alternative explanation. In the social disorganisation theory, they identify three structural factors leading to a disruption of a community's social organisation: a precarious economic situation (poverty), ethnic heterogeneity and a high residential mobility. These factors lead to the absence of shared common values as well as the weakening of community ties and local social institutions. As a result, it impedes the community to exercise an effective informal social control over its members and to prevent criminal behaviours. Even if the social disorganisation theory seems to dominate the theoretical literature, strain and social disorganisation theories are quite similar as they both consider structural features as determinants of crime. They only differ on the underlying mechanisms at work (economic strain versus lack of social control). Rather than being seen as rivals, these theories should be considered supplementary. Finally, the first economic theory of crime was part of the human capital theory developed by Becker (1968). In the latter, individuals are considered as purely rational and the choice of committing a crime is the result of an analysis of the expected costs and benefits of criminal versus legal

¹⁴ According to (Agnew, 1985), these goals no longer only encompass financial prosperity but also achieving a certain status (respect) and being treated in a fair manner.

activities. In highly unequal societies, for poorer individuals, the expected payoffs of committing a pecuniary crime are higher (wealthy potential victims) whereas the returns from entering the legal job market (less legal job opportunity) and the risk of being apprehended and convicted (weak police and judicial systems) are lower. Thus, criminal activity may be more enticing in unequal communities.

Empirically, the literature on the link between income inequality and violence is quite rich. Many studies use cross-country data (Coccia, 2017; Elgar & Aitken, 2011; Nadanovsky & Cunha-Cruz, 2009; Pratt & Godsey, 2003) or longitudinal cross-country data (Fajnzylber, Lederman, & Loayza, 1998, 2002b, 2002a; Loureiro & Silva, 2012; Soares, 2004). In these studies, the detrimental effect of income inequality on crime seems to be consensual, at least at this level of analysis. Some authors nevertheless challenge these findings (Neumayer, 2003, 2005). According to Pridemore (2011), the relationship established in the literature between income inequality and homicide rates is spurious because previous studies fail to control the level of poverty in their estimations.¹⁵ Pare & Felson (2014) find similar results for different types of crimes. In their study, inequality is unrelated to assault, robbery, burglary, theft and homicide rates when poverty is correctly controlled for.

Some studies go beyond international comparisons and focus on national specificities, favouring a more disaggregated level of analysis. The United States rapidly became the privileged field for research with pioneering works on the theorization of criminal behaviour (Becker, 1968; Ehrlich, 1973) and the first empirical evidence (Ehrlich, 1973; Fleisher, 1966). Since then, many studies focusing on the U.S. context have followed, but findings are mixed. If cross-section studies highlight most of the time a positive relationship between inequality and crime (Blau & Blau, 1982; Kelly, 2000), the use of panel data yields much more uncertain results. Indeed, some empirical works find no effect of income inequality on crime (Brzezinski, 2013; Joanne M. Doyle, Ehsan Ahmed, & Robert N. Horn, 1999), a positive one (Choe, 2008; Hipp & Kane, 2017) and even sometimes a negative relationship (Chintrakarn & Herzer, 2012). Brush (2007) offers a striking example of this surprising observation. Using data at the county level, he identifies a positive association between income inequality and crime rates using a cross section analysis but a negative one using time-series data. Hence, when a much more disaggregated level of analysis is considered, results are less conclusive and depend greatly on the type of crime considered, the measures of inequality used and the

¹⁵ He argues that the Gini index is both an indicator of income inequality and poverty. For the Gini index to capture solely an inequality effect, poverty must be adequately controlled for.

nature of the data. According to Patterson, “the theoretical utility of income inequality seems more appropriate for larger units of aggregation such as regions of a country or nation themselves” (1991, p.771).

More recently, some studies focusing on countries from Asia (Cheong & Wu, 2015; Nepal, Bohara, & Gawande, 2011; Tadjoeeddin et al., 2016) and Africa (Demombynes & Özler, 2005; Harris & Vermaak, 2015) have emerged. Nonetheless, they remain scarce as research mainly turns to Latin America, one of the most violent and unequal regions in the world. Once again, the level of analysis seems to matter. Indeed, cross-country studies fail to show a significant link between the two variables (Rivera, 2016; C. J. Vilalta, Castillo, & Torres, 2016), while country specific ones conclude on a significant positive link (Bourguignon, Nuñez, & Sanchez, 2003; Cotte Poveda, 2011; Sachsida, de Mendonça, Loureiro, & Gutierrez, 2010). These conclusions, in contrast with the ones obtained for cross-countries studies encompassing countries from all around the world or those focusing particularly on the United-States, highlight the specificity of the Latin American continent.

In the case of Mexico, the common determinants of homicidal violence are extensively studied, such as unemployment and education (de Hoyos et al., 2016), weapon trafficking and availability (Dube et al., 2013; Perez Esparza et al., 2020), non-economic factors (Baysan et al., 2019) or law enforcement in a drug-related organised-crime context (Guerrero-Gutiérrez, 2011; Osorio, 2015). Others focus on the temporal and geographical trends in violence-related deaths (Leenen & Cervantes-Trejo, 2014). However, the effect of inequality on crime received little attention on its own. In this context, the study of Enamorado, López-Calva, Rodríguez-Castelán, & Winkler (2016) is of great interest. They investigate the impact of income inequality on homicide rates, at the municipality level in the Mexican drug war context. Controlling for endogeneity, they find a positive effect of income inequality, but the latter varies depending on the period of analysis and the type of homicide considered. For a municipality, a one-point increase in the Gini coefficient for the period 2005-2010 leads to an increase of six homicides per 100 000 inhabitants, an effect mainly driven by drug related criminality.

Still, some authors emphasise the importance of considering spatial dependence and the neighbouring environment while investigating the determinants of crime (Anselin, Cohen, Cook, Gorr, & Tita, 2000; Menezes, Silveira-Neto, Monteiro, & Ratton, 2013; Scorzafave & Soares, 2009). For Mexico, the non-random spatial distribution of violence and the presence

of spillover effects are no longer to prove. For example, Pan, Widner, & Enomoto (2012) find a spillover effect of high levels of violence, with theft in a given state being positively impacted by the level of overall crime in surrounding states. According to the authors, this reflects the need for criminal organisations to finance their drug related activities through pecuniary crime. These findings are confirmed for property crime rate at the municipal level (Martínez, 2016)¹⁶. Finally, Ingram (2014) highlights both a spatial clustering and a spatial spillover effect of homicide rate at the municipal level. More precisely, a 1% increase in the homicide rates of neighbouring municipalities increases violence in a focal municipality by about 1%.

Previous studies pay particular attention to the Mexican war on drug context but leave aside the effect of inequality. Nevertheless, two empirical works are worth mentioning. Vilalta & Muggah (2016) test two theories of crime, namely social disorganisation and institutional anomie (a derivative of Merton's strain theory), for the 76 municipalities of the Mexico City Metropolitan Area. Using a geographically weighted model, they investigate which factors determine crime and better predict its spatial distribution. They find that the rate of criminal investigations in 2010 positively correlates with income inequality. Combining a hierarchical and a spatial dependence model, the study of Lacombe & Flores (2017) analyses the different determinants of total homicide rates at the municipal level. They find that a 1% increase in the 2005 Gini coefficient leads to a 5.46% rise in the total homicide rate for the 2005-2010 period. They also estimate the spillover effect of income inequality. Interestingly, a 1% change in the Gini index increases homicide rates by around 7% in the surrounding municipalities. These studies do not however control for endogeneity issues.

Thus, if the empirical literature on the relationship between income inequality and violence is quite abundant internationally since the 1970s, studies focusing on the Mexican context are scarcer. In an organised-crime context, the determinants of violence and its spatial dimension received particular attention. Only a few studies focus particularly on the effect of inequality and when they do so, they fail to control for both spatial dependence and endogeneity issues. Contrary to other empirical works, studies applied to Mexico also pay too little attention to the different types of violence¹⁷, focusing mostly on homicide rates, and do not consider other

¹⁶ However, Martínez (2016) falls into a methodological fallacy as he uses data representative at the national level to estimate a model for municipalities.

¹⁷ The work by Vilalta & Muggah (2016) is one exception as they study the effect of income inequality on the rate of total crime. Pan et al. (2012) focus on total crime, theft, assault, homicide, rape, fraud, property crimes

measures of income inequality than the Gini index.¹⁸ One objective of this study is to fulfil these gaps. First, we use different measures of income inequality (namely income Gini and income polarisation). Second, by considering several crimes (intentional homicide, intentional injury and theft) for 2017, we broaden the spectrum of analysis on the link between inequality and violence and we update scarce empirical evidence at the municipal level for Mexico. Third, correcting for spatial dependence and endogeneity issues allows us to assess correctly the impact of income disparities on violent behaviours.

Using several datasets and multiple econometrics methods, this study provides both a longitudinal and a spatial analysis of the inequality-violence link at the municipal level. In a first step, we use panel data on the homicide rate between 2000 and 2010. Secondly, trying to compensate for several gaps in the literature, a detailed spatial analysis of criminality is run for the year 2017. Both analyses control for endogeneity issues.

1.3 Panel analysis

As a preliminary approach, we first analyse the dynamic of the relationship between inequality and homicide rate at the municipal level for Mexico between 2000 and 2010.

1.3.1 Data

Income inequality at the municipal level has been estimated by the National Council for the Evaluation of Social Development Policy (*Consejo Nacional de Evaluación de la Política de Desarrollo Social*, CONEVAL) since 1990 with an update every five or ten years. In 2015, the estimation methodology was updated, breaking comparability with past estimates. Even if the 2010 estimations have been revised with this new methodology to allow comparison, at least among these two periods, it impedes us from using the 2015 estimates in the analysis.

Official figures on total homicides (according to registration year) are collected from the INEGI's mortality statistics. Homicide rate per 100 000 inhabitants is then calculated as the average over a three-year period at each time point and the two years surrounding it (except for 1990 as 1989 data were unavailable).

and Martínez (2016) on property crimes but they only analyse their spillover effects and not the influence of income inequality.

¹⁸ In the empirical literature, various authors employ alternative measures of income inequality, mainly income polarization (Fajnzylber, Lederman, & Loayza, 2000; Harris & Vermaak, 2015; Nepal et al., 2011; Pratt & Godsey, 2003; Soares, 2004) but also the Theil index (Harris & Vermaak, 2015) or inequality in visible consumption or total expenditures (Hicks & Hicks, 2014).

Few control variables are included in the regressions as little information is available at such a spatially disaggregated level of analysis as the municipal one. The long time-span also limits the availability of comparable control variables over the whole period. Nonetheless, the municipal food income poverty rate (i.e. the official measure of extreme income poverty calculated by CONEVAL), the percentage of males aged 15 to 24 in the population (from the *Sistema Nacional de Información Municipal*, SNIM), the percentage of the population aged 5 and over (or aged more than 3 since 2010) speaking an indigenous language (SNIM), migration measured as the percentage of the population aged 5 years and over residing in another state five years earlier (SNIM), the percentage of the population aged 6 to 14 missing school (SNIM) and municipal density were collected.

Descriptive statistics for each variable are reported in Table A1.1 in the Appendix.

1.3.2 Analytical method

Let us consider the following panel data model with fixed effects:

$$HOMI_{it} = \alpha_1 INEQ_{it} + \alpha_2 X_{it} + u_i + e_{it} + YEAR_t \quad (1)$$

Equation (1) explains homicide rate for each municipality i at time t ($HOMI_{it}$) by the level of income inequality ($INEQ_{it}$) and a vector of additional municipal-level explanatory variables (X_{it}). u_i is the unobserved municipality-specific time-invariant effect, which allows for heterogeneity in the means of the dependent variable across municipalities. e_{it} are time-variant municipal residuals. $YEAR_t$ is a time dummy to control for trend effects common to all municipalities, such as economic shocks or political election. They capture any temporal variation in the homicide rate that is not attributable to other explanatory variables.

However, equation (1) doesn't allow us to assess properly the causal impact of income inequality on violence. Indeed, several sources of endogeneity may violate the exogeneity assumption: $E(e_{it} | X_{it}) = 0$. First, measurement error of the income distribution, by causing a correlation between the inequality measure and the error term, may bias the estimated parameters (Messner, Raffalovich, & Shrock, 2002). Measurement errors can also affect crime statistics. Indeed, crime underreporting is not random but closely correlated with factors that also affect crime rates, such as inequality, educational attainment, urbanisation rates, the police and justice systems' reliability, etc. (Fajnzylber et al., 1998, 2002a; Macdonald, 2001). Second, unobserved municipality-level fixed effects are present, simultaneously affecting crime and income inequality. These may include the level of social inclusion, policy

measures, institutional efficiency, etc. (Sachsida et al., 2010). Thus, due to omitted variables, income inequality may correlate with unobserved heterogeneity between municipalities and bias OLS estimators as well. Finally, reverse causality may be an issue since the level of crime may also impact income inequality. An increase in homicide rates could encourage wealthier individuals to move from most violent to more peaceful municipalities, thereby changing the within-municipality income distribution (Enamorado et al., 2016; Sampson & Wooldredge, 1987). In addition, high violence rates, by hindering economic growth, may impede the reduction of income inequality (Gordon, Iglesias, Semeshenko, & Nadal, 2009). Finally, Sachsida et al. (2010) mention three other channels through which violence can generate income inequality, namely investments deterrence, qualification differential and wage gap.

Endogeneity of income inequality is addressed using a two-stage least-squares (2SLS) procedure applied to a panel data model. First, the within transformation of equation (1), by removing the panel-level means from each variable, eliminates u_i (equation (2)).

$$H\widetilde{O}M\widetilde{I}_{it} = \alpha_1 \widetilde{I}N\widetilde{E}Q_{it} + \alpha_2 \widetilde{X}_{it} + \widetilde{e}_{it} + Y\widetilde{E}A\widetilde{R}_t \quad (2)$$

$$\text{with } H\widetilde{O}M\widetilde{I}_{it} = \left(H\widetilde{O}M\widetilde{I}_{it} - \underline{H\widetilde{O}M\widetilde{I}_i} + \underline{H\widetilde{O}M\widetilde{I}} \right)$$

By removing u_i , equation (2) controls for time-invariant differences among municipalities (fixed effects) that affect homicide rates and are not adequately captured by the explanatory variables in the model. Then, the 2SLS within (or fixed effect) estimator is obtained from a 2SLS regression of $H\widetilde{O}M\widetilde{I}_{it}$ on $\widetilde{I}N\widetilde{E}Q_{it}$ and \widetilde{X}_{it} with an instrument variable ($\widetilde{I}N\widetilde{S}T\widetilde{R}U\widetilde{M}E\widetilde{N}T_{it}$) used for $\widetilde{I}N\widetilde{E}Q_{it}$ (equation (3)).

$$H\widetilde{O}M\widetilde{I}_{it} = \alpha_1 \widetilde{I}N\widetilde{E}Q_{it} + \alpha_2 \widetilde{X}_{it} + \widetilde{e}_{it} + Y\widetilde{E}A\widetilde{R}_t \quad (3)$$

$$\text{with } \widetilde{I}N\widetilde{E}Q_{it} = \alpha_1 \widetilde{I}N\widetilde{S}T\widetilde{R}U\widetilde{M}E\widetilde{N}T_{it} + \alpha_2 \widetilde{X}_{it} + \widetilde{v}_{it} + Y\widetilde{E}A\widetilde{R}_t$$

Identifying relevant instrumental variables is complex, particularly when focusing on a spatially disaggregated level, such as the municipal one for which little information is available. Likewise, instrumental variables have to satisfy two requirements: (i) being good predictors of the endogenous variable even after controlling for the exogenous regressors (instrument relevance) and (ii) having no direct effect on homicide rates other than through its influence on the endogenous variable (instrument exogeneity or exclusion restriction).

Since we work with panel data and could not find any external instruments over several time periods, we adopt an alternative strategy based on time and spatial lags of the endogenous variable. In the absence of suitable external instruments, time lags are traditionally used as a ‘default’ strategy. However, they fail to satisfy the exclusion restriction condition. Spatial lags are also sometimes used in identification strategies (for example, Boix (2011)), but Betz, Cook, & Hollenbach (2018) also raise doubts about their ability to satisfy the exclusion restriction. In our model, we decide to use time-spatial lags to instrument income inequality, the potential endogenous variable. We argue that this type of combination reduces the potential for the exclusion restriction to be violated. In a given municipality, the time-spatial lag for the level of inequality is defined as the average of the neighbouring values in the previous period.

1.3.3 Results

Table 1.1 presents estimations for the impact of income inequality on homicide rate for three different time periods. As time-spatial lags are used as instruments, the 1990 year is excluded from the sample as data for earlier time that would allow us to construct an instrument for the 1990’s level of income inequality are not available. Regressions (1), (2) and (3) do not control for endogeneity issues, whereas regressions (4), (5) and (6) do. Table A1.2 in the Appendix shows the results of the first-stage regressions. Time-spatial lags of inequality are found to be good predictors of actual Gini coefficients, the effect being significant and negative regardless of the time span considered. The F-statistics of excluded instruments are greater than 10 (except for regression (5)) which is the conventional threshold for a strong instrument.

The results show that for the whole 2000-2010 period of study, income inequality has a positive and significant impact (but only at the 10% level) on homicide rate (regression (4)). It means that more unequal municipalities have higher homicide rates. This result adds further evidence to the existing empirical literature on the link between income inequality and lethal violence found in other contexts (Choe, 2008; Hipp & Kane, 2017). A closer look at the different time periods displays valuable results. Surprisingly, for the 2000-2005 period (regression (5)), the effect is negative (although significant at only 10%). But the results should be interpreted carefully as the F-statistic from the first stage regression is well below 10, indicating that the instrument is not relevant (see Table A1.2). Thus, the positive impact of income inequality on homicide rates since the 2000s is probably driven by the 2005-2010 period (regression (6)). It is also interesting to note that controlling for the endogeneity of

income inequality clearly reinforces this impact. The size of the coefficient on the income Gini is ten times higher when using an IV approach for 2005-2010 (regression (6)) compared to a simple panel estimate (regression (3)). This result may in fact be driven by an upsurge in drug related violence that followed the war on drug launch in 2006 by President Felipe Calderón. During his mandate (2006-2012), the army was deployed to stamp down DTO and the number of victims of this bloody war has been estimated to around 50,000. However, there is no variable in the model allowing controlling for drug related violence. Although the scope of this study does not cover the distinction between drug-related and other homicides, the results echo the ones of Enamorado et al. (2016) in the context of Mexico's drug war. Indeed, they highlight a positive causal relationship between income inequality and homicides over the 2007-2010 period and this effect is larger for drug-related crimes.

Table 1.1: Impact of income inequality on homicide rate (panel and panel IV estimates).

| Variables | (1) 2000-2010 | (2) 2000-2005 | (3) 2005-2010 | (4) IV 2000-2010 | (5) IV 2000-2005 | (6) IV 2005-2010 |
|-----------------|------------------------|------------------------|------------------------|-----------------------|------------------------|-------------------------|
| Income Gini | -16.7807 (13.310) | -24.4132 (15.079) | 39.1459 (30.209) | 97.9747* (54.290) | -38.0327* (21.569) | 394.4233** (153.538) |
| Poverty | 0.0186 (0.062) | 0.0225 (0.051) | -0.3409*** (0.116) | 0.0689 (0.067) | 0.0240 (0.063) | -0.5859*** (0.161) |
| Male 15-24 y.o. | -3.7597** (1.536) | -0.1703 (0.935) | -7.4597*** (2.865) | -3.0488** (1.474) | -0.2185 (0.954) | -4.5010* (2.367) |
| Indigenous | 0.2853* (0.167) | -0.3305 (0.217) | 0.4677 (0.298) | 0.6340*** (0.234) | -0.3472* (0.202) | 0.4000 (0.424) |
| Migration | -0.5279 (0.474) | 0.0806 (0.384) | 0.4248 (1.017) | -0.3998 (0.597) | 0.1735 (0.389) | -0.3565 (1.219) |
| Missing school | 0.6490*** (0.159) | 0.0863 (0.245) | -0.9212 (1.686) | 0.2946 (0.446) | 0.0827 (0.246) | -2.1495 (1.920) |
| Density | -0.0091*** (0.002) | -0.0030 (0.002) | -0.0263*** (0.008) | -0.0177*** (0.004) | -0.0032 (0.002) | -0.0419*** (0.015) |
| 2000 | -6.7032*** (2.283) | | | | | |
| 2005 | -7.0282** (3.463) | -1.6409 (1.255) | | 3.7025 (2.533) | -2.1227 (1.318) | |
| 2010 | 7.8813*** (2.938) | | 15.1729*** (2.890) | 22.4844*** (4.505) | | 28.3160*** (7.000) |
| Constant | 64.2274*** (19.804) | 41.7318*** (13.912) | 88.9995*** (31.932) | -3.5098 (28.511) | 48.5667*** (16.191) | -63.9491 (56.174) |
| Observations | 7,285 | 3,635 | 3,708 | 5,529 | 3,617 | 3,700 |
| R-squared | 0.0531 | 0.0115 | 0.0593 | | | |
| Observations | 2,247 | 2,067 | 2,097 | 2,202 | 2,059 | 2,097 |

Notes: Bootstrapped standard errors clustered at the municipal level (50 replications) in parentheses. Level of statistical significance: 1% ***, 5% **, and 10%*.

Source: Author' calculations based on multiple datasets.

As a robustness check, Table A1.3 in the Appendix uses the logarithm of homicide rate as dependent variable and yields similar results. This allows correcting for the large dispersion of homicide rates across municipalities as the distribution is right-skewed and bounded by zero (see Figure A1.1 in the Appendix). In this case, a negative binomial regression usually performs better than an OLS model (Hilbe, 2007) but if the distribution is normalised using the log of the homicide rate, both estimates should display comparable results.

1.4 Spatial analysis

The preliminary panel results are completed with an in-depth spatial analysis of criminality for the year 2017. Indeed, considering spatial dependence while studying the determinants of crime is essential (Anselin et al., 2000; Menezes et al., 2013; Scorzafave & Soares, 2009) as the non-random spatial distribution of violence and the presence of spillover effects in Mexico are no longer to prove (Ingram, 2014; Martínez, 2016; Pan et al., 2012).

1.4.1 Data

Most empirical studies focus on the effect of inequality on violent crimes, considering quasi-exclusively homicide rates. In Mexico, lethal violence is extremely high and mainly related to DTO. But the country is suffering from other types of criminal behaviours as lately, OCG have diversified their sources of income with other illicit activities such thefts, kidnappings, extortions, etc. “Organized crime groups do not account for all violence crime in Mexico but there are clear indications that such groups played a major role in overall crime trends in recent years” (*Organized Crime and Violence in Mexico: 2020 Special Report*, 2020, p. 5). Yet, official statistics do not allow making a clear distinction between violence linked to criminal organisations from violence amongst the general public.

In order to broaden the spectrum of analysis and to be as complete as possible, this study uses data related to criminal incidence in 2017.¹⁹ Criminal incidence refers to *presumed* crimes registered whether in preliminary enquiries or initiated investigations. The Attorney General of each state reports the information and is responsible for its veracity and updating. Data are then collected by the Executive Secretary of the National System for Public Security

¹⁹ Before 2017, more than 90% of Oaxaca’s municipalities had no data collection. They represented 535 out of the 2457 Mexican municipalities but accounted only for 1.78% of the country’s population. From 2017 onwards, every municipality has available data although 289 municipalities from Oaxaca have no reported crime during the year. It is quite surprising and may be either the true value as these municipalities are small rural isolated areas (cities with an average of 2143 inhabitants) or may be related to bad quality data collection. Nevertheless, it allows the implementation of an unbiased spatial analysis.

(*Secretariado Ejecutivo del Sistema Nacional de Seguridad Pública, SESNSP*). As data come from citizens' complaints, unreported crime or uninvestigated complaints (because there were not enough elements to presume the commission of crime) are therefore excluded from the data. Yet, according to the 2020 National Survey of Victimization and Perception of Public Security (*Encuesta Nacional de Victimización y Percepción sobre Seguridad Pública, ENVIPE*), in 2019 the dark figure of crime was estimated to be 92.4%. Indeed, 11% of crimes were reported in 2019 and the Public Prosecutor's Office initiated an investigation in 69.1% of the cases. Hence, only 7.6% of the total number of crimes were reported and investigated.²⁰ Thus, official statistics suffer from underreporting bias and are well below real levels, calling into question the effectiveness and efficiency of official crime data collection. According to Pansters, "the massive size of the "dark" (unreported) number of delinquencies can be attributed entirely to a key aspect of Mexico's (in)security regime: the (perceived) ineffectiveness of the country's institutions responsible for preventing and investigating crimes and processing them judicially" (p.18, 2012). Statistics from victimisation surveys may provide a better alternative source of information. In Mexico, the ENVIPE has collected data annually since 2011 but they are not representative at the municipal level.

The decomposition of the data collected by the SESNSP allows testing for a potential differentiated effect of income inequality on different types of violence. In this study, we consider:

- The **total number of crimes** including all types of common law crimes in Mexico, classified into seven categories.²¹ This represents the total criminal incidence in the country.
- **Intentional homicides** and **intentional injuries**, two major violent crimes against life and body integrity. They represented respectively 1.28% and 7.98% of the total reported crimes in 2017.
- **Theft**, a major pecuniary crime. The analysis concentrates solely on thefts as they represent 76% of the property crimes registered in the data. In 2017, theft was the most common crime, accounting for 41.33% of the total number of crimes reported.

The crime figures are then expressed as a rate for 100.000 inhabitants using the 2015 intercensus survey (*Encuesta Intercensal, EIC*).

²⁰ https://www.inegi.org.mx/contenidos/programas/envipe/2020/doc/envipe2020_presentacion_nacional.pdf

²¹ The seven categories refer to the legal assets affected. It encompasses crimes against property, family, sexual freedom and security, society, life and body integrity, personal liberty and other legal assets (from common law).

For intra-municipal income inequality, two measures calculated by CONEVAL are used: the traditional Gini coefficient and an alternative income ratio. The latter is calculated dividing the total current income per capita of the population in extreme poverty by the total current income per capita of the non-poor and non-vulnerable population.²² This income polarisation indicator measures horizontal inequality which is inequality between groups (Esteban & Ray, 1994). The smaller this income ratio, the greater the income gap between these two populations at the extreme.

As in the panel analysis, the municipal food income poverty rate (i.e., the official measure of extreme income poverty calculated by CONEVAL), the percentage of males aged 15 to 24 in the population (SNIM), migration measured as the percentage of the population aged 5 years and over residing in another state five years earlier (SNIM) and municipal density are controlled for. As additional explanatory variables, an index of ethno-linguistic fractionalisation (Normalised Generalised Variance, NGV)²³ calculated from the 2015 EIC survey, unemployment rate (SNIM) and the percentage of the population aged 15 or more with incomplete basic education (SNIM) are added. Finally, to account for drug related activities/violence, we calculate the distance in kilometres from each municipality to the U.S. border. Indeed, municipalities located close to the U.S. border may have higher levels of violence (Dube et al., 2013; Lacombe & Flores, 2017). All control variables are for the year 2015.

Descriptive statistics are reported in table A1.4 in the Appendix.

1.4.2 Mapping evidence

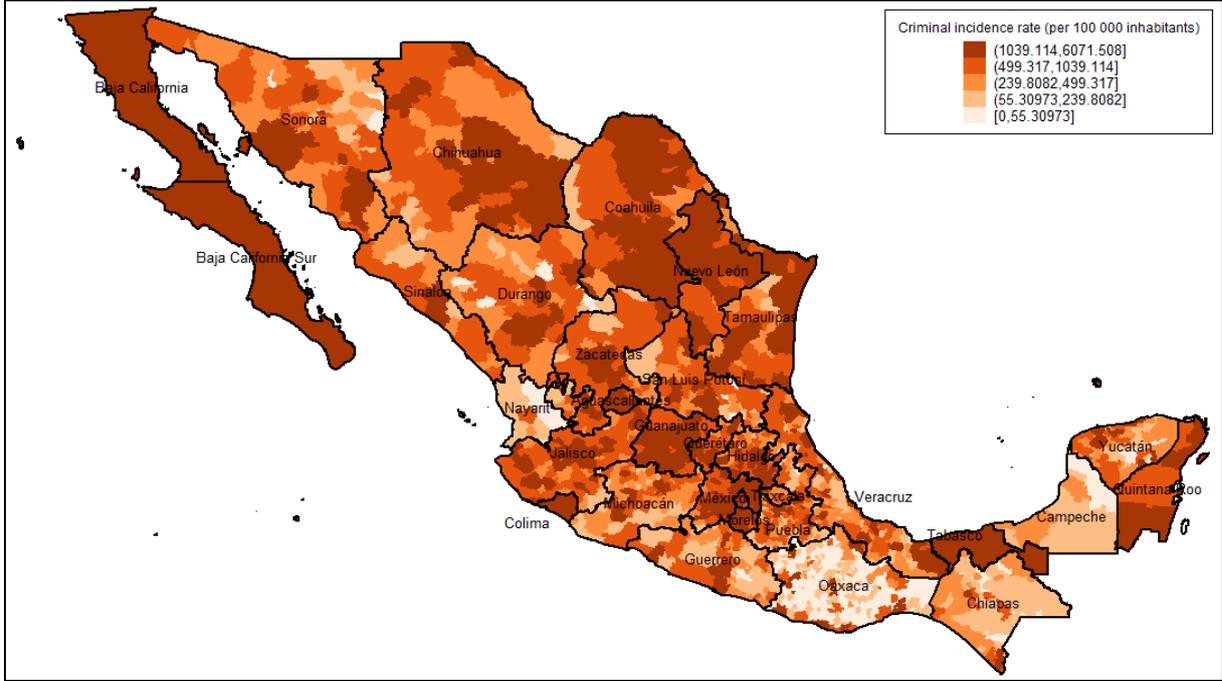
To provide a preliminary spatial analysis, Figures 1.1 to 1.4 depict the different crimes considered for Mexico in our study.

²² A person in extreme poverty combines three or more deprivations out of the six within the Social Deprivation Index (education delay, access to health services, social security or food, housing quality and basic services in housing) and is below the extreme income poverty line. The extreme income poverty line corresponds to the value of the food basket per capita per month. Non-poor and non-vulnerable populations have an income above the income poverty line and do not suffer from any social deprivations. The income poverty line corresponds to the value of the food and non-food (basic goods and services) baskets per month for one person. This income ratio is not reported for municipality without a non-poor and non-vulnerable population.

²³ NGV can be expressed as follows (Budescu & Budescu, 2012): $NGV = \frac{1}{C(C-1)} \sum_{i=1}^C P_i^2$. Where P_i is the proportion of people who belong to the ethnic group i and C is the number of groups. NGV measures “the probability that two randomly selected individuals from a particular population belong to different subgroups (...). A high value (probability) reflects a higher degree of diversity” (Budescu & Budescu, 2012, p. 217).

Figure 1.1 maps criminal incidence for Mexican municipalities in 2017. Violence is widespread all over the country and a clear geographical pattern is difficult to identify. However, some states exhibit a higher crime rate. This includes municipalities of the northern states along the United States border (Baja California, Chihuahua, Coahuila, Nuevo León and Tamaulipas), Mexico City and its bordering states (Mexico and Morelos) as well as the occidental region (Aguascalientes, Querétaro, Guanajuato and Hidalgo). Violence is also widespread in Quintana Roo and Baja California Sur, two highly touristic regions. The states of Tabasco and Colima, respectively on the Gulf of Mexico and the Pacific coast are also worth mentioning. Finally, few municipalities seem to be spared from violent behaviours, as pockets of criminality can be observed here and there throughout all the territory even in the less affected southern states of Campeche, Chiapas, Oaxaca and Nayarit.

Figure 1.1: Total crime rate by municipalities in 2017.

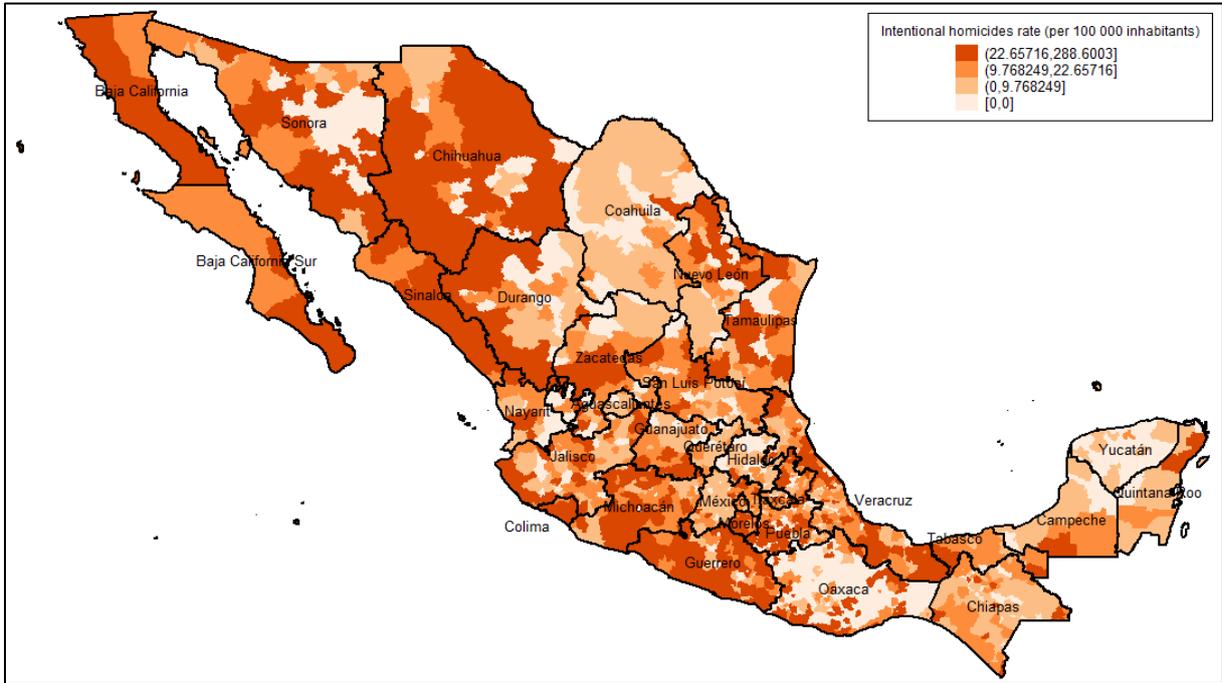


Source: author’s calculations based on SESNSP data.

In Mexico, it is extremely difficult to differentiate between violent crimes committed by OCG and the general public. Homicides are perhaps the easiest crimes to relate with OCG, as “tallies produced over the past decade by government, media, academic, NGO, and consulting organizations suggest that roughly a third to half of all homicides in Mexico (from 2006-2017) bear signs of organized crime-style violence [...]” (Calderón, Ferreira, & Shirk, 2018, p. 5). Besides, areas historically plagued by drug trafficking activities are among the most

affected by lethal violence as conflicts rage, between rival cartels or with the authorities, in order to gain or maintain control over drug-trafficking territories, routes or distribution centres. Thus, a geographical pattern is more easily identified for intentional homicide rates (Figure 1.2), with a concentration of extreme violence in territories affected by organised crime. High homicide rates are observed in municipalities of the Golden triangle, a major drug producer region formed by the states of Chihuahua, Durango and Sinaloa and in municipalities of the northern states along the border which are transit areas to the United States (Baja California, Sonora, Chihuahua, Nuevo León and Tamaulipas). The pacific coastal region is also strongly affected. The states of Jalisco, Colima, Michoacán, Guerrero (and Morelos to a lesser extent) are major producers of illicit drugs such as marijuana, opium and amphetamine and constitute a turning point for the reception and shipping of drug by sea (Guerrero-Gutiérrez, 2011). Lastly, the state of Veracruz is the scene of violent clashes between *Los Zetas* and the *Cártel de Jalisco Nueva Generación* (CJNG), two rival factions. On the contrary, the states of the Yucatan Peninsula (Quintana Roo, Yucatan and Campeche) as well as Chiapas and Oaxaca seem relatively spared by homicidal violence.

Figure 1.2: Intentional homicide rate by municipalities in 2017.

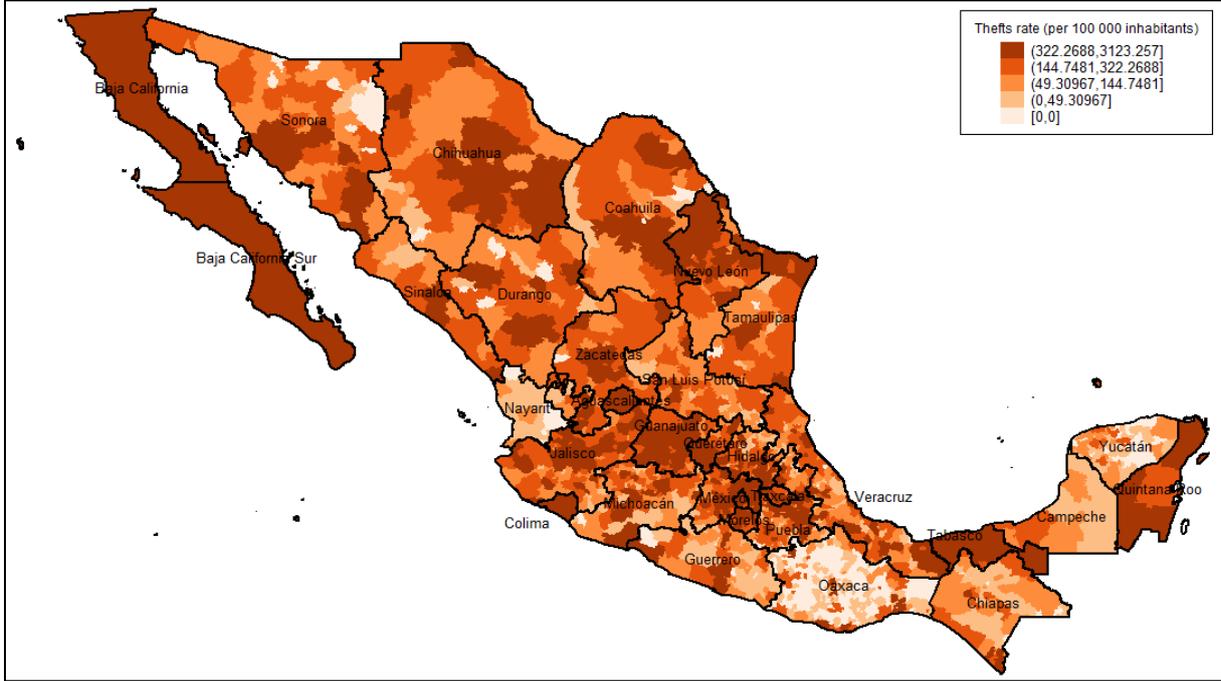


Source: author’s calculations based on SESNSP data.

Thefts and intentional injuries rates are reported respectively in Figure 1.3 and 1.4. The spatial distribution of pecuniary crimes is similar to the distribution of total criminal incidence except

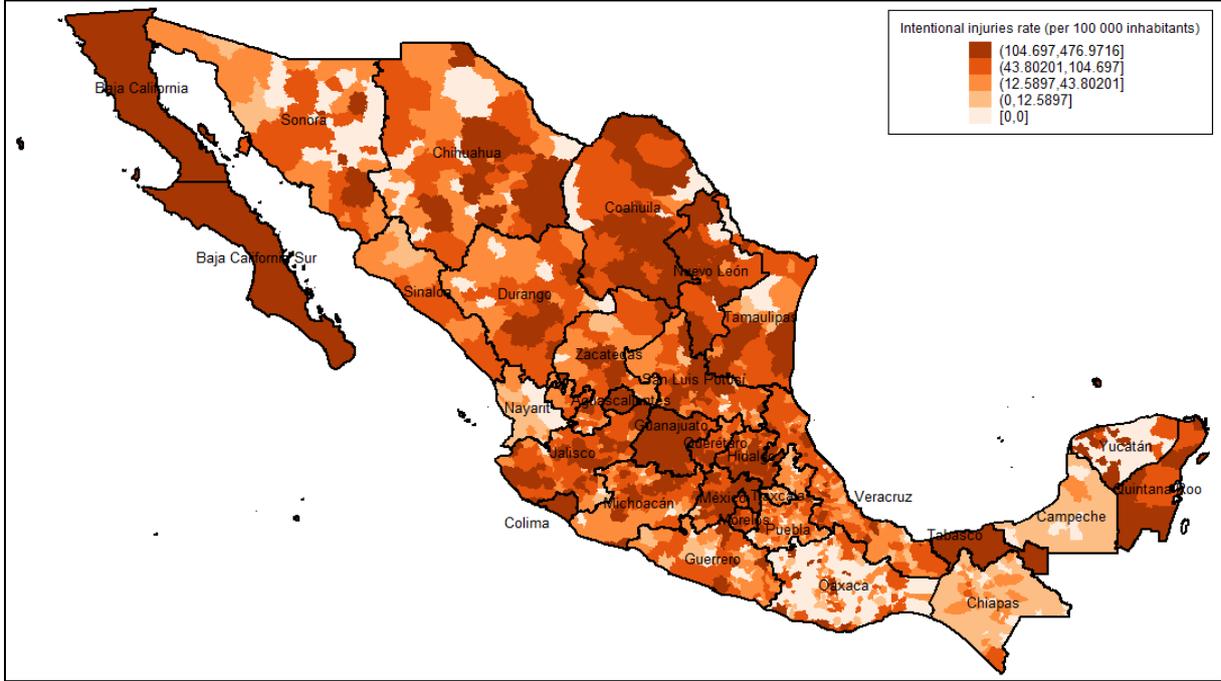
for the state of Yucatan which is relatively unscathed by thefts. This is not surprising as thefts represent 41.33% of the crimes reported to the authorities in 2017. The spatial pattern for intentional injuries is similar, indicating that municipalities highly affected by thefts suffer as well from high intentional injury rates.

Figure 1.3: Theft rate by municipalities in 2017.



Source: author’s calculations based on SESNSP data.

Figure 1.4: Intentional injury rate by municipalities in 2017.



Source: author’s calculations based on SESNSP data.

Attributing other crimes than homicides to criminal organisations is tempting, although this is not the case in all Mexican states. Indeed, these crimes could be viewed as mafia ridden violence of the cartels described by Guerrero-Gutiérrez as a way of propaganda in order to

“intensively advertise their violence and to make sure that broad sectors of society identify their violence potential” (2011, p.51). Northern states at the US border (Baja California, Chihuahua, Nuevo León and Tamaulipas) are a good illustration as they combine all forms of violence (apart from Coahuila which had a relatively low intentional homicide rate in 2017). In Colima state, the Sinaloa cartel and the CJNG have been fighting since 2015 over the control of pacific coast’s drug trafficking routes and in particular over the port of Manzanillo, an entry point of chemicals necessary for the production of synthetic drugs (Olson and Hinojosa, 2017). Clashes between these two rival cartels also frequently took place in Baja California Sur. CJNG also expanded to the state of Tabasco and opposes other cartels in the state of Quintana Roo which occupy a strategic position in the Caribbean. In Guanajuato, criminality seems mainly linked to fuel theft from government oil pipelines under the supervision of the *Cartel de Santa Rosa de Lima* (Calderón, Heinle, Ferreira, & Shirk, 2019). Colima, Baja California, Quintana Roo and Guanajuato were among the least peaceful states in Mexico in 2019 (Institute for Economics & Peace, 2020). Interestingly, Mexico state, Hidalgo and Aguascalientes display high theft and intentional injuries rates but relatively low intentional homicide violence. This might indicate that these states are spared by the cartels and tend to experience mostly criminality among the general public. Alternatively, this may signal a diversification of OCG’s activities in these regions.

A quick visual review of the spatial distribution of criminality at the municipal level suggests a positive spatial autocorrelation, with a clustering of violence in some municipalities, even though the geographical patterns are not exactly similar for the different crimes considered. The results for the global association test are displayed in Table 1.2. It performs the Moran’s I test for spatial correlation among the residuals to capture whether there is a global (non-random) spatial process in the entire sample. A positive global Moran’s I indicates spatial clustering, with high (low) values clustered around high (low) values. On the contrary, negative values suggest spatial dispersion, with high (low) values clustered around low (high) values. An inverse-distance spatial weighting matrix with spectral-normalisation is used.²⁴ The results highlight a significant and positive spatial autocorrelation for all crime variables, indicating that criminality is not randomly distributed throughout Mexican territory. Municipalities with high (low) rates of intentional homicide, intentional injury or theft are clustered around municipalities with similar values for that specific crime.

Table 1.2: Global Moran’s I test for the different dependent variable.

²⁴ The spectral normalisation normalises the weighting matrix by dividing the entries by the absolute value of the largest eigenvalue of the matrix.

