Do Gun Policies Really Protect Women?
A Cross-national Test of the Relationship between Gun Regulations and Female Homicide Victimization

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Abstract

Globally, firearms are the most frequent means of committing homicide and young males are most likely to be victimized with guns. However, females' risk of lethal gun violence rises significantly within the context of intimate partner and family violence. Some countries have addressed the gendered nature of gun violence in the private sphere by regulating access to guns based on the risk of domestic or family violence. There has been little research conducted on the extent to which such policies have been adopted around the world and their effectiveness for protecting females against gun violence. This quantitative, cross-national study tested the effects of gun availability and gun policies on levels of lethal violence against women in a relatively large sample of countries, controlling for other structural and cultural predictors of macro-level homicide rates. We found that the civilian gun ownership rate was positively associated with lethal gun violence against women. However, the relationship between gun policies to protect against domestic and family violence did not have a direct effect on female homicide rates. Instead, domestic violence background checks for gun permits only had a moderate negative effect on female homicides in countries with large numbers of private firearms.

Keywords: Firearm, Gun, Domestic violence, Homicide, Law.

Introduction

In the last two decades, we have seen significant advances in data collections documenting the prevalence of violence against women (VAW) across a fairly large number of countries due to efforts by international organizations to improve the measurement and monitoring of this global social problem. For example, the World Health Organization (WHO) conducted a comprehensive review of existing population-based studies of violence against women through 2011 and found that approximately one-third of women in the world were victims of intimate partner violence and/or sexual violence (García-Moreno et al., 2013). Additionally, the

United Nations Office on Drugs and Crime (UNODC) reported that 58% of all female homicides (87,000) documented around the world in 2017 were the result of intimate partner or family violence ("Global Study on Homicide," 2019).

With respect to lethal violence, males face considerably higher risk of homicide than females, but the causes and contexts of female homicides are quite different than males. For example, firearms are the most frequent means of committing homicide globally (54%) and young males are the modal victims of firearm homicides ("Global Study of Homicide," 2019). However, females' risk of lethal gun violence rises significantly in the context of intimate partner and family violence. Among documented homicide cases in the world that result from intimate partner or family conflict, 82% of victims in these cases are female ("Global Study of Homicide," 2019).

One way to protect women from firearm violence within the private sphere is to regulate access to guns based on the risk of family violence. As such, some countries include domestic violence offenses as part of background checks for gun licenses and deny or revoke licenses for applicants with domestic violence convictions. However, we do not know the effectiveness of gun regulations for reducing VAW on a global scale or whether or not geographic variations in levels of lethal VAW can be explained, in part, by differences in firearm policies across countries. To address this knowledge gap, this study examines the extent to which gun availability and gun regulations affect lethal violence against women in a relatively large sample of countries, controlling for other known predictors of macro-level homicide rates. It contributes to the modest literature on the relationship between civilians' access to guns and homicide cross-nationally. Additionally, it is the first study to empirically investigate whether firearm regulations specifically designed to protect women decrease the risk for lethal VAW globally.

1. Theoretical Framework

Public health scholars studying gender-based violence contend that the etiology of VAW can be best understood through a multi-dimensional, multi-level model of interacting factors. Building on earlier work on family

and child violence, Heise (1998) proposed a four-tiered, integrated ecological model starting with personal history and expanding out to include the microsystem, exosystem (mesosystem), and macrosystem. Personal history includes individual-level factors that may predispose a person to violence, such as early exposure to violence or poor relationships with parents. The microsystem captures the proximal context of violence, such as family dynamics, level and types of conflict, or substance use. The mesosystem focuses on social institutions, such as work, neighborhood, or social groups. Finally, the macrosystem encompasses the larger structural and cultural forces shaping gender roles, norms, and values.

This model has been updated over time, particularly as more information about VAW globally has become available, but it is still the dominant perspective for studying causes and correlates of VAW (Heise, 2011; Fulu & Miedema, 2015). A recent review of population-based studies of VAW around the world found that this research "has largely ignored the role of macro-level factors in affecting a woman's risk of violence and the geographical distribution of abuse" and that "violence research is dominated by studies from North America and other high-income settings and these have emphasized the role of personality and relationship dysfunction, childhood trauma and developmental adversity, and antisocial behavior as key risk factors for partner violence" (Heise & Kotsadam 2015, p. e333; see also Matias et al., 2020).

In particular, Heise (2011) noted a lack of research attention on the role of the legal system for reducing VAW. Advocates working to reduce VAW maintain that legal reforms are necessary for "holding the state accountable for protecting women's human rights and ending the 'culture of impunity' around gender-based violence" (Heise, 2011, p. 6). They are an important part of the social construction of VAW as a social problem and provide formal tools of social control, and yet they are often overlooked in global research on correlates of VAW.

Criminologists also have not paid much attention to variations in legal responses to VAW cross-nationally. One of the most dominant theories to explain national differences in the prevalence of female homicide victimization is Gartner's (1990) theory of macro-level contexts of violence (see Figure 1). The *material context* was derived from Durkheim's theory of anomie (1951 [1897]) and subsequent developments of social strain theories (e.g., Merton,1938; Messner & Rosenfeld, 2007). This context captures how

a lack of economic resources creates social stressors that can encourage deviant behaviors, especially aggression. The *integrative context* focuses on the population characteristics that indicate social cohesion (e.g., low divorce rates or low ethnic heterogeneity), suggesting greater informal social controls on antisocial behaviors. The *situational context* considers population characteristics and social patterns that could increase the pool of potential offenders (e.g., high percentage of young males in a population) or increase opportunities for criminal activity in general (e.g., working outside of the home) or aggressive behaviors in particular (e.g., high rates of alcoholism). Finally, the *cultural context* considers broader norms and values that might promote violent conflict resolution (e.g., a history of wars or excessive extralegal violence).