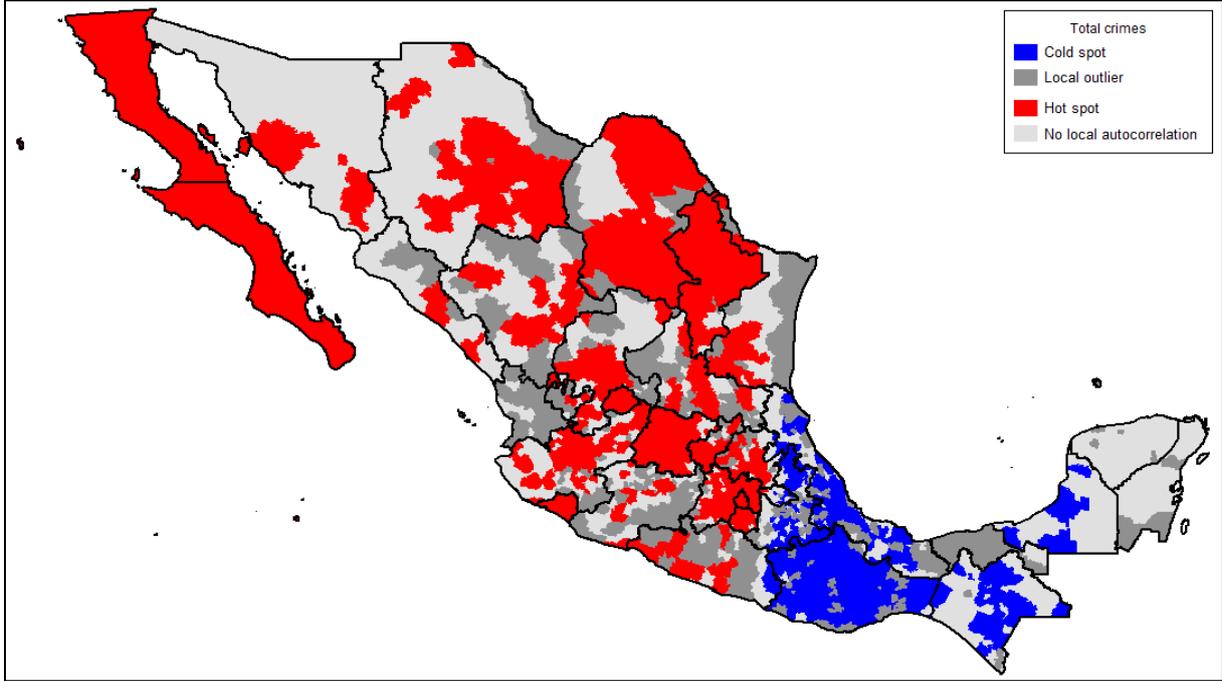
| Variable | Moran's I | z | P-value | Interpretation |
|---------------------------|-----------|---------|---------|--------------------|
| Total crime rate | 0.219*** | 119.307 | 0.000 | spatial clustering |
| Intentional homicide rate | 0.066*** | 36.146 | 0.000 | spatial clustering |
| Intentional injury rate | 0.214*** | 116.470 | 0.000 | spatial clustering |
| Theft rate | 0.159*** | 86.993 | 0.000 | spatial clustering |

Notes: Coefficients were calculated based on inverse-distance spatial weighting matrices with spectral-normalisation.
Level of statistical significance: 1%***, 5%**, and 10%*.
Source: author's calculations.

In order to identify potential local deviations from this global pattern, local autocorrelation tests can be performed to detect local clusters or outliers. Local clusters are identified if one municipality and its neighbours concentrate high values of the variable of interest with respect to the average (hot spot) or low values of the variable of interest with respect to the average (cold spot). On the contrary, one municipality showing very different values from its neighbours is considered as a local outlier. Figures 1.5 to 1.8 display local Moran's I using inverse-distance spatial weighting matrices with spectral-normalisation.

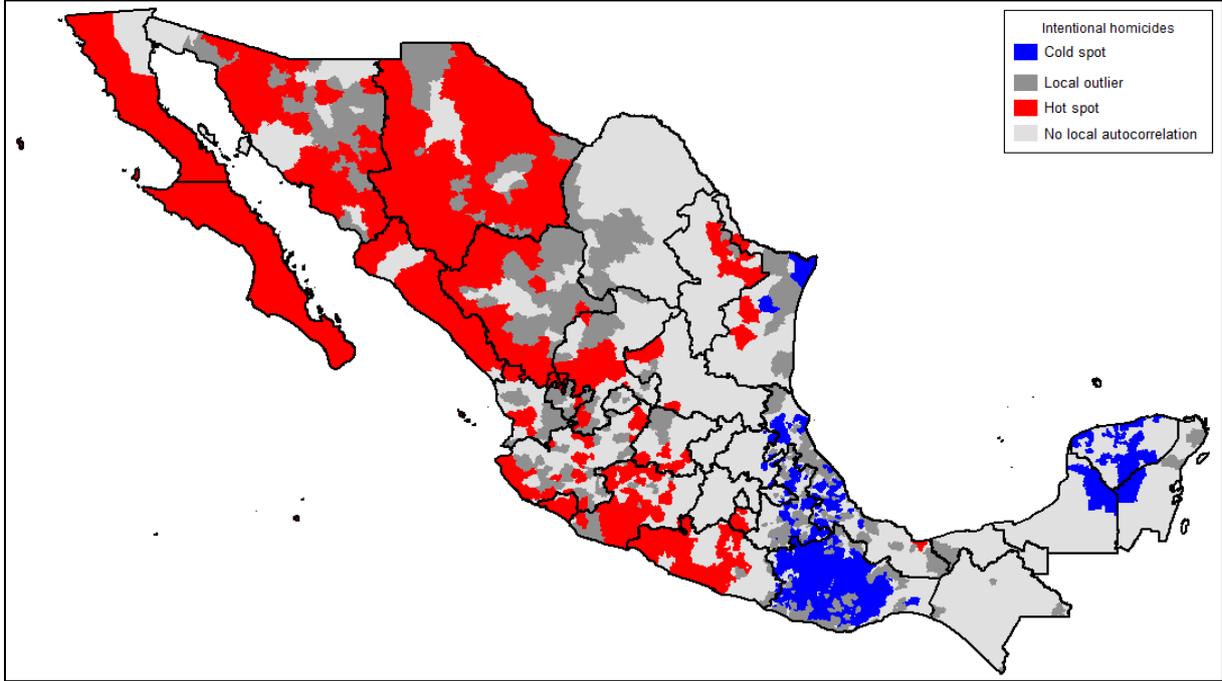
The hot and cold spots analysis of Figure 1.5 allows the identification of a clear geographical rationale, with a territorial divide for criminal incidence. Municipalities with high levels of criminality that are surrounded by municipalities with similarly high levels of global crime (compared to the national average) (hot spots) are exclusively concentrated in the northern and western states of the country. Every state from this area exhibits hot spots except for Nayarit. The northern states (Baja California, Baja California Sur, Nuevo León and Coahuila), the central region (Aguascalientes, Guanajuato, Querétaro, Hidalgo, Mexico, federal district of Mexico and Morelos) and Colima are particularly affected. Otherwise, we observe hot spots here and there. On the contrary, municipalities with low criminal levels (compared to the national average) surrounded by units with similarly low levels (cold spots) are concentrated in the southern states of Campeche, Chiapas, Oaxaca as well as in Veracruz and Puebla. Thus, there is an evident concentration of municipalities with elevated levels of violence in one side of the county whereas the other side is relatively safer.

Figure 1.5: Hot and cold spots analysis for the total crime rate in 2017.



Source: Author's calculations.

Figure 1.6: Hot and cold spots analysis for the intentional homicide rate in 2017.



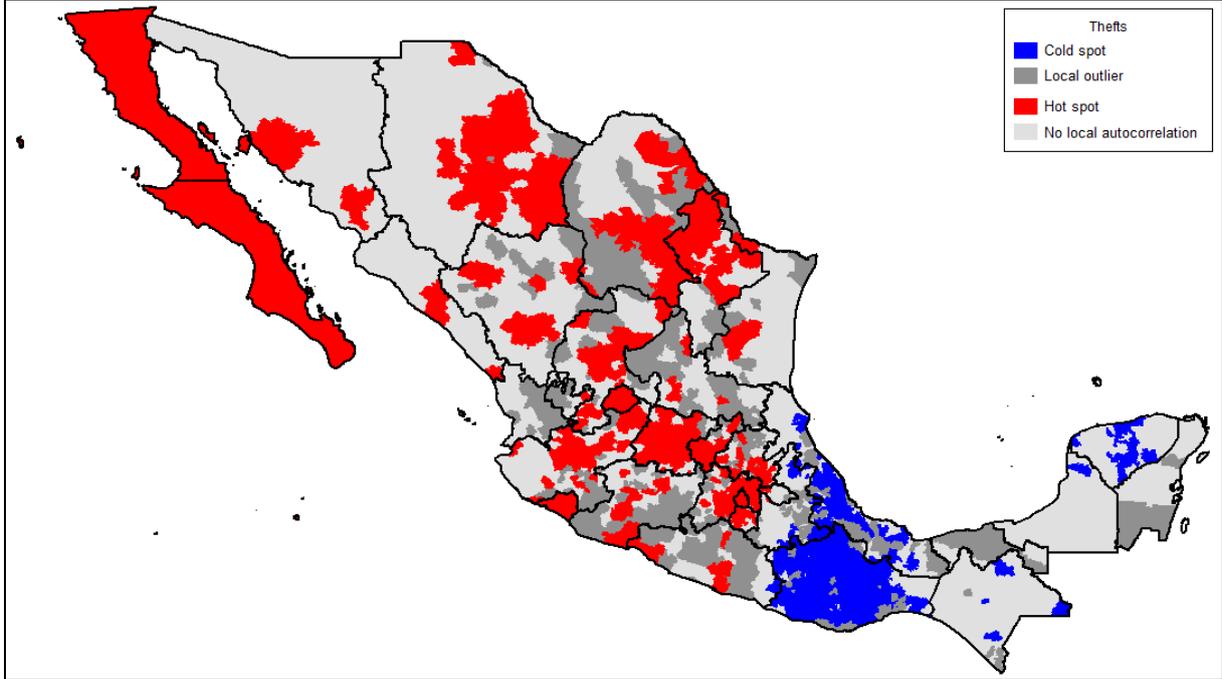
Source: Author's calculations

A clear pattern is also observable for the intentional homicide rate (Figure 1.12). Hot spots are highlighted in the north-western states of Baja California, Baja California Sur and Sonora, in the Golden Triangle region (Chihuahua, Sinaloa and west of Durango) and along the Pacific

coast (Jalisco, Colima, Michoacán and Guerrero). There is also a concentration of municipalities with high intentional homicide rates in Zacatecas, the north-east of Nuevo Leon, Morelos and Guanajuato. This confirms the clustering of municipalities with extreme levels of lethal violence in states where DTO are present. Conversely, cold spot areas are mainly observed in Yucatan and its bordering municipalities and in Oaxaca. Some are also encountered throughout Puebla, Veracruz and Tamaulipas.

For theft rates (Figure 1.7), the results of the hot and cold spots analysis are quasi-identical to the ones of the analysis of total crime rates except for the states of Yucatan and Campeche. However, even if northern and western states of the country gather all the hot spots, they are a little bit more diffuse and spatially fragmented. Again, all cold spots are highlighted in south-eastern states.

Figure 1.7: Hot and cold spots analysis for the theft rate in 2017.

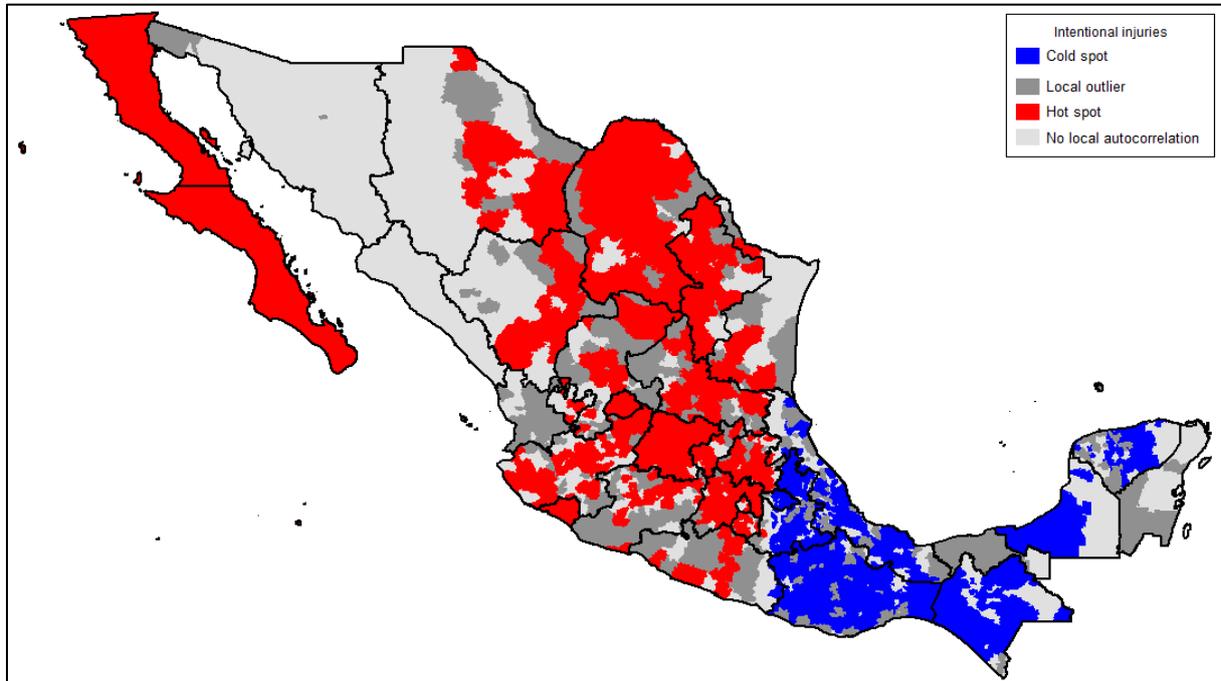


Source: Author’s calculations

Finally, Figure 1.8 depicts hot and cold spots for intentional injury rates. Municipalities with high intentional injury rates are forming a vertical strip in the centre of the country as the states of Sonora, the western part of Chihuahua, Sinaloa and Nayarit don’t exhibit hot spots. This is surprising as municipalities from these states hosted many hot spots for intentional homicide rate. Clusters of municipalities with low injury rates are observed in every southern-eastern state except Tabasco and Quintana Roo. Once again, the spatial division of the

country into two parts, according to the spatial clustering of municipal injury rates, is observed as for other crimes.

Figure 1.8: Hot and cold spots analysis for the intentional injury rate in 2017.



Source: Author's calculations.

1.4.3 Empirical strategy

Criminality is not randomly distributed throughout the territory as spatial clustering has been detected with the Moran's I test. Moreover, spillover effects of violence have already been highlighted in the literature for Mexico (Ingram, 2014; Martínez, 2016; Pan et al., 2012). Therefore, OLS models are misspecified, biasing results. To properly estimate the effect of inequality on different types of crime, we estimate a spatial autoregressive combined (SAC) model with endogenous and residual correlations. The model is expressed as follows:

$$y_i = \rho W y_i + X \beta_i + \alpha INEQ_i + u_i \quad (4)$$

$$\text{with } u_i = \lambda W u_i + e_i \text{ with } e_i \sim N(0, \sigma^2 I)$$

where y_i is the dependent variable (i.e. different crime rates at the municipal level), X encompasses the exogenous regressors, $INEQ_i$ represents intra-municipal inequality and W is an inverse-distance spatial weighting matrix with spectral normalisation. An inverse-distance spatial-weighting matrix is composed of weights that are inversely related to the distances

between the different spatial units and the spectral normalisation divides each element in row by the absolute value of the largest eigenvalue of the matrix. Even if row-standardised matrices are widely used in applied works, spectral normalisation guarantees nonsingularity without changing the model specification of the original matrix²⁵. Kelejian & Prucha (2010) also point out that normalising by a vector of row sums needs to be guided by theory. Thus, a spectral-normalised matrix is preferred. The parameters ρ and λ account respectively for spatial autocorrelation among the dependent variable and the residuals.

Likewise, as stated before in the panel analysis, endogeneity of the different inequality measures is another issue to tackle. For spatial analysis, following the pioneering work of Easterly (2007) and in particular its underlying intuition, we use meteorological data as instruments (as in Clément & Piaser (2021)). Sokoloff & Engerman (2000) have developed the idea that factor endowments in Latin American colonies historically contributed to the emergence of strong wealth, human capital, and political power inequalities, which are still deeply rooted nowadays. Because these countries had soil and climate well suited for cash crops such as sugarcane, cocoa and coffee, settlers set up large plantations relying on intensive slave labour. The resulting distribution of land, income and human capital was highly unequal. On the contrary, North American colonies' endowment favoured family farms growing subsistence crops (wheat in particular), homogenous population and a relatively equal distribution of wealth. Even if Mexico was not historically known for high-scale sugarcane production relying on slavery²⁶, factor endowments still played an important role in shaping inequality in Mexican society (Sokoloff & Engerman, 2000). During colonisation, the country was rich in mineral resources and of a native population providing cheap and abundant labour. Spanish authorities awarded property titles to the early settlers, allowing the implementation of large-scale agricultural exploitation and mines concentrated in the hands of the local elite. This resulted in a highly unequal distribution of land and wealth. After independence, inequalities persisted as the elite maintained its dominant status and power. It could be argued that the agrarian reform implemented in 1911 during the Mexican Revolution

²⁵ Indeed, spectral normalisation produces matrices that differ from the original ones only by a scalar multiple. In contrast, "row normalization can potentially multiply different rows by different scalars, and if it does so, that changes the model specification given by the weighting matrix" (p.7). In addition, even if both normalisations guarantee nonsingularity, "because [row normalization] is not a scalar multiple of the unnormalized matrix, we cannot in general say how it will change the spatial lag coefficient estimates relative to the estimates produced using the unnormalized matrix" (p.7). Quotes are from: <https://www.stata.com/manuals/spspregress.pdf#spspregressRemarksandexamplesChoosingweightingmatricesandtheirnormalization>.

²⁶ Note however that cash crops were still part of Mexican agriculture. For example, in 2012, the country was the 6th world largest producer of sugarcane, using around 2.7% of its agricultural land (SIAP and SAGARPA).

may have lessened the legacies of colonisation. However, it happened one century after independence, leaving time for inequality to become deeply entrenched in society.

Following this theory, Easterly (2007) uses measures of agricultural endowments to instrument inequality. In particular, he relies on geographical and meteorological data (such as soil, rainfall, temperature and altitude) to predict the percentage of agricultural land suitable for growing wheat versus sugarcane in a country. Furthermore, he argues that despite being less precise than real production data, relying on meteorological measures ensures the exogeneity of the instruments. Such land suitability data are not available at the scale of Mexican municipalities. We were however able to collect weather data for 967 weather stations all over the territory. The data comes from the National Water Commission (*Comisión Nacional del Agua*, CONAGUA). It includes, for every station over the 1951-2010 period, the yearly average amount of precipitation, temperature and the altitude. Every municipality centroid is then matched with the nearest weather station based on latitude and longitude coordinates. The data present a high variability at the municipal level (see Table A1.4 in the Appendix for descriptive statistics). These meteorological data intend to reflect the land endowment of every municipality and thus their historical path of inequality.²⁷

Temperature, through its effects on non-economic psychological and physiological factors, may influence the level of violence (Baysan et al., 2019); violating the exclusion restriction (the instrument should have no direct effect on crime other than through its influence on income inequality). Yet, the fact that the meteorological data is the yearly average over the 1951-2010 period (while crime is measured in 2017) mitigates this risk.

1.4.4 Results

Table 1.3 presents estimates for the spatial autoregressive model for the different types of crime. A spatial lag of the dependent variable and an autoregressive error term are included, and endogeneity of the various inequality measures is controlled for. Regressions (1) to (4) use the income Gini as the inequality measure whereas regressions (5) to (8) use the income

²⁷ Other papers also use weather data as an instrument for inequality and in particular rainfall. For example, Nepal et al., (2011a) use rainfall shocks to instrument economic inequality. Although the underlying reasoning is slightly different, Ramcharan (2010) uses weather and crop characteristics to instrument land inequality, their measure of wealth disparity.

ratio. Table A1.5 in the Appendix displays the results of the first-stage regressions. All regressions are estimated using the *gs2sls* estimator.²⁸

In all specifications, the lag of the error term is positive and significant at the 1% level. The estimated coefficient on the spatial lag of the intentional homicide rate (regressions (2) and (6)) indicates a negative correlation between the intentional homicide rate in a municipality and the one in neighbouring municipalities. On the contrary, the effect of the spatial lag of the intentional injury rate is significant and positive (regressions (4) and (8)). The results indicate that regardless of the measure of income disparity used, inequality levels impact positively and significantly the intentional homicide rate (regressions (2) and (6)) and the intentional injury rate (regressions (4) and (8)), the two most violent crimes considered in the study. Nonetheless, the effect of income inequality on total criminal incidence and theft rate is not significant (regressions (1), (3), (5) and (7) respectively).

Coefficient estimates from Table 1.3 cannot be interpreted directly as the model includes spatial lags of the dependent variables, modifying the covariate effects. Indeed, all covariates now have a direct, indirect and total effect (LeSage & Pace, 2009), including income inequality. The direct effect measures the impact arising from changes in an explanatory variable within an area on its own dependent variable, including feedback effects. The feedback effects, i.e. impacts rippling through neighbouring areas and then returning back to the original location, are the results of the spatial autoregressive structure of the model. For example, a change in income inequality in one municipality will impact the dependent variable of that same municipality. However, the dependent variable of that municipality will affect the dependent variable of neighbouring municipalities (because of the dependent-variable spatial lag included in the model) that will in return influence back the level of the dependent variable in the focal municipality and so on until this feedback effect is stable. The average direct effect is the mean across all observations. The total indirect or spillover effect of a covariate in a given municipality is its impact on the dependent variable in all other different locations.

A change in income inequality in one municipality affects the value of the dependent variable in other municipalities due to spatial spillover effects. Every municipality produces spillovers and the average indirect effect of an explanatory variable is the mean of these municipality-specific indirect effects. The indirect effect of income inequality can be both due to the spatial

²⁸ The *spivregress* command in Stata 15 is used to predict these models (StataCorp, 2017).

lags of the dependent variable and income inequality. The effective impact or total effect of a variable is the sum of the direct and indirect effects.

As this study focuses particularly on the influence of income inequality on violence, Table 1.4 displays the direct, indirect and total effects of the two measures of income disparity on the different types of crime. For intentional homicides, the direct effect of the income Gini (income ratio) is positive (negative) because the coefficient of the income Gini (income ratio) is positive (negative) (see Table 1.3). This means that as the level of income inequality in one municipality increases, its intentional homicide rate heightens. Besides, the indirect effect of the income Gini (income ratio) is negative (positive) because the coefficient of the dependent-variable lag is negative and the coefficient of the income Gini (income ratio) is positive (negative). A surge of income inequality in a focal municipality decreases the homicide rate in neighbouring municipalities. This is the spillover effect. A surge in inequality in a municipality raises its level of lethal violence. That positive variation then reduces the intentional homicide rate in neighbouring municipalities. This highlights a transfer of lethal violence towards more unequal municipalities. One possible explanation could be the higher level of impunity in more unequal municipalities due to a more deficient police and justice system. Finally, the effective or total impact of income Gini (income ratio) on the level of homicides is positive (negative) as the direct effect prevails over the indirect effect. Moreover, the magnitude of the direct effects is much larger than their associated indirect effects, which is consistent.

For intentional injuries, only a direct effect of inequality is detected, and solely when the income ratio measure is used. Income disparities in one municipality positively impact the intentional injury rate of that same municipality. It would therefore appear that levels of inequality mainly affect violent crime, confirming primarily the strain and social disorganisation theories. However, as most homicides may be drug-trafficking related crimes motivated by rivalry or financial interest, the human capital theory is equally relevant. These significant results emphasised exclusively for violent crimes may also be explained by the fact that homicides and intentional injuries, due to their seriousness, are the crimes suffering the least from underreporting bias. For example, homicides are always investigated in Mexico, contrary to other offences which require a formal complaint by the victim.

Table 1.3: Impact of income inequality on different crimes (spatial IV estimates).

| | Income Gini | | | | Income ratio | | | |
|---------------------------------|----------------------------|-------------------------------|---------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|--------------------------------|
| | Total crime (1) | Intentional homicide (2) | Theft (3) | Intentional injury (4) | Total crime (5) | Intentional homicide (6) | Theft (7) | Intentional injury (8) |
| Inequality measure | -201.191 (1,010.257) | 385.995*** (63.066) | -568.773 (444.245) | 394.136*** (125.138) | -197.225 (1,085.603) | -397.305*** (61.121) | 739.546 (496.528) | -325.372** (135.401) |
| Poverty | -0.037 (0.827) | 0.103 (0.066) | 0.151 (0.357) | 0.073 (0.108) | -0.132 (0.884) | 0.103 (0.069) | 0.175 (0.385) | 0.088 (0.111) |
| Males 15-24 y.o. | 36.679*** (9.586) | 1.061* (0.583) | 12.149*** (4.455) | 5.187*** (1.113) | 37.46*** (9.910) | 1.416** (0.602) | 11.724** (4.574) | 5.508*** (1.140) |
| Migration | 28.525*** (8.212) | 1.032*** (0.319) | 19.031*** (3.929) | 0.235 (0.799) | 29.102*** (8.337) | 0.795** (0.316) | 19.638*** (4.038) | -0.002 (0.802) |
| Incomplete education | -22.435*** (1.255) | 0.163*** (0.062) | -8.289*** (0.560) | -1.830*** (0.137) | -22.679*** (1.251) | -0.045 (0.050) | -8.154*** (0.560) | -2.044*** (0.127) |
| Density | 0.098*** (0.024) | 0.0002 (0.000) | 0.071*** (0.014) | -0.002 (0.002) | 0.097*** (0.024) | -0.001* (0.000) | 0.072*** (0.015) | -0.003* (0.002) |
| Unemployment rate | -0.493 (2.207) | -0.309* (0.159) | 1.081 (0.953) | -0.588** (0.288) | -1.290 (2.223) | -0.183 (0.154) | 1.123 (0.978) | -0.434 (0.291) |
| NGV | -269.7*** (47.112) | -19.497*** (3.290) | -116.221*** (19.296) | -25.775*** (6.337) | -268.412*** (41.874) | -13.690*** (2.884) | -117.627*** (17.038) | -18.998*** (5.697) |
| Distance border | -0.299*** (0.069) | -0.015*** (0.004) | -0.006 (0.029) | -0.048*** (0.007) | -0.293*** (0.073) | -0.01** (0.004) | -0.01 (0.032) | -0.041*** (0.007) |
| Rho (lag of dependent variable) | -0.064 (0.111) | -0.881*** (0.303) | -0.057 (0.130) | 0.991*** (0.110) | -0.074 (0.113) | -0.613** (0.278) | -0.093 (0.136) | 0.923*** (0.110) |
| Lambda (lag of error term) | 2.343*** (0.105) | 2.795*** (0.226) | 2.44*** (0.178) | 2.573*** (0.114) | 2.513*** (0.146) | 3.328*** (0.235) | 2.457*** (0.177) | 2.68*** (0.143) |
| Constant | 1,713.351*** (414.476) | -136.582*** (26.305) | 696.850*** (177.381) | -50.104 (51.992) | 1,668.673*** (203.679) | 74.352*** (11.079) | 368.554*** (96.224) | 154.102*** (23.477) |
| Observations | 2,413 | 2,413 | 2,413 | 2,413 | 2,354 | 2,354 | 2,354 | 2,354 |

Notes: Standard errors treated as heteroskedastic in parentheses. Level of statistical significance: 1% ***, 5% **, and 10% *.

Source: Author's calculations based on multiple datasets.

The output of Table 1.4 can be read directly as it shows marginal effects, that is the total effect of a discrete change in income inequality on the metric of the dependent variable. Results indicate that an increase of 0.01 in the Gini coefficient causes the intentional homicide rate to rise by about 2.4 per 100,000 inhabitants across Mexican municipalities in 2017. Similarly, a change of 0.01 in the income ratio causes the intentional homicide rate to change by about 2.7 per 100,000 inhabitants. These results are smaller in magnitude than the ones of Enamorado et al. (2016). Indeed, they found that for the time period 2007-2010, a rise of one point in the Gini coefficient represents an increase of more than 6 homicides per 100,000 inhabitants. This may indicate that this causal relationship lost intensity between 2010 and 2017, which is after the climax of the war on drugs.

Table 1.4: Spatial direct, indirect and total effects from SAC model.

| | Income Gini | | | Income ratio | | |
|----------------------|-------------------------------|-------------------------------|------------------------------|---------------------------------|-------------------------------|--------------------------------|
| | direct | indirect | total | direct | indirect | total |
| Total | -201.192 (1010.263) | 9.649 (53.983) | -191.542 (958.66) | -197.227 (1085.609) | 10.834 (56.104) | -186.393 (1031.507) |
| Intentional homicide | 386.281*** (63.125) | -149.662*** (39.23) | 236.619*** (46.69) | -397.463*** (61.143) | 123.804*** (40.644) | -273.659*** (56.233) |
| Theft | -568.775 (444.25) | 24.48771 (60.5781) | -544.288 (415.49) | 739.554 (496.544) | -50.283 (88.035) | 689.271 (437.321) |
| Intentional injury | 413.026 313.906 | 32781.74 422309.2 | 33194.77 422601.8 | -327.223*** (137.567) | -2874.458 (5138.588) | -3201.681 (5234.846) |

Notes: Standard errors in parentheses. Level of statistical significance: 1% ***, 5% **, and 10%*.
Source: Author' calculations based on multiple datasets.

1.4.5 Robustness checks

To test for the robustness of the results, similar estimations using our own estimates for the income Gini at the municipal level plus entropy indices (computed in Clément & Piaser (2021)) were implemented. Table 1.5 displays the direct, indirect and total effects of the different alternative income inequality measures. The estimation strategy is the same as before.

Table 1.5: Spatial direct, indirect and total effects from SAC model.

| | Total | Homicide | Theft | Injury |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|
| Gini (own estimates) | | | | |
| <i>direct</i> | 7021.185*** | 573.235*** | 3631.762*** | 1333.486*** |
| | 1780.117 | 99.405 | 892.869 | 228.343 |
| <i>indirect</i> | 258.6464 | -231.184*** | 605.703 | -17218 |
| | 632.4488 | 65.938 | 514.639 | 29236.81 |
| <i>total</i> | 7279.831*** | 342.051*** | 4237.466*** | -15884.51 |
| | 1943.362 | 52.765 | 1134.39 | 29275.7 |
| Ge0 | | | | |
| <i>direct</i> | 4083.532*** | 249.542*** | 1999.608*** | 790.66*** |
| | 1287.093 | 72.092 | 638.648 | 192.907 |
| <i>indirect</i> | 138.5378 | -113.607*** | 236.022 | -10982.26 |
| | 366.0224 | 36.636 | 261.311 | 19966.97 |
| <i>total</i> | 4222.07*** | 135.935*** | 2235.631*** | -10191.6 |
| | 1389.438 | 39.938 | 764.182 | 19991.73 |
| Ge1 | | | | |
| <i>direct</i> | 804.155 | 68.596 | 343.555 | 369.577* |
| | 774.2227 | 53.406 | 343.996 | 208.920 |
| <i>indirect</i> | -21.42869 | -33.957 | 2.298 | 8878.398 |
| | 67.82182 | 26.910 | 34.337 | 32707.58 |
| <i>total</i> | 782.7263 | 34.639 | 345.853 | 9247.975 |
| | 754.5639 | 26.826 | 346.347 | 32765.12 |
| Ge2 | | | | |
| <i>direct</i> | -119.513 | -5.224 | -64.558 | -1.021598 |
| | 116.0217 | 4.645 | 60.395 | 5.833 |
| <i>indirect</i> | 3.03242 | 2.423 | .284 | -17.423 |
| | 10.37279 | 2.157 | 6.648 | 107.655 |
| <i>total</i> | -116.4806 | -2.8 | -64.274 | -18.444 |
| | 113.785 | 2.516 | 60.671 | 113.015 |

Notes: Standard errors in parentheses. Level of statistical significance: 1% ***, 5% **, and 10%*. Source: Author' calculations based on multiple datasets.

Results concerning intentional homicide rate remain unchanged to the use of our own income Gini estimates. Despite a negative indirect effect of income inequality, its total effect is positive and significant at the 1% level. An increment of one point in the Gini coefficient represents an increase of 3.4 intentional homicides per 100,000 inhabitants across Mexican municipalities, a magnitude slightly higher than with CONEVAL's estimates. Results are however more sensitive when the total criminal incidence or theft rate are considered. Indeed, now both a significant (at the 1% level) and positive direct and total effects are highlighted. Thus, with our estimates, income inequality positively impacts the total level of crime and in

particular theft rate. Across Mexican municipalities in 2017, an increase of 0.01 in the income Gini leads to a growth of respectively, 72.8 crimes and 42.4 thefts per 100,000 inhabitants, which is not negligible. Furthermore, previous results are driven by $GE(0)$, a measure of inequality more sensitive to income differences in the bottom of the distribution, suggesting that the total rate of criminality and especially intentional homicides and thefts are mainly impacted by income disparities observed in the lower parts of the income distribution. However, marginal effects are weaker. An increase of 0.01 in $GE(0)$ raises the intentional homicide rate by 1.4, theft rate by 22.4 and the total crime rate by 42.2 per 100,000 inhabitants. No impact of income inequality is detected for $GE(1)$ and $GE(2)$, two measures more sensitive to income differences in the middle and top of the distribution, regardless of the crime considered.

1.5 Conclusion

Given the importance of inequality and violence as two major societal issues in Mexico, the purpose of this empirical study was to analyse in depth the causal impact of income inequality on violence. Using several datasets and multiple econometrics methods, this study provides both a longitudinal and a spatial analysis of the inequality-violence link at the municipal level. This study enriches past empirical works for multiple reasons. First, by encompassing several types of crimes (namely total criminal incidence, intentional homicides, intentional injuries and thefts), we do not underestimate other forms of criminality, which are just as harmful in Mexico, and broaden the spectrum of analysis when most previous studies focus only on homicide rates. Second, different measures of income inequality (income Gini and income polarisation) are combined in our analysis. Third, this is to our knowledge the first study in the case of Mexico to control simultaneously for spatial dependence and endogeneity issues while assessing the effect of income disparity on crime. Finally, we provide new empirical evidence at the municipal level for Mexico and bring additional findings for middle income countries, where less research on this issue was conducted until now.

In a first step, using panel data on homicide rate between 2000 and 2010, the findings emphasise a positive and significant impact of income inequality on homicide rate driven by the 2005-2010 period. This result may be explained by an upsurge in drug related violence that followed the war on drug launch in 2006. Second, trying to compensate for several gaps in the literature, a detailed spatial analysis of criminality is run for the year 2017. Using a spatial autoregressive combined (SAC) model with an instrumental variable approach, we

find a positive causal impact of income inequality on intentional homicide rate that can be decomposed into a direct and an indirect effect. The direct effect of income inequality is positive, meaning that as the level of income inequality in one municipality increases, the intentional homicide rate in that same location heightens. Conversely, the indirect (or spillover effect), is negative indicating that a surge in inequality in a municipality reduces the intentional homicide rate in neighbouring municipalities. It highlights a transfer of lethal violence towards more unequal municipalities. All in all, the total impact is positive and non-negligible since a one-point increase in the Gini index leads to a rise of 2.4 intentional homicides per 100,000 inhabitants in 2017. If the results for intentional homicides are robust to the different inequality measures employed, for total criminal incidence and theft rate, results are less stable.

We acknowledge that the criminal data used in our analysis suffer from underreporting bias and are well below real levels. Yet, because homicides are always investigated, contrary to other offences which require a formal complaint by the victim, this crime may suffer the least from underreporting. Ideally, statistics from victimisation surveys should be preferred to minimise this bias. In Mexico, the National Survey of Victimization and Perception of Public Security (*Encuesta Nacional de Victimización y Percepción sobre Seguridad Pública*, ENVIPE) collects data annually since 2011, but they are not representative at the municipal level. Hence, further research in that direction is encouraged. Investigating the inequality-violence link for other crimes such as kidnappings, extortions or femicides is also of great interest.

Finally, if crime and violence have tremendous individual and collective costs, another social issue, fear of crime, by having equally harmful consequences, is of relevant importance. Its levels are even often higher than actual crime rates in a society (Hale, 1996). In 2020, in Mexico, 70.3% of the survey respondents from the ENVIPE declared feeling unsafe, in terms of delinquency, living in their municipality. Nonetheless, fear of crime may be unrelated to the level of criminality or at least related to a lesser extent than previously stated in the literature (Franklin, Franklin, & Fearn, 2008; Taylor & Hale, 1986; Vieno, Roccato, & Russo, 2013). Perhaps the link between these two phenomena lies in the impact that inequality has on them. Indeed, income inequality, as a structural factor of social disorganisation, may as well affect fear of crime (Rueda & Stegmueller, 2016; Vieno et al., 2013). Further investigation is needed to get a better understanding of these dynamics.

Appendix

Table A1.1: Descriptive statistics for the panel analysis.

| Variables | Observations | Mean | SD | Min | Max |
|------------------|---------------------|-------------|-----------|------------|------------|
| <i>1990</i> | | | | | |
| Income Gini | 2,454 | 0,401 | 0,037 | 0,138 | 0,617 |
| Homicide rate | 1,738 | 34,295 | 54,190 | 0,687 | 1473,137 |
| Poverty | 2,454 | 37,486 | 17,798 | 1,437 | 94,860 |
| Males 15-24 y.o. | 2,402 | 9,411 | 1,362 | 2,829 | 14,881 |
| Indigenous | 2,402 | 21,584 | 33,710 | 0 | 99,918 |
| Migration | 2,402 | 2,747 | 2,775 | 0,000 | 39,704 |
| Missing school | 2,402 | 18,290 | 9,335 | 1,163 | 79,179 |
| Density | 2,402 | 213,722 | 1124,471 | 0,194 | 19706,860 |
| <i>2000</i> | | | | | |
| Income Gini | 2,453 | 0,461 | 0,069 | 0,243 | 0,705 |
| Homicide rate | 1,839 | 23,966 | 28,637 | 1,045 | 275,862 |
| Poverty | 2,453 | 44,448 | 24,258 | 1,590 | 96,838 |
| Males 15-24 y.o. | 2,441 | 8,877 | 1,220 | 3,814 | 13,739 |
| Indigenous | 2,441 | 20,489 | 32,368 | 0 | 99,783 |
| Migration | 2,441 | 2,852 | 2,519 | 0 | 32,251 |
| Missing school | 2,441 | 10,067 | 5,191 | 0 | 56,209 |
| Density | 2,442 | 250,355 | 1156,801 | 0,147 | 19233,950 |
| <i>2005</i> | | | | | |
| Income Gini | 2,453 | 0,416 | 0,048 | 0,247 | 0,690 |
| Homicide rate | 1,797 | 23,811 | 40,159 | 0,898 | 819,672 |
| Poverty | 2,454 | 32,880 | 18,918 | 0,106 | 84,011 |
| Male 15-24 y.o. | 2,454 | 8,613 | 1,135 | 0,685 | 13,524 |
| Indigenous | 2,454 | 19,563 | 31,720 | 0 | 99,927 |
| Migration | 2,454 | 1,932 | 1,971 | 0 | 27,589 |
| Missing school | 2,454 | 6,420 | 3,606 | 0 | 40,718 |
| Density | 2,454 | 261,144 | 1157,098 | 0,125 | 17893,440 |
| <i>2010</i> | | | | | |
| Income Gini | 2,456 | 0,374 | 0,049 | 0,252 | 0,565 |
| Homicide rate | 1,914 | 34,772 | 64,525 | 1,529 | 1174,628 |
| Poverty | 2,456 | 31,907 | 19,077 | 0,999 | 86,365 |
| Males 15-24 y.o. | 2,455 | 9,093 | 1,000 | 2,151 | 13,601 |
| Indigenous | 2,455 | 19,045 | 30,782 | 0 | 99,769 |
| Migration | 2,455 | 3,865 | 2,540 | 0 | 39,344 |
| Missing school | 2,455 | 5,411 | 3,170 | 0 | 42,303 |
| Density | 2,453 | 279,647 | 1177,705 | 0,144 | 17423,360 |

Source: Author's calculations based on multiple datasets.

Table A1.2: First-stage regressions (panel analysis).

| | Gini | Gini | Gini |
|--------------|----------------------------|---------------------------|----------------------------|
| | 2000-2010 | 2000-2005 | 2005-2010 |
| Instrument | -.3001884*** (.0301849) | -.5378586*** (.070743) | -.1934413*** (.0363804) |
| F-statistics | 11.72 | 2.15 | 10.71 |
| Observations | 5529 | 3617 | 3700 |

Notes: Robust standard errors clustered at the municipal level are in parentheses. Level of statistical significance: 1% ***, 5%**, and 10%*.

Source: Author' calculations based on multiple datasets.

Table A1.3: Impact of income inequality on homicide rate (panel and panel IV estimates) using the logarithm of homicide rate as dependent variable.

| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
|-------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|
| | 2000-2010 | 2000-2005 | 2005-2010 | IV 2000-2010 | IV 2000-2005 | IV 2005-2010 |
| Income Gini | -0.0140 (0.181) | -0.1582 (0.254) | 0.9833** (0.398) | 1.4710* (0.811) | -0.5607 (0.521) | 4.7910** (1.907) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 7,285 | 3,635 | 3,708 | 5,529 | 3,617 | 3,700 |

Notes: Bootstrapped standard errors clustered at the municipal level (50 replications) in parentheses. Level of statistical significance: 1% ***, 5%**, and 10%*.

Source: Author' calculations based on multiple datasets.

Table A1.4: Descriptive statistics for spatial analysis.

| Variables | Observations | Mean | SD | Min | Max |
|---------------------------|--------------|----------|----------|----------|----------|
| Income Gini | 2,446 | .391732 | .0360072 | .303377 | .659405 |
| Income Ratio | 2,386 | .1466854 | .0284982 | .036198 | .288663 |
| Total crime rate | 2,457 | 603.6923 | 707.684 | 0 | 6071.508 |
| Intentional homicide rate | 2,457 | 14.14933 | 23.75993 | 0 | 288.6003 |
| Theft rate | 2,457 | 201.118 | 302.6398 | 0 | 3123.257 |
| Intentional injury rate | 2,457 | 56.79898 | 75.56224 | 0 | 476.9716 |
| Poverty | 2,446 | 24.4231 | 11.78524 | 0 | 85.67036 |
| Males 15-24 y.o. | 2,457 | 8.630567 | 1.101019 | 3.061224 | 13.65462 |
| Migration | 2,457 | 2.742344 | 1.979945 | 0 | 26.00755 |
| Incomplete education | 2,446 | 52.63084 | 14.52891 | 8.2009 | 91.269 |
| Density | 2,457 | 296.218 | 1208.515 | .144664 | 16818.1 |
| Unemployment rate | 2,457 | 4.549763 | 3.983725 | 0 | 51.85185 |
| NGV | 2,413 | .1547541 | .2099505 | .0004975 | .9977058 |
| Distance border | 2,457 | 752.8592 | 262.252 | 8.136756 | 1355.335 |
| Altitude | 2,457 | 1296.299 | 818.8193 | 1.5 | 3008.275 |
| Temperature | 2,457 | 20.4696 | 4.290472 | 10 | 29.5 |
| Precipitation | 2,457 | 1092.766 | 799.4323 | 53.6 | 4217.3 |

Source: Author' calculations based on multiple datasets.

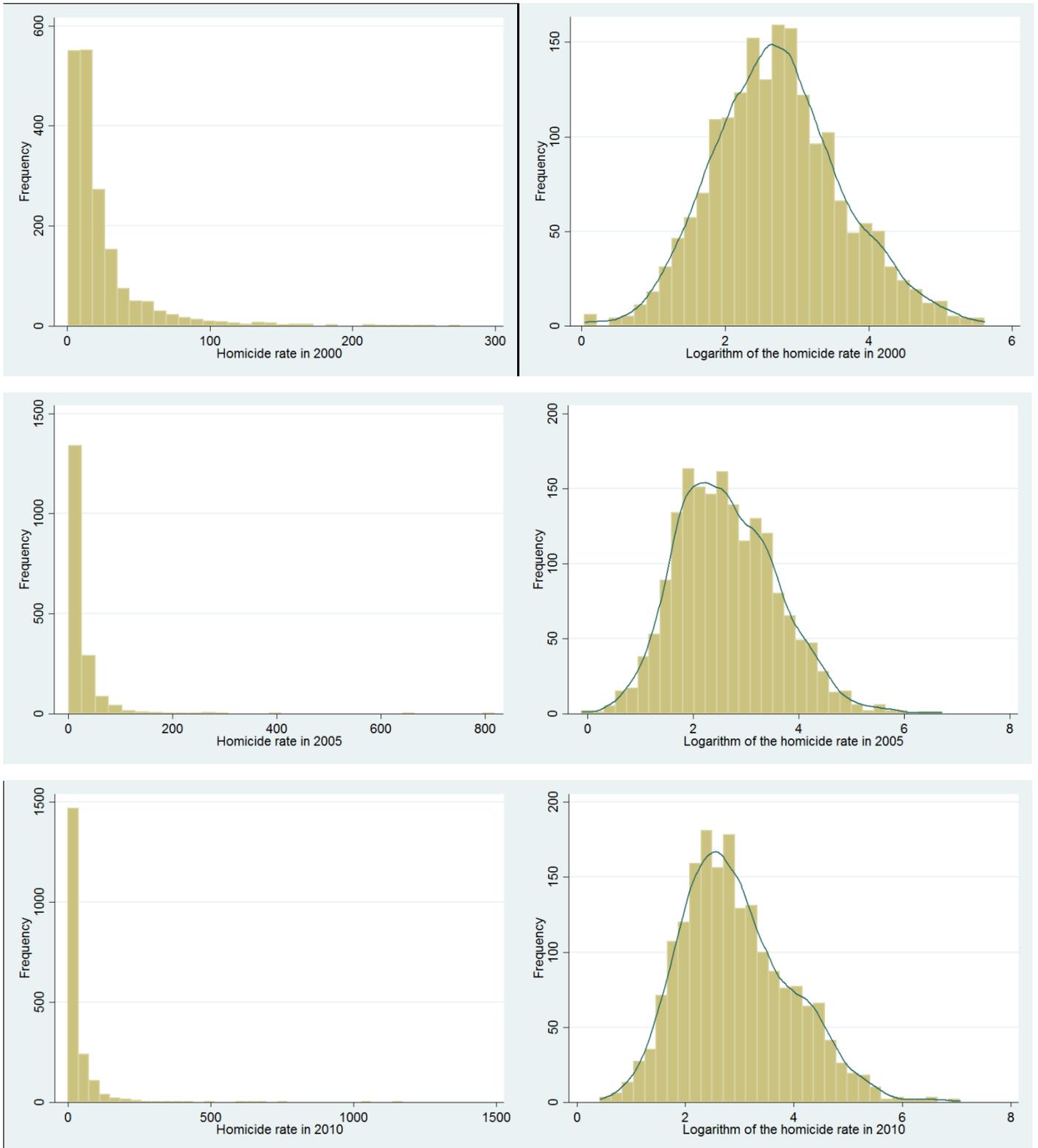
Table A1.5: First-stage regressions (spatial analysis).

| | Income (1) | Gini Income Ratio (2) |
|----------------------|-----------------------|-----------------------------|
| Altitude | 0.0033* (0.000) | 0.00495*** (0.000) |
| Temperature | 0.0012*** (0.000) | -0.0003 (0.000) |
| Precipitation | 0.00233** (0.000) | -0.00201** (0.000) |
| Poverty | 0.0002*** (0.000) | -0.0002*** (0.000) |
| Males 15-24 y.o. | 0.0006 (0.001) | -0.0005 (0.001) |
| Migration | -0.0008** (0.000) | 0.0004 (0.000) |
| Incomplete education | -0.0005*** (0.000) | -0.0000 (0.000) |
| Density | -0.0000*** (0.000) | -0.0000* (0.000) |
| Unemployment rate | 0.0017*** (0.000) | -0.0017*** (0.000) |
| NGV | 0.0164*** (0.005) | -0.0014 (0.003) |
| Distance border | 0.0000 (0.000) | 0.0000*** (0.000) |
| Constant | 0.3655*** (0.011) | 0.1610*** (0.009) |
| Observations | 2,413 | 2,354 |
| F-statistic | 17.18 | 20.94 |
| R-squared | 0.0841 | 0.1087 |

Notes: Altitude and Precipitation have been divided by 1000 to rescale the values of coefficients. Robust standard errors in parentheses. Level of statistical significance: 1% ***, 5% **, and 10%*.

Source: Author' calculations based on multiple datasets.

Figure A1.1: Distribution of homicide rates and logarithm of homicide rates (per 100,000 inhabitants).



Source: Author's calculations.

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Chapter 2: Do inequalities predict fear of crime?²⁹

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²⁹ This chapter is a joint work with Matthieu Clément.
Matthieu Clément: Investigation, Methodology, Data curation, Software, Formal analysis, Writing - review & editing.
Lucie Piaser: Conceptualization, Investigation, Methodology, Data curation, Software, Formal analysis, Writing - original draft, Writing - review & editing.

2.1 Introduction

Fear of crime has important harmful consequences in societies. Individually, it can cause dramatic health problems, worsening physical, mental health and well-being. Indeed, it hinders life satisfaction and triggers more stress and even depression (Michalos and Zumbo, 2000; Moore, 2006). Yet, feeling safe is one of the basic human needs, it is therefore necessary that every individual feels protected, physically and morally, to access upper needs such as esteem or self-actualization. Collectively, high levels of fear of crime erode social cohesion (Corbacho, Philipp, and Ruiz-Vega, 2015) and cooperation between individuals. Trust in the institutions such as the justice system or the police is harmed (Malone, 2010). It can also lead to massive population displacement and reduced economic opportunities. Thus, the human, economic and social costs of fear of crime are tremendous, hindering development. However, fear of crime is a complex phenomenon composed of overlapping concepts with blurred contours. Currently, there is no consensus, neither in the theoretical nor in the empirical literature over its conceptualization and operationalization.

In the 1960-70's, the theoretical and empirical literature about the determinants of fear of crime was mainly interested in the effect of individual characteristics and a consensus was rapidly reached on a number of factors such as sex, age, education, income and past victimization (see Hale (1996) for a complete review). Progressively, some authors emphasise the importance to consider, in addition to individual characteristics, the neighbouring environment while studying the different causes of fear of crime. Thus, research gradually opened up to collective determinants and this new empirical approach was favoured by the rediscovery of the social disorganisation theory by criminologists in the 1980's. Originally formulated to explain variation in levels of violence, this theory identifies structural factors at the neighbourhood level leading to the disruption of community social organisation. Slowly emerged as well, the idea that fear of crime may be unrelated (or at least to a lesser extent than previously stated in the literature) to violence level (Franklin, Franklin, and Fearn, 2008; Taylor and Hale, 1986; Vieno, Roccato, and Russo, 2013).

Empirical studies were primarily interested in the effect of traditional structural factors of social disorganisation such as poverty, racial heterogeneity and neighbourhood instability. Inequality is also a key community feature but its impact on fear of crime is, to our knowledge, barely studied. Even if some studies do so, most of them focus on developed economies and on cross-country/region comparisons, neglecting the effect of community characteristics and mechanisms because of their highly aggregated scale of analysis. Besides,

existing studies only pay attention to income inequality, neglecting the non-monetary dimensions of inequality. Lastly, only a few consider the three dimensions of fear of crime (emotion, cognition and behaviour) simultaneously. Our empirical investigation aims to fill this literature gap.

This study focuses on the Mexican case. In common with most Latin American countries, Mexico has historically been known for its very high degree of income inequality. Despite a significant decline in the 2000s (Lustig, Lopez-Calva, and Ortiz-Juarez, 2013), Mexico is still the fourth most unequal country of all OECD members, with a Gini index of 0.46 in 2014 (OECD, 2019). Violence is another challenge the country has to face. In Mexico, violence is historically related to drug-trafficking and organised crime, as the country is an important producer of illicit drugs and a major drug-trade junction thanks to its ideal geographic location between the United States and South America. Following the war on drugs launched by President Felipe Calderón in 2006, violence became even more prevalent. Indeed, conflicts intensified between rival drug-trafficking organisations or with military authorities in order to maintain control over territories, drug-trafficking routes or distribution centres. After a decrease until 2007, the death rate per homicide rose to reach its highest level recorded since 1990 in 2017, with 25.2 per 100 000 inhabitants (INEGI). This criminogenic context is also favoured by the availability of illegal firearms from the United States. Fear of crime is a real plague as well, as in a society, its levels are even often higher than the actual crime rate (Hale, 1996). In 2017, in Mexico, 63% of the survey respondents from the National Survey of Victimization and Perception of Public Security (Encuesta Nacional de Victimización y Percepción sobre Seguridad Pública, ENVIPE) declared feeling unsafe, in terms of delinquency, living in their municipality. Although the direct consequences of crime are not negligible, the damages of fear of crime are equally harmful. Even if the relation between inequality and crime in Mexico has already been deeply analysed in the literature (Enamorado et al., 2016; Vilalta and Muggah, 2016), the effect of inequality on fear of crime remains poorly addressed.

From this perspective, the purpose of this article is to study the causal impact of different measures of inequality (income and education) at the municipal level on individual fear of crime. Combining multiple datasets, this study has three main contributions. First, we construct an innovative composite indicator of fear of crime through multiple correspondence analysis, trying to compensate for methodological gaps in the existing literature. Using the 2017 ENVIPE, our outcome measure is a multidimensional index combining the three

components of fear of crime: emotion, cognition and behaviour. Second, we construct representative measures of education and income inequalities for Mexican municipalities. For income inequality, we rely on small area estimation and combine data from the 2015 Inter-Census Survey (Encuesta Intercensal, EIC) and the 2016 National Survey of Household Income and Expenditure (Encuesta Nacional de Ingresos y Gastos de Hogares, ENIGH). Third, relying on a two-stage least squares (2SLS) multilevel model, we assess the causal effect of inequality on fear of crime, controlling for the hierarchical structure of the data and endogeneity bias.

Our results suggest a strong positive linear relationship between municipal income inequalities and individual fear of crime, giving additional support to the existing empirical literature and confirming the damaging impact of this structural factor of social disorganisation on fear of crime. However, the observed effect is stronger for the emotive and behavioural components of fear of crime. More precisely, income inequality significantly deteriorates one's feeling of safety in his municipality of residence and during his daily life activities (emotive dimension). It also favours the adoption of constrained behaviours and protective measures against crime (behavioural dimension). Focusing on education inequality, we also find a positive impact on the feeling of unsafety, but of smaller magnitude. A positive influence on risk perception (cognitive dimension) is also detected, indicating that the latter relates more to education inequality than income inequality. Yet, if our results for income inequality are robust to the different robustness checks, for education inequality, results are less stable.

The rest of the article is structured as follows. Section 2 reviews the studies that link inequality and fear of crime, with a special focus on the underlying mechanisms and the social disorganisation theory. Data and variables are described in Section 3. Section 4 lays out the empirical strategy, whereas Section 5 presents the main findings. Finally, Section 6 concludes.

2.2 Literature review

The social disorganisation theory was originally formulated by sociologists from the “Chicago School” in order to explain variation in delinquency and crime rates. Shaw and McKay (1942) identify three structural factors leading to the disruption of the community social organisation: a precarious economic situation (poverty), ethnic heterogeneity and neighbourhood instability. The neighbourhood structure is thus identified as a cause of crime. After being dormant, this

theory reemerged in the 1980's and gained major attention from criminologists. The framework progressively expanded to include other community characteristics such as urbanisation, family disruption or inequality. For example, Blau and Blau (1982) were among the first to consider socio-economic inequalities as a key structural factor which could reduce social cohesion/integration and generate further social disorganisation and violent crime.

The renewal of the social disorganisation theory also owes a great deal to the pioneering work of Sampson and Groves (1989) which tested the social disorganisation theory as a relevant determinant of macro-level variations in crime rates. They considerably enriched the analysis, paying particular attention to the social mechanisms at work, binding community structural characteristics, social disorganisation and crime rates. Defining social disorganisation as the "inability of a community structure to realise the common values of its residents and maintain effective social controls" (Sampson and Groves, 1989, p. 777), they show that it mediates the effects of community structure on crime rates. Indeed, the concentration of structural disadvantages (such as low socio-economic status of the population, high residential mobility or racial segregation) leads to the absence of shared common values and impedes the development of formal or informal ties, weakening local social institutions. As a result, the community cannot address common problems nor exercise an effective informal social control over its members to prevent criminal behaviours. This lack of monitoring could burst into an increase in violence levels.

This framework was further refined and labelled as collective efficacy theory, an extension of the social disorganisation and social capital theories. Sampson et al. first described it as the "social cohesion among neighbours combined with their willingness to intervene on behalf of the common good" (Sampson, Raudenbush, and Felton, 1997, p. 918), insisting on the role of mutual trust and solidarity. Analysing residents from different Chicago neighbourhoods, their results confirm previous works: the effect of neighbourhood structural features on violence level is partially mediated through collective efficacy (measured as a combination of common values and informal social control). Another study of major importance is the one by Morenoff et al. (2001). First, contrary to previous studies, they include inequality as a key community structural characteristic while analysing homicide variations across neighbourhoods of Chicago. Second, they find concentrated disadvantage, inequality in socioeconomic resources and collective efficacy to be each, directly and independently of the others, associated with homicide.

Social disorganisation and collective efficacy theories were originally formulated to explain levels of violence. However, it slowly turns to the analysis of fear of crime as well. As collective efficacy emerged as the mechanism binding structural characteristics of social disorganisation and crime-related outcomes, an important part of the literature started to test the effect of collective efficacy on fear of crime. This was favoured by proxies for collective efficacy largely available and easily collected in victimisation, public safety or crime surveys. This literature offers mixed results. Several studies confirm that an increased perception of collective efficacy diminishes fear of crime among residents (Franklin, Franklin, and Fearn, 2008; Gibson et al., 2002; Ruiz Pérez, 2010; Zhao, Lawton, and Longmire, 2015). In this first facet of the empirical literature, social integration through social ties, community cohesion and collective efficacy may act as inhibitors of fear. Indeed, this allows the implementation of mechanisms of informal social control and informal social support. Community residents also have better access to the information thanks to dense social networks and develop a higher sense of interpersonal trust. As a result, they may feel more protected in public spaces, expect support from the community in case of victimisation and have a smaller perceived risk of personal victimisation. However, this view is not unanimous in the empirical literature. Some studies found mixed results depending on the fear of crime measure used (Rountree and Land, 1996; Taylor and Hale, 1986) and more recent studies even found contrary results (Ferguson and Mindel, 2007; Roman and Chalfin, 2008; Villarreal and Silva, 2006). The main underlying idea explaining this effect is that in socially integrated neighbourhoods, increased communication between residents can favour a greater spread of alarming, fake or exaggerated information on criminal activities or victimisation risk. Thus, collective efficacy may not always reduce fear of crime but may exacerbate it as well.

By focusing heavily on collective efficacy mechanisms, these studies neglect the direct effect of structural factors on fear of crime. This is certainly due to the fact that they quasi-solely use individual survey data and thus are not able to take into account more aggregated structural features. They sometimes at best include them as controls for contextual effect but without focusing on their impact on fear of crime. Moreover, studies testing the impact of the structural factors of social disorganisation on fear of crime mainly pay attention to the traditional community features mentioned in the literature, such as poverty, ethnic heterogeneity or family disruption. The effect of income inequality as a key structural characteristic is poorly considered however.

We posit that inequalities, as a factor of social disorganisation, may influence fear of crime through the mediating role of collective efficacy. High levels of inequality are detrimental to social cohesion and trust among community members (Alesina and La Ferrara, 2002). Indeed, strong disparities and in particular socio-economic inequalities exacerbate perceived social differences, encouraging people to see each other as strangers (Neckerman and Torche, 2007). Thus, inequality is expected to negatively affect social organisation and collective efficacy. However, the effect of collective efficacy on fear of crime may be ambiguous as explained above. Nevertheless, we expect a positive effect of inequality on fear of crime.

Studies focusing on the impact of inequality on fear of crime are scarce. Based on large available datasets, European countries are largely studied. Vieno et al. (2013) find a positive association between national levels of fear of crime and inequality. Kujala et al. (2019) emphasise similar results (even if moderate), employing various inequality measures at the national level for 20 European countries. At a more disaggregated level, Rueda and Stegmueller (2016) observe that in western European regions with higher degrees of inequality, respondents are more afraid of crime. All these studies use a similar and unique question as their measure of fear of crime: “How safe do you feel walking alone in the area you live after dark?”. Some scholars try however to enlarge the definition of fear of crime. For instance, Vauclair and Bratanova (2017) focus on a composite index combining three different indicators to measure fear of crime and risk perception and find a positive impact of national inequality in 29 European countries. Lastly, the work of Chon and Wilson (2016), contrary to previous studies, makes the distinction between highly developed and less developed countries. Analysing the impact of individual and country-level variables on fear of crime and risk perception, they do not emphasise any influence of income inequality, whatever the country of residence. These macro-studies, while relevant, only focus on developed economies and on cross-country/region analyses. Hence, they do not fit into the social disorganisation and collective efficacy frameworks because of the highly aggregated scale of analysis.

Empirical works at a more disaggregated geographical level are even rarer because inequalities representative at such a scale are more difficult to measure. Yet, they are more grounded in the social disorganisation theory and its underlying mechanisms. For example, at the level of 26 U.S. metropolitan areas, Collins and Guidry (2018) are interested in exploring the mediating role of social capital and civic engagement between inequality and sense of safety, in relation to the collective efficacy and social capital theory. They do not provide

evidence for a direct effect of inequality levels on their measure of residents' sense of safety. However, they found that as inequality increases, the sense of safety is expected to decrease indirectly through the mediation role of social capital. Gaitán-Rossi and Shen (2018) study the effects of traditional individual predictors and municipality characteristics on fear of crime in Mexico's urban population. Distinguishing the three components of fear of crime (emotion, cognition and behaviour), they find that people living in more unequal municipalities report higher perceptions of risk. They also analysed the effect of collective organisation indicators, at the municipal and individual levels and found that they positively influence fear of crime, showing that collective efficacy is not a protective factor of fear of crime in this particular context.

To sum up, the empirical literature analysing the impact of inequalities on fear of crime is still emerging. It is interesting to note that existing studies only focus on income inequality and only a few consider the different dimensions of fear of crime. Moreover, evidence on developing countries and/or at a more disaggregated level is clearly lacking. Thus, one objective of this study is to fulfil these gaps. Our main aim is to highlight and quantify the direct effect of inequality on fear of crime. With the data at hand, we are unfortunately unable to test for possible transmission channels, in particular we cannot show that our favoured channel, which operates through social disorganisation and collective efficacy, is effectively at work. This is despite the fact that, by focusing on inequalities at the municipal level, our analysis fits with these two frameworks.

2.3 Data and variables

2.3.1 Fear of crime

For many years, and still today, fear of crime was measured by a single question (and the variants that may exist) namely: "How safe do you feel or how safe would you feel walking alone in your neighbourhood at night?" (e.g. Garofalo, 1979; Box, Hale, and Andrews, 1988). This method is however very imperfect, and many authors have formulated criticisms that tend to diminish the relevance of this type of question for measuring fear of crime (Garofalo, 1979; Ferraro and LaGrange, 1987; Rader, 2004) and the results obtained so far.

Gradually, researchers insist on the fact that fear of crime is a multidimensional phenomenon (Ferraro and Grange, 1987; Gabriel and Greve, 2003; Rader, 2004; Smith and Torstensson, 1997). A theoretical consensus rapidly emerged on the necessity to distinguish the emotive dimension, which encompasses fear of crime, from the cognitive component representing risk

perception (Ferraro and Grange, 1987; Smith and Torstensson, 1997). However, the operationalization of such a concept is way more hazardous and debated. Indeed, there is a huge disagreement in empirical studies on the adequate indicators to measure each dimension. One salient example is the use of questions relative to feeling of safety. It seems to be both a common measure of risk perception (Krucichová, 2019; Rountree and Land, 1996; Visser, Scholte, and Scheepers, 2013) and fear of crime (Chon and Wilson, 2016; Wyant, 2008). Thus, concepts and indicators are often used interchangeably when referring to the emotive and cognitive dimensions (Ferraro and Grange, 1987). Moreover, risk perception is mainly studied as a determinant of fear of crime (Ferguson and Mindel, 2007; Krulichová, 2019; Smith and Torstensson, 1997) but the reverse causal order is also verified (Gabriel and Greve, 2003; Rader, May, and Goodrum, 2007). On the contrary, studies focusing on the behavioural component are rarer and mostly analyse it either as a cause or a consequence of fear of crime (Ferguson and Mindel, 2007; Liska, Sanchirico, and Reed, 1988). Only a few recent works consider it as a proper dimension of fear of crime (Roman and Chalfin, 2008; San-Juan, Vozmediano, and Vergara, 2012).

Yet, some authors offer to consider the three dimensions of fear of crime simultaneously, reinforcing the multidimensionality of the concept and breaking with the traditional dependency relations established previously in the literature (Gabriel and Greve, 2003; Rader, 2004). Gabriel and Greve (2003) were among the first to identify the three dimensions as complementary facets of fear of crime. Even if they acknowledge that fear of crime is mainly an emotive phenomenon, they note that this facet is always accompanied by a cognitive one and that the behavioural dimension is also part of the concept. They consider that these three components are necessary conditions for the state of fear to be experienced. In the same vein, Rader (2004) proposes a broader concept called “threat of victimisation” where fear of crime is only the emotive dimension. The cognitive (risk perception) and behavioural (constrained behaviours) components are also constitutive of it. In this new theoretical framework, the three dimensions of threat of victimisation are interrelated because they are involved in reciprocal relations (for partial empirical evidence, see Rader et al. (2007)).

To sum up, we can say that fear of crime is a complex phenomenon composed of overlapping concepts with fuzzy contours. There is no consensus, neither in theoretical nor the empirical literature, offering a wide range of conceptualizations and operationalizations of fear of crime. As stated by Farrall et al., “our understanding of the fear of crime is a product of the way it has been researched rather than the way it is” (Farrall, Bannister, Ditton, and Gilchrist, 1997,

p. 658). One of the contributions of this paper lies in the construction of an innovative measure of fear of crime that tries to overcome previously exposed limitations.

The data for our fear of crime measurement come from the 2017 ENVIPE survey conducted by the National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía, INEGI) of Mexico. One of the objectives of this rich survey is to measure the perception of public safety of the adult population, his degree of institutional trust and experiences with institutions in charge of public security and justice. The sampling unit is the dwelling unit. For every household in the selected dwellings, one person, aged 18 or more is interviewed. The survey is representative at the national and state levels.

As fear of crime is fundamentally a multidimensional phenomenon (Rader, 2004; Gabriel and Greve, 2003; Smith and Torstensson, 1997; Ferraro and LaGrange, 1987), several variables are constitutive of it, but each considered individually cannot claim to be a sufficient measure of the phenomenon.³⁰ A global indicator will provide an overview of the different components of fear of crime, which allows us to observe and measure adequately a multitude of configurations and not just a simple dichotomous situation (fearful versus not fearful). Thus, our indicator takes into account all dimensions of fear of crime and synthesises effectively all its manifestations. Besides, it also allows us to assess fear of crime intensity via a score. To construct this composite index of fear of crime, we rely on Multiple Correspondence Analysis (MCA) since the data consist of categorical variables.³¹ The three dimensions used are:

1) Emotional component: this dimension relates to negative emotional reactions generated by crime and the symbols associated with it. Issues related to this dimension seek to capture whether individuals feel insecure or worry about crime.

2) Cognitive component: this is the risk perceived by individuals through the assessment of their extent and likelihood of being a victim of crime.

³⁰ Trying to overcome these limits, some authors create composite indexes aggregating different questions instead of a single one. However, these studies do not pay particular attention to the different dimensions of fear of crime (Ruiz Pérez, 2010; Wyant, 2008) or at best focus solely on the emotive component (Markowitz et al., 2001; Vaclair and Bratanova, 2017).

³¹ This method analyses the pattern of relationships between several categorical variables, allowing synthesising rich and complex information on a reduced number of axes. The contribution of each axis to the total variance, i.e. the percentage of information summarised, is determined endogenously. The higher the contribution, the more the axis is important in explaining the phenomenon. The MCA also allows to aggregate the different variables into a synthetic indicator by estimating a weighting system based on the coordinates of these variables on the different axes, generally the first and second ones, depending on their contribution to total inertia (for more details see Greenacre, 2007).

3) Behavioural component: it reflects the adoption of preventive and/or defensive behaviours for fear of being victimised. The goal is to avoid possible risks and/or protect oneself against crime.

For each of these three facets of fear of crime, we select different indicators from the ENVIPE survey, as shown in Table 2.1 (respectively two variables for the emotive and behavioural dimensions and one for the cognitive one). The weights assigned to each indicator based on the MCA are also reported. They are only derived from the first axis given its strong contribution to the total inertia (i.e. 90.19%). Categories with negative weights indicate fear of crime and vice versa. Categories with the highest weights (in bold) are a low feeling of municipal and everyday life insecurity, a low degree of risk perception and no constrained behaviours adopted. On the contrary, categories with the lowest weights (in italics) are a perception of high insecurity in the municipality and during everyday life, a strong subjective victimisation probability and the adoption of many risk avoidance and protective behaviours. For every individual, the fear of crime index is the weighted average of his answers. To facilitate the interpretation of our results, we rescale the fear of crime indicator as an index scoring from 0 to 1 such as 0 indicates the lowest level of fear in our sample and 1 suggests the highest level of fear.

To further investigate the effect of inequalities on fear of crime and to ease comparisons with other contexts, we also run econometric estimations on each variable of the index separately. Nevertheless, it is important to keep in mind that replications are difficult to achieve because empirical studies resort to different surveys where questionnaires are distinct and not exactly similarly formulated.

Table 2.1: Multiple correspondence analysis weights.

| Dimensions | Questions | Indicators | Category | Weights |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------------------------------|---------------------------------------------------------|
| Emotive | In terms of delinquency, do you consider that living in this municipality is safe or unsafe? | Municipality insecurity | 0- Safe 1- Unsafe | 1.225 <i>-0.690</i> |
| | In terms of delinquency, tell me if you feel safe or unsafe in ... It has twelve items such as: street, market, public transportation, park etc. | Everyday life insecurity | 0- Low 1- Medium low 2- Medium high 3- High | 1.791 0.160 <i>-0.681</i> <i>-1.260</i> |
| Cognitive | In what is left of 2017, near the places you move on or for the type of activities you do, do you believe this could happen to you? (1) Theft or assault in the street or in public transportation; (2) Injuries due to physical aggression; (3) Extortion or kidnapping demanding money or goods. | Risk perception | 0- Low 1- Medium low 2- Medium high 3- High | 1.650 0.188 <i>-0.413</i> <i>-1.002</i> |

| | | | | |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------|-------------------------------------------|
| Behavioural | During 2016, due to fear of being a victim of some crime (theft, assault, kidnapping, etc.), did you refrain from?: (1) Going out at night; (2) Visiting friends or family; (3) Using public transportation; (4) Going out for lunch or dinner; (5) Travelling in highway etc. | Constrained behaviours (CB) | 0- No CB 1- Few CB 2- Some CB 3- Many CB | 1.481 0.407 -0.574 -1.377 |
| | During 2016, to protect yourself from delinquency, were any measures taken in this household such as: (1) changing or reinforcing doors or windows; (2) installing alarms and/or surveillance camcorders; (3) buying a watch dog; (4) carrying out joint actions with your neighbours etc. | Protective measures (PM) | 0- No PM 1- One PM 2- 2 or more PM | 0.614 -0.438 -1.161 |

Source: Authors' calculations based on ENVIPE.

2.3.2 Inequality variables

From a methodological perspective, measuring the distribution of intra-municipal inequality raises some important issues. Ideally, census data should be privileged to measure inequality at the municipal level, to the extent that doing so ensures representativeness at the municipal scale. This could be done for education inequality since information on educational attainment is available. Our measure of education inequality is the Gini index applied to the number of years of schooling available in the 2015 EIC survey. We calculate education Gini for individuals aged over 15 and use a formula that allows for 0-values.

However, censuses are not suited for the measurement of income inequality because of the absence of income data collection. Household surveys are better suited in this regard but fail to be representative at a disaggregated level, such as municipalities. This is the reason why, in line with the pioneering work of Elbers, Lanjouw and Lanjouw (2003), we apply small area estimation (SAE) techniques. The main objective of SAE is to combine census and survey data in order to simulate representative inequality measures at a spatially disaggregated level. Several studies have applied SAE techniques to measure income inequality among Mexican municipalities (e.g. Enamorado et al., 2016). In this study, we provide our own SAE estimates based on the combination of the 2015 EIC inter-census survey and the 2016 ENIGH household survey implemented by INEGI.

Despite many recent refinements in SAE methods, we adopt the standard approach developed by Elbers, Lanjouw and Lanjouw (2003) because of its multiple applications in poverty and inequality analysis. The methodology and its implementation are extensively described in the Appendix 2.1. From these SAE simulations, we generate our main measures of income inequality, calculated at the municipal level. We mainly use the Gini index but have also calculated the generalised entropy indices to test the robustness of our results. Figures A2.1

and A2.2 in the Appendix report maps depicting the spatial distribution of education and income Gini across Mexican municipalities.

2.3.3 Control variables

2.3.3.1 Individual-level predictors (from 2017 ENVIPE)

Fear of crime is partly explained by individual experiences of crime. Because of its long lasting psychological and/or material consequences, victimisation fosters feelings of vulnerability and insecurity among victims, reinforcing their fear of crime (e.g. Hale, 1996). We account for past household victimisation with a dummy taking the value 1 if one of the household members was a victim of a crime during 2016. Some population groups are more vulnerable to crime and, because they have a higher perception of their vulnerability, they feel less safe and express more fear toward crime. This is particularly true for women and the elderly (e.g. Pantazis, 2000). To control for that, we include the sex and age of individuals. Finally, education and working are proxies for individual socio-economic status. People with low socio-economic status may have a low capacity of prevention and resilience, because of meagre social and economic resources. As they are less vulnerable, they are supposed to be less fearful (e.g. Hale (1996)). Education is captured by a five-scale categorical variable (no education, primary, lower secondary, upper secondary and higher education). Activity status is measured with a dummy indicating if the individual was working the week before the interview.

2.3.3.2 Municipal-level predictors

Considering the neighbouring environment while studying the different determinants of fear of crime is crucial. Back to the theory of social disorganisation, Shaw and McKay (1940) have identified three structural factors leading to a disruption of community social organisation: a precarious economic situation, ethnic heterogeneity and high residential mobility. This is why several variables related to social disorganisation are included.

Population density comes from the 2015 EIC survey, as the participation rate of men aged between 15 and 29. We also use this database to get an index of ethno-linguistic fractionalization (Normalised Generalised Variance, NGV)³² and to calculate a proxy for

³² NGV can be expressed as follows (Budescu and Budescu, 2012): $NGV = \frac{1}{C(C-1)} \sum_{i=1}^C P_i^2$. Where P_i is the proportion of people who belong to the ethnic group i and C is the number of groups. NGV measures “the probability that two randomly selected individuals from a particular population belong to different subgroups (...). A high value (probability) reflects a higher degree of diversity” (Budescu and Budescu, 2012, p. 217).

migration defined as the proportion of household heads living in a different municipality five years earlier, in 2010. Income represents the households' average annual income per capita in thousands of pesos estimated through SAE. We account for the exposure to violence with the 2015 average homicide rate per 100 000 inhabitants according to registration year (INEGI) and an index of prevalence of drug cartels. The latter was constructed from the UCDP Georeferenced Event Dataset (Uppsala University). This dummy gets the value of 1 if at least one event³³ involving a drug cartel was identified in the municipality in 2016. Security and justice are respectively the number of security and justice personnel employed by the municipality per 10 000 inhabitants. These variables indicate the willingness of the municipality to fight crime and delinquency and its implication in maintaining social order. They are calculated for the year 2014, using the National Census of Municipal Governments and Delegation (Censo Nacional de Gobiernos Municipales y Delegacionales, 2015).

Descriptive statistics for each of the variables are reported in Table A2.1 in the Appendix.

2.4 Empirical strategy

One of the main methodological challenges of this study is both to control for the multilevel structure of the data (individuals nested within municipalities) and the endogeneity of our variable of interest. Addressing clustering in the analysis of hierarchical data is fundamental otherwise results may suffer from a lack of validity. If not, standard errors will be underestimated, leading to an overstatement of the statistical significance of coefficients (Goldstein, 2011). This will affect in particular standard errors of the coefficients of higher-level variables. To take into account the hierarchical structure of our data, we use a multilevel modelling approach, which provides many advantages. It generates statistically efficient estimates of regression coefficients, provides correct standard errors, confidence intervals and significance tests (Goldstein, 2011).

Dealing with endogeneity is another important issue. Indeed, we suspect that our different measures of inequality may be endogenous. The first reason is reverse causality. If people feel unsafe in their municipality of residence, the most prosperous citizens may move out to a more secure place (Sampson and Wooldredge, 1987). The level of income inequality in a municipality will then be affected by the feeling of fear of its residents. This reasoning also applies to education inequality, as the most educated citizens may also have better facilities to

³³ An event is defined as an incident where armed force was used by an organised actor against another organised actor, or against civilians, resulting in at least 1 direct death at a specific date and location.

move out if they feel insecure, modifying the municipal distribution of educational levels. Potential biases may also arise due to omitted variables. According to social disorganisation and collective efficacy theories, community dynamics and interactions play an important role in shaping fear of crime (Box, Hale, and Andrews, 1988; Collins and Guidry, 2018; Ferguson and Mindel, 2007). However, these characteristics and in particular social ties, informal social control, civic engagement and collective efficacy are unobservable at the municipal level and plausibly correlated with income and education inequalities.

To assess correctly the causal impact of inequality levels on individuals' fear of crime, we adopt a multilevel model combined with a two-stage least squares (2SLS) procedure. In the first stage, we regress our inequality variable on all exogenous variables defined at the municipal level plus the selected instruments.

$$INEQ_j = \alpha_0 + \alpha_1 X_j + \alpha_2 Z_j + \varepsilon_j \quad (1)$$

Equation (1) models inequality levels for each municipality j ($INEQ_j$). X_j is a vector of municipal-level exogenous variables and Z_j is a vector of instruments. ε_j are municipal residuals.

Then, we use a multilevel model to allow for clustering of residents' fear of crime by municipality. Fear of crime for individual i living in municipality j (FOC_{ij}) is regressed on the predicted value of the endogenous variable (\widehat{INEQ}_j) obtained from the previous stage. In this specification, we add control variables at the individual (X_{ij}) and municipal (X_j) levels. e_{ij} are individual residuals and u_j are municipal ones. The error terms are assumed to be normally distributed.

$$FOC_{ij} = \alpha_0 + \alpha_1 X_{ij} + \alpha_2 X_j + \alpha_3 \widehat{INEQ}_j + e_{ij} + u_j \quad (2)$$

This model allows the intercept to vary randomly across municipalities. As a result, the residual variance is decomposed into a between-municipality component (variance of the municipal-level residuals) and a within municipality component (variance of the individual-level residuals). The standard errors of the second-stage estimates are adjusted via bootstrapping (500 replications) to account for the two-step estimation and obtain robust standard errors. When focusing separately on the five indicators making up our composite index of fear of crime, we adopt the same IV multilevel strategy but use Logit and ordered Logit estimates in order to take into account the nature of the variables (i.e. one dummy and four ordinal variables, see Table 2.1).

Identifying relevant instrumental variables is a difficult task as they have to satisfy two requirements: (i) being good predictors of the endogenous variable even after controlling for the exogenous regressors (instrument relevance) and (ii) having no direct effect on fear of crime other than through its influence on the endogenous variable (instrument exogeneity or exclusion restriction). This challenge is even more important when focusing on a spatially disaggregated level such as the municipality level for which little information is available.

Following the pioneering work of Easterly (2007) and in particular its underlying intuition, we use meteorological data as instruments to tackle endogeneity of inequality in our data. Sokoloff and Engerman (2000) have developed the idea that factor endowments in Latin American colonies historically contributed to the emergence of strong wealth, human capital, and political power inequalities, which are still deeply rooted nowadays. Because these countries had soil and climate well suited for cash crops such as sugarcane, cocoa and coffee, settlers set up large plantations relying on intensive slave labor. The resulting distribution of land, income and human capital was highly unequal. On the contrary, North American colonies' endowment favoured family farms growing subsistence crops (wheat in particular), homogenous population and a relatively equal distribution of wealth. Even if Mexico was not historically known for high-scale sugarcane production relying on slavery,³⁴ factor endowments still played an important role in shaping inequality in Mexican society (Sokoloff and Engerman, 2000). At the time of the colonisation, the country was rich in mineral resources and of a native population providing cheap and abundant labour. Spanish authorities awarded property titles to the early settlers, allowing the implementation of large-scale agricultural exploitation and mines, concentrated in the hands of the local elite. This resulted in a highly unequal distribution of land and wealth. After independence, inequalities persisted as the elite maintained its dominant status and power. It could be argued that the agrarian reform implemented in 1911 during the Mexican Revolution may have lessened the legacies of colonisation. However, it happened one century after independence, leaving time for inequalities to become deeply entrenched in society.

Following this theory, Easterly (2007) uses measures of agricultural endowments to instrument inequality. In particular, he relies on geographical and meteorological data (such as soil, rainfall, temperature and altitude) to predict the percentage of agricultural land suitable for growing wheat versus sugarcane in a country. Furthermore, he argues that despite

³⁴ Note however that cash crops were still part of Mexican agriculture. For example, in 2012, the country was the 6th world largest producer of sugarcane, using around 2.7% of its agricultural land (SIAP and SAGARPA).

being less precise than real production data, relying on meteorological measures ensures the exogeneity of the instruments. Such land suitability data are not available at the scale of Mexican municipalities. We were however able to collect weather data for 967 weather stations all over the territory. The data comes from the National Water Commission (Comisión Nacional del Agua, CONAGUA). It includes, for every station over the 1951-2010 period, the yearly average amount of precipitation, temperature and the altitude. Every municipality centroid is then matched with the nearest weather station based on latitude and longitude coordinates. Our data present a high variability at the municipal level (see Table A2.1 in the Appendix for descriptive statistics and Figures A2.3 and A2.4 for cartographic representations). These meteorological data intend to reflect the land endowment of every municipality and thus their historical path of inequality.³⁵

2.5 Results

The original sample is composed of 92,551 individuals. Following previous studies (e.g. Gaitán-Rossi and Shen, 2018), we choose a threshold of at least 20 individuals per municipality. Indeed, as most of the variability in our data occurs within municipalities, small clusters could bias the estimates. The final analysis sample contains, depending on the regression, between 71,665 and 73,368 individuals (or between 77% and 79% of the original sample) nested within 577 municipalities, covering every state of the country. Table 2.2 presents estimations for the impact of income and education inequalities on our individual index of fear of crime. Regressions (1) and (2) do neither control for endogeneity nor the hierarchical structure of the data, whereas regressions (5) and (6) do. Regressions (3) and (4) only take into account the multilevel nature of the data.

Individual level variables are found to be good predictors of fear of crime, most of them being significant at the 1% level whatever the econometric specification. However, if some exhibit the expected signs, such as gender and past victimisation, others contradict previous findings. For instance, a higher socioeconomic status goes together with more fear of crime, contradicting prior evidence. The effects of municipal control variables are sensitive to the different inequality measures (regressions (5) and (6)) but are globally in line with the literature.

³⁵ Other papers also use weather data as an instrument for inequality and in particular rainfall. For example, Nepal et al. (2011) use rainfall shocks to instrument economic inequality. Although the underlying reasoning is slightly different, Ramcharan (2010) uses weather and crop characteristics to instrument land inequality, their measure of wealth disparity.

Let now consider the influence of inequalities on fear of crime. To do so, we primarily focus on IV multilevel estimates (regressions (5) and (6)), the most relevant ones. For the income and education Gini, the F-statistics of the first-stage regressions are largely greater than 10 and the instruments are found to be good predictors of inequalities (Table A2.2 in the Appendix for more details). Positive and significant coefficients for the three instruments (except for altitude when instrumenting education inequality) suggest that meteorological and altitude variations strongly affected farming specialties across Mexican municipalities in the past (cash crops vs. feed crops) and then positively influenced local income or education inequalities.

The results show that income inequality has a positive and significant effect (at the 1% level) on fear of crime (regression (5)), meaning that people living in more unequal municipalities have a greater fear of crime. This effect is strong since a one-point increase in the Gini index leads to a 5-point rise in the fear of crime index. It is interesting to note that controlling for the endogeneity of income inequality clearly reinforces this impact. The size of the coefficient on the income Gini more than triples when using an IV approach (regression (5)) compared to OLS or multilevel estimates (regressions (1) and (3)). This result adds further evidence to the existing empirical literature on the link between income inequality and fear of crime found in other contexts (Kujala, Kallio, and Niemelä, 2019; Rueda and Stegmüller, 2016; Vieno, Roccato, and Russo, 2013) and confirms the impact of the structural factors of social disorganisation on fear of crime. On the contrary, we fail to emphasise any significant effect of municipal education inequality on the individual fear of crime when controlling for endogeneity issues (regression (6)) whereas a counter-intuitive negative effect is highlighted with OLS and multilevel estimates (regressions (2) and (4)).

Table 2.2: Impact of income and education inequalities on fear of crime (OLS, multilevel and IV multilevel estimates).

| | OLS | | Multilevel | | IV multilevel | |
|--------------------------------------|-----------|------------|------------|------------|---------------|-----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Municipality-level predictors | | | | | | |
| Income Gini | 1.3356*** | | 1.4272*** | | 5.0280*** | |
| | (0.050) | | (0.192) | | (1.135) | |
| Education Gini | | -0.6541*** | | -0.5369*** | | 0.3628 |
| | | (0.035) | | (0.104) | | (0.229) |
| Density | 0.0123*** | 0.0115*** | 0.0163*** | 0.0165*** | 0.0086*** | 0.0193*** |

| | | | | | | |
|------------------------------------|------------|------------|------------|------------|------------|------------|
| | (0.000) | (0.000) | (0.002) | (0.003) | (0.003) | (0.003) |
| Migration | 0.1934*** | -0.0022 | 0.2497*** | 0.0952 | 0.2494*** | 0.2860*** |
| | (0.022) | (0.023) | (0.087) | (0.089) | (0.068) | (0.088) |
| Income | -0.0012*** | -0.0008*** | -0.0010*** | -0.0007*** | -0.0034*** | 0.0008* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Ethno-linguistic fractionalization | -0.1597*** | -0.0580*** | -0.0816*** | -0.0029 | -0.1139*** | -0.0654** |
| | (0.009) | (0.009) | (0.0241) | (0.024) | (0.025) | (0.026) |
| Homicide rate | 0.0009*** | 0.0012*** | 0.0001 | 0.0004* | 0.0004*** | 0.0002 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Drug cartel | -0.0099*** | -0.0186*** | 0.0039 | 0.0119 | -0.0196 | -0.0021 |
| | (0.003) | (0.003) | (0.0147) | (0.015) | (0.012) | (0.014) |
| Participation rate (for men 15-29) | 0.0214 | 0.0835*** | 0.1073* | 0.1173** | 0.1341*** | 0.1432*** |
| | (0.017) | (0.017) | (0.0586) | (0.057) | (0.045) | (0.047) |
| Security | 0.0000** | -0.0000** | -0.0000 | -0.0001 | 0.0000 | -0.0001* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Justice | -0.0002*** | -0.0003*** | -0.0004* | -0.0005* | -0.0002 | -0.0005** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Individual-level predictors | | | | | | |
| Female | 0.0671*** | 0.0678*** | 0.0682*** | 0.0683*** | 0.0682*** | 0.0683*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.002) | (0.003) |
| Age | 0.0076*** | 0.0075*** | 0.0072*** | 0.0073*** | 0.0072*** | 0.0073*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Age squared | -0.0001*** | -0.0001*** | -0.0000*** | -0.0001*** | -0.0000 | -0.0001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Education (Ref.=no education) | | | | | | |
| Primary | 0.0536*** | 0.0460*** | 0.0533*** | 0.0526*** | 0.0533*** | 0.0533*** |
| | (0.005) | (0.005) | (0.004) | (0.005) | (0.004) | (0.005) |
| Lower secondary | 0.0820*** | 0.0708*** | 0.0787*** | 0.0777*** | 0.0786*** | 0.0786*** |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| Upper secondary | 0.0859*** | 0.0754*** | 0.0800*** | 0.0790*** | 0.0800 | 0.0799*** |
| | (0.005) | (0.005) | (0.006) | (0.006) | (0.006) | (0.006) |
| Higher education | 0.0865*** | 0.0778*** | 0.0821*** | 0.0812*** | 0.0821*** | 0.0820*** |
| | (0.005) | (0.005) | (0.007) | (0.008) | (0.008) | (0.008) |
| Working | 0.0101*** | 0.0112*** | 0.0121*** | 0.0122*** | 0.0121*** | 0.0122*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Household victimisation | 0.1287*** | 0.1310*** | 0.1210*** | 0.1212*** | 0.1211*** | 0.1212*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.002) | (0.003) |
| Constant | -0.2769*** | 0.4382*** | -0.3660*** | 0.3643*** | -1.7278*** | 0.0090 |

| | | | | | | |
|------------------|---------|---------|---------|---------|---------|---------|
| | (0.022) | (0.017) | (0.079) | (0.050) | (0.428) | (0.100) |
| Observations | 71,665 | 71,665 | 71,665 | 71,665 | 71,665 | 71,665 |
| Number of groups | / | / | 577 | 577 | 577 | 577 |

Notes: Robust standard errors are reported into brackets. Level of statistical significance: 1% ***, 5%**, and 10%*. Source: Authors' calculations based on multiple datasets.

To further investigate the effect of inequalities on the different dimensions of fear of crime, we run additional estimations for the five indicators making up our fear of crime index (Table 2.3). Income inequality significantly deteriorates (at the 1% level) one's feeling of safety in his municipality of residence and during his daily life activities (regressions (1) and (2)). For instance, a one-point increase in the income Gini index raises the probability of feeling unsafe in one's municipality by around 10 percentage points, all things being equal. In addition, higher levels of income disparities also favour the adoption of constrained behaviours (regression (4)) and protective measures against crime (regression (5)). However, individuals living in more unequal municipalities do not perceive their likelihood of being victim of a crime as higher than individuals living in less unequal municipalities (regression (3)). Thus, income inequality solely affects the emotive and behavioural facets of fear of crime. By encouraging relational distance, high levels of income inequality induce a lack of social cohesion, mutual trust and solidarity. In turn, it may accentuate worries and anxiety related to crime (Vauclair and Bratanova, 2017; Vieno, Roccato, and Russo, 2013), leading individuals to feel insecure in their municipality of residence and during their daily life activities and adopt more constrained and protective behaviours even if they do not consider themselves more at risk of being victim of a crime than residents of a more equal municipality. It is quite surprising that individuals' risk perception remains unaffected by the level of income inequality in the municipality, taking its effects on the emotive and behavioural dimensions into consideration. Hence, the emotive and behavioural dimensions could be understood as more visceral, maybe irrational fears.

As income inequality, education inequality positively influences (at the 1% level) feeling of unsafety (regressions (6) and (7)). However, the effect is smaller in magnitude. A one-point increase in the education Gini index raises the probability of feeling unsafe in one's municipality by around 1 percentage point, all other things held constant. This is not surprising since the impact of inequality on individuals' fear of crime is highly related to their own perception and experience of inequality. Education inequality, unlike income inequality, is less visible (even if the two are closely related) and probably generates less frustration and

envy. It could also be seen as more acceptable because of meritocracy. People’s perception of their victimisation probability is also positively and significantly affected (at the 1% level) by education inequality (regression (8)). Individuals living in municipalities with stronger educational disparities feel more at risk of being the victim of a crime. Interestingly, this effect is not detected with income inequality, indicating that risk perception relates more to education inequality than income inequality. It may be argued that educational disparities, by harming collective efficacy, impede the implementation of effective informal social control mechanisms of crime and raise one’s subjective probability of victimisation. This finding calls for further research examining the social processes behind high levels of education inequality at the level of Mexican municipalities. Lastly, higher levels of education inequality surprisingly lead to a reduction of measures adopted to protect oneself against crime (regression (10)). This could be explained by the ambiguous effect of collective efficacy on fear of crime. Indeed, some studies highlight the fact that in highly socially integrated neighbourhoods, increased communication between residents can favour a greater spread of alarming, fake or exaggerated information on criminal activities or victimisation risk. Thus, in unequal municipalities, where collective efficacy is impaired, this pernicious effect may be curbed, reducing the adoption of protective measures by inhabitants (Ferguson and Mindel, 2007). This result reminds of the one obtained by Gaitán-Rossi and Shen (2018). Yet, more research is needed to understand this counterintuitive effect and its potential underlying mechanisms.