Applying this model to VAW, Gartner, Baker, and Pampel (1990) argued that the situational context was most relevant for understanding lethal VAW because gender roles, status, and norms affect females' risk of exposure to potential offenders and opportunities for victimization. On the one hand, greater gender equality could increase VAW because women are more exposed to opportunities for victimization and there may also be a backlash effect against females if males feel threatened by women's rising status or changing roles (e.g., Renzetti, 2013; Russell, 2003 [1984]; Whaley, 2001). On the other hand, when women's higher social status becomes normalized and they have more power in the legal, employment, and domestic spheres, then they will have greater resources to combat the risks of violent victimization (MacKinnon, 1989; Renzetti, 2013; Whaley, 2001).

Fig. 1. Macro-Level Contexts of Violence
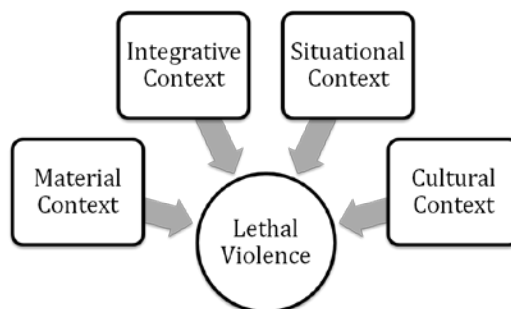
Source: Adapted from Gartner (1990)

Tests of Gartner's (1990) contextual model of violence have largely supported the importance of the material, integrative, and situational contexts on cross-national variations in total homicide rates, although some of the empirical results are mixed due to different measures of these contexts (see Nivette, 2011 and Pridemore & Trent, 2010 for extensive literature reviews). There has also been empirical support for the effect of gender roles on female homicide victimization (Cutright & Briggs, 1995; Gartner et al., 1990; Stamatel, 2014, 2015, 2016), although tests of female status on homicide rates have shown mixed results based on how status has been measured, as well as the size and composition of the samples (Chon, 2013; Stamatel 2014, 2016; Yodanis, 2004). Recent research in the U.S. and European nations suggests that this relationship may be curvilinear, with some gains in women's status decreasing lethal VAW, but high levels of female equality generating a backlash effect and increasing VAW (Whaley, 2001; Stamatel, 2016).

The theoretical insights and empirical tests of cross-national differences in VAW are sparse, leaving much room for additional research. Neither public health nor criminological research has paid sufficient attention to policy initiatives aimed to reduce lethal VAW or to the role of guns in perpetrating VAW, despite the large number of deaths caused by firearms. This study aims to address these gaps by adapting Gartner's (1990) model of the contexts of violence to include both of these factors.

2. Firearm Legislation to Protect Women

International laws, such as the 2001 United Nations Firearms Protocol to reduce illegal manufacturing and trafficking of weapons or the 1995 Beijing Declaration that raised concerns about the effect of the proliferation of weapons on VAW, have increased global awareness about the relationship between firearms and interpersonal violence and helped build consensus about the need to address this problem. However, there are obvious limitations to the effectiveness of international laws, as it is not clear how international guidelines are implemented at the national level and there are rarely penalties for noncompliance. Meaningful legislation to regulate firearms and/or reduce VAW occurs at the national level, but little has been

published about the motivations, provisions, implementation, or consequences of these laws.

The cases of Canada and the U.S. provide two examples of how and why gun regulations were passed at the national level specifically to protect women from lethal violence. In 1989 a mass shooting at an engineering school in Montreal, Canada resulted in the deaths of 14 women. The perpetrator stated that he intentionally targeted women studying in a male-dominated field because they were threatening employment opportunities for men. Survivors of the attack formed the Coalition for Gun Control that fought for the passage of a 1992 firearm regulation bill. In addition to restricting certain types of weapons, the law mandated better screening processes for applicants of gun licenses, including requiring references, instituting a waiting period, and adding medical and marital screenings to background checks.

The U.S. has passed three gun laws that specifically aim to reduce lethal domestic violence. The Gun Control Act of 1968 was initially passed in response to high-profile political assassinations at that time, but the law also made it illegal for people convicted of a felony domestic violence charge to own a firearm. The Domestic Violence Offender Gun Act of 1997 expanded the restriction against gun ownership to individuals with misdemeanor domestic violence convictions, which was important in the context of widespread plea bargaining in the U.S. Finally, in 2005 the Gun Control Act was modified to extend the prohibition to applicants named in a civil protection order so that a criminal conviction was no longer necessary to restrict access to guns.

According to the most recent data available about gun regulations around the world, 52 countries have legislation that stipulates that a firearm license should be denied or revoked for applicants with a documented history of domestic violence. Additionally, 150 countries perform general criminal history background checks on gun license applicants and 32 conduct background checks specifically for domestic violence ("GunPolicy.org," 2019). This paper examines whether countries with these legal provisions have lower rates of lethal VAW compared to countries without such laws.

3. Availability of Guns and Lethal Violence against Women

The small body of cross-national literature on the relationship between firearms and total homicide rates has focused mainly on the availability of guns and has generally found a positive relationship between high rates of civilian gun possession and high homicide rates. One of the earliest studies to examine this connection (Killias, 1993) found positive correlations between the percentage of households owning a gun in fourteen developed countries and different measures of lethal violence, including homicide, using data from the International Crime Victimization Survey. A subsequent study using multiple waves from the same data collection confirmed this finding for female homicides, but not male (Killias, et al., 2001). Other research using official records data found a positive relationship between gun availability and homicides in a sample of twenty-six developed nations (Hemenway & Miller, 2000).