Table 2.3: Impact of income and education inequalities on the different dimensions of fear of crime (IV multilevel estimates).

| | Emotive component | | Cognitive component | Behavioural component | |
|-----------------------|--------------------------------------|---------------------------------------|------------------------------|-------------------------------------|----------------------------------|
| | Municipality insecurity ^a | Everyday life insecurity ^b | Risk perception ^b | Constrained behaviours ^b | Protective measures ^b |
| | (1) | (2) | (3) | (4) | (5) |
| Income Gini | 10.1432*** | 50.9873*** | 1.9699 | 10.6092*** | 20.7141*** |
| | (0.957) | (3.619) | (3.851) | (3.511) | (3.941) |
| | (6) | (7) | (8) | (9) | (10) |
| Education Gini | 1.1249*** | 3.8042*** | 3.3155*** | 0.6746 | -1.7833** |
| | (0.195) | (0.768) | (0.691) | (0.665) | (0.792) |

| Control variables | Yes | Yes | Yes | Yes | Yes |
|-------------------|--------|--------|--------|--------|--------|
| Observations | 72,491 | 73,368 | 72,734 | 73,136 | 73,277 |
| Number of groups | 577 | 577 | 577 | 577 | 577 |

Notes: Robust standard errors are reported into brackets. In IV estimates, errors are clustered at the municipal level. Level of statistical significance: 1% ***, 5%***, and 10%*. (a) Binary Logit estimates (marginal effects are reported). (b) Ordered Logit estimates (coefficients are reported).

Source: Authors' calculations based on multiple datasets.

To sum up, our results show that both income and education inequalities influence fear of crime even if their effects vary in magnitude, significance and sign depending on the dimension considered.

2.5.1 Robustness checks

We propose to explore further the impact of inequalities on fear of crime through several robustness checks. First, we estimate the effect of income inequality on fear of crime and its sub-dimensions using alternative inequality indices. Table A2.3 in the Appendix reports the estimations with the three well-known entropy indices: the mean log deviation GE(0), the Theil index GE(1) and half the squared coefficient of variation GE(2). Our results are fairly robust to these alternative inequality measures. GE(0) and GE(1) increase fear of crime, affecting primarily the emotive and behavioural components. This fully confirms our previous results. However, the latter are clearly less consistent when GE(2) is used as an alternative income inequality index. Let us recall that GE(0) and GE(1) are more sensitive to income differences in the bottom and middle of the distribution while GE(2) is more sensitive to income differences in the top of the distribution. This suggests that fear of crime and especially perception of public unsafety (either in the municipality of residence or during daily life activities) and the adoption of protective measures are mainly affected by income disparities observed in the lower and middle parts of the income distribution. This is quite intuitive, in particular when we refer to the different underlying mechanisms. Moreover, the results concerning the impact of GE(2) should be interpreted carefully as the F-statistic from the first stage regression is well below 10, indicating that the instruments are not relevant (Table A2.2).

Second, we propose to test the sensitivity of our results to the use of an alternative composite index of fear of crime. To ease comparisons, we have constructed a simplified index that does not include weights endogenously generated through MCA procedure. Our alternative measure is inspired by the Human Development Index and assigns an equal weight of one-

third to each dimension (emotive, cognitive and behavioural). Regressions (1) and (2) in Table A2.4 in the Appendix report estimations with this alternative index. The results largely confirm our previous findings in terms of signs, magnitude and significance of the effects.

Third, the literature highlights the crucial role of poverty in the explanation of fear of crime (Kujala, Kallio, and Niemelä, 2019; Pantazis, 2000). Although our previous estimates partly control poverty with the average per capita household income at the municipal level, we propose to further investigate its role. To do so, we include the municipal food income poverty rate (i.e. the official measure of extreme income poverty calculated by CONEVAL (Consejo Nacional de Evaluación de la Política de Desarrollo Social)) as a control variable instead of the average municipal income. Regressions (3) and (4) in Table A2.4 present these new estimates. Interestingly, the magnitude of the effect of income inequality is smaller, suggesting that, with our previous estimates, income inequality captured part of the effect of poverty. However, this does not call into question our results since the effect of income inequality remains positive and significant. Our findings for the education Gini tell a different story with a coefficient that becomes significant and negative (instead of non-significant). This clearly indicates a greater sensitivity of our results for education inequality.

Fourth, for exploratory purposes, we also test the presence of a non-linear relationship between inequality and fear of crime. Regressions (5) and (6) in Table A2.4 report the results for regressions with a quadratic specification for income and education inequalities. We fail to find any significant quadratic relationship between inequalities and fear of crime.

In a nutshell, our results for income inequality are robust to the different robustness checks. For education inequality, however, our results appear to be less consistent.

2.6 Conclusion and discussion

The purpose of this article was to study in depth the causal impact of different types of inequality (income and education), as structural factors of social disorganisation at the municipal level, on individual fear of crime. Based on the combination of multiple datasets (the 2017 ENVIPE survey, the 2015 EIC survey and the 2016 ENIGH survey), we were able to construct (i) a new composite indicator of fear of crime trying to compensate for several gaps in the literature and (ii) representative measures of income and education inequality at the municipal level. Based on these variables, we examined the causal effect of inequalities on fear of crime, controlling for the hierarchical structure of the data and endogeneity bias, through IV multilevel models.

This study enriches the empirical literature on the link between inequality and fear of crime for multiple reasons. Our investigation takes into account both individual and contextual factors. Thanks to the creation of an innovative index, we consider every dimension of fear of crime. It brings additional evidence while focusing on the particular context of developing countries, where little research on this issue was conducted until now. To our knowledge, this is also the first study combining different types of inequality.

Our results emphasise a positive linear relationship between municipal income inequality and individual fear of crime, giving additional support to the existing empirical literature. This effect is strong since a one-point increase in the Gini index leads to a 5-point rise in the fear of crime indicator, confirming the impact of the structural factors of social disorganisation on fear of crime. Nevertheless, we fail to observe such an effect for education inequality. At a more disaggregated level, we highlight a positive impact of income inequality on the emotive and behavioural dimensions of fear of crime. This means that individuals living in municipalities with higher income disparities feel more insecure, both in their municipality of residence and during their daily life activities and adopt more constrained behaviours and protective measures against crime. Surprisingly, income inequality has no significant impact on risk perception. Education inequality positively influences feelings of unsafety, the effect being however smaller in magnitude. In addition, and contrary to income inequality, education inequality positively affects one's subjective victimisation probability. It also leads to a reduction of measures adopted to protect oneself against crime. While our findings for income inequality are fairly robust, results concerning education inequalities are less consistent among different robustness checks.

In line with research on the links between fear of crime, social disorganisation and collective efficacy, there is a need for continued investigation to better understand the effect of inequality on fear of crime through these transmission channels. However, mechanisms binding contextual factors to individual outcomes are difficult to identify. Understanding how individuals experience and evaluate inequalities could increase our comprehension of how municipal-level inequality influences subjective fear of crime. Previous studies have already focused on the effect of inequality perception on redistribution preferences (Gimpelson and Treisman, 2018), voting behaviour, life satisfaction or trust (Schneider, 2012; Gallego, 2016). But beliefs about income distribution are often inaccurate and differ from real inequality degrees (Norton and Ariely, 2011; Hauser and Norton, 2017). Actually, it depends on people's current position in the income distribution (Knell and Stix, 2017). For example,

individuals with a higher socio-economic status may have a greater perception of income inequality (Norton and Ariely, 2011; Schneider, 2012) and tend to legitimate inequalities more than those belonging to lower socio-economic status groups. But individuals assess as well very badly their own position in the income distribution, with poor people often overestimating their rank whereas rich people underestimate theirs (Gimpelson and Treisman, 2018). It would have been interesting to have data on the individual socio-economic status to determine if the impact of inequality on fear of crime is mediated by people's position in the income distribution. Unfortunately, such data are not available from the ENVIPE survey. Perception of inequality is also related to the environment people evolve in. Mijs (2019) finds that people living in more unequal societies have a higher tolerance of inequality because they perceive it as the result of a meritocratic process. Understanding how Mexicans perceive and experience inequalities is the next step, but is not an easy task. As Neckerman and Torche highlight, "we know very little about how people become aware of complex economic information, how quickly they revise this information when conditions change, how institutions mediate the acquisition and interpretation of economic information, and what kinds of biases might affect perceptions of inequality. Nor do we understand how people choose reference groups against which to evaluate their own status" (Neckerman and Torche, 2007, p. 349). That is why we encourage further research in that direction.

Finally, public policies aiming at fighting inequalities could be more effective to curb fear of crime than those targeting directly criminality. As surprising as it sounds in the Mexican context, "actual levels of crime should not be overlooked as a key determinant of fear of crime" (Gaitán-Rossi and Shen, 2018). Income inequality is also a well-known determinant of criminality and in particular homicide rate (Enamorado et al., 2016; Vilalta and Muggah, 2016). As a result, reducing inequalities would be beneficial to tackle both criminality and fear of crime.

Appendix

Appendix 2.1: Small area estimation procedure.

For the implementation of the small area estimation (SAE) procedure, our primary data source is the 2015 EIC survey implemented by the National Institute of Statistics and Geography (INEGI) with the objective of updating the socio-demographic information between the 2010 census and the one to be carried out in 2020. This survey covers 6.1 million households (more than 22 million individuals) and is representative at the national, state and municipal levels. It provides basic information on households' assets, housing, education, ethnicity, health, etc. However, this survey fails to collect accurate data on household income. This is the reason why we also use the 2016 ENIGH survey, which covers more than 70,000 households and provides precise information on household income and its different components. Despite many recent refinements in SAE methods, we adopt the standard approach developed by Elbers, Lanjouw & Lanjouw (ELL) (2003) because of its multiple implementations.

The first step in ELL methodology estimates a welfare model (called the Beta model), based on household survey data (ENIGH data in our case), following equation (1):

$$\ln Y_{hm} = X_{hm}\beta + \eta_m + \varepsilon_{hm} \quad (1)$$

where Y_{hm} is the per capita income of household h in municipality m and X_{hm} are income predictors that must be available and comparable in both the household survey and the census. The error terms η_m and ε_{hm} represent the unexplained variation at municipality and household levels, respectively, and are treated as random effects. This specific structure of the error component explains why model (1) is estimated using Generalized Least Squares (GLS). Two additional elements are important components when estimating the welfare model. First, in addition to household-level variables, ELL recommend including municipal-level variables as covariates to account for heterogeneity between municipalities. Second, in the ELL specification, the household-specific error component $\widehat{\varepsilon}_{hm}$ is assumed to be heteroscedastic (i.e., to vary between households). The ELL strategy for modelling heteroscedasticity consists of estimating a model to explain the squared predicted household-level residuals by household-level and municipality-level characteristics through a parametric logistic transformation (called the Alpha model).

In the second step of the methodology, the parameter estimates from equation (1) are applied to census data (EIC data in our case) in order to predict income for all households and then to estimate welfare indicators (inequality indices in our case). More precisely, a series of k Monte Carlo simulations (usually around 100) are implemented. In each simulation, a set of values $\hat{\beta}$, $\hat{\eta}_m$ and $\widehat{\varepsilon}_{hm}$ are drawn from their estimated distributions and an estimate of income and the Gini index are produced. After k simulations, we can calculate the average income and the average of inequality indices which can be treated as representative at the municipal level.

The numerous applications of SAE methods provide practical guidelines for constructing the first-stage model. One important issue is that variables are comparable between the survey

and the census (both in their definition and in their distribution). Among comparable variables, it is necessary to include a large set of predictors with characteristics for the head of the household (age, sex, employment, education) and the household (assets, housing, demographic composition, employment, education, migration, etc.). In addition, ELL recommend the inclusion of municipal-level variables (aggregated means from census data, for instance) in order to reduce the magnitude of the unexplained municipal-level component of the error term η_m . Moreover, as recommended by Tarozzi & Deaton (2009), we include non-linear functions of quantitative variables by including their squared terms. We also take into account some interaction terms as recommended by Fuji (2010).

The final set of variables included in the income model has been determined by a stepwise procedure and ex-post diagnostics. More precisely, once controlling for the comparability of variables between the EIC and ENIGH surveys, we set the model specification in such a way as to maximize the number of significant variables, to maximize the adjusted R-squared and to minimize the variance in the municipal component of the error term η_m . Our SAE estimates also include a heteroscedasticity model (Alpha model) in which residuals predicted from the income model are regressed on all the explanatory variables.

In Table 1, GLS estimates for the logarithm of monthly per capita household income are reported. Following the above-described procedure, more than 40 explanatory variables have been included. The estimates perform to a highly competitive extent with an adjusted R-squared close to 0.60 with the variance of η_m being residual (less than 0.015). It is also worth noting that heteroscedasticity is found to be negligible ($R^2 < 0.02$ in the Alpha model). The parameter estimates from this model are then applied to EIC data through 100 Monte Carlo simulations. From these simulations, the mean per capita household income and the main measures of income inequality are calculated. We mainly use the Gini index but have also calculated the generalized entropy indices to test the robustness of our results in relation to alternative inequality measures.

References

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- Fujii, T. (2010). Micro-level estimation of child undernutrition in Cambodia. *World Bank Economic Review*, 24(3), 520-553.
- Tarozzi, A., & Deaton, A. (2009). Using census and survey data to estimate poverty and inequality for small areas. *Review of Economics and Statistics*, 91(4), 773-792.

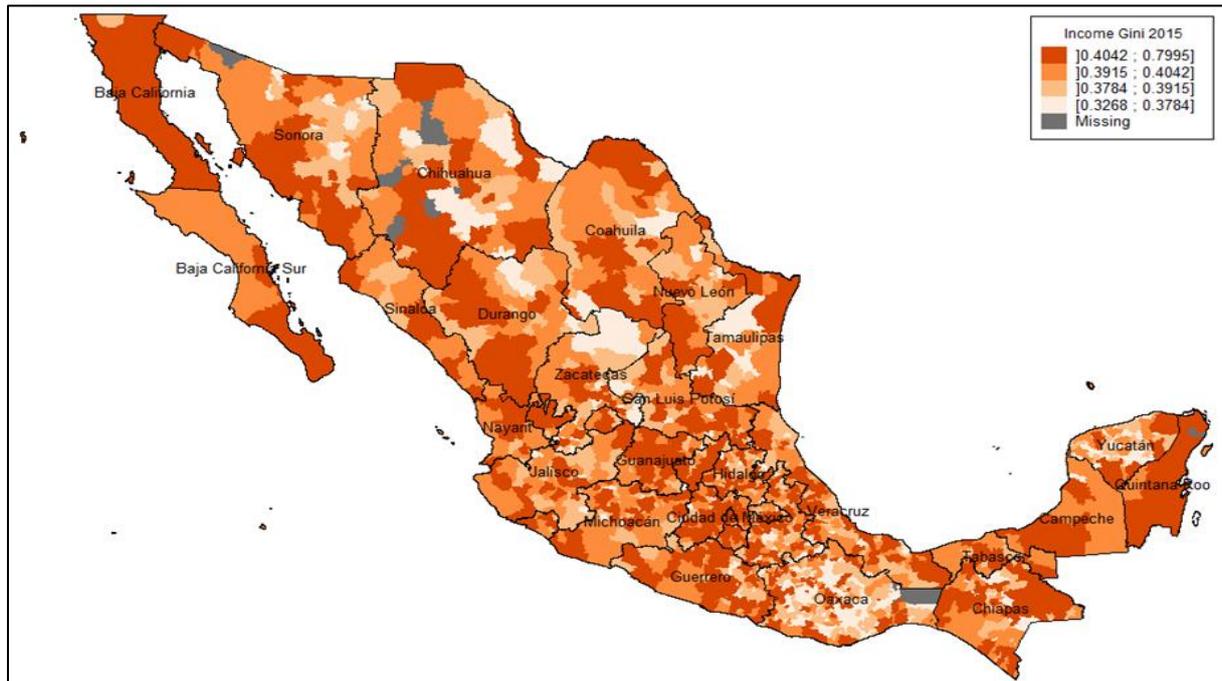
Table 1: Income model for small area estimation (GLS estimates).

| Variables | Coefficient | z | p-value |
|--------------------------------------------------------------------------------|-------------|--------|---------|
| Constant | 8.0757*** | 184.34 | 0.000 |
| Household head characteristics | | | |
| Male | -0.0093 | -1.54 | 0.124 |
| Age | -0.0043*** | -6.05 | 0.000 |
| Age squared | 0.00005*** | 8.92 | 0.000 |
| Indigenous (self-description) | -0.0142*** | -3.24 | 0.001 |
| Literate | 0.0610*** | 8.39 | 0.000 |
| Secondary education or higher | 0.0188*** | 2.68 | 0.007 |
| In a couple | 0.0164** | 2.56 | 0.010 |
| Household characteristics | | | |
| Urban | 0.1265*** | 10.00 | 0.000 |
| Migration (=1 for households whose head lived in another municipality in 2010) | 0.0509*** | 4.98 | 0.000 |
| Household size | -0.3053*** | -63.38 | 0.000 |
| Household size squared | 0.0189*** | 45.34 | 0.000 |
| Proportion of male | -0.4073*** | -13.58 | 0.000 |
| Proportion of male squared | 0.5153*** | 17.15 | 0.000 |
| Proportion of children (11 y.o. or less) | -0.0606* | -1.91 | 0.056 |
| Proportion of children squared | -0.2857*** | -5.28 | 0.000 |
| Proportion of hh members (15 y.o or more) with at least secondary education | 0.1791*** | 8.41 | 0.000 |
| Proportion of hh members with at least secondary education squared | 0.0259 | 1.30 | 0.193 |
| Employment rate (for 12-65 y.o. members) | 0.3805*** | 14.43 | 0.000 |
| Employment rate squared | 0.0692*** | 2.84 | 0.005 |
| Number of rooms per capita | 0.0244*** | 4.94 | 0.000 |
| Number of rooms per capita squared | 0.0055*** | 9.74 | 0.000 |
| HH with access to piped water into dwelling | 0.0529*** | 10.22 | 0.000 |
| HH with access to piped sewer system | 0.0336*** | 5.78 | 0.000 |
| HH equipped with a car | 0.1498*** | 21.07 | 0.000 |
| HH equipped with a mobile phone | 0.1228*** | 15.50 | 0.000 |
| HH equipped with a computer | 0.1823*** | 32.28 | 0.000 |
| HH with access to the internet | 0.1579*** | 12.34 | 0.000 |
| HH equipped with a washing machine | 0.0668*** | 14.60 | 0.000 |
| HH equipped with a refrigerator | 0.0519*** | 8.31 | 0.000 |
| HH equipped with a flat screen tv | 0.0695*** | 17.07 | 0.000 |
| HH with access to pay tv | 0.1355*** | 33.60 | 0.000 |
| Interaction terms | | | |
| Urban * household size | -0.0150*** | -6.97 | 0.000 |
| Urban * internet | -0.0329** | -2.44 | 0.015 |
| Urban * mobile phone | -0.0348*** | -3.31 | 0.001 |
| Urban * car | 0.0777*** | 9.15 | 0.000 |
| Municipal controls | | | |
| Municipal employment rate | 0.9586*** | 10.80 | 0.000 |
| Municipal secondary education rate | 0.2569*** | 3.94 | 0.000 |
| Municipal migration rate | 0.3522*** | 4.98 | 0.000 |
| Municipal car equipment rate | 0.2543*** | 7.19 | 0.000 |
| Municipal computer equipment rate | 0.2026*** | 2.61 | 0.009 |
| N | | 69,078 | |
| Adjusted R-squared (Beta model) | | 0.583 | |
| Adjusted R-squared (Alpha model) | | 0.015 | |
| Sigma eta squared | | 0.013 | |
| Variance of epsilon | | 0.270 | |

Notes: Robust t-statistics are reported into brackets. Level of statistical significance: 1 % ***, 5 % **, and 10 % *.

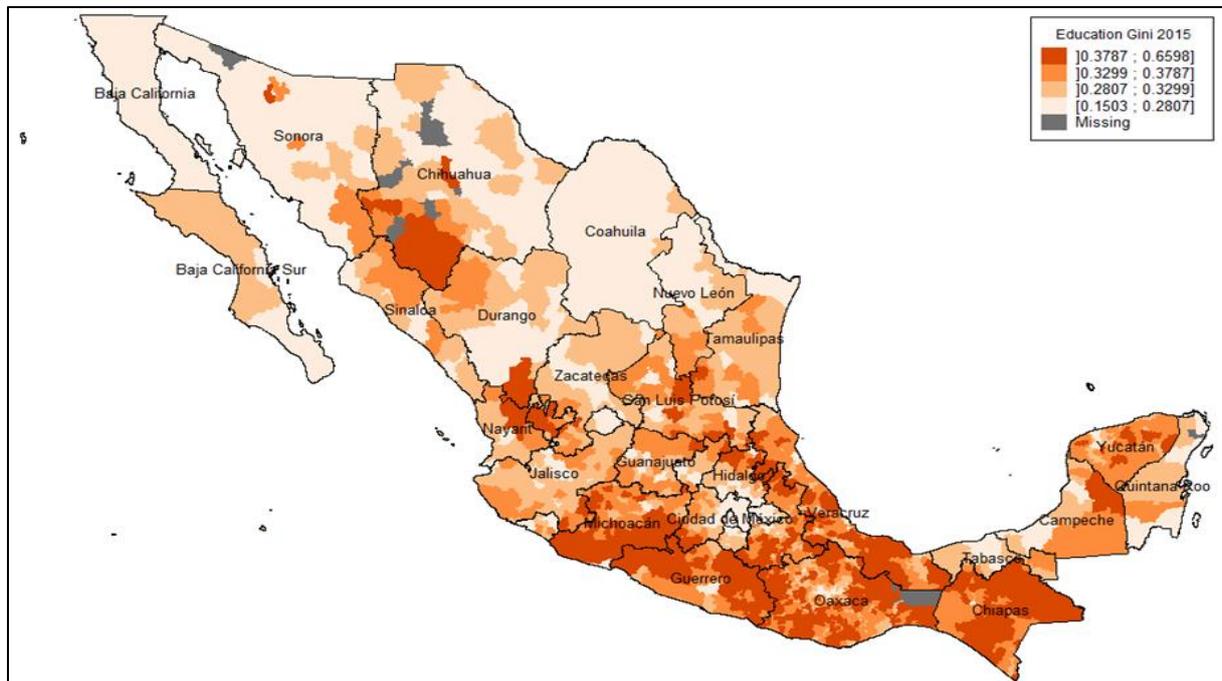
Source: Authors' calculations based on ENIGH data.

Figure A2.1: Income Gini index in 2015 (Small Area Estimation).



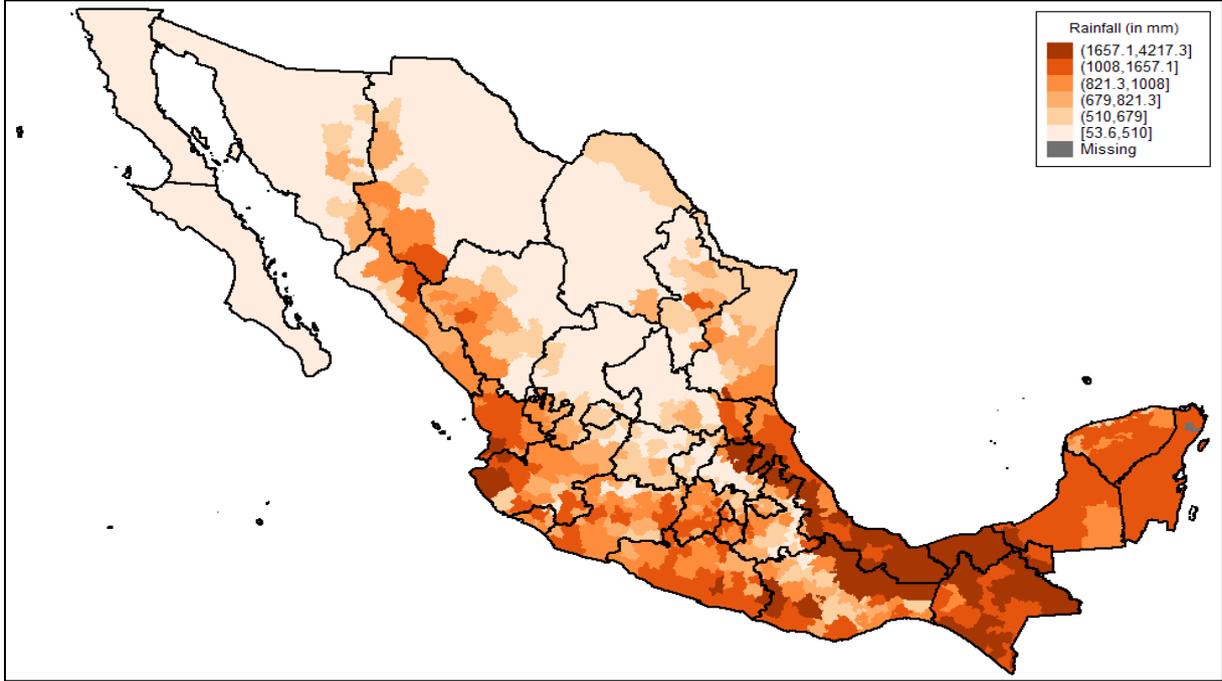
Source: Authors' calculations based on EIC and ENIGH.

Figure A2.2: Education Gini index in 2015.



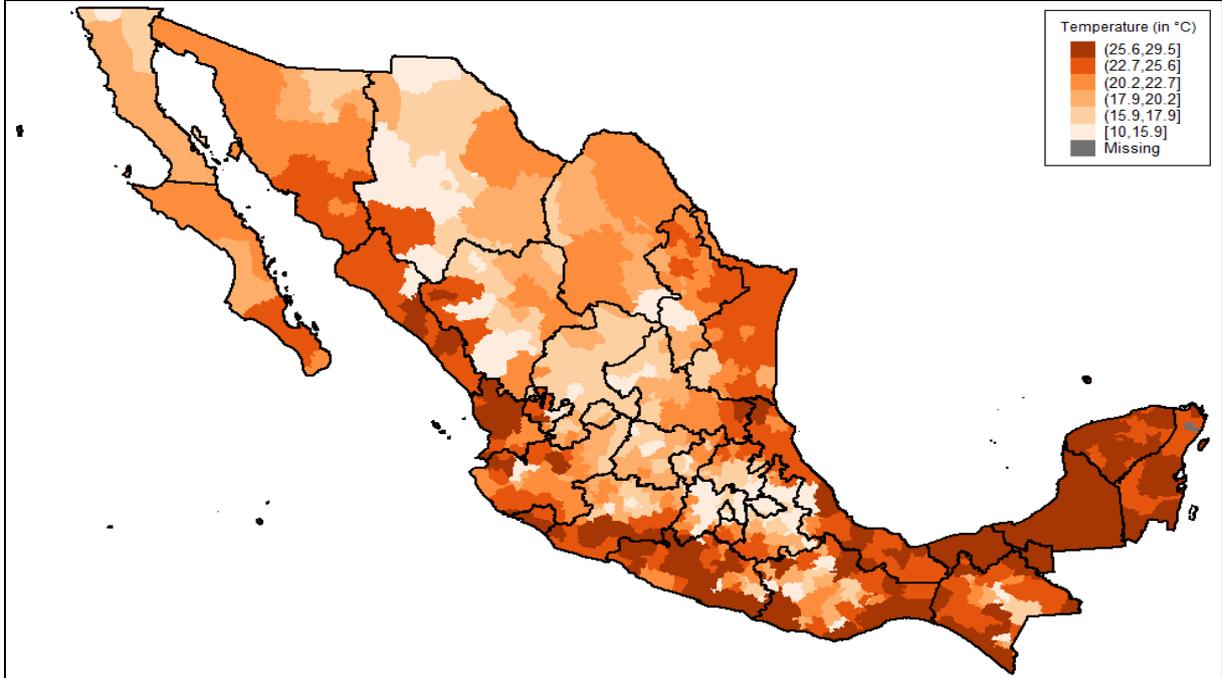
Source: Authors' calculations based on EIC.

Figure A2.3: Yearly average amount of precipitation over the 1951-2010 period.



Source: Authors' calculations based on CONAGUA data.

Figure A2.4: Yearly average temperature over the 1951-2010 period.



Source: Authors' calculations based on CONAGUA data.

Table A2.1: Descriptive statistics.

| Person level variables | | Mean | SD | Min | Max |
|-----------------------------------------|------------------|-------------|-----------|------------|------------|
| FOC index | | 0.551 | 0.275 | 0 | 1 |
| FOC alternative index | | 0.497 | 0.272 | 0 | 1 |
| Municipality insecurity | | 0.638 | 0.480 | 0 | 1 |
| Everyday life insecurity | | 1.491 | 1.121 | 0 | 3 |
| Risk perception | | 1.672 | 1.204 | 0 | 3 |
| Constrained behaviors | | 1.474 | 1.119 | 0 | 3 |
| Protective measures | | 0.655 | 0.850 | 0 | 2 |
| Female | | 0,538 | 0,499 | 0 | 1 |
| Age | | 43,218 | 17,265 | 18 | 98 |
| Education: | None | 0.064 | 0.245 | 0 | 1 |
| | Primary | 0.260 | 0.438 | 0 | 1 |
| | Lower secondary | 0.295 | 0.456 | 0 | 1 |
| | Upper secondary | 0.177 | 0.381 | 0 | 1 |
| | Higher education | 0.204 | 0.403 | 0 | 1 |
| Working | | 0.664 | 0.473 | 0 | 1 |
| Household victimization | | 0.242 | 0.428 | 0 | 1 |
| Municipality level variables | | | | | |
| Income Gini | | 0,393 | 0,025 | 0,327 | 0,799 |
| Education Gini | | 0,334 | 0,072 | 0,150 | 0,660 |
| GE(0) | | 0,264 | 0,043 | 0,181 | 1,398 |
| GE(1) | | 0,276 | 0,073 | 0,179 | 2,979 |
| GE(2) | | 0,479 | 1,265 | 0,210 | 48,658 |
| Density | | 0,296 | 1,208 | 0,000 | 16,818 |
| Migration | | 0,057 | 0,045 | 0,000 | 0,673 |
| Income | | 33,220 | 19,214 | 8,216 | 229,162 |
| Poverty | | 0.244 | 0.117 | 0 | 0.856 |
| NGV | | 0,155 | 0,210 | 0,000 | 0,998 |
| Homicide rate | | 30.057 | 38.900 | 1.245 | 537.634 |
| Drug cartel | | 0,027 | 0,162 | 0 | 1 |
| Participation rate (for men 15-29 y.o.) | | 0,526 | 0,114 | 0,054 | 0,802 |
| Security | | 211.018 | 298.523 | 0,000 | 3936.039 |
| Justice | | 39.603 | 127.104 | 0,000 | 2413.793 |
| Temperature | | 20,469 | 4,290 | 10 | 29,5 |
| Precipitation | | 1092,766 | 799,432 | 53,6 | 4217,3 |
| Altitude | | 1296,299 | 818,819 | 1,5 | 3008,275 |

Source: Authors' calculations based on multiple datasets.

Table A2.2: First stage regressions (OLS).

| | Income Gini | Education Gini | GE(0) | GE(1) | GE(2) |
|------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Precipitation | 0.0034*** (0.001) | 0.0193*** (0.002) | 0.0055*** (0.001) | 0.0046*** (0.001) | -0.0183 (0.027) |
| Temperature | 0.0072*** (0.002) | 0.0171*** (0.004) | 0.0110*** (0.002) | 0.0087** (0.003) | -0.0517 (0.065) |
| Altitude | 0.0051*** (0.001) | -0.0003 (0.002) | 0.0078*** (0.001) | 0.0090*** (0.002) | 0.0121 (0.036) |
| Density | 0.0015*** (0.000) | -0.0026** (0.001) | 0.0024*** (0.001) | 0.0023** (0.001) | 0.0086 (0.019) |
| Migration rate | -0.0092 (0.009) | -0.1788*** (0.026) | -0.0269** (0.014) | -0.0298 (0.021) | -0.3489 (0.395) |
| Income | 0.0008*** (0.000) | -0.0019*** (0.000) | 0.0013*** (0.000) | 0.0010*** (0.000) | -0.0004 (0.001) |
| Ethno-linguistic fractionalization | 0.0141*** (0.002) | 0.0402*** (0.006) | 0.0232*** (0.003) | 0.0257*** (0.005) | 0.1863* (0.098) |
| Homicide rate | -0.0000*** (0.000) | 0.0001*** (0.000) | -0.0000** (0.000) | -0.0001* (0.000) | 0.0004 (0.001) |
| Drug cartel | 0.0064*** (0.002) | 0.0238*** (0.007) | 0.0107*** (0.004) | 0.0106* (0.005) | 0.0430 (0.102) |
| Participation rate (for men 15-29) | -0.0021 (0.004) | -0.0726*** (0.011) | -0.0088 (0.006) | -0.0085 (0.009) | -0.0880 (0.175) |
| Security | -0.0000*** (0.000) | -0.0000*** (0.000) | -0.0000*** (0.000) | -0.0000*** (0.000) | -0.0002** (0.000) |
| Justice | -0.0000*** (0.000) | 0.0001* (0.000) | -0.0001*** (0.000) | -0.0001*** (0.000) | -0.0006 (0.000) |
| Constant | 0.3500*** (0.005) | 0.3853*** (0.014) | 0.1946*** (0.007) | 0.2220*** (0.011) | 0.6667*** (0.214) |
| Observations | 1,809 | 1,809 | 1,809 | 1,809 | 1,809 |
| F-statistic | 115.68 | 214.90 | 134.11 | 42.07 | 1.49 |
| R-squared | 0.4360 | 0.5895 | 0.4726 | 0.2194 | 0.0099 |

Notes: Precipitation and Altitude have been divided by 1000 to rescale the values of coefficients. Robust standard errors are reported into brackets. Level of statistical significance: 1% ***, 5% **, and 10%*.

Source: Authors' calculations based on multiple datasets.

Table A2.3: Impact of different entropy indices on fear of crime and its sub-dimensions (IV multilevel estimates).

| | FOC index | Emotive component | | Cognitive component | Behavioral component | |
|-------------------|----------------------|--------------------------------------|---------------------------------------|------------------------------|------------------------------------|----------------------------------|
| | | Municipality insecurity ^a | Everyday life insecurity ^b | Risk perception ^b | Constrained behaviors ^b | Protective measures ^b |
| GE(0) | 3.1988*** (0.750) | 6.4422*** (0.523) | 32.4313*** (2.623) | 1.4235 (2.317) | 6.7859*** (2.431) | 13.1638** * |
| GE(1) | 2.7978*** (0.681) | 4.8196*** (0.551) | 27.9781*** (2.108) | -3.4266 (2.137) | 6.3514*** (1.981) | 17.2846** * |
| GE(2) | -0.0147 (0.103) | -0.2974 (0.084) | -0.2589 (0.277) | -1.5062*** (0.323) | 0.1127 (0.291) | 1.8667*** (0.297) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 71,665 | 72,491 | 73,368 | 72,734 | 73,136 | 73,277 |
| Number of groups | 577 | 577 | 577 | 577 | 577 | 577 |

Notes: Robust standard errors are reported into brackets. In IV estimates, errors are clustered at the municipal level. Level of statistical significance: 1% ***, 5% **, and 10%*. (a) Binary Logit estimates (marginal effects are reported). (b) Ordered Logit estimates (coefficients are reported).

Source: Authors' calculations based on multiple datasets.

Table A2.4: Additional robustness checks (IV multilevel estimates).

| | Alternative FOC index | | Poverty as an additional control | | Quadratic relationship | |
|------------------------|-----------------------|-------------------|----------------------------------|-----------------------|------------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Income Gini | 4.1972*** (1.051) | | 0.9950*** (0.228) | | -28.7447 (28.833) | |
| Income Gini squared | | | | | 40.3324 (34.541) | |
| Education Gini | | 0.3405 (0.215) | | -0.3045*** (0.074) | | 0.1119 (1.437) |
| Education Gini squared | | | | | | -0.8533 (2.050) |
| Poverty | | | 0.3951*** (0.042) | 0.4080*** (0.041) | | |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 71,665 | 71,665 | 71,665 | 71,665 | 71,665 | 71,665 |
| Number of groups | 577 | 577 | 577 | 577 | 577 | 577 |

Notes: Robust standard errors are reported into brackets. In IV estimates, errors are clustered at the municipal level. Level of statistical significance: 1% ***, 5% **, and 10%*.

Source: Authors' calculations based on multiple datasets.

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Chapter 3: Perception of gender inequality: a proposal for measurement and analysis of its correlates

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3.1. Introduction

Significant efforts have been made in recent years to reach gender equality and improve women's rights in Mexico. Among many examples, the General Law for Equality between Women and Men was published in the Official Gazette in 2006 with the objective to regulate and guarantee equal opportunities and treatment between women and men. The biggest advance was maybe the constitutional reform of 2014 which enacted gender parity in the registration of candidates for the Federal (Senators and Deputy) and States Congresses. More recently, the 2020-2024 National Programme for Equality between Women and Men (PROIGUALDAD) encompasses six priority objectives³⁶ to be taken into account in the national policy to advance substantive equality³⁷ between women and men. According to the World Economic Forum, in 2021 Mexico had closed 75.7% of its overall gender gap³⁸, ranking 34 out of 156 countries and 4th for Latin America and the Caribbean (World Economic Forum, 2021). It represents an increase of 11.1 percentage points compared to 2006, as well as a jump of 41 places in the ranking.

Nevertheless, despite such advances, gender gaps are far from being closed and there are many challenges to be met, notably in terms of women's economic participation and opportunity. In 2020, only 44.9% of adult women were in the labour force, 33.8% of employed women earned less than a minimal wage and only 0.7% were employed as civil servants or executives (INEGI. *Encuesta Nacional de Ocupacion y Empleo*, 2020). In addition, even if the amount of federal expenditures allocated to actions and programmes promoting equality between women and men increased by 20% between 2020 and 2021, several programmes, whose main purpose is to promote equality and eradicate gender-based violence,³⁹ faced reductions in the funds received whereas the contribution of other recipient programmes to gender equality is uncertain and unverifiable (Benumea et al., 2020). A major

³⁶ For example, empowering women's economic autonomy and positioning women's equal participation in decision-making in the political, social, community and private spheres are two of these objectives (Author's translation, INMUJERES, 2020, p.27)(INMUJERES, 2020).

³⁷ Substantive equality is the combination of formal gender equality with equality of outcome, meaning that equality in law, equal opportunities and equal treatment of women and men are complemented by equality in impact, outcome or result (retrieved from the glossary of the European Institute for Gender Equality <https://eige.europa.eu/thesaurus/terms/1401>, accessed the 06/13/2022).

³⁸ The country had a Global Gender Gap Index of 0.757 in 2021. This indicator considers four dimensions (economic participation and opportunity, health and survival, education attainment and political empowerment) and ranges on a 0-to-1 scale with a score of one indicating full gender parity.

³⁹ Such as the National Commission for the Prevention and Eradication of Violence Against Women (*Comisión Nacional para Prevenir y Erradicar la Violencia contra las Mujeres*, CONAVIM), the National Women's Institute (*Instituto Nacional de las Mujeres*, INMUJERES) and the National Centre for Gender Equity and Reproductive Health (*Centro Nacional de Equidad de Género y Salud Reproductiva*, CNEGySR).

structural problem is also the persistent gap between formal and substantive equality, that is the difference between what is officially enacted and the extent to which gender equality is actually achieved, a challenge made even more difficult at disaggregated levels such as the federal or municipal ones (ONU Mujeres).⁴⁰

Gender inequalities are deeply harmful to women, limiting their full access to legal rights, power, resources (education, income, assets etc.) and practices (housing, consumption, health, leisure etc.). Aside its direct impacts on women, gender inequality has long been associated to a serie of negative outcomes such as lower economic growth (Cuberes & Teignier, 2014; Santos Silva & Klasen, 2021), violence against women (Frias, 2008a) or infant mortality (Brinda, Rajkumar, & Enemark, 2015). Nonetheless, perceived levels of inequality may be as important as actual levels to understand individual behaviours and the mechanisms leading to collective outcomes. Driven by research on economic disparity, various studies have for example already focused on the effect of income inequality perception on redistribution preferences (Gimpelson & Treisman, 2018), voting behaviour, life satisfaction or trust (Gallego, 2016; Schneider, 2012). Thus, the study of gender inequality perception may be as well of great interest.

Perception of gender inequality and its determinants has been extensively analysed by sociologists and psychologists since the end of the 1990s. Both the perceived amount of personally faced gender discrimination (Brown & Craig, 2020; Kobryniewicz & Branscombe, 1997) and discrimination faced by women as a group have been studied (Davis & Robinson, 1991; Harnois, 2017; Kehn & Ruthig, 2013; Neff, Cooper, & Woodruff, 2007; Spoor & Schmitt, 2011; Stephens & Levine, 2011). In these studies, the empirical measure of perceived gender inequality generally consists of a combination of several items measured on a Likert-type scale and assessing the existence and/or level of gender inequality in society. As an example, items can range from “Women often miss out on good jobs due to sexual discrimination”, “Would you say that opportunities for a university education are, in general, better or worse for women than for men?”, “Who tends to have more power to make decisions in politics, men or women?” or “Men and women are equal in society”. Nevertheless, this type of measurement has limitations as it does not allow comparison with actual levels nor between individuals (individuals can have different interpretations of what “*very much*” or “*men a lot more*” means). It would be useful, beyond the levels of perceived gender inequality

⁴⁰ <https://lac.unwomen.org/es/donde-estamos/mexico> (accessed 04/14/2022).

obtained via a Likert-type scale (weak, moderate, important etc.), to investigate whether they are correctly estimated or if individuals overestimate or underestimate it. This is particularly interesting given that previous studies showed that beliefs about the income distribution are often inaccurate and differ from real inequality levels (Gimpelson & Treisman, 2018; Norton & Ariely, 2011). To our knowledge, perceived levels of gender inequality have not yet been numerically quantified nor compared to actual levels. Besides, the vast majority of empirical works focuses on developed countries and economic inequalities between women and men. For example, due to data made available by the Eurobarometer survey, much attention has been paid to perception of the gender wage gap in European countries (e.g. Khoreva (2012) and Lausi et al. (2021)).

In Mexico little is known about perceived gender inequality level and its measurement.⁴¹ In that respect, this study is pioneering as it provides an innovative statistical measure of gender inequality perception taking into account several of its dimensions, quantifying its levels and confronting it to individual determinants mentioned in the literature. In that sense, it aims at better describing and analysing this phenomenon and fulfils past empirical gaps.

This study is based on a quantitative survey with 220 students from high school to doctorate levels in Mexico. Inspired by the studies of Niehues (2014) (Niehues, 2014) and Gimpelson & Treisman (2018) (Gimpelson & Treisman, 2018) which estimated a perceived Gini coefficient of income inequality from survey questions,⁴² we construct an indicator of perceived gender inequality based on respondents' estimations of different indicators of women's attainment in various domains (economy, education, politics). The results of an extensive descriptive analysis show that students misperceive gender inequality, underestimating its levels. Perceptions of economic and educational inequalities are the most inaccurate whereas students' estimates of political inequality are the closest to reality. The multivariate analysis highlights that depending on the type of gender inequality considered, different individual factors matter for inequality perception. More precisely, students in a relationship and holding a more progressive gender ideology perceive lower general levels of gender equality. Women and students perceiving gender differences as unfair also estimate lower levels of gender

⁴¹ For example, the very first empirical work assessing perception of economic inequality was only recently conducted in the country by Campos-Vazquez, Krozer, Ramírez-Álvarez, de la Torre, & Vélez-Grajales (2020).

⁴² In their study, they use the "types-of-society diagrams" question from the International Social Survey Programme. The latter asks respondents to pick a diagram and description that best fit their country in terms of pay and earnings among five possibilities. Then they estimated the level of income inequality corresponding to each diagram. This inferred Gini coefficient corresponding to perceived inequality levels is then compared to the actual Gini in the respondent's country.

equality but only when it comes to politics. The level of education is the strongest predictor of the perceived level of gender inequality. As their level of education increases students assess higher levels of global, educational and political inequality between women and men. Their estimates are also more accurate. Finally, the results highlight that women (because they are better aware of political inequality) and students belonging to the lower-middle/middle class (a result driven by perception of economic inequality) are less likely to underestimate gender inequality. This result is also emphasised for undergraduate students. Lastly, attachment to justice appears to be extremely important but for political inequality estimation only.

The rest of the article is structured as follows. Section 2 describes the data collection process and the methodology used for the construction of the gender inequality perception index. The results are presented in Section 3 and finally, Section 4 concludes.

3.2. Methodology

3.2.1. Data collection process and sample characteristics

The data was collected during May and June 2021 through an online questionnaire voluntarily distributed to students from different high schools and tertiary educational institutions in Mexico by their professors via email (due to the COVID-19 pandemic). Professors were contacted at random (unknown and local contacts). We explained to them the research project and kindly asked if they would agree to forward the survey to their students and colleagues to do the same. Thus, the sample was not randomly selected. The anonymous self-completed questionnaire consisted of 5 sections, mainly of closed questions, and it took approximately 15 minutes to complete it.

The final sample is composed of 220 Mexican students,⁴³ with a higher proportion of female students compared to males (respectively 57.7% and 40%).⁴⁴ Graduate students are overrepresented in the sample (high school (5%), bachelor (48.2%), master (32.7%) and PhD students (12.7%)).⁴⁵ The repartition of women and men among the different academic levels is quite similar for bachelor and master's degrees (e.g. 32.3% of the women in our sample are

⁴³ Initially, 262 people responded to the online survey, but we excluded the non-students (31 individuals) and the non-Mexican (11 individuals).

⁴⁴ 2,3% of other (non-binary, don't know or missing values).

⁴⁵ The academic level refers to the diploma currently in preparation at the time of the survey. Due to the small size of our sample, we grouped some modalities together to simplify the analysis. Thus, the "Bachelor" modality includes students preparing higher technical or commercial studies (*Estudios técnicos o comerciales superiores*). In the same vein, the "Master" modality takes into account students preparing a specialisation (*Especialidad*), that is, a type of postgraduate degree that is studied at university after a bachelor's degree.

studying for a master degree compared to 34.1% of the men). However, there is a slight overrepresentation of women among high school and doctoral students (see Table A3.1 in the Appendix for more details). Finally, the average age is 26 years old and 64.1% of the respondents are single, 31.4% are in a relationship, and 4.1% are separated or divorced. Only 4.1% of the survey respondents identify themselves as indigenous.

Two main limitations affect our database, particularly with regard to representativeness. First, the population considered (high school or university students) represents a small fringe of Mexican society. Indeed, in 2020, only 45.5% of the adult population (15 years and older) had completed secondary school in Mexico (INEGI. *Censo de Población y Vivienda*, 2020). This particular group has higher educational and socio-economic backgrounds than the rest of the population and our sample reflects these characteristics. For example, 77.3% of the respondents consider belonging at least to the lower-middle class (this percentage rises to 94.1 when we use a proxy to measure social class of membership instead of a self-declared question) and 75.4% have both their parents who completed at least the secondary school. Second, due to the survey dissemination process, we were not able to control in which school/university the online questionnaire circulated. Hence, 97.7% of the respondents are from a public school, whereas nationally, 86.8% of high school and 76% of university students were enrolled in public schools for the 2019-2020 school year (INEGI. *ECOVIED, Encuesta para la Medición del Impacto COVID-19 en la Educación*, 2020). Attention may also be raised to the spatial distribution of the respondents. Even if we were able to collect data from students residing in 13 different states, most respondents concentrated in five (Ciudad de México (50.5%), México (18.2%), Baja California (15.9%) and Morelos (6.8%)). Furthermore, all high school students were living in Mexico City or the state of Mexico. Thus, results concerning high school students may not only be influenced by their educational level but by their geographical location which confers them unobservable characteristics. Similarly, almost half of the bachelor students (44.3%) reside in Mexico City, such as 62.5% of the master students and 39.3% of the PhD students.

Semi-structured interviews regarding gender inequality in Mexico followed this quantitative survey in July 2021. Their in-depth analysis is the focus of the 4th Chapter of the thesis. However, brief reference will sometimes be made to these qualitative interviews in order to support or qualify our findings.

3.2.2. *The measurement of gender inequality perception*

To compute individuals' perception of gender inequality, respondents were asked several questions related to women's attainment in various fields, at the national level in 2020. Each question corresponded to an indicator composing a gender equality index. Their answers to each of these questions constitute their estimation of the different indicators. From their answers, we were therefore able to calculate a *perceived* gender equality measure representing their perception of gender equality. The latter is then compared to the *real* measure of gender equality computed with actual data for 2020.

Our measure of gender equality for Mexico is inspired by the Global Gender Gap Index (GGGI) calculated by the World Economic Forum since 2006 and the Gender Equality Index for Mexican State (GEIMS) of Frias (2008b). Both indices tend to measure gender-based gaps in access to resources and opportunities rather than women's empowerment. Equality is reached when there are equal numbers of women and men in one domain. The two indexes have varying methodologies and we decided to follow the one of Frias (2008b) due to its specific application to the Mexican context and easier implementation in our survey.

Frias (2008b) assesses gender equality across Mexican states with a multidimensional index composed of 4 fundamental categories (economy, education, politics and legal rights) and 36 indicators. For the purpose of our study, the index was simplified and rearranged. First, the legal dimension was excluded. Indeed, as Mexico has a federal political system, each state initiates its own legislation and laws ensuring women rights vary greatly from one state to another. For example, only seven states count with legal abortion, free and on demand, up to 12 weeks' gestation. Thus, measuring the legal dimension of gender inequality (and its perception) at the national level is made difficult. Second, for reasons of duration and simplicity of the survey, we reduced the number of indicators to 4 per dimension (instead of between 6 and 8), for a total of 12 indicators. Some were conserved identical to the ones used by Frias (2008b) and others were modified to better fit the current context or available data.⁴⁶ Thirdly, although territorial disparities are important, which may justify the measurement of gender inequality across states, we decided to measure it at the national level for various reasons. Indeed, questioning respondents about gender inequality at the national level

⁴⁶ This arbitrary selection of indicators is not neutral and the final interpretation of our measure of gender equality (and by extension our measure of gender inequality perception) is only made possible with respect to the selected indicators. However, we tried to select indicators capturing a wide range of gender inequalities in each dimension.

simplifies considerably the survey⁴⁷ and allows comparison of individuals' perceptions given the small size of our sample. In addition, even though respondents' answers are influenced by their social environment, memory and personal experience (and thus likely by their state of origin, of residence or both) due to social sampling effects⁴⁸ (Fiedler, 2000; Galesic, Olsson, & Rieskamp, 2012), we presume that mental inference of gender inequality is made easier at a national rather than regional level as the former may be taken as an anchoring point. Information on gender inequality is also often reported at the national level. Finally, we follow most empirical works, and in particular the first one led in Mexico (Campos-Vazquez, Krozer, Ramírez-Álvarez, de la Torre, & Vélez-Grajales, 2020), which measures perception of inequality at the national level.

Despite these adjustments, the methodology for the construction of our Gender Equality Index for Mexico (GEIM) remains similar to the one elaborated by Frias (2008b). This index measures the gender gap without taking into account the relative position of women, i.e. the absolute levels of privilege of either men or women. The aim of the different indicators is to “evaluate the extent to which, compared to men, women have access to economic resources, education, positions of political power and decision making [...]” (Frias, 2008a, p. 219). It is expressed as a percentage (percentage of women in a particular socially valuable position divided by the percentage of men in that same position) and a score of 100 represents perfect equality between men and women (50% of women and 50% of men in a particular position). Thus, the smaller the index, the greater the gender inequality level at the expense of women. A ratio (percentage divided by percentage) is used rather than a single percentage because otherwise equality would be represented by 50%, which is less intuitive. In the absence of a criterion to assign different weights, each sub-index is the average of the indicators included in that specific dimension with similar weight assigned to all indicators, and the global index is the average of the three dimensions sub-indexes.

Table 3.1 summarises the different indicators selected for each category, their construction and values. All indicators are calculated for the year 2020. For example, EC_1 is calculated as

⁴⁷ Respondents are from different states of the republic and may have lived in multiple places during their lives. It is unthinkable to ask respondents about gender inequality in all 32 states of Mexico. Then, in relation to which state should the questions have been asked? Should individuals have been asked about levels of gender inequality in their state of residence, their state of origin, the state where they have spent most of their life?

⁴⁸ Because of a lack of accurate information, individuals' cognition is based on objective clues from their environment. When they need to infer the distribution of social phenomena, they draw on samples of their social circles and then extrapolate it to the whole population (Fiedler, 2000; Galesic et al., 2012).

follows: $\frac{(\% \text{ of women in the employed labour force})}{(\% \text{ of men in the employed labour force})} * 100$. Its real value is 63.6% which means that on average, for each 100 employed men, there are around 64 women.

The indicators are expressed as a ratio of percentages for uniformity purposes. Indeed, it is impossible, for example, to compute the ratio of gender ratios in politics as there is no information on respectively the female and male population at risk of running for different political functions. In this case, the only information available relates to the percentage of mayors, magistrates, ambassadors or deputies who are women (Frias, 2008b). In our survey, it is also easier, more intuitive and faster to use a ratio of percentages as we ask repetitively respondents to appraise the number of women belonging to different fictive populations of 100 individuals. For example, we ask them to estimate, at the country level, the number of women in a group of 100 employed persons (*According to you, at the national level in 2020, for every 100 employed persons, how many were women?*). Their answers give us the perceived percentage of females in the occupied workforce, allow us to infer the percent of men and then calculate the ratio of percentages. Alternatively, if we would have used a ratio of ratios, two different questions would have been necessary. One to get the perceived female labour force participation (women employed/women in the labour force) and one for perceived male labour force participation (men employed/men in the labour force).

Table 3.1: Gender Equality Index in Mexico (GEIM) in 2020.

| Dimensions | Indicators | Definitions | Value and calculation | Related survey questions | Sources |
|-------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Economic GEIM_ECO =49,5% | Employed EC_1 | Percent of 15 years and older females in the employed labour force relative to the percent of males. | $\frac{\left(\frac{20\ 726\ 315}{53\ 331\ 429}\right)}{\left(\frac{32\ 605\ 114}{53\ 331\ 429}\right)} = 0,6357$ = 63,6% | According to you, at the national level in 2020, for every 100 employed people (people aged 15 years and older with an occupation), how many were women? | INEGI. Encuesta Nacional de Ocupación y Empleo (Nueva Edición) (ENOEN). Indicadores estratégicos. Cuarto trimestre de 2020. |
| | Employer EC_2 | Percentage of females among employers relative to the percentage of males among employers. | $\frac{\left(\frac{506\ 277}{2\ 427\ 313}\right)}{\left(\frac{1\ 921\ 036}{2\ 427\ 313}\right)} = 0,2635$ = 26,4% | According to you, at the national level in 2020, for every 100 employers (self-employed who employ people in exchange for financial remuneration in cash or in kind), how many were women? | INEGI. Encuesta Nacional de Ocupación y Empleo (Nueva Edición) (ENOEN). Indicadores estratégicos. Cuarto trimestre de 2020. |
| | Above poverty level EC_3 | Percentage of females earning more than 5 minimum salaries relative to the percentage of males. | $\frac{\left(\frac{422\ 673}{1\ 474\ 697}\right)}{\left(\frac{1\ 052\ 024}{1\ 474\ 697}\right)} = 0,4018$ = 40,2% | According to you, at the national level in 2020, for every 100 people working and receiving more than 5 minimum wages, how many were women? | INEGI. Encuesta Nacional de Ocupación y Empleo (Nueva Edición) (ENOEN). Indicadores estratégicos. Cuarto trimestre de 2020. |
| | Health Benefits EC_4 | Percentage of women who receive health benefits (in public or private institutions) as a result of their employment relative to the percentage of males receiving health benefits. | $\frac{\left(\frac{8\ 337\ 791}{20\ 614\ 778}\right)}{\left(\frac{12\ 276\ 987}{20\ 614\ 778}\right)} = 0,6791$ = 67,9% | According to you, at the national level in 2020, for every 100 people working and with access to (public or private) health institutions, how many were women? | INEGI. Encuesta Nacional de Ocupación y Empleo (Nueva Edición) (ENOEN). Indicadores estratégicos. Cuarto trimestre de 2020. |
| Educational GEIM_EDUC =75,8% | Literacy ED_1 | Percent of the literate population (15 years and older) who are female relative to the percent of men. | $= \frac{(45\ 955\ 971/89\ 320\ 723)}{(43\ 364\ 752/89\ 320\ 723)}$ = 1,0598 = 106% | According to you, at the national level in 2020, for every 100 literate people (aged 15 and over), how many were women? | INEGI. Censo de Población y Vivienda 2020. Tabulados del Cuestionario Básico |
| | Engineering, manufacturing and construction | Percent of the population (15 years and older) females with higher education in the areas of engineering, manufacturing or construction | $\frac{(301\ 582/1\ 010\ 664)}{(709\ 082/1\ 010\ 664)}$ = 0,4253 = 42,5% | According to you, nationally in 2020, for every 100 people with a higher education (Technical, Bachelor's, Master's or PhD) in engineering, manufacturing or construction, how | Anuario estadístico de la Educación Superior 2019-2020. Formatos 911 de Educación Superior aplicados por la Secretaría de Educación Pública en coordinación con la ANUIES. Información proporcionada por las Instituciones educativas al |

| | | | | | |
|------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | ED_2 | relative to the percent of males with higher education in these areas. | | many were women? | inicio del ciclo escolar 2019-2020. |
| | Graduate education ED_3 | Percent of population 15 years and older with graduate education (MA or PhD) who are females relative to the percent of males. | $\frac{(874\ 072/1\ 809\ 911)}{(935\ 839/1\ 809\ 911)} = 0,9339 = 93,4\%$ | According to you, nationally in 2020, for every 100 people with a postgraduate education (Master's or PhD), how many were women? | INEGI, Censo de Poblacion y Vivienda 2020. Tabulados del Cuestionario Básico. |
| | Professional researcher ED_4 | Percent of SNI members (<i>Sistema Nacional de Investigadores</i> , National System of Researchers) who are females relative to the percent of SNI's members who are males. | $\frac{\left(\frac{12587}{33165}\right)}{(20578/33165)} = 0,6117 = 61,2\%$ | According to you, at the national level in 2020, for every 100 researchers who were members of the National System of Researchers (a distinction that symbolises the quality and prestige of scientific contributions), how many were women? | Author's calculations based on information retrieved from the Conacyt's webpage. https://conacyt.mx/sistema-nacional-de-investigadores/archivo-historico/Investigadores Vigentes 2020 (consulted the 14 of October 2021). |
| Political GEIM_POLI =49,8% | Mayor PO_1 | Percent of mayors who are women relative to the percent of male mayors. | $= \frac{0,217}{0,783} = 0,2771 = 27,7\%$ | According to you, at the national level in 2020, for every 100 municipal presidencies, how many were headed by women? | Inmujeres. Calculations from SEGOB - INAFED. Sistema Nacional de Información Municipal, 2020 (information as of 23 September 2020). |
| | Magistrate PO_2 | Percent of Magistrate from the <i>Tribunal Electoral del Poder Judicial de la Federación</i> who are women relative to the percent of male magistrate | $= \frac{(8/25)}{(17/25)} = 0,4706 = 47,1\%$ | According to you, at the national level in 2020, among the 25 Magistrates of the Electoral Tribunal of the Federal Judiciary, how many were women? | Author's calculations based on information retrieved from the Electoral Court's webpage. https://www.te.gob.mx/front3/contenidos/index/5 https://www.te.gob.mx/front3/contenidos/index/2 (consulted the 5 of April 2021). |
| | Ambassador PO_3 | Percent of ambassadors who are female relative to the percent of male ambassadors. | $= \frac{(19/80)}{(61/80)} = 0,3115 = 31,1\%$ | According to you, at the national level in 2020, among the 80 ambassadors appointed by the Mexican government, how many were women? | Author's calculations based on information retrieved from the government's webpage. https://www.gob.mx/gobierno/mexico-en-el-mundo (consulted the 5 of April 2021). |
| | Deputy PO_4 | Percent of Deputy from the Congress who are women relative to the percent of male Deputy. | $= \frac{\left(\frac{241}{500}\right)}{\left(\frac{259}{500}\right)} = 0,9305 = 93,1\%$ | According to you, at the national level in 2020, among the 500 deputies in the Congress of the Union, how many were women? | Inmujeres. Calculations from H. Congreso de la Unión, Cámara de Diputados (consulted in http://www.diputados.gob.mx , information as of 10 December 2020). |

Source: Author's calculations based on multiple datasets.

3.3. Results

3.3.1. Perception of gender inequality and individual characteristics: a bivariate descriptive analysis

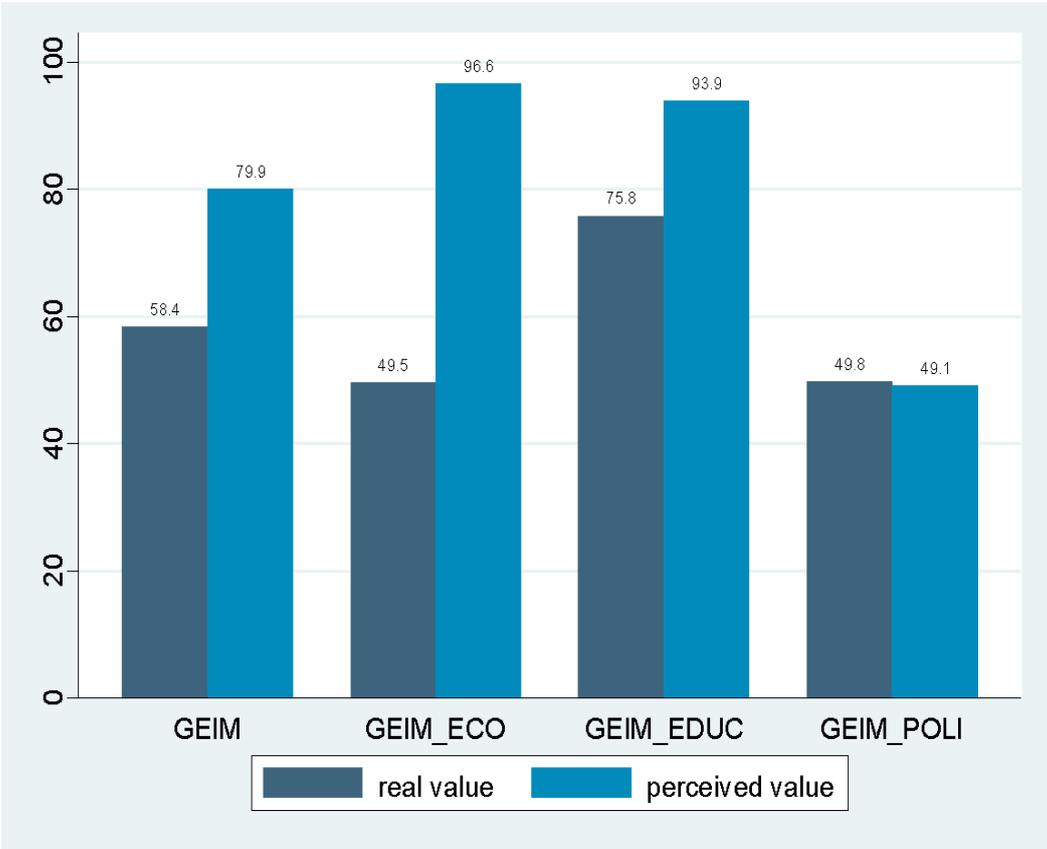
Research on social cognition notes that perceptions are based on the object of perception (in our case gender-based gaps in access to resources and opportunities) and on individual characteristics of the observer. This first part presents descriptive statistics of our perceived index of gender inequality in light of the individual demographic, socioeconomic and ideological features most commonly associated with perception of inequality (and gender inequality in particular) in the theoretical and empirical literatures.

Figure 3.1 puts the actual GEIM values into perspective with the perceived values reconstructed from the students' responses to the questionnaire. Descriptive statistics for the perceived GEIM and its sub-dimensions are presented in Table A3.2 in the Appendix. Perfect gender equality is reached when the indicator equals 100, meaning that women's attainment in different valuable positions is equal to the one of men. Hence, scores tending toward zero reflect greater gender inequality. A score can range above 100 indicating levels of disparity favouring women.

The main goal of our survey is not to measure and comment on the true level of gender inequality in Mexico. However, we can say that it is a highly unequal society where women's attainment is only 58.4% that of men in 2020 (taking into account the economic, educational and political dimensions). This very bad score is drawn by high gender inequalities in the economic and political spheres (confirming results from the *Global Gender Gap Report 2021*, (2021)). The highest equality level is reached in the educational dimension, although perfect equality has not yet been achieved.

Generally speaking, students from our sample recognize that gender inequality exists in Mexican society (perceived indices inferior to 100). Nevertheless, they strongly underestimate the true level of inequality between women and men, as they believe that higher levels of equality have been achieved compared to actual levels. The perceived GEIM is 79.9%, for a real value of 58.4%. It confirms previous empirical results (Davis & Robinson, 1991) and is reminiscent of economic inequality misperception (Gimpelson & Treisman, 2018; Norton & Ariely, 2011).

Figure 3.1: Real and perceived values of the Gender Equality Index for Mexico (GEIM) and its sub-dimensions.



Notes: Due to missing values, the sub-dimensions’ populations are varying: N_GEIM=208; N_ECO=215; N_EDUC=215; N_POLI=216.
 Source: Author’s calculations.

Decomposing by dimension, we note that perception of gender inequality is the less accurate in the economic dimension. Based on the selected indicators, the economic sphere is the least egalitarian, with women’s attainment in valuable positions being only 49.5% that of men, the worst score recorded. Nonetheless, the perceived levels of gender equality are very high, i.e. 96.6%. This result is surprising as students perceive almost no gender inequality in the environment where women are most discriminated against. Further analysis did not reveal the particular influence of one or more of the four indicators comprising the economic dimension. All of them are heavily overestimated (results not reported). However, the largest difference between true and estimated levels is found for the second indicator (percentage of women among employers). It also contrasts with the results from the in-depth interviews conducted afterwards. Economic or professional gender inequalities are rather well known by the students interviewed. They were mentioned by all of them and quasi systematically in the first place. They were also able to easily give various examples of it such as gender pay gap,

sexual division of labour, glass ceiling, less positions of responsibility/authority for women etc. This indicated their rather good perception of economic gender inequality.⁴⁹

The educational dimension is the second one where differences between real and perceived gender inequality levels are the greatest. This result echoes the study from Morrison, Bourke, & Kelley (2005) on experiences and perceptions of gender inequality by undergraduate students from a British University. Indeed, they found reluctance, particularly among female students, to recognize gender inequality problems and note a tendency to downplay or deny such inequality, probably as a coping mechanism in a highly gender-biased environment. The specific nature of our sample (upper secondary education students) may also explain that result, as respondents are particularly well integrated in the educational environment.⁵⁰ The conducted interviews are in line with this result as most gender inequality perceived in terms of education refers in fact to sexism within educational institutions and structural gender inequalities (such as the higher average number of years of schooling of men, their overrepresentation among recognised researchers, their greater representation in science or the denial of access to education or further study for girls) were rarely mentioned.

Finally, the perceived gender inequality levels closest to reality are found in the political dimension. It contrasts with the qualitative results where gender inequality in terms of executive, legislative or judicial powers was surprisingly almost completely obscured by respondents.

3.3.1.1. Demographic determinant: gender

Belonging to the dominant or the dominated group is a feature highly related to the perception of inequality. Several theories offer potential explanations for women's better awareness of

⁴⁹ These differences can be explained by several factors. First, the interviews were conducted with a limited number of students who were quasi exclusively post-graduate students. Yet, this may not be the only reason, as even if more educated students perceive more economic gender inequality, they still sorely underestimate it. Second, the two ways of measuring gender inequality perception (through a quantitative and qualitative survey) are not directly comparable but rather complementary. Indeed, the perceived GEIM refers to particular cases of economic inequality clearly identifiable by the respondent (e.g. "According to you, at the national level in 2020, for every 100 employed persons, how many were women?"). On the contrary, qualitative interviews are less restrictive as they are not limited by specific questions and students were free to mention any type of gender inequality they could think of. Third, students may not have understood well the scope of the questions used for the construction of the perceived GEIM (that is measuring gender inequality) or may have answered completely at random. Indeed, the questions were cognitively demanding and respondents may have lacked information. Finally, it could simply indicate that even if students are aware of economic gender inequality, they are unable to assess its intensity.

⁵⁰ Three out of the four indicators of the education dimension are related to female attainment at university.

gender inequality. First, derived from the underdog theory,⁵¹ disadvantaged individuals (women) are expected to be more conscious of inequality because they are the prime victims of it, compared to those who are already advantaged (men). Second, advantaged individuals (men) may argue that equality is achieved to better justify and assert their privileged position, either by self-interest⁵² or by fear of the disadvantaged ones.⁵³ Third, among members of the dominant group, thinking about inequality and thus their social privileges may trigger guilt, harm in-group's image (*group or moral image threat*) and lower their self-esteem. Indeed, they may perceive the conferred advantages as illegitimate and feel themselves as perpetrators of unjust harm (Brown & Craig, 2020; Knowles, Lowery, Chow, & Unzueta, 2014). For example, Branscombe (1998) found that for men, thinking about gender group's privileges harms their well-being. In addition, as the ideology behind discrimination is being questioned, the negative psycho-emotional effects may be strengthened as the privileges received are even more difficult to justify. Thus, we assume that men may underestimate gender inequality (consciously or not) as the result of cognitive biases, providing them a psychological buffer against the otherwise deleterious effects of inequality and its perception. This reminds the idea of Napier, Thorisdottir, & Jost (2010) based on system justification theory where sexism, by rationalising gender inequality, has a palliative function.

Figure 3.2 displays the values of the perceived GEIM and its 3 sub-dimensions by gender. The general trend and by sub-dimension are similar to those highlighted above. Nevertheless, it seems difficult to conclude on whether women are less biased toward equality than men, as it varies depending on the dimension considered.

Women perceive more inequality than men in the educational and political dimensions. In politics, they even perceive more equality than it is actually the case (44% versus 49.8%), overestimating their attainment in socially valuable positions in that domain. Conversely, in the economic dimension the perceived index for women (103%) is the highest of the three sub-dimensions and superior to that of men (this is the only case). It even exceeds 100, indicating that women perceive that they enjoy a better position than that of men in the economic dimension. Several reasons may explain this surprising finding. Women labour force participation in Mexico is very low, as only 42.2% of women (aged 15 and over) were

⁵¹ This theory was initially applied to fairness of inequality and preference for equality in Robinson & Bell (1978) and to perception of inequality in Robinson (1983).

⁵² The self-interest theory was initially developed by Meltzer & Richard (1981) for redistribution preferences.

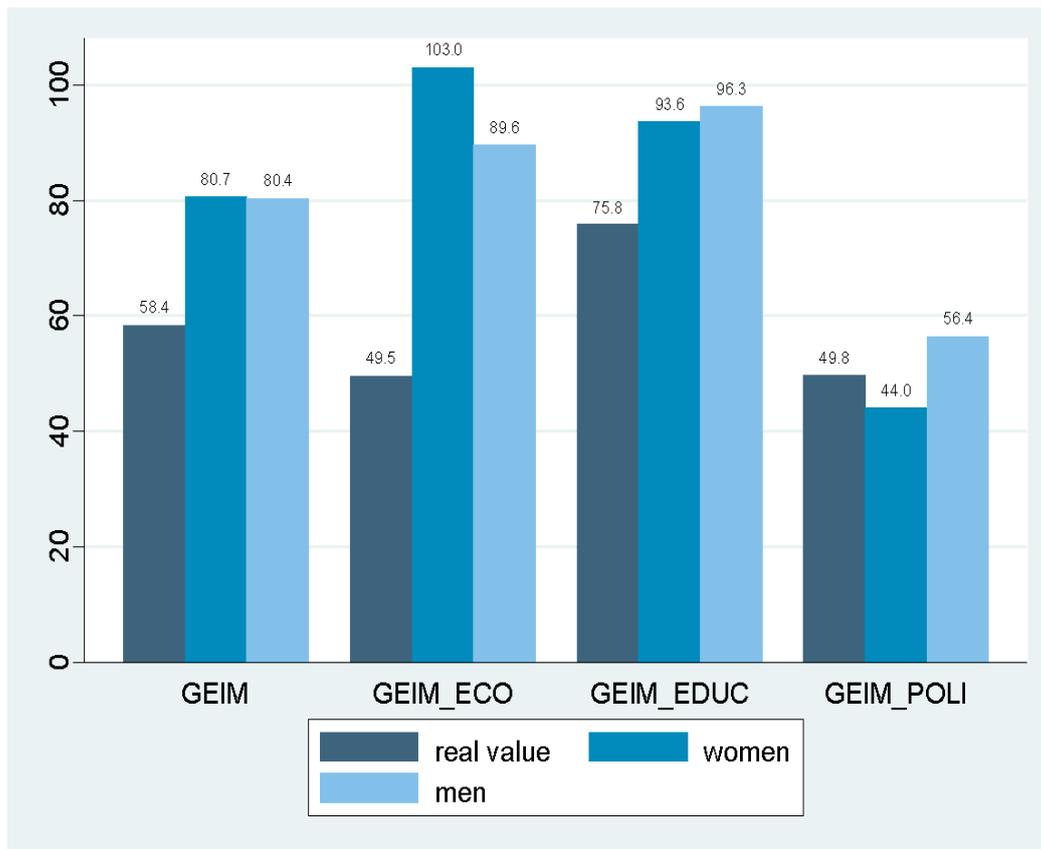
⁵³ The integrated threat theory was developed by Stephan & Stephan (2000).

economically active in 2020.⁵⁴ Sexist beliefs are also still very strong as in 2016, 37.3% of females think that women should be responsible for the care of children, the sick and the elderly and 30.4% disagree with the fact that women should be as responsible as men for bringing in money to the household.⁵⁵ Yet, women in our sample are highly educated and may enjoy better integration and conditions into the labour market. For example, among women with at least a secondary degree, labour force participation rises to 48.1%. The female respondents' privileged personal experience and closed environment may bias downward their perception of gender inequality in the economic sphere. In the case of perceived income inequality, studies have already shown that individuals have difficulties managing representative sample of the society and as a consequence, draw information from their own social circle, generalising it to the whole population (Cruces, Perez-Truglia, & Tetaz, 2013; Galesic et al., 2012; Irwin, 2018) and give greater weight to immediate experiences than distant ones (Evans & Kelley, 2004; Irwin, 2018). Empirically, the results emphasise whether a greater (García-González, Forcén, & Jimenez-Sanchez, 2019; Mårtensson, Björklund, & Bäckström, 2019) or a lower (Peng, Ngo, Shi, & Wong, 2009) perception of economic gender inequality by women.

Figure 3.2: Perception of the Gender Equality Index for Mexico (GEIM) and its sub-dimensions by gender.

⁵⁴ INEGI. *Encuesta Nacional de Ocupación y Empleo (Nueva Edición) (ENOEN). Indicadores de género. Cuarto trimestre 2020.*

⁵⁵ INEGI. *Encuesta Nacional sobre la Dinámica de las Relaciones en los Hogares 2016 (ENDIREH). Tabulados básicos.*



Notes: We use a sub-sample of women and men (N=215). Due to missing values, the sub-dimensions' populations are varying: N_GEIM=203; N_ECO=210; N_EDUC=210; N_POLI=211. Source: Author's calculations.

Yet, women's perception of gender inequality is not only conditioned by their individual characteristics but as well by the levels of male domination in the economic, political, cultural and ideological spheres, which may act as a *discount rate* (Blumberg, 1984; Blumberg & Coleman, 1989). Men's dominance in society may impede women's self-awareness as a subordinate group. As Mexico is a highly patriarchal society where women suffer from an inferior social status, they may underestimate the true level of gender inequality. Besides, a safe social sphere is necessary for people to freely talk, exchange and increase their awareness of gender inequality. Still, 38.6% of women in our sample declared that they can't express freely and without fear their feelings about gender inequality in Mexican society. This absence of a benevolent social sphere may inhibit women's perception of gender inequality.

3.3.1.2. Socioeconomic determinants: education level, marital status and social class

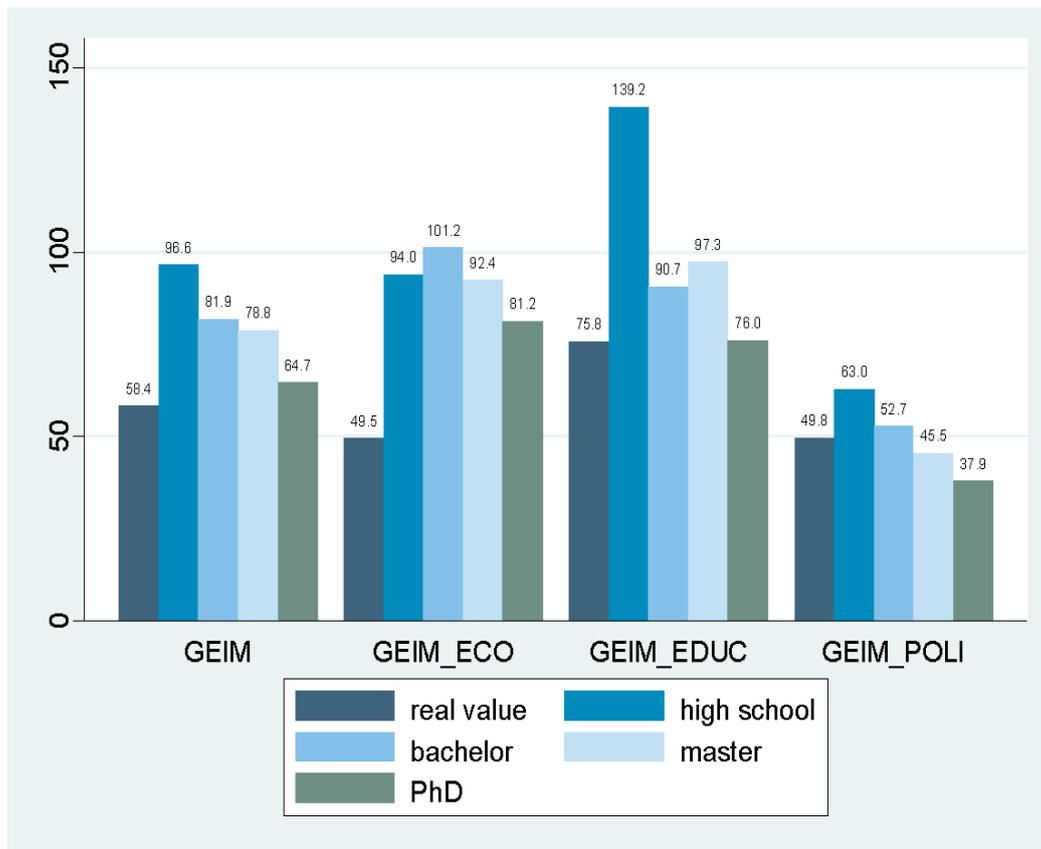
Figure 3.3 shows the GEIM and its perception according to respondents' education level. Overall, as the respondents' level of education increases, they perceive higher levels of inequality, confirming past empirical evidence (Kane, 1995; Watson, Scarinci, Klesges, Slawson, & Beech, 2002) and the enlightenment theory. The latter states that education, by favouring socialisation between individuals with different experiences (including of the other

gender) and promoting equal treatment ideals, may increase awareness of gender inequality (Davis & Robinson, 1991). As an illustration, several male students interviewed mentioned the recent sensitization they received about gender issues as part of a mandatory university course and how it enriched their knowledge on the subject. However, students continue to misperceive gender inequality, underestimating its real levels (to the exception of master and PhD students who overestimate the extent of gender inequality in the political sphere).⁵⁶ The most educated also seem to have the most accurate perceptions, as the perception error, which is the difference between the perceived level and its true value, is smaller for those students. This result is less obvious when looking at the sub-dimensions indices. Yet, results for high school students have to be taken carefully as it concerns only 9 individuals in our sample. These results may also be driven by the gender composition of each student promotion as women are over-represented among PhD and high school students (representing respectively 69.7% and 72.7% of each category). We made the same figure for women and men separately (figure not shown as the sample sizes are considerably reduced) and an exactly similar pattern is highlighted.⁵⁷ Finally, the age of the respondents may as well play a role. Because of more developed cognitive skills and/or greater likelihood to have experienced injustice during their lifetime (Shapiro and Kirkman, 2001), older individuals may better perceive inequality. Neff et al., (2007) found an age-related increase in perceptions of male dominance among adolescents (from middle school to undergraduate students). In our sample, students with the highest education levels are the oldest.

Figure 3.3: Perception of the Gender Equality Index for Mexico (GEIM) and its sub-dimensions by education level.

⁵⁶ The fact that the survey was disseminated to students of a Faculty of Political and Social Sciences via a contacted professor could explain the greater recognition of political gender inequality.

⁵⁷ Except for male high-school students, but it concerns only 3 individuals.



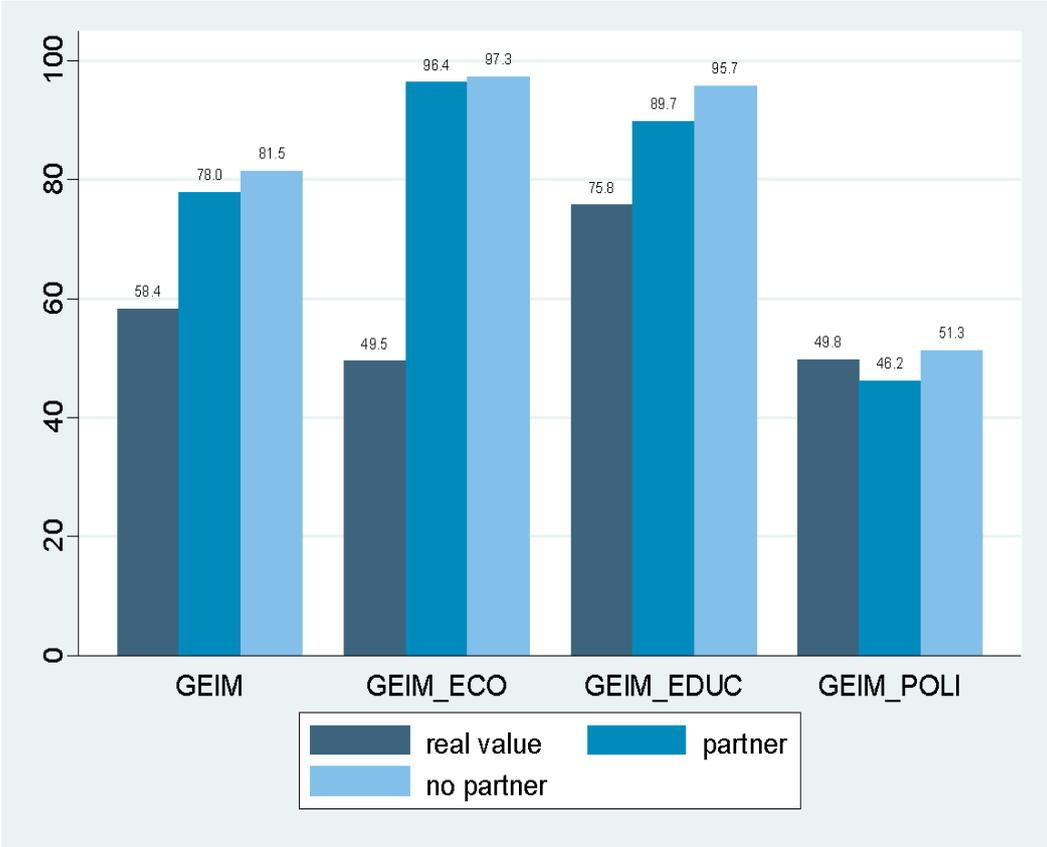
Notes: Due to missing values, the sub-dimensions' populations are varying: N_GEIM=205; N_ECO=212; N_EDUC=212; N_POLI=213.
Source: Author's calculations.

Marital status is an often-mentioned determinant of gender inequality perception as marriage is recognized as a highly patriarchal institution. Theoretically, Kane (1998) stated that women's economic and psychological dependence (through ties of love and intimacy) on men⁵⁸ may discourage them from criticising gender stratification and encourage women to draw their interpretation of gender inequality toward that of men. Some authors also highlight the importance of family situation in feminist orientations (Gerson, 1987) which plays an important role in recognition of gender inequality. Empirically, Reingold & Foust (1998) found that divorced or never married women are more likely to hold a gendered political consciousness compared to those currently married or widowed. For men the effect may be the opposite. In the study of Harnois (2017), men who are currently married or widowed (compared to men in other family forms) saw significantly more gender inequality. In our sample, the 26 students who experienced marriage in their lifetime (currently married, divorced or separated), either female or male, perceive more gender inequality than other respondents whatever the dimension considered (figure not shown). This result is in line with

⁵⁸ Measured by women's working status, education level, marital status and motherhood.

the one of Harnois (2017). Yet, theories outlined above may be obsolete in the present context as they strongly rely on the relation between women’s labour force participation within marriage and support of feminist principles when in our sample, respondents are still studying (even though some were also probably employed at the same time).

Figure 3.4: Perception of the Gender Equality Index for Mexico (GEIM) and its sub-dimensions by relationship status.



Notes: Due to missing values, the sub-dimensions’ populations are varying: N_GEIM=205; N_ECO=212; N_EDUC=205; N_POLI=207. The “partner” modality groups together individuals who are married, with a partner or a concubine. The others are single. Divorced or separated individuals were excluded (9 individuals) as we don’t know if, beyond their marital status, they had a partner at the time of the survey. Source: Author’s calculations.

Based on social cognition theories and personal experiences within respondents’ immediate environment, it appears more interesting to focus on their interactions with the other gender and thus if they had a partner at the time of the survey. Figure 3.4 displays the perceived levels of the GEIM by relationship status.⁵⁹ We note that students in a relationship at the time of the survey perceive slightly higher levels of gender inequality than single ones, even if generally both continue to underestimate its true level. Various reasons may explain this result. First, women, by extensively exchanging with men, may better acknowledge their

⁵⁹ It is important to note that previous theories rely solely on heterosexual relations between women and men. Yet, we don’t know whether individuals from our sample are in a heterosexual or homosexual relationship.

underprivileged position mostly by perceiving the advantages of their partner. On the other hand, men, by having closed interactions with their female partner may better understand their position as a dominant group.⁶⁰ Thus, the relationship may appear as a privileged space for communication, exchange of experiences and better consciousness of gender inequality, confirming the need of a safe social sphere. Secondly, and less satisfactorily, the heterosexual relationship could be yet another space where women experience inequalities in their daily life, reinforcing their perception of the discriminations they are victims of.

As for perception of economic inequality, self-positioning in society bears an important role. Respondents with a middle or top social class position report lower levels of perceived inequality (Cruces et al., 2013; Knell & Stix, 2017). In this regard, there seems to be a theoretical gap concerning in particular gender inequality perception. Yet, Harnois (2015, 2017) provides relevant insights. Based, among other, on the intersecting inequalities theory, she stated that those who suffer from other types of inequality may be more likely to perceive gender inequality as their exposure to different social injustices (such as racial/ethnic, class and sexuality-based inequalities) may shape their attachment to egalitarianism ideals and consciousness of gender. Individuals with subordinate statuses will be more likely than privileged ones to hold a strong political consciousness of gender, that is, to better perceive gender inequality and support women's efforts to fight it. She successfully tested this hypothesis for women (Harnois, 2015) and men (Harnois, 2017), nevertheless solely considering racial/ethnic and sexual inequalities. Hence, we expect low socioeconomic statuses students, whatever their gender, to perceive higher levels of inequality between women and men.

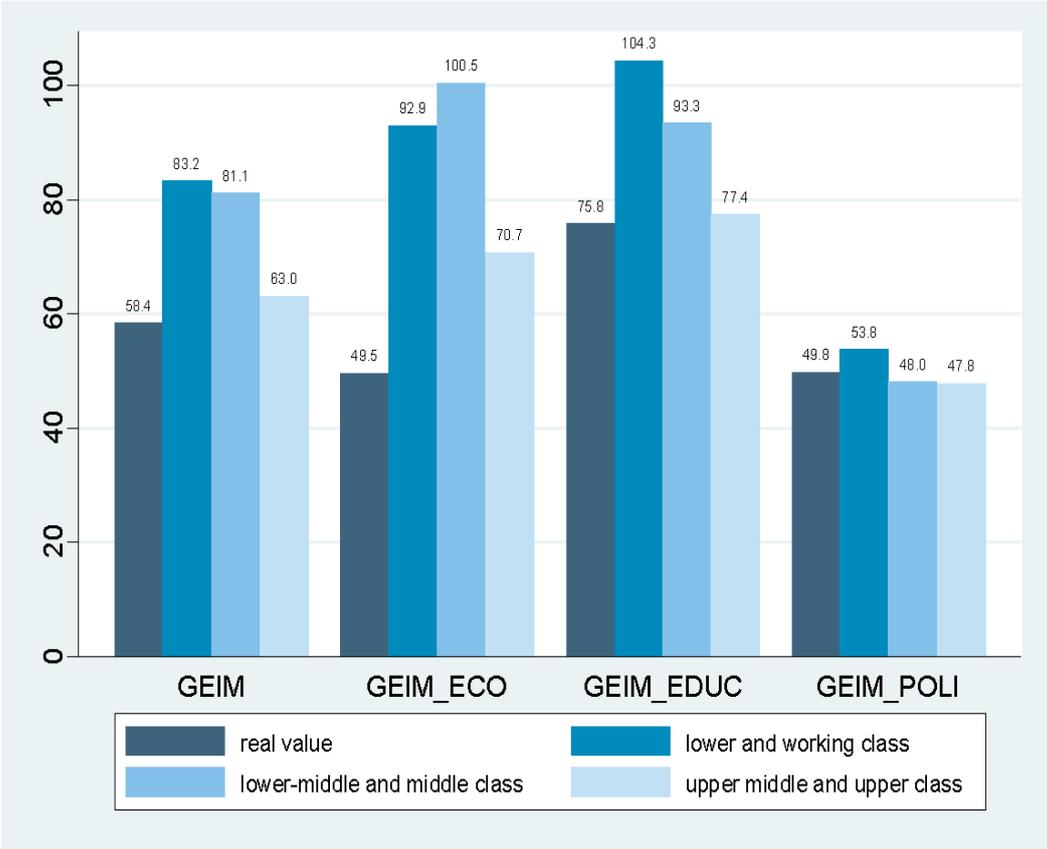
Our results (Figure 3.5) are not supportive of previous empirical findings. Broadly speaking, students considering belonging to upper-middle and upper social classes have both the highest and most accurate perceived levels of gender inequality. However, it urges caution with this particular finding as previous empirical studies showed that individuals incorrectly assess their individual position in society, in particular within the income distribution (Knell & Stix, 2017). Indeed, low-income individuals overestimate their own position whereas high income individuals underestimate theirs, which may explain this unexpected result. Additional results (not shown) with our own proxy⁶¹ for social class are as well inconclusive. Nonetheless,

⁶⁰ The figures, separately for female and male (not shown), display similar results.

⁶¹ The social class proxy includes variables for participants' perception of the quality of public services (paved roads, sidewalks, sewer system, garbage collection, and street lighting) in their neighbourhood. A Likert scale from 0 to 5 (with 0 meaning none) is used.

education is probably a confounding factor of social class, which could explain these apparently surprising results (individuals from the highest social classes are also the most educated), hence the relevance of using a multivariate analysis.

Figure 3.5: Perception of the Gender Equality Index for Mexico (GEIM) and its sub-dimensions by social class.



Notes: Due to missing values, the sub-dimensions’ populations are varying: N_GEIM=204; N_ECO=211; N_EDUC=211; N_POLI=212. Social class is self-attributed by respondents.

Source: Author’s calculations.