These early studies were based on small samples of developed countries and only examined bivariate relationships. Hoskin (2001) employed multiple regressions on a sample of thirty-six countries and confirmed the positive effect of firearm availability on homicides, controlling for other factors. Altheimer and Boswell (2012) argued that the existence and strength of this relationship depends upon the socio-historical contexts of countries, with positive relationships between gun availability and gun homicides in Latin America and Western Europe, but not in Eastern Europe. Similarly, Stevens, et al. (2011) showed that the relationship between firearm availability and homicides was conditioned on drinking cultures. Finally, van Kesteren (2014) found that handgun ownership was positively related to serious violence across a sample of fifty countries, but not associated with less serious violent crimes. The only cross-national study that specifically examined the effect of firearm availability on females found that gun ownership rates in twenty-five populous, high-income countries were positively related to overall female homicide victimizations and female homicides committed with a firearm (Hemenway et al., 2002). This was a correlational analysis that did not include any control variables.

A few studies have looked beyond firearm possession rates to examine whether gun policies reduce lethal VAW. Of the studies in the U.S. that examined the effects of gun policies on intimate partner homicide (IPH),

four found that such laws reduced IPH (Goodyear et al., 2019; Sivaraman et al., 2019; Vigdor & Mercy, 2006; Zeoli & Webster, 2010; Zeoli et al., 2018) and one found no relationship (Bridge et al., 2008). A Canadian study did not find a relationship between stricter gun regulations and IPH (McPhedran & Mauser, 2013), but an Australian study found that stricter gun laws reduced female IPH, but not male IPH (McPhedran, 2018). Two cross-national studies have explored variations in policy content and adoption related to VAW, but have not empirically tested those relationships (Corradi & Stöckl 2014; Zeoli et al., 2017).

Hypotheses

To address these gaps in the literature, we expand upon Gartner's (1990) contextual model of violence in three important ways. First, we incorporate the gendered nature of the material and situational contexts. Previous studies have defined the material context in terms of economic development (absolute deprivation) and income inequality (relative deprivation), yet sociologists have documented the differential impacts of economic development on females and males (Moghadam, 2016). Additionally, Gartner's (1990) model has been expanded to include gendered aspects of the situational contexts, but the empirical research has not clearly established whether gender equality exacerbates or protects against lethal VAW. The mixed empirical results are due, in part, to single measures of gender equality (e.g., percentage of women in the labor force). In contrast, we employ a more robust index of gender equality that spans economic, political, and health domains. Second, we expand the situational context to include the availability of firearms as a factor that increases opportunities for VAW. Third, we incorporate Heise's (2011) call for a more serious treatment of legal interventions into the integrative context. The legal system has the authority to establish formal control of violent behaviors and also shapes the collective conscience regarding acceptable methods of conflict resolution. Figure 2 illustrates the theoretical model that is tested in this study and the directions of the expected relationships. The highlighted concepts are our adaptations to the model.

Fig. 2. Conceptual Model of National Contexts of Lethal Violence against Women
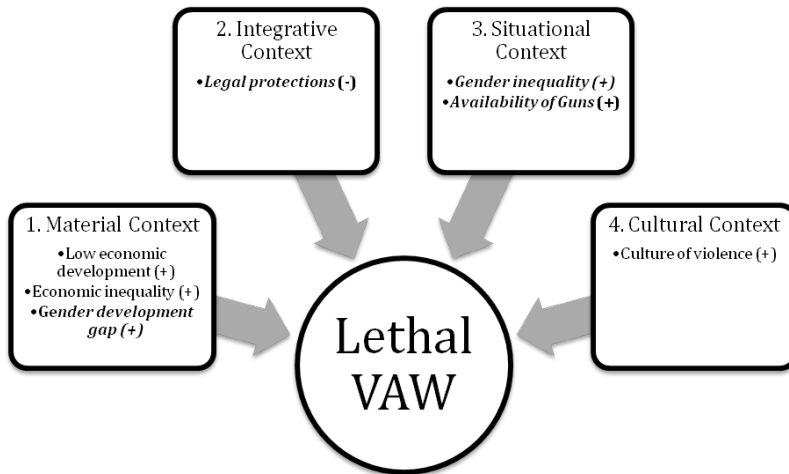
Source: Adapted from Gartner (1990) and Gartner et al. (1990)

Based on this model, this study measures the effects of these four contexts of violence on lethal violence against women in a large sample of countries. The following hypotheses will be tested.

H1A. Material Context: Countries with fewer economic resources (low economic development) and high economic inequality will have higher rates of lethal VAW than countries with more economic resources and lower levels of income inequality.

H1B. Material Context: Countries with a higher gender gap in development, indicating that females receive fewer of the benefits of economic development than males, will have higher rates of lethal VAW than countries with a lower gender gap in development.

H2. Integrative Context: Countries that have adopted legislation to mandate criminal history background checks and domestic violence background checks on applicants for gun licenses will have lower rates of lethal VAW than countries that have not adopted such policies, controlling for economic and political conditions and firearm availability.

H3A. Situational Context: Countries with greater gender inequality will have higher rates of lethal VAW than countries with less gender inequality.

H3B. Situational Context: Countries with more guns will have higher rates of lethal VAW than countries with fewer guns.

H4. Cultural Context: Countries with a history of persistent and/or severe violence will have higher rates of lethal VAW than countries with a weaker culture of violence.

Data and Methods

One of the reasons why there has been such limited research on the relationship between firearms and violence against women has been the lack of data for a large number of countries. The UNODC and WHO have made significant strides in compiling sex-specific homicide data globally. Additionally, the website GunPolicy.org has systematically assembled national-level data on firearms. This website is hosted by the Sydney School of Public Health at the University of Sydney. It provides over 200,000 pages of information about numbers and types of weapons, legal and illegal ownership, gun regulations, and gun-related violence. Information was collected from international agencies, such as UNODC, WHO, and the Small Arms Survey (SAS), in addition to country-specific sources from governments and academics.