3.3.1.3. Ideological preferences

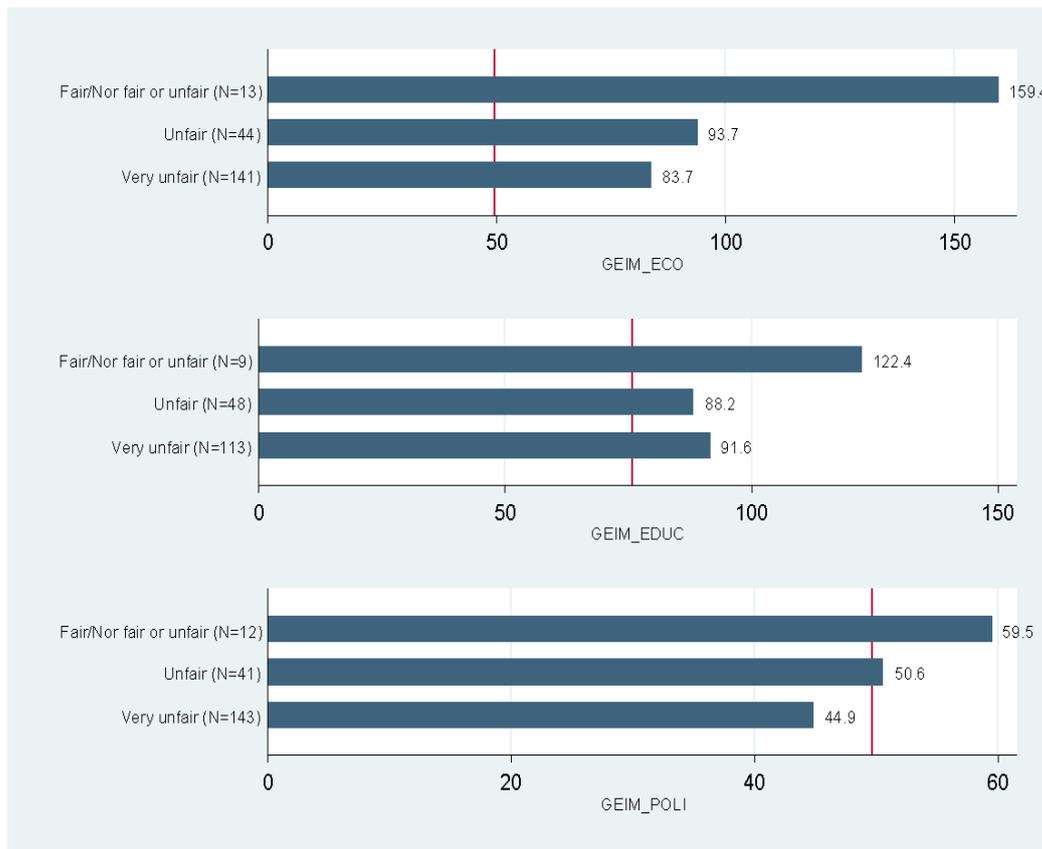
Perception of inequality is highly related to the value system of individuals. The latter can shape their social cognition in order to be consistent with their ideological preferences. As a result, ideology affects the likelihood that people attend inequality-related information and how they will process it (Waldfoegel, Sheehy-Skeffington, Hauser, Ho, & Kteily, 2021). As a result, ideology predisposes individuals to see the level of inequality their beliefs convince them must exist (Alesina & Fuchs-Schündeln, 2007). For example, those to the right of the political spectrum tend to have lower perceptions of economic inequality than left-wing individuals (Bussolo, Ferrer-i-Carbonell, Giolbas, & Torre, 2021; Chambers, Swan, &

Heesacker, 2014; Norton & Ariely, 2011). The fact that “conservatives are more satisfied with the current social system, are more likely to prefer the principle of equity (outcomes should be proportional to contributions) over the principle of equality (outcomes should be equal regardless of contributions), believe more strongly that success is attainable through individual efforts, and have a more optimistic outlook on life” (Chambers et al., 2014, p. 2) may explain this result.

In that sense, the fairness of the process through which inequality is generated and individuals’ own views of what constitutes a fair society play an important role in shaping their perceptions of inequality. When people see the resource distribution as fair in society, they tend to perceive less inequality (Castillo, Miranda, & Carrasco, 2012; Du & King, 2022; Rodriguez-Bailon et al., 2017). Our results (Figure 3.6) show that students perceiving differences between women and men in different dimensions to be unfair tend to perceive higher levels of gender inequality.

In a similar vein, gender-related ideologies, such as feminism or sexism may play an important role in shaping perception of gender inequality. In particular, individuals holding a more progressive gender ideology and committed to reducing the gap between women and men, are vigilant for and thus, would be more likely to accurately notice inequality between women and men (as it is ideologically motivated) (Rowland, 1986). Waldfogel et al., (2021), although they do not focus on gendered beliefs in particular, found in their experiment that when women were disadvantaged, social egalitarians (versus those more tolerant of social hierarchy) were less likely to underestimate inequality and more likely to estimate it accurately. Similarly, a high feminist identification implies a higher perception of disadvantage for women and commitment to change the gender hierarchy (Stephens & Levine, 2011; van Breen, Spears, Kuppens, & de Lemus, 2017). Finally, Foley, Ngo, Loi, & Zheng (2015) found out that people with a high gender identification (identifying with their gender group and thinking that it is an important part of their identity) tend to be more aware of gender discrimination in the workplace. Hence, we expect individuals with a progressive gender ideology (a combination of high feminist consciousness and low sexist orientation) to detect more evidence of gender inequality.

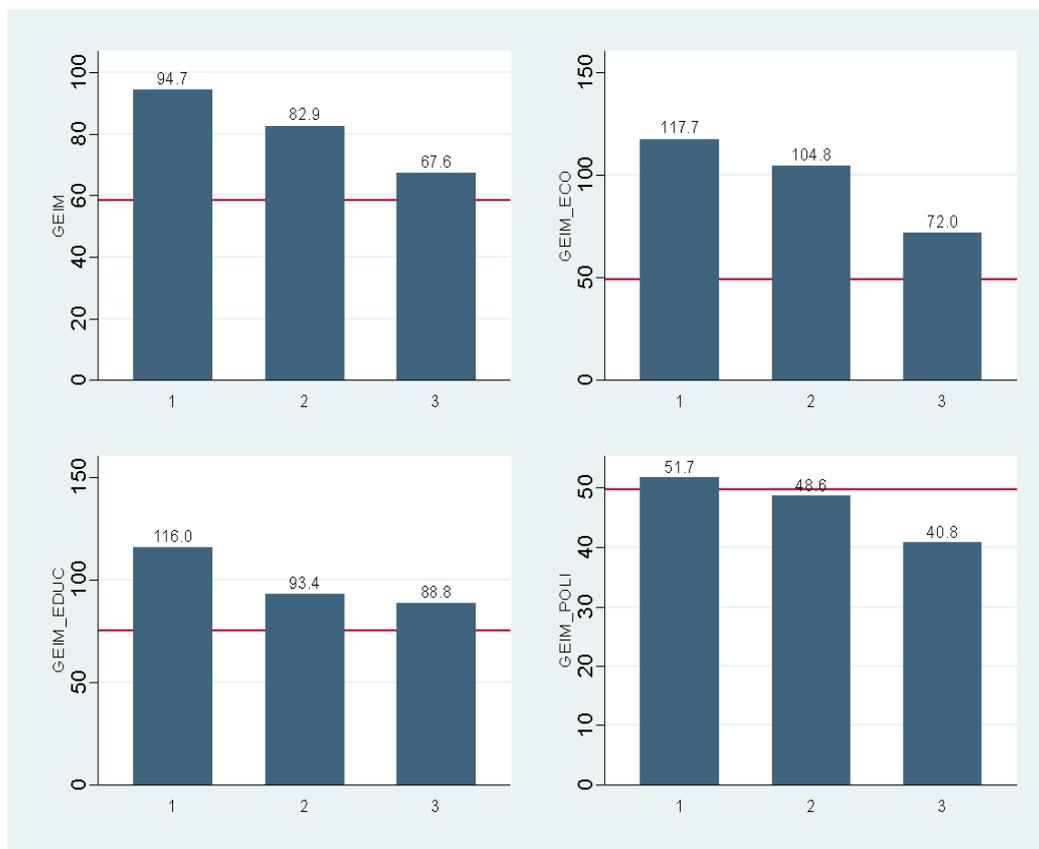
Figure 3.6: Perception of the Gender Equality Index for Mexico (GEIM) and its sub-dimensions by fairness ideology.



Notes: For each dimension, individuals were asked if the differences between women and men in today Mexican society were fair or not. As the three modalities “Very fair”, “Fair” and “Nor fair or unfair” have very few observations, they have been grouped under the label “Fair/ Nor fair or unfair”. The vertical line indicates the real value of the GEIM.
 Source: Author’s calculations.

Our results (Figure 3.7) are consistent with past empirical evidence as individuals embracing more progressive attitudes toward gender perceive higher inequality levels between women and men. They also estimate it more accurately, except in the political dimension (where they even overestimate inequality).

Figure 3.7: Perception of the Gender Equality Index for Mexico (GEIM) and its sub-dimensions by gender ideology score.



Notes: Due to missing values, the sub-dimensions' populations are varying: N_GEIM=147; N_ECO=151; N_EDUC=150; N_POLI=150. Gender ideology is measured via 8 survey questions assessing individuals' feminist and sexist (hostile and benevolent) orientations. A higher gender ideology score indicates holding a more progressive gender ideology. For each graph, the horizontal line indicates the real value of the GEIM.

Source: Author's calculations.

3.3.1.4. Robustness check

The study of perceptions is complex as they are intrinsically unobservable. What we observe instead are variables that indirectly capture respondents' views on inequality and which generally seem unrelated to actual measures of the phenomenon (Brunori, 2017). In addition, as the views expressed by respondents through different indicators may be reconstructed in different but equally legitimate manners to capture inequality perception, Bavetta, Li Donni, & Marino (2019) advocate for multiple definitions and measures of perceived inequality.

To test the robustness of our quantitative index of perceived gender inequality, we decided to confront it to an alternative measure. In our survey, perceptions of gender inequality (in the economic, educational and political spheres of society) were also assessed via simpler and more traditional survey questions, such as: *“In Mexican society, do you currently observe differences between women and men in the economic/labour sphere (in terms of access to*

employment, salary, occupation of positions of responsibility/prestige, access to health institutions, etc.)?”⁶² Possible answers, framed on five ordinal categories, range from “Yes, men are much more favoured than women” to “Yes, women are much more favoured than men”⁶³.

Figure 3.8 cross-references our quantified index of perceived gender inequality over the different categories of the more traditional question trying to assess the same phenomenon. At first sight, there seems to be consistency between the responses of individuals to these two alternative measures, indicating a cognitive coherence of individuals in their perceptions of gender inequality. Whatever the dimension considered, the more individuals report noticing differences favouring men over women, the less they perceive gender equality levels to be reached when numerically assessed (lowest GEIM).^{64, 65}

Nonetheless, we note some cognitive dissonances. For example, individuals declaring perceiving no difference between women and men should theoretically have a GEIM of 100 (indicating that women’s attainment is equal to that of men). Similarly, respondents detecting differences favouring women over men should have a GEIM superior to 100 (indicating levels of disparity favouring women). This is not the case. As an illustration, individuals perceiving women and men as equal in the economic dimension have a perceived GEIM of 170.5. Several reasons may explain this finding. First, the two variables, although they measure perception of gender inequality, are hardly comparable. The perceived GEIM refers to specific cases of inequality clearly identifiable by the respondent (e.g. “According to you, at the national level in 2020, for every 100 employed persons, how many were women?”). On the contrary, the more traditional questions were general and do not refer to any situation in particular (e.g. “In Mexican society, do you currently observe differences between women and men in the economic/labour sphere?”), even if the examples given in parenthesis in order to provide some anchor point referred to the different indicators used for our numerical index (“in terms of access to employment, salary, occupation of positions of responsibility/prestige,

⁶² The last two additional questions were: “In Mexican society, do you currently observe differences between women and men in the educational sphere (in terms of literacy, schooling, higher education, research, etc.)?” and “In Mexican society, do you currently observe differences between women and men in the political sphere (in terms of representation, legislative, executive and judicial power, etc.)?”

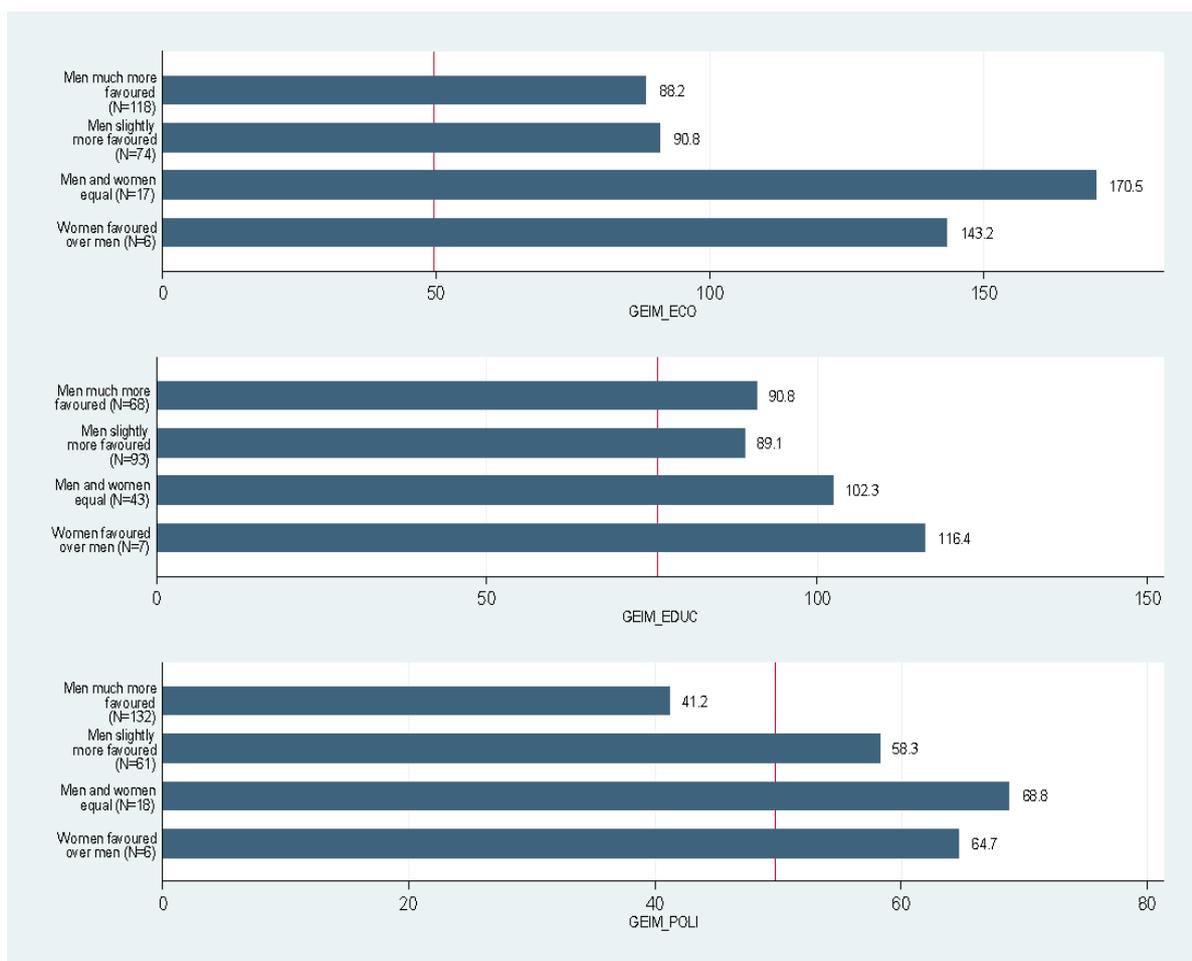
⁶³ All possible answers were: “Yes, men are much more favoured than women”, “Yes, men are slightly more favoured than women”, “No, men and women are equal”, “Yes, women are slightly more favoured than men”, “Yes, women are much more favoured than men”.

⁶⁴ It must be noted that very few individuals declare perceiving differences favouring women over men and this category should be interpreted with caution due to the small number of observations.

⁶⁵ Besides, both measures are positively correlated for the economic and political dimensions of inequality. The coefficients of correlation are respectively 0.2355 and 0.298 (statistically significant at the 1% level).

access to health institutions, etc.”). Thus, individuals could mobilise different situations or examples while thinking about any differences observed between women and men in the different environments. Second, they may not have understood well the scope of the questions used for the construction of the perceived GEIM (that is measuring gender inequality) or may have answered completely at random. Indeed, the questions were cognitively demanding and respondents may have lacked information. Previous studies already suggest that individuals guess completely randomly the levels of economic inequality (Gründler & Köllner, 2017; Stephany, 2017). Third and finally, the classic measure of gender inequality may be more sensitive to social desirability bias as students may conceal their true opinion more easily. This could be particularly the case for respondents indicating that women and men are equal instead of indicating that women are favoured over men, which is less desirable socially.

Figure 3.8: Perceived Gender Equality Index for Mexico (GEIM) and an alternative measure of inequality perception.



Notes: For each graph/dimension, the vertical line indicates the real value of the GEIM. As the two modalities “Yes, women are slightly more favoured than men” and “Yes, women are much more favoured than men” have very few observations, they have been grouped under the label “Women favoured over men”.

Source: Author’s calculations.

3.3.2. Regression analysis

To further investigate gender inequality perception and its determinants, we run a multivariate analysis using the same individual variables as in the descriptive analysis. Due to missing data, the number of observations is considerably reduced (between 82 and 128 individuals depending on the regression). For that reason, results should be taken cautiously. Table 3.2 presents various results on the levels of gender inequality perceived (OLS regressions (1) to (4)), the accuracy of perceptions (OLS regressions (5) to (8)) and the probability of underestimating gender inequality (Logit regressions (9) to (12)) for the perceived GEIM and its three sub-dimensions. The accuracy of perceptions is the absolute difference between the perceived GEIM and the actual GEIM value. The smallest the difference, the more accurate is the perception of gender inequality. The probability of underestimating gender inequality is a binary variable taking the value of 1 if the value of the perceived GEIM is superior to the actual GEIM value, indicating that individuals perceive higher levels of equality than is actually the case.

Globally, the results are unstable. Depending on the sub-analysis (level, accuracy or underestimation) and the type of inequality considered, different individual factors matter for the perception of gender inequality. The results are nonetheless in line with those of the previous descriptive bivariate analyses.

Regarding the perceived levels of gender inequality, students in a relationship and holding a more progressive gender ideology (Regression (1)) perceive lower general levels of gender equality in Mexico. These effects are not highlighted for specific sub-dimensions of gender inequality. Female students and students perceiving gender differences as unfair also estimate the levels of gender equality to be lower but only when it comes to politics (Regression (4)). Finally, the level of education is probably the strongest predictor of the perceived level of inequality between women and men. As their level of education increases students perceive higher levels of global, educational and political gender inequality (Regressions (1), (3) and (4) respectively). But this effect seems to fade for the highest level of education (among PhD students), with the exception of political inequalities. Interestingly, none of the individual predictors are significant for economic gender inequality. This appears to be a special case and could explain the very poor perception of gender inequalities in this domain.

The accuracy of perceptions depends mostly on the level of education of the respondents. Compared to high school students, respondents with higher education have more precise estimates of the level of gender inequality in general as well as in education and politics.

Table 3.2: The effect of individual determinants on gender inequality perception (perceived level, accuracy and probability of underestimating).

| Variables | (1) GEIM | (2) GEIM_EC O | (3) GEIM_EDU C | (4) GEIM_POLI | (5) ACCU | (6) ACCU_EC O | (7) ACCU_EDU C | (8) ACCU_PO LI | (9) UNDER | (10) UNDER_E CO | (11) UNDER_EDU C | (12) UNDER_POL I |
|-------------------------|----------------------------------------|----------------------|----------------------------------------|----------------------------------------|-----------------------------------------|---------------------------------------|-----------------------------------------|-----------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|
| 2.gender | 2.4577 (9.773) | 17.8496 (17.159) | -0.4034 (23.470) | -14.5851** (6.817) | 6.7274 (8.661) | 16.5026 (16.659) | 17.5077 (19.608) | 0.3097 (5.387) | -2.1165** (0.948) | 0.5653 (0.913) | -0.9108 (0.731) | -1.3315* (0.704) |
| age | 0.0818 (0.787) | 1.5911 (1.294) | -0.8861 (1.746) | -0.2316 (0.541) | 0.1410 (0.697) | 1.3848 (1.256) | -0.5154 (1.458) | 0.2603 (0.427) | 0.0264 (0.066) | 0.3073** (0.153) | 0.0155 (0.051) | -0.1148 (0.091) |
| 2.diplom | -46.5503** (20.351) | -32.2818 (33.983) | -94.9521** (40.940) | -32.7651** (13.911) | -52.1145*** (18.036) | -40.5275 (32.993) | -91.8547*** (34.204) | -24.4366** (10.993) | -0.7427 (1.435) | -0.2062 (1.466) | -2.2983* (1.259) | -2.4377* (1.315) |
| 3.diplom | -53.6230** (21.918) | -44.2534 (36.951) | -77.9538* (44.853) | -37.5145** (15.011) | -61.6511*** (19.426) | -55.0111 (35.875) | -85.1975** (37.473) | -34.6667*** (11.863) | -1.6149 (1.612) | -1.0435 (1.982) | -2.0137 (1.309) | -1.2181 (1.483) |
| 4.diplom | -41.0926 (27.284) | -28.5976 (45.562) | -50.1705 (56.336) | -42.8958** (18.759) | -47.6820* (24.181) | -38.6284 (44.236) | -63.7771 (47.067) | -35.7720** (14.824) | -0.6876 (1.976) | -2.1029 (2.534) | -2.5307 (1.654) | -2.4195 (2.098) |
| 1.partner | -16.1243* (9.555) | -25.5229 (17.602) | -25.2810 (23.092) | -1.2614 (7.080) | -11.7721 (8.468) | -22.0350 (17.090) | -8.0664 (19.293) | 1.3235 (5.596) | -1.5689** (0.739) | -0.6643 (0.758) | -0.6610 (0.680) | 0.3536 (0.740) |
| 2.social_class | 9.5578 (10.744) | -0.0539 (18.654) | 18.3630 (25.669) | -3.4944 (7.823) | 6.2711 (9.522) | -1.0392 (18.111) | 7.0326 (21.445) | -4.3151 (6.183) | 1.6410* (0.987) | 1.7988* (1.009) | -0.4058 (0.718) | 0.5936 (0.785) |
| 3.social_class | -16.3639 (18.745) | -22.5301 (33.241) | -8.7179 (40.417) | -5.6425 (13.604) | -18.6613 (16.613) | -22.8364 (32.273) | -18.7560 (33.766) | -7.5457 (10.751) | 0.5943 (1.359) | 0.9796 (1.459) | -0.5186 (1.312) | 1.0629 (1.241) |
| 2.fairness | X | -26.1522 (36.174) | -24.1599 (55.393) | -23.7324* (14.148) | X | -27.4765 (35.120) | -6.5100 (46.279) | -0.3246 (11.181) | X | -0.1294 (2.434) | 0.6969 (0.765) | -4.8613*** (1.750) |
| 3.fairness | X | -56.3918 (34.179) | -17.8526 (57.074) | -23.2356* (13.334) | X | -55.4618* (33.184) | 0.4533 (47.683) | -4.9809 (10.537) | X | -2.5406 (2.194) | | -4.3930*** (1.681) |
| 2.progressive | -29.3420* (15.878) | -3.8775 (31.209) | -26.9683 (49.098) | 4.2652 (12.597) | -18.5793 (14.072) | -0.4006 (30.300) | -22.2356 (41.020) | -8.4865 (9.955) | -16.9303 (1,357.133) | -13.9057 (1,158.617) | 1.4911 (1.612) | 2.6967 (1.659) |
| 3.progressive | -40.0524** (17.467) | -16.6802 (33.467) | -27.6393 (52.524) | -5.6303 (13.722) | -30.2297* (15.480) | -12.2152 (32.492) | -34.2551 (43.882) | -16.2547 (10.845) | -17.1043 (1,357.133) | -14.5944 (1,158.617) | 1.4915 (1.680) | 1.2135 (1.736) |
| Constant | 144.7193** * (49.150) | 124.3411 (92.898) | 344.2916* (176.537) | 126.8607*** (36.331) | 87.8058** (43.560) | 80.7557 (90.193) | 234.2563 (147.490) | 48.2258* (28.711) | 14.5576 (1,357.134) | 11.0118 (1,158.625) | -0.4083 (3.084) | 7.1577** (3.133) |
| Observations | 128 | 119 | 101 | 122 | 128 | 119 | 101 | 122 | 107 | 92 | 82 | 113 |
| R-squared | 0.3320 | 0.3093 | 0.3084 | 0.3867 | 0.3156 | 0.3067 | 0.3268 | 0.2598 | | | | |
| Adjusted R ² | 0.0975 | 0.0180 | -0.0806 | 0.1269 | 0.0753 | 0.0144 | -0.0518 | -0.0537 | | | | |
| Pseudo R ² | | | | | | | | | 0.4078 | 0.2988 | 0.1570 | 0.3327 |

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Additional variables such as parents' education and state where they spent most of their lives are controlled for. The variable related to fairness of gender inequality is not available for the global perceived GEIM.

Source: Author's calculations.

For the probability of underestimating the level of gender inequality, the results are less clear and largely related to perceived levels of inequality. We can nevertheless draw up an individual profile relying on the interpretation of the average marginal effects (see Table A3.3 in the Appendix). Being female or in a relationship reduces the probability to underestimate gender inequality. For example, women's probability of underestimating global gender inequality is 23 percentage points lower than men, a result that may be driven by their better perception of political inequalities. The effect of education is mainly significant for undergraduate students. Their probability of underestimating gender inequality in education and politics is respectively 42 and 36 percentage points lower than high school students. In addition, students identifying themselves as belonging to the lower-middle or middle class have a probability 19 and 24 percentage points higher to underestimate general levels of gender inequality compared to students identifying as belonging to the lower or working class. This result, driven by economic inequality perception, was not previously highlighted and confirms the theoretical literature. This effect may even be underestimated as a large portion of the lower-middle/middle class may in fact belong to the upper-middle/upper class (because individuals higher in the socio-economic ladder tend to underestimate their social position). Finally, attachment to justice appears to be determinant for political inequality only. Perceiving gender differences as unfair reduced students' probability of underestimating political inequality by 62 percentage points.

To sum up, the results of the multivariate analysis are relatively volatile. Depending on the type of inequality considered and the sub-analysis led, different individual characteristics matter for perception of gender inequality. They however highlight the determinant role of education, which influences at the same time the level of gender inequality perceived, the accuracy of perception and the probability of underestimating gender inequality. Except for economic inequality, as their education level increases, students perceive higher levels of gender inequality, their perceptions are more accurate, and their probability of underestimating gender inequality is reduced.

3.4. Conclusion

The purpose of this study was to assess individuals' perception of gender inequality in Mexico. Using an innovative statistical measure, it allows us to simultaneously take into account several dimensions of gender inequality, quantify perceived inequality levels, measure the accuracy of estimates and make between-individuals comparisons. In that sense,

it aims at better describing and analysing this phenomenon and fills past empirical gaps regarding perception of gender inequality. To this end, a quantitative survey was led with 220 students from Mexico. After constructing a multidimensional index of gender inequality inspired by the work of Frias (2008b), we were able to derive a measure of *perceived* gender inequality. We then analysed it and its main individual determinants in the light of the theoretical literature.

Overall, individuals misperceive gender inequality. Even though they recognize that gender inequality exists in Mexican society, they underestimate its magnitude as they believe that higher levels of equality have been achieved compared to actual ones. Surprisingly, inequality is the most underestimated in the economic dimension, where women are the most discriminated against and equality is far from being reached. Then, perceptions are the less accurate in the educational sphere. While the highest equality level is actually observed in that dimension, students perceive near gender equality. Finally, the estimates of political gender inequality are the closest to reality.

Although based on a limited number of observations, the descriptive and econometric analyses offer globally similar results, in line with past theoretical and empirical literatures. The multivariate analysis however refined the results showing that the effect of individual determinants is dimension and analysis-specific. Depending on the type of gender inequality considered and the analysis led (level, accuracy and underestimation), different individual factors matter for explaining perceptions. We were not expecting such variability in the results and this is in itself quite innovative. Regarding the perceived levels of gender inequality, students in a relationship and holding a more progressive gender ideology estimate lower general levels of gender equality. Female students and students considering gender differences as unfair also estimate the levels of gender equality to be lower but only when it comes to politics. In addition, the results highlight that women's probability to underestimate gender inequality is lower than men, mainly because they are better aware of political inequality. Students belonging to the lower-middle/middle class are also more likely to underestimate gender inequality, a result driven by perception of economic inequality. Commitment to justice also appears to be extremely determinant but for political inequality estimation only. Finally, the level of education is the strongest predictor of gender inequality perception. As their level of education increases students perceive higher levels of global, educational and political inequality between women and men. Their estimates are also more accurate and their probability to underestimate gender inequality is reduced.

This exploratory study was a first attempt at quantifying and analysing gender inequality perceptions. There are many possibilities for future research. The calculation of this perceived index should be replicated with a bigger and more diverse sample of individuals. A more in-depth study using additional indicators for each dimension of gender inequality may be relevant. Comparative cross-cultural studies could be considered as well, as our measure of perceived gender inequality allows easy collection of comparable data, validating further our index. Lastly, as perception of gender inequality remains a complex phenomenon, a complementary qualitative analysis may be of great interest to better understand it.

In terms of policy implication, our results suggest that awareness campaigns could be implemented massively, targeting all sections of the population, starting from an early age and focusing in particular on the less educated (those without access to higher education). Examples include audio-visual spots or poster campaigns in public transport. By providing quality, impactful and accessible at low-cost information on gender inequality, these campaigns may enable people to correct their estimates upwards. Some evidence offers encouraging results, showing that people incorporate information about inequality consistently in their beliefs. When confronted with factual information about the actual extent of income disparities, people become more aware of them (Kuziemko, Norton, Saez, & Stantcheva, 2015; OECD, 2021). Such campaigns may as well indirectly reduce actual gender inequality levels, in particular through their effects on individuals' decisions, behaviours and opinions, such as support for gender equality policies or activism. Indeed, such outcomes are rather based on the perceived level of gender inequality than the actual one. However, this last point must be qualified as correcting misperceptions about one social phenomenon, providing accurate information, may have little effect on political attitudes and opinions toward relevant public policies (Kuziemko et al., 2015; Lawrence & Sides, 2014). Furthermore, such campaigns are no panacea as other criteria come into play. First, support and/or demand for gender inequality-reducing policies depend on individuals' ideology, in particular the process through which inequality is generated and its fairness (Page & Goldstein, 2016). Second, the implementation of large-scale reforms and policies to fight gender inequality is not only conditioned by popular support but by the willingness and capacity of the state to do so. Yet, it does not seem to be a political priority for the Mexican government as the fight for gender equality is mainly led by the civil society and feminist movements, in a bottom-up dynamic.

Appendix

Table A3.1: Sample characteristics.

| Education level | Gender | | | Total |
|-----------------------|--------|-------|-------|-------|
| | Women | Men | Other | |
| <i>High school</i> | 72.73 | 27.27 | 0 | 100 |
| | 6.3 | 3.41 | 0 | 5 |
| | N | 8 | 3 | 0 |
| <i>Bachelor</i> | 52.83 | 44.34 | 2.83 | 100 |
| | 44.09 | 53.41 | 60 | 48.18 |
| | N | 56 | 47 | 3 |
| <i>Master</i> | 56.94 | 41.67 | 1.39 | 100 |
| | 32.28 | 34.09 | 20 | 32.73 |
| | N | 41 | 30 | 1 |
| <i>PhD</i> | 67.86 | 28.57 | 3.7 | 100 |
| | 14.96 | 9.09 | 20 | 12.73 |
| | N | 19 | 8 | 1 |
| <i>No information</i> | 100 | 0 | 0 | 100 |
| | 2.36 | 0 | 0 | 1.36 |
| | N | 3 | 0 | 0 |
| Total | 57.73 | 40 | 2.29 | 100 |
| | 100 | 100 | 100 | 100 |
| | N | 127 | 88 | 5 |

Source: Author's calculations.

Table A3.2: Descriptive statistics for the perceived GEIM and its three sub-dimensions.

| Variable | Observations | Mean | Standard deviation | Min | Max |
|-----------|--------------|-------|--------------------|-------|--------|
| GEIM | 208 | 79.95 | 44.71 | 9.91 | 311.35 |
| GEIM_ECO | 215 | 96.61 | 73.26 | 10.99 | 550.64 |
| GEIM_EDUC | 215 | 93.91 | 70.65 | 4.60 | 461.97 |
| GEIM_POLI | 216 | 49.14 | 31.82 | 2.65 | 283.65 |

Source: Author's calculations.

Table A3.3: Marginal effects for the Logit regressions.

| | UNDER | UNDER_ECO | UNDER_EDUC | UNDER_POLI |
|----------------|------------------------------|---------------------------|-----------------------------|------------------------------|
| 2.gender | -0.2336*** (0.081) | 0.0727 (0.118) | -0.1760 (0.133) | -0.1984** (0.101) |
| 2.diplom | -0.0749 (0.132) | -0.0212 (0.146) | -0.4242** (0.178) | -0.3627** (0.178) |
| 3.diplom | -0.1778 (0.148) | -0.1199 (0.204) | -0.3693** (0.187) | -0.1835 (0.214) |
| 4.diplom | -0.0688 (0.192) | -0.2622 (0.277) | -0.4671* (0.251) | -0.3603 (0.291) |
| 1.partner | -0.1915** (0.083) | -0.0851 (0.097) | -0.1279 (0.127) | 0.0510 (0.107) |
| 2.social_class | 0.1922* (0.103) | 0.2416* (0.127) | -0.0810 (0.145) | 0.0841 (0.108) |
| 3.social_class | 0.0732 (0.163) | 0.1397 (0.201) | -0.1028 (0.256) | 0.1552 (0.184) |
| 2.fairness | X | -0.0060 (0.110) | - | -0.6162*** (0.127) |
| 3.fairness | X | -0.2365** (0.100) | - | -0.5503*** (0.111) |
| 2.progressive | -0.3297*** (0.051) | -0.2107*** (0.052) | 0.2460 (0.205) | 0.3260*** (0.123) |
| 3.progressive | -0.3516*** (0.059) | -0.2982*** (0.069) | 0.2460 (0.218) | 0.1175 (0.138) |
| Observations | 107 | 92 | 82 | 113 |

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's calculations

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Chapter 4: Student's perception of gender inequality and intimate partner violence in Mexico: a qualitative approach

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4.1. Introduction

Ending all forms of violence against women and girls is part of the 5th goal defined in the 2030 Agenda for Sustainable Development of the United Nations.⁶⁶ Among these violences, intimate partner violence⁶⁷ (IPV) remains the most widespread form of violence against women worldwide. Indeed, one in four women has suffered physical, sexual or psychological violence by a current or former intimate partner at least once in her lifetime (WHO, 2021). In addition to being a major women's human rights violation, IPV is a serious public health problem. It has negative physical (injury, death), mental (well-being, depression, anxiety, post-traumatic stress disorder) and reproductive health (sexually-transmitted diseases, unintended pregnancy, miscarriage) consequences (Campbell, 2002). IPV not only affects women, but it also has ripple effects throughout family, community and society at large. Because of its serious socioeconomic costs (in terms of justice, health, social services, education, business and employment etc.) (Day, McKenna, & Bowlus, 2005) and detrimental effects on human capital, productivity, health and welfare consumption (Duvvury, Callan, Carney, & Raghavendra, 2013), IPV is a real obstacle to growth and development.

In Mexico, despite the recent governmental involvement towards ending violence against women,⁶⁸ IPV remains an endemic problem. According to the last available data (ENDIREH, 2016), 44% of women (aged 15 and over) have been victim of violence by a current or former intimate partner in their lifetime. Emotional and economic violences are the most common (with respectively 40% and 21% of women having experienced such violences), followed by physical (18%) and sexual (6.5%) violence.⁶⁹ Unfortunately, these figures greatly

⁶⁶ Goal 5.2: Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation (UN General Assembly, Transforming our world: the 2030 Agenda for Sustainable Development, 21 October 2015, A/RES/70/1, available at: <https://www.refworld.org/docid/57b6e3e44.html> [accessed 26 April 2021]).

⁶⁷ The World Health Organization defines intimate partner violence as any behaviour by an intimate partner or ex-partner, within the context of marriage, cohabitation or any other formal or informal union that causes physical, sexual or psychological harm including physical aggression, sexual coercion, psychological abuse and controlling behaviours.

⁶⁸ In 2007, the General Law on Women's Access to a Life Free of Violence (*Ley General de Acceso de las Mujeres a una Vida Libre de Violencia*) was adopted to prevent, punish and eradicate violence against women.

⁶⁹ Nevertheless, this national rate hides important geographic variations between states as in 2016, prevalence of IPV ranges from 53% in Mexico City to 32% in Campeche.

underestimate reality because of an under-reporting bias (Espinosa-Torres, Fernández-Ortega, García-Pedroza., & Irigoyen Coria, 2009).⁷⁰

Theoretically, the feminist perspective identifies patriarchy as the main cause of IPV (Dobash & Dobash, 1979; Fox, 1988; Yllö & Bograd, 1988). Patriarchal institutions and ideologies (such as machismo and traditional gender roles) generate and maintain structural gender inequality based on the subordination of women by men. In that sense, patriarchy favours violence against women and its normalisation. The feminist analysis focuses on female/male relationships, where the use of violence is considered as a mean used by men to exert fear, control and maintain their domination over women. Thus, in the feminist perspective, IPV is both the expression of a patriarchal system and a way of endorsing and maintaining it. Accordingly, the structural level of gender inequality may act as a risk factor for violence, with women living in more patriarchal societies being more vulnerable to IPV.

Since the end of the 1990s, in an attempt to study IPV as a global phenomenon, more authors emphasise the need to move beyond individual and couple determinants to focus on structural factors influencing as well individual behaviours (Jain, Buka, Subramanian, & Molnar, 2010; Rothman et al., 2011; Van Wyk, Benson, Fox, & DeMaris, 2003). Indeed, violent interpersonal behaviours cannot be dissociated from the global social context (dynamics and structures) they are taking place (Castro & Riquer, 2003; Frias, 2008). As a result and under the influence of feminist theory, structural gender inequality (as a measure of patriarchy (Frias, 2008)) quickly gained a central place in the empirical analysis of the determinants of IPV.

But one question remains unexplored. Patriarchy is believed to cause IPV, a fundamentally individual-level behaviour. But how contextual factors, such as the structural level of gender inequality, interact with individual outcomes? Studying mechanisms binding these two levels of analysis is of key importance to fully understand IPV and its prevalence. Castro and Riquer warned that “the study of gender-based violence has not considered, or is not aware of the need to consider, the mediations between structural phenomena, such as patriarchy and its expression in individual behaviour” (Castro & Riquer, 2003, p. 137, Author's translation).

⁷⁰ This under-reporting bias is explained by various factors. First, the use of violence is highly normalised in the Mexican society which favours tolerance and even legitimization of IPV. A weak denunciation culture also exists as it is seen as a private matter rather than a collective and structural problem, explaining partially the lack of adequate structures or institutions (police or judicial) properly trained to attend the victims. Finally, shame and fear of reprisals are also important barriers to reporting.

Unfortunately, identifying and understanding such mechanisms has been neglected in the theoretical and empirical literature.

To that extent, focusing on individuals' perception of their social environment can help explain their attitudes towards reality. Individuals are influenced by the social context they are embedded in. They make sense of the world based on their assumptions and experiences of it, mediated by their ideology and other social norms (Gimpelson & Treisman, 2018). Their perception and cognition of this environment will determine their behaviours as they are the expression of such perceptions (Castro & Riquer, 2003). For example, various studies have already focused on the effect of income inequality perception, on redistribution preferences, voting behaviour, life satisfaction or trust. These latter insist on the fact that perceived inequality is more important to predict individual behaviours than its effective levels.

Beyond the direct influence of actual levels of gender inequality in a society, individuals' perception and understanding of it may be important for the analysis of their beliefs and attitudes towards IPV and ultimately its prevalence. The underlying assumption is that the effect of patriarchy on IPV may be mediated by the way individuals perceive structural gender inequality. Hence, the objective of this study is to better understand Mexicans' perception of gender inequality and IPV in their society. This work fits into this approach in two ways. First, we aim to take stock of their knowledge, understanding and beliefs about these two phenomena as it may differ from what reality and theory say. Second, we will look at how the two perceptions are related and more specifically, if any type of discourse about gender inequality may be systematically associated with its counterpart about IPV. To this end, a qualitative approach is used, based on 19 individual interviews with university students in Mexico.

This may help us understand why in highly patriarchal societies such as the Mexican one, where all individuals are exposed to the same structural levels of gender inequality, some men resort to violence against their partners and others do not, a recurring criticism faced by the feminist theory. It may also provide a clarification to the inconsistent empirical findings for the effect of aggregated levels of gender inequality found in the literature. Finally, as perceived levels of gender inequality and reactions to it may be closely related to patriarchal ideology and its individual assimilation, focusing on perceptions may be a way to bind contextual and individual factors explaining IPV.

The qualitative content analysis provides three main empirical results. First, gender inequality is a fuzzy, catch-all concept even for university students and there is an apparent confusion between sexism, gender roles and gender inequality. Globally, a consensus emerges about the main dimensions making up (what they consider to be) gender inequality in the Mexican society. It includes gender inequality in the economic/professional sphere, within family as well as through violence women are victims of. However, what students perceive and label as gender inequality represents in fact sexism (without them calling it as such) and gender roles manifestations, which they have a good knowledge and perception of, rather than structural gender inequality. Second, and as an extension of the previous result, gender inequality is rather analysed by the students from an individual and socio-cultural perspective than from a structural one. Put differently, they tend to perceive more the ideological (machismo) than the structural (patriarchal institutions) component of the phenomenon. Finally, the perception of IPV overlaps in many ways with the perception of gender inequality. More precisely, students are leaning towards individual/couple and socio-cultural (such as machismo, romantic love and religion) explanations of IPV rather than structural ones.

The rest of the article is structured as follows. Section 2 reviews the empirical literature. The data and the qualitative methodology are described in Section 3. Section 4 lays out the main findings. Finally, Section 5 concludes.

4.2. Literature review

Theoretically, two main bodies of literature focusing on different levels of analysis explain IPV, namely sociocultural and individual factors theories. Although individual theories, which consider intimate partner violence as a result of individual pathology, are not of interest for our analytical framework, they are worth mentioning. In their literature review, Bell & Naugle (2008) identify for example social learning theory, background/situational model and personality/typology theory. Alternatively, sociocultural theories developed by sociologists in the late 1970s, view IPV as the result of social structures. Among them, family violence and feminist theories are the most prominent.

Family violence (or power) theory takes family as the central unit of analysis and focuses on the role of its structure and organisation in the use of violence. In this setting, violence is viewed as a mean to solve conflicts between intimate partners. Its use will be triggered by psychosocial stressors (such as unemployment, poverty etc.) and favoured by cultural norms legitimising violence as a mean for social control. The role of the sexist structure of the

family, with power imbalances between partners is also highlighted (Gelles & Straus, 1979; Straus, 1976).

In the feminist perspective, patriarchy is identified as the main cause of IPV (Dobash & Dobash, 1979; Fox, 1988; Yllö & Bograd, 1988). Patriarchal institutions and ideologies⁷¹ (such as machismo and traditional gender roles beliefs), by generating and maintaining structural gender inequality (based on the subordination of women by men), favour tolerance of violence against women and its normalization. The feminist analysis focuses on female/male relationships, where the use of violence is considered as a mean used by men to exert fear, control and maintain their domination over women. Thus, IPV is both the expression of a patriarchal system and a way of maintaining and endorsing it. Accordingly, the structural level of gender inequality may act as a risk factor for violence, with women living in more patriarchal societies being more vulnerable to IPV.

Family violence and feminist theories clash virulently for decades. The main point of contention is the different units of analysis considered (family versus gender relations). Even if the former recognises the role of women's subordination within the family structure and organisation (Kurz, 1989), this is only one of many factors. On the contrary, for feminist theorists, IPV cannot be adequately understood unless gender and power are the main components of the analytical framework (Yllö, 1993). As Heise (1998) perfectly summarizes: "feminist researchers and activists have been understandably reluctant to endorse any theory that is not grounded in a thorough understanding of the way that male privilege operates to perpetuate gender-based abuse" (p.263). Besides, in the family violence theory, the social acceptance of violence by family members is supposed to be learned early on, by being a victim or witness of violence during childhood (Straus et al., 1980). Then, psychosocial stressors may trigger these violent behaviours. This led many feminist researchers to regard this theory as providing individual pathologic explanations rather than structural ones for IPV. In the family violence theory, IPV is also part of a larger set of intra-family violence and is not intrinsically different from child abuse, elder abuse or violence between siblings. However, according to the feminist paradigm, the emphasis should be put on women. Finally, gender symmetry of IPV (or the fact that both men and women may exert violence against their intimate partner) remains a particularly important point of disagreement. Some authors

⁷¹ According to Dobash and Dobash, "[this ideology] is a rationalisation for inequality and serves as a means of creating acceptance of subordination by those destined to such positions" (R. E. Dobash & Dobash, 1979, pp. 43–44).

attempt to bind these two polarised and seemingly incompatible perspectives. For example, Heise (1998) criticizes single-factor theories, arguing that feminist theory should be combined with individual factors and calls for a multiple-level analysis. She proposes an ecological framework combining personal, situational and sociocultural factors.

Largely influenced by individual factors and family violence theory, empirical research has been dominated by the analysis of micro-correlates of IPV since the 1960s, taking the individual or the relationship/couple as the primary unit of analysis. Spouse's individual (such as age, education, race, ethnicity, working status, poverty, experience or witnessing of abuse during infancy, drug consumption, violent personality etc.) or relationship characteristics (marital status, length of the relation, number of children) were identified as protective or risk factors of IPV. However, results vary greatly from one study to another (see Casique, Irene y Castro (2014), Rivera-Rivera et al. (2004) and Espinosa-Torres et al. (2009) for studies applied in particular to the Mexican context). More recently, attention has focused on intra-relationship inequalities, insisting on power imbalances between partners (in terms of bargaining or decision making) that may arise from education, age or wage/employment differentials between them (McCloskey, Williams, & Larsen, 2005). Some investigations also analyse the effect of partners' patriarchal ideology (Harris, Firestone, & Vega, 2005; Smith, 1990; Sugarman & Frankel, 1996). According to Castro & Riquer (2003), these studies however suffer from conceptualisation and measurement issues as patriarchy, which is fundamentally structural, is reduced to individual traits, falling into an ecological fallacy.