The data are organized by country and the sources of information and number of references for each country are quite large. For example, the information compiled for Italy was based on 135 references. Given the comprehensive nature of this data collection and the large number of countries in our sample, we cannot cite the original sources for the statistics that we use in this study. As such, we indicate the most common source of data for our variables and encourage readers to visit GunPolicy.org for more details.

We extracted all of the data from this website using the Application Programming Interface (API) and then subsetted the data based on our variables of interest to facilitate data cleaning and analyses. Countries varied in terms of the number of years of data available for any given measure and the year of the most recent data point. In order to retain as many countries as possible for analysis, data were selected for the year 2018 or the closest available year.

Dependent Variables

The two dependent variables for this study are both measures of female homicide victimization, as provided by GunPolicy.org. The first is the overall female homicide victimization rate, including homicides by any

means. This is the most comprehensive measure of lethal violence against women for the largest number of countries. The primary original source for this variable is the UNODC. The second dependent variable is the female gun homicide victimization rate, counting only homicides with female victims and committed with a firearm. These data were primarily obtained from the WHO. The number of countries providing data for female gun homicides is roughly half of those providing overall female homicide victimization rates.

Table 1 lists the homicide rates for each of these indicators for the countries included in our analyses, as well as information about gun ownership and gun policies, which are the primary variables of interest for this study. The data were extracted from GunPolicy.org in 2019 and include the most recent year available on the website at that time (circa 2018). Homicide victimization rates were calculated as the number of completed, intentional homicides with female victims or female victims by firearm divided by the female population, times 100,000. The total female homicide victimization rate has an average of 2.12 homicides per 100,000 females across 132 countries. The female gun homicide victimization rate has an average of 0.60 homicides per 100,000 females for 70 countries.

Tab. 1. National Female Homicide and Female Gun Homicide Victimization Rates per 100,000 Population, circa 2018

Country	Female Homicide Rate	Female Gun Homicide Rate	% Gun Ownership	Criminal Checks	Domestic Violence Checks
Albania	1.03		12.0	Yes	No
Algeria	0.37		2.1	No	No
Angola	2.05		11.2	No	No
Argentina	1.38	0.55	7.4	Yes	No
Armenia	0.51	0.25	6.1	No	No
Australia	0.66	0.05	13.7	Yes	Yes
Austria	0.58	0.20	30.0	Yes	No
Azerbaijan	1.80		3.6	Yes	No
Bangladesh	1.05		0.4	No	No
Belarus	2.29		6.1	Yes	Yes
Belgium	0.94	0.17	12.7	Yes	No
Benin	2.39		0.3	No	No
Bhutan	1.07		0.8	No	No
Bolivia	4.06		2.0	Yes	No
Bosnia & Herzegovina	0.83	0.10	31.2	No	No

Botswana	2.47		4.1	Yes	No
Brazil	4.45	2.20	8.3	Yes	No
Bulgaria	0.60	0.05	8.4	Yes	No
Burkina Faso*	(0.19)		0.9	Yes	Yes
Burundi	2.29		2.0	Yes	Yes
Cabo Verde*+	2.62	(0.75)	5.4	No	No
Cameroon	1.53		2.1	Yes	No
Canada	0.83	0.13	34.7	Yes	Yes
Central African Republic*	(10.38)		1.8	No	No
Chad	3.62		1.0	Yes	No
Chile	1.28	0.19	12.1	Yes	No
China	0.51		3.6	Yes	Yes
Colombia	4.41	2.52	10.1	Yes	No
Congo	4.51		2.4	Yes	No
Costa Rica	2.89	1.01	10.0	Yes	No
Croatia	0.94	0.27	13.7	Yes	Yes
Cyprus	0.85	0.34	34.0	Yes	Yes
Czech Republic	0.48	.04	12.5	Yes	No
Dem. Republic of Congo	5.14		1.2	Yes	No
Denmark	0.80	0.07	9.9	Yes	No
Dominican Republic	3.18	1.49	7.4	Yes	No
Ecuador	2.41	0.41	2.4	Yes	No
Egypt*+	(0.06)	(0.02)	4.1	Yes	Yes
El Salvador	8.84	6.74	12.0	Yes	No
Estonia	1.48	0.15	5.0	Yes	No
Ethiopia	3.86		0.4	No	No
Finland	0.86	0.07	32.4	Yes	No
France	1.04	0.06	19.6	Yes	No
Gabon	3.18		3.4	No	No
Gambia	1.79		6.5	No	No
Georgia	2.97	0.12	10.1	No	No
Germany	1.13	0.06	32.0	Yes	No
Ghana	0.99		8.0	No	No
Greece	0.46	0.11	17.6	Yes	Yes
Guatemala	6.83	4.98	12.1	Yes	No
Haiti	1.63		2.6	No	No
Honduras	8.40		14.1	No	No
Hungary	0.75	0.04	10.5	Yes	Yes
Iceland+	0.60	(0.60)	31.7	No	No
India	2.67		5.3	Yes	Yes
Indonesia	0.26		0	Yes	No
Iran	0.40	0.09	7.3	Yes	No
Iraq+	3.23	(2.09)	19.6	No	No
Ireland	0.21	0.04	7.2	Yes	No
Israel	0.67	0.20	6.7	Yes	No
Italy	0.49	0.09	12.9	Yes	No