In order to study IPV as a global phenomenon more authors emphasise the need to move beyond individual and couple characteristics to focus on structural factors influencing as well individual behaviours, with a strong anchoring in the social disorganisation and collective efficacy theories (Jain et al., 2010; Rothman et al., 2011; Van Wyk et al., 2003). Indeed, violent interpersonal behaviours cannot be dissociated from the global social context (dynamics and structures) they are taking place (Castro & Riquer, 2003; Frias, 2008). Thus, under the influence of feminist theory, structural gender inequality (as a measure of patriarchy (Frias, 2008)), quickly regained a central place in the empirical analysis of IPV.

Empirically, the feminist theory meets mixed support. Both the ameliorative (Archer, 2006; Frias, 2008; Hudson, Bowen, & Nielsen, 2011; Liu & Fullerton Jr, 2015; Straus, 1994; Titterington, 2006; Yodanis, 2004) and the backlash hypotheses are confirmed (Chon & Clifford, 2021; Martin, Vieraitis, & Britto, 2006; Valle-Fajer, 2014). According to the former,

the higher the women's relative status in a society, the less they may suffer from IPV. On the contrary, the backlash hypothesis argues that as the economic, political, educational and legal position of women improve, their risk of IPV will increase as men, by feeling threatened, may try to maintain their dominant position by exerting violence. Inconclusive results (Brewer & Smith, 1995; Chon & Clifford, 2021; Esquivel-Santoveña, Lambert, & Hamel, 2013; Frias, 2008) or non-linear U-shape relationship (Frias, 2008; Yllö & Straus, 1984) are also highlighted. It may be important to mention that even if all these empirical works analyse the effect of women's relative status within society on their victimisation rate, they do not consider the same dimensions for gender inequality (ranging from education, health, politics, social, economic to legal). Results also vary greatly depending on the type of violence considered (such as femicide, rape, assault or different forms of IPV) and the different scales of analysis (national, regional, local). In addition, some limitations may be highlighted. First, most of these studies focus on the US (even if Mexico is rather well represented) and consider quasi-solely the structure of patriarchy, neglecting its other facet, namely patriarchal ideology (see Archer (2006) and Yllö & Straus (1984) for exceptions). Second, studies combining both the structural and individual levels of analysis are extremely rare despite some feminists' old urging to do so (Yllö & Bograd, 1988). Nevertheless, the above-cited works of Valle-Fajer (2014) and Frias (2008) offer interesting results for Mexico.

Despite the key importance of identifying and understanding mechanisms binding the structural level of gender inequality (contextual factor) to IPV (individual outcome), such study has been neglected in the theoretical and empirical literature. This article wishes to fulfil this gap. As individuals' perception of their social environment can help explain their behaviours, we posit that their perception and understanding of actual levels of gender inequality may be critical for the analysis of their beliefs and attitudes towards IPV and ultimately its prevalence. The underlying assumption is that the effect of patriarchy on IPV may be mediated by the way individuals perceive gender inequality.

4.3. Methodology

As part of a mixed approach, the present study is a qualitative extension of the Chapter 3, aiming at enriching the quantitative results about gender inequality perception. Mixed methods research involves collecting and analysing both quantitative and qualitative data. This allows for a more complete and in-depth understanding of a phenomenon than a

quantitative or qualitative approach alone. Moreover, the strengths of each type of method may offset the limitations of the other (Creswell, 2014).

Semi-structured in-depth interviews are used for the qualitative analysis. They are akin to a dialogue between the researcher and participants, structured by a rather flexible interview protocol and completed by follow-up questions, probes and comments. Their goal is to explore respondents' thoughts, perspectives, feelings, and beliefs about a specific topic.

All interview respondents were prior participants of an online survey and were recruited in this way. The online survey (about gender inequality and intimate partner violence in Mexican society) was voluntarily distributed to university students by their professors via email during May and June 2021 (due to the COVID-19 pandemic). We contacted them at random (unknown and through local contacts), explained the research project and kindly asked if they would agree to forward the survey to their students and colleagues to do the same. At the end of the survey questionnaire, students were invited to participate in follow-up interviews. They were free to leave their email address if interested. All potentially interested students (67) were reached back at the beginning of July to set up the interviews. No particular selection process was applied as all the students who responded positively and for whom it was possible to arrange an interview were included in the study. Thus, participants were not randomly selected.

Between July and August 2021, 19 face-to-face interviews with both female and male Mexican students were successfully conducted. The interview respondents consisted of nine female (1 undergraduate, 5 graduates and 3 PhD) and ten male (all graduates) university students. Although respondents were from four different public institutions of higher education of the states of Mexico City (UNAM, UAM Azcapotzalco, Colmex) and Morelos (INSP), 13 of them were from the same department of Political and Social Sciences of the UNAM. Table A4.1 in the Appendix provides key information about the informants.

Interviews were carried out by the Author and lasted approximately 1.5 hours. They were organized into two parts, covering first gender inequality issues and then IPV against women (see Appendix 4.1 for details about the interview protocol). More specifically, we focus on how students understand and conceptualise these two social phenomena in their society, and we try to relate these two perceptions through an analysis of their discourses. The interview was not intended to focus on their own experience of gender inequality and IPV. However,

due to the very nature of the topics discussed, their discourse is tainted by their personal experiences of it.

All interviews were taped, fully transcribed and hand coded. The content analysis aims to identify, describe and explain consistent and repeated themes, concepts, patterns and language elements among participants' discourses (Creswell, 2014). The results of the qualitative analysis are not intended to be generalised to all Mexican students outside of those under study. They seek to be illustrative of a particular context, the one of a very small fringe of privileged Mexicans, highly educated, cultivated and well-off. But despite the biases inherent in their discourse and their situated viewpoint, it is still of interest.

4.4. Results

In order to facilitate reading and understanding, the analysis of the results is divided into three parts. The first two are dedicated to the perception of gender inequality. More precisely, the first section exposes the different dimensions of gender inequality according to students and discusses them in relation to sexism. The second section first highlights how gender inequality is analysed from an individual perspective rather than from a structural one, insisting on the responsibility of women. Then it shows how students perceive gender inequality as a socio-cultural issue, assessing the role of collective representations. Finally, the results are put into perspective. The third and last section focuses on the perception of IPV, insisting on the similarities with the perception of gender inequality and trying to link the two. All original citations (in Spanish) are available in order of appearance in the Appendix 4.2.

4.4.1. The different dimensions of gender inequality

Interviewees are aware that gender inequalities permeate all spheres of society and affect women in many contexts. But describing them, including via concrete examples, is a much more difficult task. However, a general consensus emerges about the different dimensions of gender inequality.

4.4.1.1 Economic inequality

Economic gender inequalities are rather well known by the students interviewed. They were mentioned by all of them and quasi systematically in the first place. They were able to easily give various examples of it such as gender pay gap, sexual division of labour, glass ceiling,

less positions of responsibility/authority for women etc. This may indicate their good perception of economic gender inequality. Likewise, the economic sphere is actually the only one where students were able to perceive structural gender inequality in addition to sexism even if they were not explicitly distinguishing the two. Sexism may be for example, promoting a man rather than a woman on the assumption that she lacks authority or may not always be available when required, lecturing women at a meeting on a subject they are familiar with, calling a colleague childish or overly familiar names etc. (Council of Europe, 2020). Interviewees n°3 and n°9 gave striking examples of it.

Interviewee n°3 (Woman, 53): And look, I have just realised this in a research circle, in a research project, there are four researchers, and they call each other Doctor. "Doctor Lopez, Doctor Martinez, Doctor Gonzalez". "Ah, Julia". It's not Doctor Julia or it's not Doctor Perez. "Julia".

Interviewee n°9 (Woman, 28): And in the case of meetings, it's the same thing. The issue is with my boss of the consultancy, because it's basically body language, talking to my [male colleague] and not talking to me. So, there is a situation of very strong discrediting and zero legitimacy, isn't it? I mean, I don't have it.

Yet, this result contrasts with the one from the quantitative survey (see Chapter 3). Indeed, the greatest gap between perceived and real inequalities is observed for the economic dimension, where students heavily underestimate the true level of economic disparity between women and men. These results point to some limitations of a quantitative indicator as an effective measure of perceived gender inequality. First, it could indicate that, lacking the necessary knowledge, students answered completely at random. Second, the questions asked, and the statistics used in the quantitative survey to illustrate the different types of gender inequality were limited to a few specific cases. Perhaps the selected examples did not, in the respondents' opinion, correspond to gender inequality (the term gender inequality was not explicitly mentioned in the questions) or there were not the examples they had in mind to refer to economic disparities between women and men. Indeed, during the interview, students were not limited in the examples they could use.

4.4.1.2. Family and couple as breeding grounds for gender inequality?

Second, students highly insisted on “gender inequalities” experienced by women within the family, referring to their own family experiences. In this setting, gender inequalities consist in unequal treatments and discriminatory gender roles, disadvantaging female family members (mostly sisters and mothers).

Interviewee n°1 (Man, 28): I think that in families... in families, from both parents and siblings, I think there is always a preference. I come from a family that I consider to be macho. Well, I have never seen physical violence as such, never, never, never. But yes, I consider that there is gender inequality, seeing my parents isolated and seeing my siblings and me. I have a brother who is younger than me and a sister who is older. And I have always noticed that there are certain preferences towards me or towards my brother, over my sister. Because I think there is not so much trust from my parents, both of them, towards my sister just because she is a woman.

Interviewee n°7 (Woman, 26): [...] the first place where you can see all these inequalities is in the family, especially if you have brothers. I mean, I don't have brothers, but I am convinced that if I had had brothers my upbringing would have been totally different. [...]

And what do you think your upbringing would have been like if you had had brothers?

If I had a brother, I'm sure it would have been "you have to learn to cook, you have to learn to wash [clothes], you have to do that to your brother, your brother has to protect you and take care of you".

Students perceive the traditional gender roles and stereotypes very well and highlight them through their concrete manifestations within family. Gender roles are preconceived ideas arbitrarily assigning characteristics and roles to individuals, which are determined and limited by their gender. These roles establish socially the tasks and responsibilities expected to be fulfilled by women and men. Traditionally, women have to comply concurrently with the roles of mother, wife and caretaker, confining them to the private, domestic space. Thus, they are in charge of the vast majority of household chores, caregiving and child-rearing, which are demanding and unpaid works.

Interviewee n°15 (Woman, 35): Women are assigned to the private space, the domestic space, all the domestic tasks and the issue of care. It has to do with raising children or caring for the elderly or the sick; and men are assigned productive, paid work, especially in the public space.

Interviewee n°17 (Man, 27): So, I think that at the moment in the family, the chores, the tasks, well, they are... I mean, they are unequally distributed. And another issue is that these care tasks are devalued, right? At the end of the day, at not obtaining economic retribution etc., I believe that this generates more disadvantages for women.

However, very few discuss the long-term structural consequences of it for women, that is gender inequality. They seem to only see the tip of the iceberg, the most visible or accessible manifestations to the mind. Indeed, traditional gender roles create and perpetuate gender inequality as the roles assigned to women are associated with less power and resources

(whether economic or social) than those assigned to men (Blackstone, 2003). For example, they favour female deschooling, retract their outside-home opportunities, reduce their time for leisure and social activities, exclude them from decision-making and prevent them from greater autonomy (Bell & Naugle, 2008; Dobash & Dobash, 1977; Mihalic & Elliott, 1997). One exception may be the impact it has on female labour force participation. Indeed, some students mentioned how this double workload (combining both domestic and professional lives) prevents them from entering the labour market or at the cost of greater job precarity.

Interviewee n°19 (Woman, 29): Well, it's right that, for example in terms of work, they don't have a stable job, isn't it? Generally, they are relegated to secondary jobs, sellers, creating products or making products and selling them, and that is a way in which they earn their daily subsistence, because that allows them to take care of their house, their household and their children. I mean, they generate themselves time apart from a working day, right? Most of the time employers don't hire them because they can't spend the whole period, the whole working day. So, they try to find or pay for their expenses in another way. So, they don't ask for a stable job, but they look for this type of work more... Without time restrictions.

Interviewee n°6 (Man, 27): Because women are often labelled as "you are at home, and you have domestic work obligations". And that somehow, having these types of obligations impedes a fuller professional development in the female population, isn't it? On the other hand, as men are freed from that, well, let's say they are freer to move up the career ladder, right?

4.4.1.3. Gender violence and women's insecurity as one form of gender inequality

Feminist theories, which are the theoretical anchor of this study, depict violence against women as the ultimate consequence of gender inequality. Indeed, gender violence is used as a tool by men to establish and maintain their dominance over women, perpetuating gender inequality (Dobash & Dobash, 1979; Frias, 2008). Thus, although closely linked, there is a theoretical distinction between gender inequality and gender violence. Whether a cause or a consequence of gender inequality (bidirectional relation), they are considered distinct phenomena. For example, some official indicators do not take into account gender violence in their measure of gender inequality (e.g. the Global Gender Gap Index from the World Economic Forum, the Gender Empowerment Measure or Gender Development Index from the UNDP). Several empirical studies also investigate the effect of gender inequality on gender violence (e.g. Liu & Fullerton Jr (2015) and Valle-Fajer (2014)).

Nevertheless, the delimitation seems a bit more blurred for the interviewees as they did not clearly theorise it as a cause or consequence of gender inequality. Gender violence is just considered as one and the most extreme type of gender inequality. As violence is omnipresent in the daily life of Mexicans, it may seem difficult not to mention violence against women in an interview about gender inequality as individuals may draw from their closed environment (what they see, hear, know etc.). Since a few years gender violence is also a growing social theme on the Mexican media scene, notably made visible by the feminist movement. Not surprisingly, the very worrying problem of femicides and disappeared women were mentioned a lot. Violence toward women in the street and on public transport was also frequently described as a strong gender inequality, such as the insecurity it generates. But sexism is no stranger to this result as in addition to gender violence, sexist practices create a climate of intimidation and insecurity.

Interviewee n°7 (Woman, 26): And can you think of other spheres of society apart from those three, where inequalities occur?

In public transport, I think that in Mexico it is well known that in the metro, well in all public transport, there is segregation between men and women, isn't it? I think it is difficult to find a woman who has not suffered harassment in the street or on public transport.

When concrete examples of professional/economic or education gender inequalities were given, they also very often allude to issues of gender violence suffered by women in these two environments. Some interviewees seem as well confused about the terminology to employ, using the terms gender inequality and gender violence or violence against women interchangeably, as if they were the same phenomenon. For example, despite the fact that questions clearly and insistently mentioned gender inequality, some respondents systematically answered mentioning gender violence.

Thus, it seems difficult for students to distinguish and articulate the two phenomena. This result may also be due to the fact that at the beginning of the interview, the division of the survey into two parts, namely gender inequality and IPV was announced. As a result, students may have been influenced, may have anticipated the second part of the interview or may have wanted to link the two phenomena.

4.4.1.4. Gender inequality in education to a lesser extent

Due to their student status, the educational environment was also mentioned but less systematically than the three above-mentioned dimensions. Besides, rarely mention was made to structural gender inequalities in education such as their higher average number of years of schooling of men, their overrepresentation among recognised researchers (to the exception of interviewee n°3), their greater representation in science (to the exception of interviewees n°6 and n°14) or the denial of access to education or further study for girls (to the exception of interviewees n°4, n°10 and n°19). However, the predominance of male teachers was regularly cited. Relative to female representation among master's or doctoral studies, the discourse seems more divided, which could be explained by the personal experience of every post-graduate interviewee. While some students highlighted an underrepresentation of women among postgraduate studies (interviewees n°6, n°13 and n°17), others observed the contrary (interviewees n°12, n°15, n°16, n°18 and n°19).

Likewise, many given examples actually allude to the professional sphere since many of the interviewees were at the same time studying and employed in an educational institution, whether as giving courses or participating in research projects. In this case, gender inequality mentioned also referred to hindered career development, access to fewer positions of responsibility and sexist practices but in the specific academic context.

Once again, most gender inequality perceived in terms of education refers in fact to sexism within these institutions. Students mentioned in particular biased or discriminatory practices by educational staff, the perpetuation of stereotypes via teaching, textbooks or career guidance and the failure to punish gender-based violence.

Interviewee n°6 (Man, 27): Yes, for example, in the university recently there were cases of harassment, and they never did anything against the harassers. They only condemned it and issued a statement saying, "we condemn this type of behaviour". But as an institution, they do nothing.

Interviewee n°7 (Woman, 26): So, education was also sometimes a bit role-oriented, isn't it? Also... I mean, "Oh, what do you want to be when you grow up? Well, because boys can be this..." Those types of careers that are more masculinised or careers that are more feminised, right? Or it's like that.... I mean, they didn't tell you clearly "No, you can't be...", I don't know, "an engineer!". But it's not like they warned you about that idea either. They kept sending messages about career segregation for example, didn't they?

Interviewee n°8 (Woman, 32): It was really fun for me, like boy's activities. And always at school they would send for my mum. "Madam, take care of that little girl. That girl is strong, yes, she knows how to defend herself, but she's little now, when she grows up a man will be stronger than her and they'll give her a bad blow, they'll do this, they'll do that, they'll do the other!". In other words, "take care of her, teach her to take her place", almost, no?

4.4.1.5. The paradox of political inequalities

Finally gender inequality in terms of executive, legislative or judicial powers (political dimension) was almost completely obscured. This is quite surprising for two reasons. First, out of the 19 students interviewed, 13 were from a Faculty of Political and Social Sciences. Perhaps it was so obvious to them that they did not dwell on gender inequality in the political dimension. Second, in the quantitative survey, students estimated almost exactly the current level of political gender inequality in Mexico, indicating a good knowledge of it.

Only five students extensively developed this point and came from the same university background (4 master students of Political and Social Studies and one PhD student in Political Science from the same university). They also highlight the fact that reaching gender parity among political institutions was not enough to reach equality. Indeed, most of the time power remains in the hands of men as women do not reach the positions with the most responsibility or when it is the case, decision-making power changes location. The following two quotes illustrate this phenomenon.

Interviewee n°14 (Man, 27): The second one, in the past sixtenures, the second in command or one of the most important political actors was the Secretary of the Interior. And I say this in the masculine, because it was always a man until this six-year term. And that was seen as a triumph. [...] And the sad thing is that she became... well.... Many people call her a flower vase, that is, let's say she's there, but in reality, she's not like the Secretary of the Interior and she has less functions than the men who were there before.

Interviewee n°15 (Woman, 35): It has been with many efforts, with many "buts", with many obstacles, from men and from the patriarchal system that refuses to cede spaces (speaking of gender parity in Mexico). So now the other question is "okay, we already have the spaces". I mean, we already occupy many public spaces, but now "what are we going to do with those spaces?" Because as my teachers say, "women in power often doesn't mean women with power", right? Sometimes it tends to be a more symbolic issue and although women are in those decision-making positions, they say that decisions change places and are decided elsewhere.

In the rest of the cases, the mention of inequalities between women and men in institutions of power is limited to a brief mentioning of the lower representation of women in politics without further detailing. Moreover, their answer was triggered by a question concerning the gender parity law in political institutions in Mexico.

Finally, almost no one mentions legal rights inequality, which is women's differential position in Mexican law (even if several students defined gender inequality as unequal rights between women and men). For example, 18 states still prohibit women from remarrying within a year of divorce while men are exempt from this wait (Comisión Nacional de los Derechos Humanos, 2019). The four exceptions are interviewees n°14 and n°19 that mention the fact that abortion is not yet legalised in every state and interviewees n°13 and n°15 deploring the lack of statutes that recognize the value of domestic work performed by women in the household economy.

Interviewee n°13 (Woman, 30): [...] Policies don't recognise their responsibility in the care, right? And they put it on the family because women are the best, as AMLO said, didn't he? That women are the best at taking care of their children, right? So, it is very easy for the state to get rid of responsibilities and again overloads, subsidises itself with the free labour, isn't it? Of women.

4.4.1.6. Are we talking about gender inequality or sexism?

Gender inequality is a fuzzy, catch-all concept even for university students. Indeed, there is an apparent confusion between sexism, gender roles and gender inequality. What students perceive and label as gender inequality represents in fact most of the time sexism and gender roles manifestations, which they have a good knowledge and perception of. But although the three concepts are interdependent, they are nonetheless distinct. Hence, students seem to have a misconception or at least a truncated view of gender inequality in Mexico. From the beginning of the interview, the first question asking students to define gender inequality set the tone. Indeed, in the most recurrent terms, they describe gender inequalities as a preference for men expressed through unequal opportunities (7 mentions of it) or differentiated gender roles (6 mentions of it).

Overall, students barely perceive gender inequalities on a structural/systemic scale, with the exception of inequalities between women and men in the economic sphere. Most of the given examples of what they think to be economic, education or intra-family gender inequalities actually described sexism. Once again, the first question gave a good hint of it. Only 3

respondents use the term “structural” to explain gender inequality (interviewees n°14, n°15 and n°17).

But what is exactly sexism? It refers to discriminatory practices that exist in both behaviours and thoughts, based on the idea that some persons, most often women, are inferior because of their sex. It takes various forms and expressions (act, word, image, gesture) and is related to harmful gender stereotypes. Sexism is not only an individual act executed by one person against another, but it also manifests itself on an institutional and social level. It is present and expressed in all spheres of society: through language and communication, in the media, the workplace, government agencies (public services and justice sector), education, sport, history or in the private sphere. The fact that students often mention the role of the media reinforces this idea. Interviewee n°13 offers a good illustration of it.

Interviewee n°13 (Woman, 30): The media, i.e. Televisa. Televisa and TV Azteca are the big ones, that's where the ideological machinery of gender inequalities in Mexico is, in my opinion. All these programmes about the Virgin of Guadalupe and I don't know what, I mean yes! And the soap operas and the commercials. I mean, all the commercials you see on TV are like women cleaning. All of them.

Sexism is harmful to women as it marginalises, invisibilises, inferiorises and/or violates them. Thus, it is at the root of gender inequality between women and men (Council of Europe, 2020; INMUJERES, 2007). However, sexism is not a term students are familiar with. During the interviews, only two persons (out of 19) evoked sexism (or its derivatives) and only once, seeming to be more a coincidence than a real understanding of this concept. The two extracts are as follows:

Interviewee n°13 (Woman, 30): And on a personal or interpersonal level, it seems to me that there is a lot of violence normalisation in relationships, like it is normal to make certain types of sexist jokes.

Interviewee n°17 (Man, 27): For a variety of factors, from the fact that maternity... the law on maternity in the workplace in Mexico is very bad, so to speak. And many other factors, including sexism in the workplace, make it difficult for them to advance in the workplace, even in terms of income.

How these discriminations (based on gender roles and stereotypes) suffered in different environments affect structurally women in terms of access to resources (education, income, patrimony etc.), practices (housing, consumption, health, leisure etc.) and power, are quasi unknown or at least unexpressed by students. This is also illustrated by the consequences of gender inequality mentioned by students. These latter are minimal and very situation-specific

compared to the reality of the facts. Most of the time, and as already mentioned earlier, they are limited to the economic sphere or express how the weight of domestic work impide women from developing their professional and personal lives.

Said differently, students have difficulty to consider the aggregated consequences of sexism and thus to perceive gender inequality structurally. Globally, they underestimate or misperceive gender inequality in Mexican society. It seems to be a distant concept, difficult for them to concretize (as already shown by García-Sánchez, Van der Toorn, Rodríguez-Bailón, & Willis (2019) and Minkoff & Lyons (2019) for economic inequality).

But why do students better perceive sexism than structural gender inequality? The illustrative examples given were mainly related to the individual level, in a context of human interactions. As students lack (correct) information on gender inequality, they probably draw on their immediate environment and the information available to them in their daily lives (what they know, hear about, see and experience) to estimate gender inequality and its levels in their country. Social cognition research has already highlighted how individuals use accessible information to form their judgement (availability heuristic) (Schwarz et al., 2003). As sexist discriminations are very common, recurrent and easily observable, unsurprisingly students mostly mention them. This is the closest and most easily accessible information in mind. This could also explain why family as well as the professional or education spheres were the most commonly cited as there are familiar environments to the students interviewed. Empirically, this reminds us of the study of García-Castro, Willis, & Rodríguez-Bailón (2019) who rather considers individuals' everyday experiences to better measure their perception of economic inequality. Nonetheless, a relevant future question would be whether their perception of sexist discriminations is related to the actual level of structural gender inequality? Several other elements of the students' discourse reinforce the idea that gender inequality is seen as a problem of individual interactions rather than a structural one.

4.4.2. An individual and socio-cultural issue more than a structural one?

4.4.2.1. An individual perspective of gender inequality

Gender inequality is conceptualised and articulated by the students at the individual level as the result of human interactions and socialisation. The idea of an individual responsibility is very frequently expressed, notably through expressions such as “*no nos damos cuenta*” (we don't realise it), “*no nos cuestionamos*” (we don't question it) or “*lo normalizamos*” (we

normalise it) applied both for women and men. This is combined with a difficulty in recognising the role played by the institutional structure. Interviewee n°3 offers a good summary of it.

Interviewee n°3 (Woman, 53): I think we have to assume our own responsibility. Although it is a social situation that as a community we have to resolve and that is the challenge, a gigantic challenge, because we have to fight against years of macho conditioning in Mexican society; I think that we have to take on our work in this world in a very personal way, don't we? Well, as I was saying, it's not a question of forming organisations, institutions, NGOs or anything like that. Well, it is not a bad thing that they are built, but they are not a panacea, they are not the solution. I think that projects should be aimed at that, at re-signifying in our subjectivity our life condition. And that is the only way to be able to accept, first of all, that these gender inequalities exist. It is like a personal process. First, to accept it. Well, first realise that there are, then accept it and then do what is necessary to overcome it. [...] But if we don't assume this responsibility in a personal way, then we won't be able to, no matter how many organisations emerge, or laws are passed.

This idea is first echoed by the responsables of gender inequality put forward by students. In addition to an individual responsibility, two social environments are singled out as mainly responsible for perpetuating and legitimating gender inequality by transmitting gender roles and stereotypes. These are the family sphere and school. Here are some examples among many others:

Interviewee n°4 (Man, 34): But I do remember other relatives who said things like "That's why you have your wife, to be your servant. If you get married, she can cook everything you want". And just as a sexual object, that's why you have her, isn't it?

Interviewee n°10 (Woman, 26): I don't know, even, for example, I think about choosing the career they wanted to study. And I think of a female cousin who decided to study chemistry and they always questioned her, it was like "what are you going to do and what are you going to do for a living?" And they pigeonholed her into this role of a woman, that at the end of your bachelor's degree you have to get married, and you have to have children. Things that they never questioned, for example, with my male cousins, no?

Second, as a logical consequence of the previous point, the solutions proposed by the students to fight gender inequality (and IPV as we will see later) are mainly centred on the individual and her education, whether received from the family or at school. In fact, whatever the level of the measures proposed (individual, collective or institutional), the latter are most of the time directed toward individuals' changes and actions rather than structural or institutional

ones. This is not surprising, as for students, gender inequality, embodied by sexism, is driven by harmful gender roles and stereotypes. All of these are social constructs and therefore can be deconstructed through education and awareness. Thus, the responsibility lies within society and in particular the individuals who make it up. Interview n°19 perfectly sums up this idea.

Interviewee n°19 (Woman, 29): So, you think that education would be like the main solution to fight gender inequalities?

Yes, I think education, understood as the space in the classroom and understood as what we learn at home, right? The same family, the same teachers, all those who reproduce this kind of patterns. To have that same openness because even if the teachers do this work of openness with the children, but in the mother's house the daughter serves all the siblings and the daughter is the only one who does the dishes, who does the laundry, who helps with the housework, this type of pattern continues to be reproduced.

4.4.2.2. Gender inequality, a women's issue in particular?

Some other elements of the interviews highlight this idea of an individual responsibility and that of women in particular. This was manifested in three examples. First, many students (8) mentioned the role women, and mothers in particular, play throughout the (macho) education they give to their children. Here a distinction can be made between thus recognizing the role of the father as well (through his disengagement in the children's education and via the role model given) (interviewees n°6, n°13 and n°15), the ones warning against the macho foundations of this discourse that makes women guilty (interviewees n°13 and n°15) and the others who can sometimes have a vehement discourse (interviewees n°3, n°5, n°8, n°9 and n°19).

Interviewee n°9 (Woman, 28): Why do you think there are gender inequalities in Mexican society? What are its sources or origins?

It's going to sound cliché, but it's the education, but it's not education as understood in school, isn't it? It is not academic education, but education that often comes from home. So, I think that a lot of responsibility is due to the fact that many Mexican mothers bring up children who are like that. [...] So, I think that a large part of the problem is that we ourselves (women) have allowed this problem to continue [...] So I think it is a vicious circle, which is a lot like ourselves towards our partners, towards our children, towards our nephews, towards our.... I mean, whatever.

Second, through the idea that some women wallow in a situation that is unfavourable to them due to a lack of self-questioning, whether because they do not realise it or do not want to.

However, only four people expressed this prejudicial view (interviewees n°1, n°3, n°8 and n°17). Third, the idea of a differentiated and/or separated feminist struggle is also expressed by 13 of the students. Interviewees share the idea that the feminist struggle must be led by both women and men as part of a societal issue. Nevertheless, although they may come together on some points, differentiated roles must be adopted by each since one gender can hardly understand the issues experienced by the other. While women should be the main stakeholder, highlighting the discrimination they face and ask for concrete actions, men should be a support, working on their masculinity, questioning their privileges and the problems that arise from it.

Interviewee n°12 (Woman, 29): I mean, I think that the fight against gender inequalities belongs to everyone. It is everyone's task because it affects all of us. All of us. But I don't know if it should be parity in the sense that... I don't think it could be parity, could it? Because in the end you never fight to eradicate your own privileges or the things that benefit you. So, on that side I think it's a bit more complicated for men to accept and join in the fight against a system and a structure that de facto benefits them in many ways. [...] And generally it is those who are oppressed under that structure who seek to subvert it or break it. But of course, I mean, I think that women should lead this struggle, firstly because they are oppressed by the system and secondly whoever joins in, right? But yes. And it belongs to everyone.

4.4.2.3. A socio-cultural perspective: machismo (ideology) or patriarchy (structure/system)?

Gender inequality is conceptualised and presented by the students as a socio-cultural issue in Mexican society more than a structural one. They tend to perceive more the ideological than the structural component of patriarchy. Prior to the interview, we expected a massive use of the word patriarchy and its derivatives. Indeed, in the feminist perspective, the patriarchal structure embodied by gender inequality is at the root of IPV. Quite surprisingly, this was not the case. Out of 19 students interviewed, nine never mentioned patriarchy (4 women and 5 men), only five of them cited it several times, without any prior intervention of the interviewer (3 women and 2 men) and finally five students mentioned it only once in their discourses after being explicitly questioned about it (3 women and 2 men). In this latter case, the interviews lacked methodological rigour as the students probably employed this term to be complacent and satisfy the interviewer's expectations. Two interesting remarks can be made. First, the use of this concept is not necessarily associated with its understanding as shown in the following extracts. Unfortunately, in most cases when the term was employed, we didn't ask them to define it. Second, some students identify the structural nature of gender

inequalities but didn't label it as patriarchy. Thus, it seems that this is a theoretical concept which they are not familiar with.

Interviewee n°16 (Man, 60): Yes, but... yes, definitely that the Mexican state is patriarchal... Well, I'm not... I'm not very clear on that word, right?

Interviewee n°5 (Man, 35): Do you think that the Mexican state is a patriarchal state?

In which sense of patriarchal? Of a preeminence of the majority of men?

On the contrary, students employed massively the terms “cultural” and “machismo” (and its derivatives) and depict the latter as the main cause of gender inequality. Even if both patriarchy and machismo are related, they are nonetheless distinct. Machismo can be defined as an ideology that defends and perpetuates the superiority and dominance of men over women. Machismo is a social construction based on cultural values and the polarisation of gender roles and stereotypes. It exalts masculine qualities, such as aggressiveness, independence, emotional restriction and dominance, while stigmatising feminine qualities, such as weakness, dependence and submission.⁷² Some authors also present it as the psychohistorical product of the Spanish conquest of Latin America (Mirandé, 1997; Monfort Tomas, 1985; Ramos, 1962), an explanation that some students share (interviewees n°3, n°11 and n° 16). In retrospect, we should have systematically asked how students would define machismo. For it is possible that the word used does not fit exactly to the corresponding theoretical concept. As a matter of fact, the few times we asked for a definition of it, this yields different results.

Like sexism, machismo may also be more easily perceived or experienced than structural gender inequality which could explain the recurrence of this term in their discourse. Besides, as students find it difficult to identify the causes of gender inequality, they may refer to things that are familiar to them. As an illustration, the first three quotes below are the answer to the question “Why are there gender inequalities? What are their origins/sources?”.

Interviewee n°4 (Man, 34): I would put first, in this case of Mexico, ideology. That would be one of the main ones for me. Above all that ideology that we have here. Maybe not so much in the city, but I think even more so in the provinces, of the superiority of men.

⁷² Even if some research emphasises the multiplicity of machismo, highlighting both its negative and positive aspects (such as responsibility, respect, courage or honour) (Torres, Solberg, & Carlstrom, 2002), all students allude to machismo in a negative sense.

Interviewee n°10 (Woman, 26): Oh! I think that's the most difficult question, it's something that.... It's something that's always present, isn't it? It's like we are always asking ourselves where it comes from and why. I think a lot of it is cultural. I mean, I think Mexico has a very macho and patriarchal culture, I don't know if it's more or less than other countries, other cultures, but.... I mean, yes it's historical.

Interviewee n°6 (Man, 27): Oh, I don't know, it's a thesis question. Well, I don't know where the genesis is or how we could try to explain, let's say, the nodal point from which it arises, right? But what I can tell you is that traditionally, I don't know, since the time of the revolution, the male is often portrayed as this warlord, even within the family. This person who is able to do everything, to demand, to distribute, to lead a family. And regularly, the woman was the companion. It always seems to me... She has regularly been subjected to serve this caudillo, this leader who is supposed to command your family.

Emphasising as well the cultural component of gender inequality, half of the students (10 interviewees) designated the role of the Church and the Catholic religion (in a country where 78% of the population aged 5 and over is catholic (INEGI, *Censo de Poblacion y Vivienda* 2020)), as fomenting and legitimating gender inequality through the macho ideology conveyed. The following quote is an example of it.

Interviewee n°16 (Man, 60): But I also think of Catholicism. From my point of view, it is very important to be able to recreate these models of disparity, isn't it? That the man has to be the breadwinner, the strong one, the everything; and the woman, the submissive one who is left to do the cooking, to look after the children.

4.4.2.4. The role of socio-cultural representations: The Mexican macho

Machismo has traditionally been associated with Mexican and Latino cultures. Within this context, men are expected to endorse a set of socially and culturally constructed behaviours, norms and practices that promote a structure of male dominance over sexuality, procreation, work and affection amongst others (Perilla, 1999). In line with the previous finding, students visualise perfectly the theoretical traits of a man according to machismo and the Mexican man seems to be the perfect incarnation of it. According to them, the Mexican macho man withdraws from the care of children, is not involved in household chores, dominates his wife, is the economic provider of the family, is sexually active, heterosexual and sires an offspring, is not allowed to express his emotions and feelings, drinks heavily, is possessive and jealous toward his partner, needs to express its physical strength and uses aggression as a response to problems.

Accordingly, the role played in the 1930s by the Golden Age Mexican cinema in depicting the archetype of the Mexican was also highlighted recurrently. Particularly the image of masculinity conveyed through the “charro” and its greatest figures such as Jorge Negrete or Pedro Infante. The following quote illustrates this point perfectly.

Interviewee n°10 (Woman, 26): I mean, I think, for example, in the figure of men or this macho man that is reflected, for example in films, right? I don't know if you know about this Mexican golden cinema that was like during the 50s, 1950s, I mean... and I've seen these films again, because they are shown again. I mean, the figure of the man shown is very ugly. Looking at it from a more critical point of view. I mean, it's this macho man who can have one or two women and still be respected by society or by his village. He can have macho attitudes, he can be an aggressor and so on, but he is still the reference point for men at the time, isn't he? Well, I mean, these are patterns that I think are reproduced.

4.4.2.5. Is the structural component of gender inequality always misperceived?

The understanding of inequality as a structural issue is not absent from the students' discourse. Some speeches stand out, mentioning the systemic foundations of gender inequality and the role played by the Mexican institutions. Among these, we can distinguish two types of discourses. First, the students holding mostly a perception of gender inequality as an individual issue but acknowledging here and there its structural component (for example interviewees n°6, n°8, n°9, n°17, n°19 and n°18), yielding sometimes confused and contradictory discourse as interviewee n°9 shows.

Interviewee n°9 (Woman, 28): I would like to know, in your opinion, why gender inequalities persist in Mexican society? Or why does it take so long to reduce or combat them?

Because it is a firmly rooted problem. It is a very strong structural problem. I mean, it is not an individual problem, it is a structural problem. And like any structural problem, it is far-reaching. [...] I think the problem in Mexico is exactly the same, it's exactly this one. Mexico's problem is structural, but not only at an institutional level, but also at a cultural level, at a social level, at an individual level, even because within the psychic conformations of individuals, there are structural things that you have to change and they are not easy and that's why I want to send everyone to therapy so that they can solve it, but it's difficult.

Second, are students holding a more structural than individual perception of gender inequality. They are characterised by high theoretical knowledge of gender inequalities, have a feminist understanding of the problem and seem to embrace a left-wing political ideology.

However, these latter represent a small fringe of the discourses held as it concerns only six students in our study (n°7, n°10, n°11, n°13, n°14 and n°15). Among them, four are women. Nevertheless, it does not refute the previous points raised by our analysis. Indeed, when it does, this systemic vision is accompanied by the individual and cultural perspectives developed earlier in this chapter.

4.4.3. Perception of intimate partner violence

It seems difficult to bring to light a systematic connection between the perceptions held by students on the issues of gender inequality and IPV. Indeed, some have a good knowledge of both issues; others have a better grasp of one issue than the other and finally some have little expertise of both problems. Thus, having a good perception of gender inequalities does not guarantee a good understanding of IPV and *vice versa*.

Nevertheless, the perception of IPV overlaps in many ways with the perception of gender inequality. There are many similarities between the two discourses. More precisely, students seem to be leaning towards individual/couple and socio-cultural explanations of IPV rather than structural ones. This result is not in line with those highlighted by the quantitative survey, which posits gender inequality and patriarchy as the main causes of IPV.⁷³

4.4.3.1. An individual perspective more than a structural one

Rather than the feminist theory, students seem to adhere to individual factors (such as social learning theory and background/situational model) and family violence theories to explain IPV, placing the individual and the relation at the core of the analysis. These latter theorise IPV as a family or interpersonal conflict and analyse how different factors will influence it. This idea is expressed through three aspects of the student's discourse.

First, IPV was presented by half of the students as the result of psychological stressors such as men's insecurities (lack of confidence or self-esteem) and frustrations. They also insist on a poor communication within couple due to limited men's emotional and relational capacity that does not allow for a peaceful conflict resolution. This idea is part of the background/situation model which considers problem-solving skills and communication style as key predictors of IPV (Bell & Naugle, 2008).

⁷³ 45% of the students interviewed chose patriarchy as one of the three main reasons explaining IPV and 36% of the students chose gender inequality.

Interviewee n°2 (Man, 30): So, one of them is that, physical violence that is exercised perhaps because of not being able to resolve interpersonal conflicts and that this difficulty in resolving conflicts through dialogue and above all through negotiation, which nowadays I think is the case in our generation. [...] I think that's why, because there is a difficulty for negotiation and when there is a difficulty for negotiation and we live in violent conditions, then the step is very small to start using violence.

Interviewee n°6 (Man, 27): And you, for example, when you talk to your friends and you can't express openly what you feel and with your partner either because you are emotionally incapable, you are emotionally disabled to do so. Well, many people find no other way but to unwind, to unwind on the wall or on your partner.

Second, the three theories cited earlier (social learning and family violence theories and background model) posit that violence against intimate partners is initially acquired during childhood by observing parental and peer relationships (Bowen, 1978; Mihalic & Elliot, 1997). Hence, victims and perpetrators of partner abuse are expected to have either witnessed or experienced abuse as children, resulting in tolerance or acceptance of violence within the family as a mean to handle conflict (Lewis & Fremouw, 2001). The role played by the family environment in which individuals grew up and the idea of an intergenerational reproduction of violence was mentioned recurrently by the students. The following quote by interviewee n°9 summarises this idea well.

Interviewee n°9 (Woman, 28): If you see your dad hitting your mum, well, it's something you normalise, it's something normal. That's how it's going to happen, and if you see as a woman that your mother also lets him, well, it's also going to be something that you say, "well yes, I let him because I love him". So, I think that is also one of the reasons why there are men who are violent and there are women who accept this type of violence.

Third and finally, family violence theory underlines the role of societal beliefs about IPV. During the interviews, one stereotype about IPV emerged among six interviewees (n°2, n°3, n°5, n°9, n°17 and n°19), namely the fact that women allow the violence they are victims of. In two cases, interviewees (n°3 and n°8) even mentioned that IPV is enjoyed.

Interviewee n°17 (Man, 27): And why do you think a Mexican man can allow himself to use violence against his partner?

There are many causes that allow it. I believe that here, too, a factor of responsibility lies with... Yes, but I think... I really think that women are responsible for allowing it. I think we have to be more

aware that they should not allow it and that they should use the legal figures, if they are available in their state.

This discourse is extremely guilty inducing for women. It seems interesting to mention that among the four women holding prejudices about IPV, three of them were directly victims of violence or grew up in a violent environment (n°3, n°8 and n°9). It seems that their harshness toward the victims, highlighting their responsibility, may be due to their own feeling of culpability. In a more subtle way, two male students (n°1 and n°4) mention the fact that women should value themselves more (see the following quote). Hence, as in the case of gender inequality, the responsibility seems to lie with individuals and with women in particular.

Interviewee n°4 (Man, 34): Well, from my point of view, I think that what is important here, as I was saying, is education, but above all that the woman realises, that she gives herself value. Yes, I know that... Well, I have never, never put myself in the shoes of a woman, but I feel that it must be very, very difficult to remove that stigmatisation, that ideology that you have. But I think that first of all, individually, it has to start with the woman. Believing that yes, she is capable, that she doesn't have to be tied to a man all the time.

As a result of all the previous points, education emerged as one of the main solutions to IPV. Indeed, among the solutions proposed by the students to combat domestic violence, two came up repeatedly (both mentioned 10 times), one at the individual and the other at the institutional level.⁷⁴ Education of individuals (both women and men) from an early age is of key importance and is based on two pillars. First it needs to provide a better emotional education in order to know how to relate with others in a healthy way and how to manage conflict and dissent. Secondly, it aims at raising awareness among individuals about IPV allowing them to identify, prevent and fight it. It echoes the idea mentioned by all, that women may not realise that they are victims of violence, preventing them from getting out of violent situations. This is supported by a particular piece of language, the recurrent use of the expression “*no se dan cuenta*” (they do not realise) or “*no nos damos cuenta*” (we do not realise) by the students.

⁷⁴ This measure regards the Mexican legal and judicial system. It ranges from ensuring a gender perspective in these institutions to implementing the law effectively to end impunity. This measure echoes the barriers raised by students that women wishing to leave abusive relationships may face. It includes the difficulty of making a complaint, the process of re-victimisation and the lightness or absence of punishment (impunity).

4.4.3.2. A socio-cultural perspective more than a structural one: the predominant role of the ideology

Machismo, romantic love and religion are highlighted by the students as legitimising factors of IPV, notably by influencing how a love relationship should be. These ideologies are labelled as socio-cultural constructions by the interviewees. First, students identified machismo as a risk factor for gender violence as it conveys harmful ideals of masculinity such as toughness, physical strength, aggressiveness, lack of emotional sensitivity etc. Second, the harmful effects of romantic love were frequently raised. The latter is a set of myths about the power of love and the perfection of romance. By dictating the characteristics or criteria of an ideal, acceptable and normal relationship (Bartell, 2009), they influence beliefs and actions taken in an affective relationship. Jealousy as a proof of love and omnipotence (true love can overcome all obstacles) are some of these myths. However, romantic love favours the persistence of IPV. By romanticising and justifying selfish, unjust, repressive and violent behaviours, it tends to make them socially acceptable and normal (Bonomi, Altenburger, & Walton, 2013; Bonomi et al., 2014; Lelaurain et al., 2018). Respondents n°7 and n°18 provide good examples of it.

Interviewee n°7 (Woman, 26): It's that they teach you that there is this romantic love, so everything your partner does is because he wants you and he loves you. So, if he is jealous, it's because he loves you a lot. If he denies you things or subtly tells you "Don't do that", it means that he loves you a lot and wants to take care of you. And it's also because a man has to take care of you and protect you. So, if he does things, it's because he takes care of you and protects you and cares about you. So, you are imbued with these ideas all the time.

Interviewee n°18 (Man, 30): I hadn't thought about it until now, but there is a part of these stereotypes towards women... it seems to me that there is one in which they manage to rescue the boy from this situation, they manage to save him and change him. And that's why it's very perverse, because in the end this situation is: "I'm violent but this is the last time". And then clearly there is a certain, I don't know if I can say it like this, codependency in which "I am trying to rescue you and this time we failed, but it will be the last time". And then instead of denouncing it and enunciating it as what it is, as the violence that it is, it is enunciated as part of a process of the same relationship.... That the relationship itself has to overcome, doesn't it? As if it were something necessary.

Third, the previous points are very much linked to the role played by the church through the dissemination of gender stereotypes and in particular the concept of marianismo, the feminine equivalent of machismo. "Marianismo is the expression of an ideology of sacrifice and

abnegation of women to the family. Women perceive themselves as morally and spiritually superior to men, in direct proportion to their behaviour in accordance with the expectation of benevolent sexism, which implies an idealised vision of the feminine within the machista culture (Díaz-Guerrero, 2007)” (Moral de la Rubia & Ramos Basurto, 2016, p. 40, author's translation). This conveys an idea of endurance and suffering that must accompany the relationship, as a sign of virtue and faith. Several students mention these cultural norms and values as legitimising IPV.

Interviewee n°3 (Woman, 53): They have a very deep-rooted saying: "With him God united me and with him I'm going to die". Or "he left me here and I'm going to die here". Then, or else, "this is the cross that I have to bear". And they even want to be strong, don't they? To say, "look how much suffering I have endured". And that is a religious invocation.