Ivory Coast	7.51		4.4	No	No
Jamaica	9.64	3.78	8.8	Yes	No
Japan	0.3	0	0.3	Yes	No
Jordan	0.80	0.20	18.7	No	No
Kazakhstan	2.45	0.9	2.8	Yes	No
Kenya	2.62		1.5	Yes	Yes
Kyrgyzstan	1.90	0.07	2.8	No	No
Laos	3.20		3.0	Yes	Yes
Latvia	2.80	0.28	10.5	Yes	No
Lebanon	1.23		31.9	Yes	No
Lesotho	8.90		4.8	Yes	No
Liberia	1.38		2.1	Yes	No
Lithuania	1.95	0.06	13.6	Yes	No
Luxembourg	0.70	0.35	18.9	Yes	No
Macedonia	0.96	0.19	29.8	Yes	Yes
Malawi	0.77		0.3	Yes	No
Malaysia*+	(0.10)	(0.01)	0.5	No	No
Maldives	0.34		6.2	No	No
Mali	5.10		1.1	Yes	No
Malta	0.46	0.48	28.3	Yes	Yes
Mauritania	5.17		2.8	Yes	No
Mauritius	1.31	0.15	8.3	No	No
Mexico	4.28	1.61	12.9	Yes	No
Moldova	2.28	0.05	3.0	Yes	No
Mongolia	2.72	0.13	7.9	No	No
Montenegro	0.94	1.27	39.1	Yes	No
Morocco+	0.55	(0.1)	4.8	No	No
Mozambique	1.10		4.5	Yes	No
Myanmar	0.76		1.6	No	No
Namibia	3.48		15.4	Yes	No
Nepal	0.89		1.5	No	No
Netherlands	0.37	0.03	2.6	Yes	No
Nicaragua	2.05	0.23	5.2	Yes	No
Niger*	(1.96)		0.5	No	No
Norway	0.42	0.04	28.8	Yes	No
Pakistan	2.35		22.3	No	No
Panama	1.85	1.54	10.8	Yes	No
Paraguay	1.80	0.81	16.7	Yes	No
Peru	12.26	0.01	2.0	Yes	No
Philippines+	2.26	(1.22)	3.1	Yes	No
Poland	0.35	0.2	2.5	Yes	Yes
Portugal	1.04	0.22	21.3	Yes	No
Romania	0.85	0.01	2.6	Yes	No
Russia	6.96		12.3	Yes	No
Rwanda	1.09		0.5	Yes	No
St. Lucia*	(0)	1.2	3.4	Yes	No
Sao Tome & Principe	1.54		3.4	No	No

Senegal	2.67		2.0	Yes	No
Serbia	0.91	0.49	39.1	Yes	No
Sierra Leone	0.75		0.5	No	No
Slovakia	0.72	0.25	6.5	Yes	No
Slovenia	0.19	0.47	15.6	Yes	Yes
South Africa*	(11.64)		9.7	Yes	Yes
South Korea	0.76	0.01	0.2	Yes	No
Spain	0.48	0.05	7.5	Yes	Yes
Sri Lanka	1.21		2.4	No	No
Sudan	2.38		6.6	Yes	No
Swaziland	4.51		4.8	No	No
Sweden	0.49	0.04	23.1	Yes	No
Switzerland	0.59	0.19	34.8	Yes	Yes
Syria	0.40	0.25	8.2	Yes	No
Tajikistan	0.41		0.4	No	No
Tanzania	2.46		0.8	No	No
Thailand	0.80	0.38	15.1	Yes	No
Togo	3.17		0.8	No	No
Tonga	1.91		8.0	Yes	No
Tunisia	1.03		1.1	Yes	No
Turkey	0.54	0.31	16.5	Yes	Yes
Uganda	4.31		0.8	Yes	No
Ukraine	2.45		9.9	Yes	Yes
United Kingdom	0.87	0.01	5.0	Yes	No
United States*+	(2.39)	(1.40)	120.5	No	No
Uruguay	3.17	0.98	34.7	Yes	No
Uzbekistan	0.74	0.01	0.4	No	No
Venezuela	3.3	2.51	18.5	Yes	No
Vietnam	0.45		1.6	Yes	Yes
Yemen	2.97		52.8	Yes	No
Zambia	2.07		0.9	Yes	No
Zimbabwe	2.04		2.8	Yes	No

Source: All data in this table were obtained from GunPolicy.org in 2019[1].

Independent Variables

Independent variables to measure the four contexts of violence were selected based on previous cross-national homicide studies and the conceptual framework presented in Figure 2. Consistent with prior research, the *material context* was represented by gross domestic product per capita in

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[1] Eight countries were identified as influential cases for the female homicide victimization analyses (*) and eight countries were influential cases for the female gun homicide analyses (+). These countries were not included in the final models presented in this paper. Their data are not included in any subsequent tables in this paper. They are included in this table for informational purposes only and to facilitate transparency of the data analyses.

US dollars (GDP/capita) as a measure of absolute wealth or deprivation and the Gini coefficient of income inequality was used as a measure of relative deprivation. The data for these two variables were extracted from the World Development Indicators for 2018, or the closest year available (World Bank Group, 2019). GDP/capita was not statistically significant in any of the preliminary models and was highly collinear with the gender-specific variables, so it was removed from the final results presented below.

We added another measure of relative deprivation to represent the gendered gap in economic development. For this concept, we used the Gender Development Index (GDI) of the United Nations Development Programme (UNDP). The index includes the same measures of wealth, education, and life expectancy as the Human Development Index (HDI), but instead calculates the gap in HDI between women and men. The GDI is the female development index as a percentage of the male development index. Scores greater than one indicate that women scored better than men on the human development measures. For example, Poland's GDI is 1.009 for 2018. Lower scores mean that women experienced fewer benefits of economic development compared to men. For example, Nigeria's GDI for 2018 is 0.298 (UNDP, 2019a). In other words, lower scores indicate a larger gap in development, which is hypothesized to increase female homicide victimization.

In prior research, the *integrative context* has been tested with measures of social cohesion (e.g., ethnic heterogeneity, rule of law) or family cohesion (e.g., divorce rate). These variables were either not available for a large number of countries, were not particularly relevant for understanding female homicides, or were highly collinear with other variables in the model so they were not included in this study. Instead, we used measures of legal responses to VAW to represent the integrative context. Two policy variables from GunPolicy.org were selected for this study based on their relationship to violence against women and their availability for the largest number of countries. We included a dichotomous measure of whether the country required any criminal background checks before a firearm license is issued or renewed. We also included a dichotomous measure of whether the country required a background check specifically for a history or risk of domestic violence. These variables capture the existence of these laws only at the national (federal) level. Missing data for the two background check variables were coded as 0 (i.e., no checks) to maximize sample size.

Sensitivity checks using these variables with missing data and with imputed data did not yield any substantive differences

The *situational context* was operationalized with two variables. First, the Gender Inequality Index (GII) from the UNDP was used to measure how gender roles and status affect female equality and thereby influence opportunities for or protections against VAW. The GII comprises three areas of inequality, which are health, politics and empowerment, and the labor market. Countries with low GII scores have less gender inequality than countries with high scores. For example, in 2018 the GII for Switzerland was 0.037, whereas it was 0.411 in Colombia (UNDP, 2019b).

Opportunities for lethal VAW are also expected to increase when firearms are easily accessible. Previous cross-national research has shown that the number of guns available to the public increases the risk for homicide in general and female homicide in particular. Consistent with prior research, we used the rate of civilian firearm possession per 100 people, which includes estimates of both legal and illegal firearms. The data were obtained fro GunPolicy.org circa 2018. The original source for these numbers was most often the Small Arms Survey (SAS) of the Graduate Institute of International Development Studies in Geneva.

Finally, the *cultural context* was the most difficult to measure for this study, and that has been a persistent problem in quantitative cross-national studies of violence. Ideally we would have liked to include measures of social values and norms regarding gender. Such measures exist in cross-national survey datasets, but they are not available for a large number of countries included in this study. Instead we adopted an approach used by other scholars to capture broad cultural patterns through regional variables (e.g., Altheimer & Boswell, 2012; Cao & Zhang, 2015; Stamatel, 2015). For example, there is an extensive literature on how decades of civil wars, extrajudicial conflicts, and military dictatorships have had a long-term effect on violence in Latin America (see Fajnzylber et al., 2002a, 2002b). We included a dichotomous variable for Latin American countries to capture this culture of violence. We examined other regional indicators in preliminary analyses but they were not informative so they were removed from the final models to maintain a reasonable ratio between the number of independent variables in the statistical models and the number of cases (Long, 1997).

Table 2 shows the descriptive statistics for the dependent and independent variables for the two different samples based on the different dependent variables. The larger sample size for the total female homicide rate allows for greater variation in gender development (GDI) and gender inequality (GII). The smaller sample has a greater percentage of countries in Latin America. While the majority of countries in both samples mandate criminal history background checks for gun licenses, regulations specifically for domestic violence offenses are less common.

Tab. 2. *Descriptive Statistics for All Variables circa 2018*

		Total Homicide Rate (n=132)				Total Gun Homicide Rate (n=70)			
		Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
Dependent Variables	Total female homicide victimization rate	2.12	2.11	0.19	12.26				
	Female gun homicide victimization rate					0.60	1.16	0	6.74
Material Context	Gini index	37.68	7.55	25.0	59.10	36.33	7.19	25.4	53.30
	Gender develop-ment index	0.94	0.75	0.46	1.03	0.97	0.36	0.80	1.03
Integrative Context	Criminal background check (1=yes)	1= 73.5%		0	1	1= 88.6%		0	1
	Domestic violence background check (1=yes)	1= 15.9%		0	1	1= 18.6%		0	1
Situational Context	Gender inequality index	0.35	0.20	0.37	0.83	0.28	0.15	0.34	0.55
	Civilian gun ownership rate	10.22	10.65	0	52.80	13.96	10.61	0.20	39.10
Cultural Context	Latin America (1=yes)	1= 15.91%		0	1	1= 25.71%		0	1

Table 3 shows the zero-order correlations for all of the variables for both samples. The bivariate relationships do not indicate strong correlations between the two dependent variables and the gun measures. Some of the correlations between the control variables, particularly with Latin America, are relatively high indicating potential multicollinearity problems.

Variance inflation factors were calculated for all of the regression models to address this issue, as discussed in the results section.

Tab. 3. *Zero-Order Correlation Matrices*

	Total fem. homicide rate	Gini index	Gender development index	Gender inequality index	Civilian gun owner-ship rate	Crim. checks	Domes tic viol. checks	Latin Am.
Total female homicide victimiza-tion rate (n=132)	1.00							
Gini index	0.46	1.00						
Gender developme nt index	-0.06	-0.00	1.00					
Gender inequality index	0.41	0.52	-0.61	1.00				
Civilian gun owner-ship rate	-0.15	-0.22	-0.01	-0.41	1.00			
Criminal back-ground check (1=yes)	0.02	0.02	0.30	-0.34	0.18	1.00		
Domestic violence back-ground check (1=yes)	-0.20	-0.22	0.17	-0.29	0.15	0.26	1.00	
Latin America (1=yes)	0.50	0.49	0.16	0.16	0.00	0.12	-0.19	1.00
	Total female gun homic. rate	Gini index	Gender develop-ment index	Gender inequa-lity index	Civilian gun owner-ship rate	Cri-minal checks	Do-mestic vio-lence.	Latin Ame-rica
Total female gun homicide victimiza-tion rate	1.00							

(n=70)								
Gini index	0.49	1.00						
Gender development index	0.04	-0.01	1.00					
Gender inequality index	0.46	0.67	-0.26	1.00				
Civilian gun ownership rate	-0.01	-0.16	-0.02	-0.34	1.00			
Criminal background check (1=yes)	0.15	0.12	0.19	-0.24	0.11	1.00		
Domestic violence background check (1=yes)	-0.16	-0.20	-.01	-0.30	0.27	0.17	1.00	
Latin America (1=yes)	0.63	0.83	0.14	0.64	-0.18	0.21	-0.28	1.00

Analysis and Results

For each dependent variable, we ran an ordinary least squares (OLS) regression with all of the independent variables. The dependent variables were logged to reduce heteroskedasticity. Variance inflation factors (VIFs) were calculated to check for multi- collinearity. GDP per capita was originally included in the models as a measure of the material context, but the VIFs with this variable were greater than 3.5 and the variable was not statistically significant in any of the models so it was removed from the analyses presented below. We used Cook's D to identify influential cases (outliers) with a threshold of 4/n (Gordon, 2015). For the initial regression models with each dependent variable, we identified eight influential cases that affected overall model quality so they were excluded from the final models presented in Table 4. The effects of those cases on the models are discussed in more detail after the presentation of results.