Related to the previous points, several interviewees raised the fact that violence within interpersonal relations is highly normalised and socially accepted in Mexican society (n°2, n°3, n°4, n°5 and n°6). Students also sometimes generalised it to the global situation of extreme insecurity and violence in the country as illustrated by the words of the next interviewee.

Interviewee n°13 (Woman, 30): There is a history in Mexico of a lot of violence, isn't there? [...] And now we are living through another one of these moments. I mean, all of a sudden, we have millions of disappeared people, trailers full of corpses who knows who they are, and they don't know where to keep them. I think that... I mean, I don't know if it's connected to inequalities, but it is connected now with the crudest violence, right? The femicides, the disappeared women, all of that is directly related because it's always like... when life begins to be less important or less valuable, the first lives that are not valued have to be women's lives.

4.4.3.3. What about the link between gender inequality and IPV?

After emphasising the similarities of the structure and content of the students' discourses on gender inequality and IPV, it seems interesting to focus specifically on how students relate gender inequality and IPV.

In a direct manner, after having extensively debated about the two topics, students were finally asked if gender inequality had an effect on IPV and how. All students answered in the affirmative (certainly to please the interviewer), but explaining the underlying mechanisms was much more hazardous. Indeed, seven students were for example completely off topic. Besides, following the above-mentioned results, six students provide answers structured at the

individual level and focus mainly on economic gender inequality. They highlight how economic gender inequality may favour violence toward women. First, they rely on the recurrently mentioned idea that the economic dependence of a woman to an intimate partner is one obstacle impeding her to end a violent relationship (n°7, n°12 and n°14).

Interviewee n°12 (Woman, 29): Well, yes. Well, in the end I see it, for example, in women older than me, right? Who often stay in physically or psychologically or economically abusive, violent relationships, because they cannot provide, for example, a certain standard of living or a certain quality of life for their family.

Second, three students (n°6, n°18 and n°19) conceptualised IPV as an unfortunate consequence of reducing gender inequalities, i.e., the backlash hypothesis. In a situation where men feel threatened in their traditional role, especially as the main economic provider of the household, they may resort to violence against their partner to vent their frustration. The below-citation is a selected answer to this last question.

Interviewee n°18 (Man, 30): I think, for example, not knowing how to handle frustration in a situation where the male provider cannot find a job, clearly affects that he might hit his wife because he does not know where to express that frustration and how.

Finally, and interestingly, students holding a structural perception of gender inequality perceive IPV to be systemic. These few students who hold a feminist ideology identified explicitly gender inequality and patriarchy as the main causes of IPV (interviewees n°7, n°10, n°11, n°13, n°14 and n°15).

Interviewee n°14 (Man, 27): And on the other side, it goes hand in hand with what we are talking about inequality. I mean, the more support or policies you have for women, where they are less vulnerable, the less violence there will be. [...] So I think these measures would be like, if you support or if they reduce gender inequality, it seems to me that it would reduce violence against women. I think.

You answered my last question before I had the time to ask it. Well, I think it was the last question, which was if you think gender inequalities affect violence against women? And if so, how? But well...

Yes, I think they go hand in hand, no doubt. But I don't know if it's a matter of the chicken and the egg, but I think that if you decrease inequality, violence will decrease. I mean, I could perhaps say the same thing about the opposite case, but I think it's, I mean, it would be more generalised the other way around. In other words, it would be more generalised, if you reduce inequality, violence would decrease. It's not an easy cause and effect, but it would go that way.

4.5. Conclusion

The purpose of this study was to better understand students' perception of gender inequality and IPV in Mexico. To this end, a qualitative approach was used, based on 19 semi-structured in-depth interviews with university students. The analysis of their discourses first aimed to take stock of their knowledge, understanding and beliefs about these two phenomena as it may differ from what reality and theory say. Second, we looked at how the two perceptions are related and in particular, if any type of discourse about gender inequality may be systematically associated with its counterpart about intimate partner violence.

The qualitative content analysis provides three main empirical results. First, gender inequality is a fuzzy, catch-all concept even for university students and there is an apparent confusion between sexism, gender roles and gender inequality. Globally, a consensus emerges about the main dimensions making up (what they consider to be) gender inequality in Mexican society. It includes gender inequality in the economic/professional sphere, within family as well as through violence women are victims of. But what students perceive and label as gender inequality represents in fact sexism (without them calling it as such) and gender roles manifestations, which they have a good knowledge and perception of, rather than structural gender inequality. However, even if the three concepts are closely related, they are nonetheless distinct. How these discriminations (based on gender roles and stereotypes) suffered in different environments affect structurally women in terms of access to resources (education, income, patrimony etc.), practices (housing, consumption, health, leisure etc.) and power, are quasi unknown (or at least unexpressed) by students. Overall, students barely perceive gender inequalities on a systemic scale, with the exception of inequalities between women and men in the economic sphere.

Second, and as an extension of the previous result, gender inequality is analysed by the students from an individual and socio-cultural perspective more than a structural one. Said differently, they tend to perceive more the ideological (machismo) than the structural (patriarchal institutions) component of the phenomenon. Indeed, gender inequality is conceptualised by the students as the result of human interactions and socialisation at the individual level. This is not surprising as the way they conceive gender inequality, embodied by sexism, is driven by harmful gender roles and stereotypes and all of these are social constructs. Thus, the responsibility tends to lay within society and in particular the individuals

who make it up. There is a chronic difficulty to recognise the role played by the institutional structure.

Third and finally, the perception of intimate partner violence overlaps in many ways with the perception of gender inequality. More specifically, students are leaning towards individual/couple and socio-cultural explanations of IPV rather than structural ones. Instead of the feminist theory, students seem to adhere to individual factors (such as social learning and background/situational models) and family violence theories to explain IPV, placing the individual and the relation at the core of the analysis. Furthermore, machismo, romantic love and religion are perceived by students as socio-cultural constructions legitimising IPV.

While the results of this qualitative analysis are not intended to be generalised to all Mexican university students outside of those under study, some limits can be highlighted. The discourses, although nuanced, appear on the whole relatively homogeneous (interviewees shared a minimum of common knowledge on gender inequality and IPV in Mexico) and socially compliant. There may be several explanations. First of all, we were dealing with a highly educated public of postgraduate students characterised by strong knowledge. Several interviewees also mentioned the recent sensitisation they received about gender issues as part of a mandatory university course and how it enriched their knowledge on the subject. Second, as participation was voluntary, it can be assumed that the participants had prior knowledge or at least some interest in the topic. Finally, the social desirability bias may have been important for two reasons. The socioeconomic characteristics of the interviewer (young white European woman) certainly played a favourable role in the production of a socially acceptable discourse on gender inequality and IPV (Davis, Couper, Janz, Caldwell, & Resnicow, 2010). Moreover, as the interviews occurred in an academic context (students reached out through their teachers and interviews conducted by a PhD student), tactics to avoid peer judgement may have been implemented.

In view of the results of this chapter, one may think that information campaigns should be put in place to make Mexican students aware of the structural component of gender inequality. But we must be cautious about the expected results of such a policy. Indeed, correcting perceptions by providing accurate information regarding structural gender inequality may not change individuals' perception of gender inequality, IPV and ultimately their behaviours. Learning facts may not change attitudes. It has for example already been tested for income inequality perception and policy preferences, showing that providing correct information

about the income distribution has little effect on related political attitudes, even when that information corrects serious misperceptions (Kuziemko, Norton, Saez, & Stantcheva, 2015; Lawrence & Sides, 2014).

Appendix

Table A4.1: Description of participants.

| Participant | Gender | Age | Education | Area of study | University | Duration of the interview |
|-------------|--------|-----|-----------|---------------------------------------------------|--------------------------------------------------------------------------|---------------------------|
| 01 | Man | 28 | Master | Government and Public Affairs | Faculty of Political and Social Sciences (UNAM) | 1h06 |
| 02 | Man | 30 | Master | Environmental Health Sciences | National Institute of Public Health (INSP) | 1h45 |
| 03 | Woman | 53 | PhD | Political and Social Sciences | Faculty of Political and Social Sciences (UNAM) | 2h20 |
| 04 | Man | 34 | Master | Metropolitan Planning and Policies | Autonomous Metropolitan University (UAM) Azcapotzalco | 1h11 |
| 05 | Man | 35 | Master | Government and Public Affairs | Faculty of Political and Social Sciences (UNAM) | 1h12 |
| 06 | Man | 27 | Master | Social Science with a specialisation in Sociology | El Colegio de Mexico (Colmex) | 1h34 |
| 07 | Woman | 26 | Master | Political and Social Studies | Faculty of Political and Social Sciences (UNAM) | 1h42 |
| 08 | Woman | 32 | Master | Public Health | National Institute of Public Health (INSP) | 1h47 |
| 09 | Woman | 28 | Bachelor | Sociology/Philosophy | Faculty of Political and Social Sciences (UNAM) and Universidad La Salle | 1h38 |
| 10 | Woman | 26 | Master | Studies in International Relations | Faculty of Political and Social Sciences (UNAM) | 1h15 |
| 11 | Man | 26 | Master | Political and Social Studies | Faculty of Political and Social Sciences (UNAM) | 2h12 |
| 12 | Woman | 29 | Master | Political and Social Studies | Faculty of Political and Social Sciences (UNAM) | 1h24 |
| 13 | Woman | 30 | PhD | Social Science with a specialisation in Sociology | El Colegio de Mexico (Colmex) | 1h20 |
| 14 | Man | 27 | Master | Political and Social Studies | Faculty of Political and Social Sciences (UNAM) | 2h12 |
| 15 | Woman | 35 | PhD | Political Science | Faculty of Political and Social Sciences (UNAM) | 1h20 |
| 16 | Man | 60 | Master | Studies in International Relations | Faculty of Political and Social Sciences (UNAM) | 1h24 |

| | | | | | | |
|----|-------|----|--------|---------------------------------------------------|-------------------------------------------------|------|
| 17 | Man | 27 | Master | Social Science with a specialisation in Sociology | El Colegio de Mexico (Colmex) | 1h27 |
| 18 | Man | 30 | Master | Political and Social Studies | Faculty of Political and Social Sciences (UNAM) | 1h43 |
| 19 | Woman | 29 | Master | Communication | Faculty of Political and Social Sciences (UNAM) | 1h38 |

Source: Author.

Appendix 4.1: Interview protocol.

Gender inequality questions:

- 1) What are gender inequalities? How would you define them?
- 2) How do gender inequalities manifest themselves in Mexican society? If you have any particular examples? (*Investigator will probe for different sectors/spheres of society*).
- 3) Specifically, how do you think gender inequalities impact women's lives? In terms of living conditions, rights, personal and professional projects etc.
- 4) Do you believe that gender inequalities affect all women in Mexican society?
- 5) Why are there gender inequalities? What are their origins/sources?
- 6) Are there situations or cases in which gender inequalities are justified or acceptable?
- 7) Are there any cultural norms, values or beliefs in Mexican society that justify or make acceptable gender inequality?
- 8) What do you think of the parity law in parliament?
- 9) Do you think that gender inequality is a major social problem in Mexico? How do you perceive its levels? Do you think that most people perceive similar levels of gender inequality in Mexican society?
- 10) What could be the solutions to fight gender inequalities? Whether at the individual, community or institutional level.
- 11) Why do gender inequalities persist? Why does it take so long to reduce them?
- 12) What do you think of the feminist struggle in Mexico? Do you believe that both women and men have a role to play in the fight against gender inequalities?
- 13) In the face of gender inequalities, how do you feel as a woman/man in Mexican society? What are your expectations, fears, challenges?

Intimate partner violence questions:

- 1) What is intimate partner violence against women? How would you define it? (*Investigator will probe for examples*).
- 2) Why is there intimate partner violence against women? What could be its causes?
- 3) Are there situations or cases in which intimate partner violence is justified or acceptable?
- 4) So why do certain men allow themselves to use violence against their partners?

- 5) Are there any cultural norms, values or beliefs in Mexican society that justify or make acceptable intimate partner violence?
- 6) What are the direct and indirect consequences of such violence in the lives of women victims of it? In terms of well-being, living conditions, professional or personal projects etc.
- 7) Do you think there are any obstacles that can prevent a woman from ending a violent relationship with her partner? Whether at the individual, community or institutional level.
- 8) What advice would you give to a woman victim of violence from her intimate partner?
- 9) What could be the solutions to fight intimate partner violence against women? Whether at the individual, community or institutional level.
- 10) Why do intimate partner violences against women persist? Why does it take so long to eradicate all its forms in Mexican society?

Concluding questions:

- 1) Do you think gender inequalities have an impact/effect on intimate partner violence against women? If so, how?
- 2) Is there anything else I haven't asked you that you think would be important or interesting to know or think about?

Appendix 4.2: Extracts from interviews (in Spanish).

Interviewee n°3 (Woman, 53): Y mira, yo me acabo de dar cuenta en un círculo de investigación, en un proyecto de investigación. Hay cuatro investigadores y entre ellos se dicen Doctor. "Doctor Lopez, Doctor Martinez, Doctor Gonzalez". "Ah, Julia". No es la Doctora Julia o no es la Doctora Perez. "Julia".

Interviewee n°9 (Woman, 28): Y en el caso de las juntas es lo mismo. El asunto es con mi jefe de la consultoría, pues es básicamente el lenguaje corporal, hablar con mi [compañero varón] y no hablar conmigo. Entonces hay como una situación ahí de desacreditación bien fuerte y de legitimidad cero, ¿no? O sea, no la tengo.

Interviewee n°1 (Man, 28): Creo que en las familias... En las familias, tanto en la parte de los padres como en la parte de los hermanos, creo que siempre hay una preferencia. O sea, yo vengo de una familia, que yo considero machista. O sea, nunca he visto violencia física como tal, nunca, nunca, nunca. Pero considero que si hay una desigualdad de género, viendo mis papás aislados y viendo a mis hermanos y mí. Tengo un hermano más chico que yo y una hermana más grande. Y siempre he notado que existen ciertas preferencias hacia mí o hacia mi hermano, sobre mi hermana. Porque creo que no hay tanta confianza de mis papás, los dos, hacia mi hermana sólo por el hecho de ser mujer.

Interviewee n°7 (Woman, 26): [...] el primer espacio en el que se pueden apreciar todas esas desigualdades es en la familia y sobre todo si tienes hermanos. Digo, yo no tengo hermanos, pero sí estoy convencida de que si hubiera tenido hermanos mi educación hubiera sido totalmente diferente. [...]

Y cómo crees que hubiera sido tu educación si tú hubieras tenido hermanos?

Si hubiera tenido un hermano, estoy segura que hubiera sido de que "tienen que aprender a cocinar, tienen que aprender a lavar, tienen que hacerle eso a su hermano, su hermano las tiene que proteger y las tiene que cuidar".

Interviewee n°15 (Woman, 35): Que a las mujeres se les asigne el espacio privado, el espacio doméstico, todas las tareas domésticas y el asunto del cuidado. Tiene que ver con la crianza o con los cuidados adultos mayores o a personas enfermas y que a los hombres se les asigna el trabajo productivo, remunerado y en el espacio público, sobre todo.

Interviewee n°17 (Man, 27): Entonces creo que al momento en la familia, las labores, las tareas, pues son... O sea se reparte de manera inequitativa. Y también justo un tema es que, justo estas labores de cuidado son desvaloradas, ¿no? Al final del día, al momento de no obtener una retribución económica etc., creo que eso ya genera más desventajas para mujeres.

Interviewee n°19 (Woman, 29): Pues justo que, por ejemplo en lo laboral, no tengan un trabajo estable, ¿no? Generalmente ya se ven relegadas a trabajos secundarios, comerciantes, a crear productos o hacer productos e ir a venderlos, y eso es como una manera en la cual se ganan el sustento del día, porque eso le permite tener el cuidado de su

casa, del hogar y de los hijos. O sea, es decir, se generan un tiempo aparte a una jornada laboral, ¿no? Muchas veces los empleadores no las contratan porque no pueden estar el periodo, la jornada laboral completa. Entonces ellas tratan de buscar o solventar sus gastos de otra manera. Entonces ya no piden un trabajo estable, sino que ellas mismas buscan como este tipo de trabajos más... Sin restricciones de horarios.

Interviewee n°6 (Man, 27): Porque frecuentemente a las mujeres se les etiqueta como "tú estás en la casa y tienes obligaciones laborales domésticas". Y eso de alguna manera, al tener ese tipo de obligaciones, impide un desarrollo laboral más pleno en la población femenina, ¿no? En cambio los hombres al estar desligados de eso, pues digamos son más libres de ascender laboralmente, ¿no?

Interviewee n°7 (Woman, 26): Y puedes pensar en otras esferas de la sociedad a parte de esas tres, donde se manifiestan las desigualdades?

En el transporte público, creo que en México es muy conocido que en el metro, bueno en todo el transporte público, la segregación entre hombres y mujeres, ¿no? Creo que difícilmente podremos encontrar una mujer que no ha sufrido acoso en la calle o en el transporte público.

Interviewee n°6 (Man, 27): Si, por ejemplo, en la universidad hace poco hubo casos de acoso y nunca hizo nada contra los acosadores. Namás condenó y sacaron su comunicado de "condenamos a este tipo de comportamientos". Pero yo como institución no hago nada.

Interviewee n°7 (Woman, 26): Entonces también la educación a veces sí era como un poco encaminada a los roles, no? También... o sea de qué, "ah pues qué quiere ser de grande. Bueno, porque los niños pueden ser esto..." Ese tipo de carreras que están como más masculinizadas o carreras que están como más feminizadas, ¿no? O como que por ahí te lo... O sea, no te lo decían claramente "No, tú no puedes ser", no sé "ingeniería". Pero tampoco es como que advirtieron esa idea. Seguían mandando mensajes de segregación de carreras por ejemplo, ¿no?

Interviewee n°8 (Woman, 32): Y a mí se me hacía súper divertido como las actividades de un niño. Y siempre en la escuela le mandaban llamar a mi mamá. "Señora cuide a esa niña. Esa niña sí está fuerte, si esto, si se sabe defender, pero ahorita está chiquita, cuando crezca un hombre va a tener más fuerza que ella y le van a dar un mal golpe, van a hacer esto, van a hacer el otro". O sea, "cuídela, que enséñela a tomar su lugar", casi casi no?

Interviewee n°14 (Man, 27): El Segundo, en los sexenios pasados, el segundo al mando o uno de los actores políticos más importantes era el Secretario de Gobernación. Y lo digo así en hombre, porque siempre fue hombre hasta este sexenio. Y eso se daba como un triunfo. [...] Y lo triste es que se volvió... pues... Muchos le dicen, un florero o sea digamos está ahí, pero en realidad no está como secretaria de Gobernación y funciona para menos cosas que funcionaban los hombres que estaban antes.

Interviewee n°15 (Woman, 35): Ha sido con muchos esfuerzos, con muchos "peros", con muchos obstáculos, de los hombres y del sistema patriarcal que se rehúsa a ceder espacios

(hablando de la paridad de género en México). Entonces ahorita la otra cuestión es "okay, ya tenemos los espacios". O sea, ya ocupamos muchos espacios públicos, pero ahora toca entonces "¿ahora qué vamos a hacer con esos espacios?" Porque como dicen mis maestras, "mujeres en el poder muchas veces no significa mujeres con poder", ¿no? A veces tiende a ser un asunto más simbólico y aunque las mujeres estén en esos puestos de toma de decisiones, dicen que las decisiones cambian de lugar y ya se deciden en otro lado.

Interviewee n°13 (Woman, 30): [...] las políticas no reconozcan como su responsabilidad también en los cuidados no? Y se lo cargan a la familia porque las mujeres son las mejores, como AMLO lo decía, no? Que las mujeres son las mejores cuidando a sus hijos no? Entonces así muy fácil el estado se deshace de responsabilidades y de nuevo sobrecarga, se subsidia con el trabajo gratuito, ¿no? De mujeres.

Interviewee n°13 (Woman, 30): Los medios de comunicación, o sea Televisa. Televisa y TV Azteca son los grandes, ahí la maquinaria digamos ideológica de las desigualdades de género en México a mi parecer. Todos estos programas de la Virgen de Guadalupe y no se que o sea si! Y las telenovelas y los comerciales. O sea, todos los comerciales que ves en la tele, es así, tipo las mujeres limpiando. Todos.

Interviewee n°13 (Woman, 30): Y a nivel como personal o sea del interpersonal me parece que hay como mucha normalización de violencia en las relaciones interrelaciones, como que es normal hacer ciertos tipos de bromas como sexistas.

Interviewee n°17 (Man, 27): Por una diversidad de factores desde que, la maternidad... La ley de la maternidad en el trabajo es en México, pues muy mala, por así decirlo. Y bueno otros muchos factores incluso el sexismo del trabajo se les dificulta pues el avance laboral, incluso en los ingresos.

Interviewee n°3 (Woman, 53): Yo pienso que tenemos que asumir nuestra propia responsabilidad. Si bien es una situación social que como comunidad tenemos que resolver y ese es el reto, un reto gigantesco, porque tenemos que luchar con años de condicionamiento machista en la sociedad mexicana, yo creo que si tenemos que asumir de manera muy personal nuestra labor en este mundo, ¿no? Pues, como te decía, no es cuestión de conformar organismos, ni instituciones, ni ONGs nada por el estilo. O sea, no es malo que se construyan, pero no son la panacea, no son la solución. Pienso que los proyectos deben estar encaminados a eso, a resignificar en nuestra subjetividad nuestra condición de vida. Y es la única manera de poder, aceptar en primer lugar, que existen estas desigualdades de género. Es como un proceso personal. Primero, aceptarlo. Bueno, primero darte cuenta de que lo hay, después aceptarlo y posteriormente hacer lo necesario para superarlo. [...] Pero si no asumimos esta responsabilidad de manera personal, pues no vamos a poder, por más organismos que surjan o por más leyes que se dictaminen.

Interviewee n°4 (Man, 34): Pero si me acuerdo de otros familiares que por ejemplo decían cosas "Para eso tienes a tu mujer, para que sea tu criada. Si te casas que te guise todo lo que tú quieras". Y igual como un objeto sexual para eso la tiene, no?

Interviewee n°10 (Woman, 26): No sé, incluso, por ejemplo, pienso elegir la carrera que querían estudiar. Y pienso en una prima mujer que decidió estudiar química y siempre la cuestionaban, era cómo "¿qué vas a hacer y a qué te vas a dedicar?" Y que la encasillaban en este rol de mujer de que al final de tu licenciatura te tienes que casar y tienes que tener hijos. Cosas que jamás cuestionaban por ejemplo, con mis primos hombres no?

Interviewee n°19 (Woman, 29): Así que tú crees que la educación sería como la principal solución para poder luchar contra las desigualdades de género?

Sí, creo que la educación, entendida como el espacio en la aulas y entendida como lo que traemos desde casa, no? La misma familia, las mismas maestras, todos los que van reproduciendo este tipo de patrones. Tener esa misma abertura porque incluso si los maestros hacen esta labor de apertura con los niños, pero en la casa de la mamá hace que la hija le sirva a todos los hermanos y que la hija sea la única que lava trastes, que lavar ropa, que ayude en las labores de la casa, se siguen reproduciendo ese tipo de patrones.

Interviewee n°9 (Woman, 28): ¿Por qué crees que hay desigualdades de género en la sociedad mexicana? Cuáles serían sus fuentes o sus orígenes?

Es que va a sonar mucho cliché, pero es la educación, pero no es la educación como entendida escolarmente, no? No es la educación academizada, sino es la educación que viene muchas veces como de casa. Entonces yo creo que pues, gran responsabilidad se debe a que muchas de las mamás mexicanas crían a hijos que son así. [...] Entonces, yo creo que gran parte del problema es que nosotras mismas hemos permitido que ese problema se siga generando.[...] Entonces yo creo que es un círculo vicioso, que es mucho como nosotras mismas, hacia nuestras parejas, hacia nuestros hijos, hacia nuestros sobrinos, hacia nuestro... O sea, lo que sea.

Interviewee n°12 (Woman, 29): O sea, creo que la lucha contra las desigualdades de género es de todos. Es una tarea de todos porque nos afecta a todos, a todas y a todos. Pero no sé si debería de ser paritaria en el sentido de que... Creo que no podría ser paritaria, no? Porque al final uno nunca lucha para erradicar sus propios privilegios o las cosas que te benefician. Entonces yo por ese lado creo que es un poco más complicado que los hombres acepten y se sumen a combatir un sistema y una estructura que de facto los benefician en muchas cosas. [...] Y generalmente pues es quien está oprimido bajo esa estructura quien busca subvertirla o romperla. Pero claro, o sea, creo que las mujeres deberían encabezar como, esta lucha, primero por ser oprimidas del sistema y segunda pues quien siquiera se une, ¿no? Pero sí. Y es de todos.

Interviewee n°16 (Man, 60): Sí, pero pues... sí, definitivamente que el Estado mexicano sea patriarcal... pues bueno, no... no me queda muy claro esa palabra, no?

Interviewee n°5 (Man, 35): Crees que el Estado Mexicano es un Estado patriarcal?

En el sentido de que patriarcal? De una preeminencia de la mayoría de varones?

Interviewee n°4 (Man, 34): Yo pondría por primera, en este caso de México, la ideología. Eso sería una para mí de las principales. Sobre todo esa ideología que tenemos aquí. A lo mejor no tanto en la ciudad, pero yo creo que todavía más en provincia, de la superioridad del hombre.

Interviewee n°10 (Woman, 26): Ay! yo creo que es la pregunta más difícil, de ahí es algo que... como que siempre está presente, ¿no? Como que siempre nos estamos preguntando de dónde viene y porqué. Yo creo que mucho es cultural. O sea, creo que si México tiene una cultura muy machista y muy patriarcal, no sé si más o menos que otros países, que otras culturas, pero... O sea, si es histórico.

Interviewee n°6 (Man, 27): Ay no sé, es una pregunta de tesis. Pues no sé en dónde está la génesis o cómo podríamos tratar de explicar, digamos, el punto nodal de donde surge, no? Pero lo que sí te puedo decir es que tradicionalmente, no sé, desde la época de la revolución, frecuentemente al varón se le enarbola como éste caudillo, incluso dentro de la familia. Esta persona que es capaz de hacer todo, de demandar, de distribuir, de liderar una familia. Y regularmente, la mujer era la acompañante. Siempre me parece... Regularmente ha estado sometida a servir a ese caudillo, a ese líder que se supone comanda a tu familia.

Interviewee n°16 (Man, 60): Pero también creo que el catolicismo. Desde mi punto de vista es muy importante para poder también recrear estos modelos de disparidad, ¿no? De que el hombre tiene que ser el sostén de la casa, el fuerte, el todo y la mujer, la sumisa a la que se queda haciendo la comida, cuidando a los niños.

Interviewee n°10 (Woman, 26): O sea, pienso, por ejemplo, en la figura de hombres o de este macho que se refleja, por ejemplo, en las películas, ¿no? No sé si sepas de este cine de oro mexicano que estuvo como durante los 50, 1950, o sea... y he vuelto a ver cómo estas películas, porque si las pasan de repente. O sea la figura que se muestra del hombre es muy fea. Ya viéndolo como con una mirada más crítica. O sea, es este macho que puede tener una o dos mujeres y aun así ser respetado por la sociedad o por su pueblo. Que puede tener actitudes machistas, que puede ser agresor y demás, pero que sigue siendo como el referente de hombre de la época, ¿no? Entonces, o sea son patrones que yo creo que se reproducen.

Interviewee n°9 (Woman, 28): Me gustaría saber, en tu opinión, por qué persisten las desigualdades de género en la sociedad mexicana? ¿O porque toma tanto tiempo reducirlas o combatirlas?

Porque es un problema de raíz. Ese es un problema estructural fortísimo. O sea no es un problema individual, es un problema estructural. Y como todo problema estructural, es de largo alcance. [...] Yo creo que el problema en México es igual, es exactamente ese. El problema de México es estructural, pero no solamente a nivel institucional, sino a nivel cultural, a nivel social, a nivel individual, incluso porque dentro de las mismas conformaciones psíquicas de individuales, pues hay cosas estructurales que tienes que cambiar y no son fáciles y por eso quiero mandar todo mundo a terapia para que pueda como solucionar eso, pero es difícil.

Interviewee n°2 (Man, 30): Entonces pues una es esa, la violencia física que se ejerce por a lo mejor de no poder resolver conflictos interpersonales y que esta dificultad para resolver conflictos a través del diálogo y sobre todo de la negociación que hoy en día creo que en nuestra generación. [...] Yo creo por eso, porque hay una dificultad para la negociación y cuando hay una dificultad para la negociación y vivimos en condiciones violentas, pues el paso es muy pequeño en que se empiece a violentar.

Interviewee n°6 (Man, 27): Y tú, por ejemplo, al hablar con tus amigos y no poder expresar abiertamente lo que sientes y con tu pareja tampoco porque eres emocionalmente incapaz, eres emocionalmente discapacitado para hacerlo. Pues, muchos no encuentran otra forma más que desquitarse. Desquitarse como ya sea con la pared o ya sea con tu pareja.

Interviewee n°9 (Woman, 28): Si tú ves que tu papá golpea a tu mamá, pues efectivamente es algo que normalizas, es algo normal. Así va pasar y si tú ves como mujer que también tu mamá se deja, pues efectivamente también va a ser algo que digas "pues sí, pues lo dejo porque lo amo". Entonces yo creo que también es una de las razones por las cuales hay hombres que son violentos y hay mujeres que aceptan ese tipo de violencia.

Interviewee n°17 (Man, 27): Y por qué crees que un hombre mexicano se puede permitir usar violencia contra su pareja?

Hay muchas causas que lo permiten. Creo que aquí también, un factor de responsabilidad también está.... Sí, pero creo... realmente lo creo que un factor de responsabilidad está en las mujeres en justamente permitirlo. Creo que hay que tener mayor conciencia en que ellas no deben permitirlo y que deben usar las figuras legales en caso de que estén disponibles en su estado.

Interviewee n°4 (Man, 34): Pues yo, desde mi punto, creo que lo importante aquí como te decía es la educación, pero sobre todo que la mujer se dé cuenta, darse el valor ella misma. Si, sé que... Bueno, nunca, nunca me he puesto en los zapatos de una, pero siento que ha de ser mucho, muy difícil quitarte esa estigmatización, esa ideología que tienes. Pero creo que primero individualmente tiene que empezar por sobre todo por la mujer. Creer que ella sí es capaz, de que no tiene que estar siempre atado a un hombre.

Interviewee n°7 (Woman, 26): Es que te enseñan que está ese amor romántico, entonces que todo lo que haga tu pareja es porque te quiere y te ama. O sea si es celoso, es que te ama montón. Es que si te niega cosas o te dice sutilmente "no hagas eso", es que te quiere mucho y te quiere cuidar. Y es que aparte el hombre te tiene que cuidar y proteger. Entonces, si hace cosas es porque te cuida y te protege y le importas. Entonces estás embebida todo el tiempo por esas ideas.

Interviewee n°18 (Man, 30): No lo había pensado hasta ahorita, pero hay parte de estos estereotipos hacia las mujeres... me parece que hay uno en el que ellas logran rescatar al chico de esta situación, con que lo logran salvar y cambiar. Y entonces por eso es muy perverso, porque al final esta situación es: "yo soy violento pero es la última vez". Y entonces claramente hay como una cierta, no sé si decirlo así, codependencia en la que "yo te

intento rescatar y esta vez fracasamos, pero va a ser la última". Y entonces en vez de denunciarlo y enunciarlo como lo que es, como la violencia que es, se enuncia como parte de un proceso como de la misma relación... Que la misma relación tiene que superar, ¿no? Como si fuera algo necesario.

Interviewee n°3 (Woman, 53): Ahí tienen muy arraigado un dicho que es: "Con él Dios me unió y con él voy a morir". O decir "él me dejó aquí y aquí me voy a morir". Entonces, o sino, "esta es la cruz que me tocó carga". Y hasta se quieren hacer fuertes, ¿no? De decir mira cuánto sufrimiento aguanto. Y esa es una invocación religiosa.

Interviewee n°13 (Woman, 30): Hay como una historia en México de mucha violencia, ¿no? [...] Y que ahora estamos viviendo otro de estos momentos. O sea de repente estamos con millones de desaparecidos, tráilers llenos de cadáveres, que quién sabe quiénes son, que no saben dónde guardar. Yo creo que... o sea eso, digo no sé si está conectado con las desigualdades pero si está conectado ahora con cómo... la violencia más cruda no? Los feminicidios, las desaparecidas todo eso está directamente relacionado porque siempre como... que en el momento que la vida empieza a ser menos importante o menos valiosa, las primeras vidas no valorarse tiene que ser la de las mujeres.

Interviewee n°12 (Woman, 29): Pues sí. Pues al final lo veo, por ejemplo, en mujeres más grandes que yo, ¿no? Que muchas veces se quedan en relaciones físicamente o psicológicamente o económicamente abusivas, violentas, porque no pueden proveer, por ejemplo, cierto nivel de vida o cierta calidad de vida para su familia.

Interviewee n°18 (Man, 30): Pienso, por ejemplo, el no saber manejar la frustración ante una situación en la que el hombre proveedor no puede encontrar trabajo, claramente incide en que a lo mejor golpea a su mujer porque no sabe dónde expresar esa frustración y como.

Interviewee n°14 (Man, 27): Y por otro lado, va de la mano con lo que hablamos de desigualdad. O sea, mientras tengas más apoyos o políticas hacia las mujeres, donde ellas tengan menos condiciones de vulnerabilidad, menos violencia va a haber. [...] Entonces estas medidas, creo que sería como, si apoyas o si disminuyen la desigualdad de género, me parece que disminuiría la violencia contra las mujeres. Creo.

Contestaste a mi última pregunta antes de que he tenido el tiempo de preguntartela. Pues, creo que fue la última pregunta. Pues qué era si piensas que la desigualdades de género afectan a las violencias contra las mujeres? Y si es así como? Pero ya...

Sí, es... creo que van de la mano, sin duda. Pero no sé si es un asunto del huevo y la gallina, pero yo creo que si disminuyes la desigualdad, va a disminuir la violencia. Digo, podría decir quizá lo mismo del caso contrario, pero creo que es, o sea sería más generalizado al revés. O sea sería más generalizado, si disminuyes la desigualdad disminuiría la violencia. No es causa efecto fácil, pero sí iría por ahí.

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General Conclusion

By shedding new light on the link between inequality and violence in Mexico, this thesis aims to explore further that relationship and deepen its understanding. This work provides an empirical and theoretical contribution to the analysis of the link between inequality and violence. It expands first the existing literature by examining the effect of inequality on both effective crime and fear of crime. The contribution is also methodological as we use innovative quantitative and qualitative data and analytical tools. Third, we integrated the concept of inequality perception to the study of the inequality-violence link. Finally, we give this literature a deeper gender perspective by analysing in particular intimate partner violence and gender inequality.

Chapter 1 examines the impact of inequality on crime at the municipal level in Mexico. Using several datasets, it provides complementary longitudinal and spatial analyses. As a preliminary approach, we first study the dynamic relationship between income inequality and homicide rate between 2000 and 2010. The findings emphasise a positive and significant impact driven by the 2005-2010 period, a result that may be explained by an upsurge in drug related violence that followed the war on drug launch in 2006. As criminal behaviour is not randomly distributed throughout Mexican territory (positive spatial autocorrelation), the panel results are completed with an in-depth spatial analysis of criminality for the year 2017. Considering the total criminal incidence, intentional homicide, intentional injury and theft, this work enriches past empirical studies for multiple reasons. First, by encompassing several types of crimes, we do not underestimate other forms of criminality, which are just as harmful in the country, and broaden the spectrum of analysis. Second, different measures of income inequality (income Gini and income polarisation) are combined in the investigation. Third, this is to our knowledge the first study in the case of Mexico to control simultaneously for spatial dependence and endogeneity issues while assessing the effect of income disparity on crime. Finally, we update scarce empirical evidence at the municipal level for Mexico and bring additional findings for middle income countries, where less research was conducted until now. The findings are only conclusive for the homicide rate, highlighting a positive direct effect and a negative spillover effect of income inequality. As the level of income inequality in one municipality increases, the intentional homicide rate in that same location

heightens and the intentional homicide rate in neighbouring municipalities decreases, highlighting a transfer of lethal violence towards more unequal municipalities. All in all, the total impact is positive and non-negligible since a one-point increase in the Gini index leads to a rise of 2.4 intentional homicides per 100,000 inhabitants in 2017.

The findings from Chapter 1 could benefit from several extensions and improvements. First, alternative measures of income inequality, such as Atkinson inequality measures (Atkinson, 1970) or ratios could be used. Second, other inequality dimensions such as consumption/expenditures (see Hicks and Hicks (2014) for a study using conspicuous consumption) or housing (Manea, Piraino, & Viarengo, 2021) inequalities may be of great interest. As Mexico is highly diversified ethnically, socioeconomic inequalities within and between racial/ethnic groups may play an important role in explaining criminal behaviours. Interestingly, some evidence suggests that within racial/ethnic groups inequality is mainly associated with violent crimes whereas between racial/ethnic groups inequality contributes particularly to property crimes (Blau & Blau, 1982; Demombynes & Özler, 2005; Hipp, 2007). Third, given the spatial autocorrelation of crime and the spillover effect of inequality, more disaggregated geographic data should be privileged, for example at the AGEB level (*Área Geoestadística Básica*, the territorial subdivisions of a municipality)⁷⁵ or the police sector (Vilalta & Muggah, 2014). Fourth, our findings mainly support the social disorganisation and strain theories, which are sociological theories. However, the analysis could be enriched with psychological theories of crime and in particular the behavioural theory. The latter states that violent behaviours are learned through a process of behaviour modelling, that is by observing and interacting with others (the family, the environment and the mass media) (Bandura, 1977). In addition, the results of the first Chapter raise further directions for research as several questions remain unanswered. Are crimes in one area committed by individuals living in that same area? Do we observe within or between groups violence? Are there any individuals more at risk of being victim of or committing a crime? Thus, there is an urgent need for better crime statistics providing information on the victim's and offender's profile. In that respect, victimisation surveys can fill this gap, albeit partially. When possible, collection of data regarding the offender should be implemented, systematised and made available. Qualitative interviews with criminals may also help us understand better their motives and the psychosocial mechanisms at work. Finally, additional research is needed to explain why the effect of income inequality is only significant for homicides in our results.

⁷⁵ In an urban area, it corresponds to a set of 1 up to 50 blocks.

Disentangling the effect of organised crime organisations remains very difficult but may be an avenue for research.

Rooted in the social disorganisation theory, Chapter 2 explores the effect of local inequality (of income and education), a main community structural factor, on individuals' fear of crime in Mexico. The contributions of this chapter are threefold. We first build a new composite index of fear of crime combining its emotional, cognitive and behavioural dimensions. For that purpose, we use a multiple correspondence analysis and the 2017 National Survey on Victimization and Perception of Public Security (ENVIPE). Second, we construct representative measures of education and income inequalities at the municipal level. For income inequality, we rely on small area estimation and combine data from the 2015 Inter-Census Survey (EIC) and the 2016 National Survey of Household Income and Expenditure (ENIGH). Third, controlling simultaneously for individual and contextual characteristics as well as endogeneity bias, we assess the causal effect of inequalities on fear of crime with a two-stage least squares (2SLS) multilevel model. We find that municipal income inequality significantly deteriorates the feeling of safety of its residents (emotive dimension) and favours the adoption of constrained behaviours and protective measures against crime (behavioural dimension). Regarding education inequality, the results are less stable but indicate that higher levels reduce as well the feeling of safety (emotive dimension), but to a smaller extent, and increase the perceived risk of victimisation (cognitive dimension).

First of all, and as already mentioned for Chapter 1, the analysis could be extended by testing for the effect of other measures and types of inequality. In Chapter 2, we posit that inequality, as a structural factor of social disorganisation, influences fear of crime through the mediating role of collective efficacy that is a mix of common values, informal social control, mutual trust and solidarity (Sampson, Raudenbush, & Felton, 1997). Indeed, strong disparities and in particular socio-economic inequalities between individuals exacerbate perceived social differences, encouraging people to see each other as strangers (Neckerman & Torche, 2007). This channel was not directly tested, as it went beyond the scope of analysis of this chapter. Future research could address this question by testing this channel empirically. This is even more pressing challenge given that the literature finds mixed results on the effect of collective efficacy perception on fear of crime (Ferguson & Mindel, 2007; Franklin, Franklin, & Fearn, 2008). Several questions from the ENVIPE could be used as proxies for collective efficacy. They measure for example individuals' trust in different community members and institutions and the organisation between neighbours to solve neighbourhood problems. Constructing and

adding effective measures of collective efficacy (not based on individuals' perception) at the municipal level would also be of great interest.

The two first chapters of the thesis investigate the detrimental effect of inequality on respectively different violent criminal behaviours and fear of crime. Yet, the theories mobilised rely on the assumption that individuals are aware of actual inequality levels and correctly process them. Studying how individuals perceive, evaluate and experience inequality could increase our comprehension of how the latter relates to different individual (criminal) behaviours. This reflection is at the core of the last two chapters of this dissertation.

Chapter 3 proposes to gauge gender inequality perception among Mexican students and analyse its individual correlates. For this purpose, we led a quantitative survey with 220 students from high school to doctorate levels in Mexico. After designing the questionnaire, we collected the data during May and June 2021 through a self-administered online survey. We then created an innovative measure of gender inequality perception in the following manner. Respondents were asked several questions related to women's attainment in three fields (economy, education and politics), at the national level in 2020. Each question corresponded to an indicator composing a gender equality index. Their answers to each of these questions constitute their estimation of the different indicators. From their answers, we were therefore able to calculate a *perceived* gender equality measure representing their perception of gender equality. The latter is then compared to the real measure of gender equality computed with actual data for 2020. This methodology overcomes limitations of past empirical measures as it allows us to simultaneously take into account several dimensions of gender inequality, quantify perceived levels of gender inequality, infer the accuracy of estimates and make between-individuals comparisons. Overall, the results of the extensive descriptive analysis show that students misperceive gender inequality. Even if they recognize that gender inequality exists in Mexican society, they underestimate its magnitude. Surprisingly, inequality is the most denied in the economic dimension, where women are actually the most discriminated against in Mexican society. On the contrary, the estimates of political gender inequality are the closest to reality. Thanks to a multivariate analysis, we also find that the effect of individual determinants is dimension-specific. Depending on the type of gender inequality considered, different individual factors matter for explaining perceptions. However, the level of education appears to be the strongest predictor of perceived gender inequality levels. As their education increases students perceive higher levels of global, educational and political inequality between women and men. Their estimates are also more accurate.

Chapter 3 was a first attempt at quantifying and analysing gender inequality perceptions. The index constructed could be improved in different ways. We could add other dimensions of gender inequality to it (such as health and survival or legal rights) and/or use more than four indicators in each dimension. This would enrich the analysis and allow us to further test the robustness of our results. The study should also be replicated with a bigger and more diverse sample of individuals in Mexico to strengthen the analysis. As our measure of perceived gender inequality allows easy collection of comparable data, comparative cross-cultural studies could be implemented, validating further the use of our index. Regarding the individual correlates of gender inequality perception, particular attention should be paid to the consumption of mass and social media as they may play an important role. Indeed, by diffusing (in)accurate information about wealth, poverty or inequality, media may influence perceptions (Phillips et al., 2020). For example, in Norway, access to the income distribution of the whole population was massively and easily made available through newspapers' websites. Citizens could learn each other's income in one click. As a result, perception of one's relative income became more accurate (Perez-Truglia, 2019). On the contrary, Kim (2022) showed how media consumption can distort economic perceptions. Finally, income inequality perception has already been associated with redistributive preferences (Niehues, 2014; Page & Goldstein, 2016). Following this line of research, we may wonder if gender inequality perception (its level and/or accuracy) is linked to individuals' support of policies fighting gender inequality. Further research may also investigate the effect of gender inequality perception on other related individual attitudes and behaviours.

Chapter 4's purpose is to better understand Mexican students' perception of gender inequality and intimate partner violence in their society. Based on 19 in-depth semi-structured interviews, we first analyse their discourses to take stock of their knowledge, understanding and beliefs about these two phenomena. Second, we looked at how the two perceptions are related and more specifically, if any type of discourse about gender inequality may be systematically associated with its counterpart about intimate partner violence. The qualitative content analysis provides three main empirical results. First, gender inequality is a fuzzy, catch-all concept even for university students and there is an apparent confusion between sexism, gender roles and gender inequality. Globally, a consensus emerges about the main dimensions making up (what they consider to be) gender inequality in Mexican society. It includes gender inequality in the economic/professional sphere, within family as well as through violence women are victims of. However, what students perceive and label as gender

inequality represents in fact sexism (without calling it as such) and gender roles manifestations, which they have a good knowledge and perception of, rather than structural gender inequality. Second, and as an extension of the previous result, gender inequality is rather analysed by the students from an individual and socio-cultural perspective than from a structural one. Put differently, they tend to perceive more the ideological than the structural foundations of the phenomenon. Finally, the perception of intimate partner violence overlaps in many ways with their perception of gender inequality. More precisely, students are leaning towards individual/couple and socio-cultural (such as machismo, romantic love and religion) explanations of violence rather than structural ones.

The results of Chapter 4 call for further research. In particular, one might ask whether correcting misperceptions by providing correct information regarding structural gender inequality may change individuals' perception of intimate partner violence. To test whether learning facts changes opinions and attitudes (for example with survey experiments) is the next step. It has already been tested for income inequality perception and policy preferences, showing that providing correct information about the income distribution has little effect on related political attitudes, even when that information corrects serious misperceptions (Kuziemko, Norton, Saez, & Stantcheva, 2015; Lawrence & Sides, 2014). As raised by Lawrence & Sides (2014), one key point is also to better understand people's willingness to incorporate factual information into their attitudes. Indeed, what is the direction of causality between beliefs and attitudes/opinions? If individuals' policy preferences mainly drive their beliefs, why should they bother to consider the facts? Efforts to provide people with accurate information will then be useless. Finally, the underlying hypothesis of Chapter 4 is that the effect of patriarchy on intimate partner violence may be mediated by the way individuals perceive structural gender inequality. This was not directly tested but collecting additional information on individuals' experience of intimate partner violence, as a victim or perpetrator, opens a major path of research to relate perceptions and behaviours.

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