Table 4 shows the unstandardized OLS regression estimates and standard errors for the full regression models (Model 1A and Model 1B) for each dependent variable. Importantly, Models 1A and 1B differ not only in terms

of their dependent variables, but also with respect to sample size and sample composition. Table 2 shows how each sample varies with respect to the independent variables. Representing the *material context*, the Gini coefficient was not significant in either version of Model 1. The gender development index was significant and positive for total female homicide rates only. Higher scores on this index mean better development outcomes for females relative to males. Contrary to expectations, greater gender development is associated with higher total homicide rates. The *integrative context* comprised two measures of gun policies, which were not statistically significant for either dependent variable, contrary to expectations. There was strong support for the *situational context*, as the gender inequality index was positive and significant for both dependent variables. Countries with greater gender inequality have higher female victimization rates. The rate of gun availability was also positively associated with female gun homicides. Finally, representing the *cultural context*, countries in Latin America had higher lethal VAW relative to other regions in the world.

Models 1A and 1B each had eight influential cases that were removed from the final regression results because they created heteroskedasticity and reduced the quality of the model fit. For Model 1A, the influential cases were Burkina Faso, Central African Republic, Egypt, Niger, Malaysia, Saint Lucia, South Africa, and the United States. It is important to note that when these cases were included in the model, the R^2 was only 0.30 (compared to 0.47 in Table 4) and the rate of civilian gun ownership was positive and statistically significant. This is not surprising given that the gun ownership rate in the U.S. is excessively high at 120.5% of the population and South Africa is relatively high with 9.7%. For Model 1B, the influential cases were Cabo Verde, Egypt, Iceland, Iraq, Malaysia, Morocco, Philippines, and the United States. Removing these cases increased the R^2 from 0.55 to 0.65, but did not affect the significance or direction of the any of the predictors.

Tab. 4. OLS Regression Results for Two Measures of Lethal VAW[2]

		Total Female Homicide Victimization Rate unstandardized coefficients (b) (standard errors)			Female Gun Homicide Victimization Rate unstandardized coefficients (b) (standard errors)		
		Model 1A	Model 2A	Model 3A	Model 1B	Model 2B	Model 3B
Material Context	Gini index	0.00 (0.01)	0.00 (0.01)	0.05 ** (0.02)	0.01 (0.03)	0.00 (0.04)	-0.02 (0.05)
	Gender development index	2.94 ** (1.26)	3.96 ** (1.73)	-1.22 (2.04)	4.21 (3.79)	4.04 (4.47)	3.99 (9.29)
Integrative Context	Criminal background check (1=yes)	0.20 (0.15)	0.27 (0.18)	-0.29 (0.24)	0.29 (0.44)	0.00 (0.52)	0.95 (1.01)
	Domestic violence background check (1=yes)	-0.18 (0.18)	-0.05 (0.25)	-0.37 * (0.19)	0.17 (0.33)	-0.64 (0.59)	0.41 (0.38)
Situational Context	Gender inequality index	3.13 *** (0.60)	3.55 *** (0.72)	0.52 (1.15)	3.87 *** (1.41)	2.84 * (1.65)	6.42 ** (2.51)
	Civilian gun ownership rate	0.01 (0.01)	0.03 (0.02)	(0.01) (0.01)	0.06 *** (0.01)	0.18 *** (0.04)	0.05 * (0.02)
Cultural Context	Latin America (1=yes)	0.66 *** (0.19)	0.65 *** (0.24)	0.61 * (0.35)	1.60 *** (0.57)	1.96 *** (0.71)	0.58 (0.97)
	n	132	98	34	70	43	27
	R²	0.47	0.42	0.73	0.65	0.77	0.57

Although the insignificant findings for the integrative context comprised of the two legal reforms was contrary to expectations, it prompted further reflection about the social conditions under which such laws might be necessary and effective. Tables 1 and 2 showed that the average gun ownership rates across the sample countries is fairly low. This prompts consideration of causal ordering regarding whether laws reduce gun ownership or whether low gun ownership precludes the needs for greater gun restrictions. If the latter scenario were true, then perhaps it would not be surprising to find no significant effects of gun laws on lethal VAW across countries. In other words, countries that might benefit most from gun regulations may be those with the most guns. To investigate this

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[2] * p <=.10, ** p<=.05, *** p<=.01

hypothesis, we divided our samples into two groups based on gun ownership rates. In Table 4, Models 3A and 3B are countries with the highest 25% of gun ownership in their respective samples, whereas Models 2A and 2B are the remaining countries. For both dependent variables, the results for Model 2 parallel Model 1. However, some interesting differences appear when we only analyze countries with high levels of civilian gun possession (Model 3). Most importantly, domestic violence background checks have a statistically significant, negative relationship with total female homicide victimization (Model 3A). Although this relationship is only significant at $p < .10$, Model 3 contains a small number of cases and high levels of multicollinearity, which makes finding statistical significance harder. Of the 34 countries in the top quartile of gun ownership in Model 3A, nine countries conduct domestic violence background checks for gun licenses. Those nine countries with domestic violence checks all have female homicide victimization rates under 1 per 100,000. Our approach to answer our research questions was designed to generalize across a large number of countries and is not well suited for analyses of small subsets. Nonetheless, these results suggest that there may be certain social conditions under which legal reforms to protect against VAW might be more effective than others.

Discussion and Conclusions

The results from the quantitative analyses confirm three of the six hypotheses for this study. Notably, the *situational* and *cultural* contexts have the most influence on lethal VAW across countries (Hypotheses 3A, 3B, 4). Greater gender inequality, more firearms, and living in Latin America were consistent predictors of high female homicide rates. There were mixed results for the *material* context, although the findings raise interesting questions for further research. Traditional measures of the material context, namely GDP per capita and the Gini coefficient, were not helpful predictors in this study (Hypothesis 1A). However, the gendered development measure was statistically significant for one of the dependent variables (Hypothesis 1B). Countries with higher GDI, meaning lower gender gaps in development, had higher rates of total female homicide rates than countries with lower GDI. In other words, in countries where

women have longer life expectancies, more education, and higher standards of living relative to men, they are also at *greater* risk for violent victimization. In contrast, countries where women have more equality, as measured by more reproductive freedom, more political power, and more labor force participation, they have a *lower* risk for violent victimization. These seemingly contradictory findings are consistent with previous studies that have found support for both the backlash and amelioration hypotheses with respect to understanding VAW cross-nationally. Greater rewards for women from economic development (i.e., high GDI) could generate a backlash effect, whereas greater social status through gender equality may enable women to enact social protections against violence. More refined measures of the different aspects of gender roles, status, equality, norms, and values are needed to adequately disentangle these complex relationships.

Importantly, the key question of interest for this study that was situated in the *integrative context* was not well supported (Hypothesis 2). Criminal history background checks were not significant in any of the regression models. Similarly, domestic violence background checks were not significant in the main regression models. Although these findings are contrary to our theoretical expectations, it would be premature to conclude that these laws are ineffective based on the results of this study given the limitations of the data and study design. This is the first study to examine the effects of these laws cross-nationally so additional research is warranted before any strong conclusions can be drawn. For example, further investigation suggested that legal protections against VAW might be relevant under certain social conditions. We found modest evidence that these laws reduced lethal VAW in countries that have high rates of gun ownership. This is an area worthy of further research.

The goal of this study was to contribute to the modest literature examining the effects of firearm availability and gun regulations on lethal VAW cross-nationally. Given the sparseness of existing literature, research design decisions were made to maximize sample size and sample composition to be as inclusive as possible. Such an approach meant that we had to rely on secondary data sources, which have inherent limits with respect to data availability across time and countries and the operationalization of theoretical concepts.

For example, in order to maximize sample size we chose a cross-sectional design using the most recent data available across our sources. Cross-sectional research cannot assess long-term effects of policy changes like the adoption of firearm regulation. Countries in this study adopted laws at various times, yet the outcome variables are measured at approximately the same time period. This static snapshot of the relationship may mask dynamic effects. It could also be the case that countries with historically lower rates of VAW do not consider firearm regulations to protect women because they would be superfluous. The historical contexts shaping both the adoption of laws and levels of violence are missing from the study design.

Additionally, all quantitative, cross-national research is sensitive to sample sizes and compositions. Although this study includes significantly more countries and more diverse countries than previous research, it is still far from the population census. As noted in the presentation of results, some of the differences between the regression results from the two dependent variables are likely due to changes in sample size and characteristics of the respective samples, instead of, or in addition to, changes in the dependent variable. As others have argued, the socio-historical contexts of countries and regions are important to understanding geographic variations in homicide rates, so we need to be mindful of the composition of our samples when interpreting results (Altheimer & Boswell, 2012; Stamatel, 2006).

Finally, some of the variables were not ideal measures of the four context areas. We acknowledge this most importantly with respect to the cultural context. Regional variables are simply indicators and we infer a lot of meaning from simple dichotomies. We need better measures of cultural values, norms, and beliefs, particularly regarding gender and sexuality, across a large number of countries and over time. Additionally, this study only measured the presence or absence of two firearm regulations. Laws that are passed by legislative bodies are not always fully, or even partially, implemented for political, financial, or administrative reasons. Additionally, these data do not capture the extent to which these laws are enforced. Measuring law-on-the-books is not the same as law-in-action.

In summary, although both public health researchers and criminologists have acknowledged the need to understand macro-level correlates of lethal VAW, the research literature explaining cross-national differences in levels of violence against women is sparse. We adopted a theoretical framework from comparative criminology that identified four contexts of violence

(material, integrative, situation, and cultural) and adapted it to address some important research gaps. First, we considered the gendered nature of the material and situational contexts and included appropriate measures of gender development and gender inequality into our analyses. Second, we expanded the situational context to include the availability of firearms, which shape opportunities for lethal VAW. Third, we incorporated the legal system into the integrative context to recognize its important role for both exerting formal social control and shaping collective sentiments about violence.

We utilized a unique dataset developed by GunPolicy.org to measure the effects of gun availability and firearm regulations on lethal VAW, controlling for other known predictors of cross-national female homicide variation. Our results confirmed previous studies that have shown that high levels of gun ownership are positively related to high levels of lethal violence. We did not find strong support for the effect of gun policies on lethal VAW, although we found some evidence that domestic violence background checks for gun licenses may protect against lethal VAW in countries with high rates of gun ownership. This finding encourages further investigations into conditions under which different types of gun regulations might be most effective to reduce lethal VAW. One possible avenue is to consider other factors related to gun access and lethality, such as illegal weapons, different types of weapons, or ammunition controls. Another research track might consider cultural factors related to gun ownership, particularly as it affects perceptions of masculinity. A third approach might unpack the social conditions leading to firearm regulations that may already affect levels of VAW so that laws become more of a symbolic representation of other sociocultural factors rather than a direct determinant of risk of violence.

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