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Global Crime

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/fglc20

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To cite this article: Katharina Krüsselmann, Pauline Aarten, Sven Granath, Janne Kivivuori, Nora Markwalder, Karoliina Suonpää, Asser Hedegaard Thomsen, Simone Walser & Marieke Liem (2023): Firearm Homicides in Europe: A comparison with non-firearm homicides in five European countries, Global Crime, DOI: 10.1080/17440572.2023.2211513

To link to this article: https://doi.org/10.1080/17440572.2023.2211513

Published online: 13 May 2023.

GLOBAL CRIME
https://doi.org/10.1080/17440572.2023.2211513

Routledge
Taylor & Francis Group

Firearm Homicides in Europe: A comparison with non-firearm homicides in five European countries

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ABSTRACT

Detailed, comparative research on firearm violence in Europe is rare. Using data from the European Homicide Monitor, this paper presents the prevalence and characteristics of firearm homicides in Denmark, Finland, the Netherlands, Sweden and Switzerland between 2001 and 2016. Furthermore, we compare firearm to non-firearm homicides to assess the degree of uniqueness of firearms as modus operandi. We find that the firearm homicide rate varies across our sample of countries. We also identify two country profiles: in Denmark, the Netherlands and Sweden, most firearm homicides take place in public and urban areas, involving male victims and perpetrators. In these countries, the use of firearms in homicides is largely concentrated in the criminal milieu. In Finland and Switzerland, firearms are mostly used in domestic homicides, with a higher share of female victims. We explore these findings in relation to firearm availability in each country.

ARTICLE HISTORY
Received 27 Oct 2022
Accepted 12 Apr 2023

KEYWORDS
Homicide; firearm; gun violence; firearm availability; European homicide monitor

Introduction

Continental European countries experience a relatively low rate of firearm homicide (0.3 per 100.000 population) compared with the global average (3.1 per 100.000 population) (United Nations Office on Drugs and Crime, 2019) and other global areas such as the Americas (13.2 per 100.000 population), Africa (3.1 per 100.000 population), with rates close to Asia (0.6 per 100.000 population), and somewhat higher than in Oceania (0.1 per 100.000 population)[1] (United Nations Office on Drugs and Crime, 2022). It is possibly due to those low rates that firearm homicides have received relatively little scholarly attention in Europe – a region with a strong record of homicide research (Eisner, 2001; Kivivuori et al., 2014, 2022; Liem, 2021). Yet, the use of weapons, and specifically firearms, has only

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been touched tangentially, for example to explain differences in homicide clearance rates (Granath & Sturup, 2018; Liem et al., 2019), the context of firearms trafficking (Savona & Mancuso, 2017), or levels of homicides in relation to firearm ownership (Killias & Markwalder, 2012; Killias, 1993; Lester, 1991).

As a result, there is a lacuna of information, specifically concerning the characteristics of firearm homicides. In addition, there are two main shortcomings of existing studies: First, the few existing European studies mainly focus only on one particular national context (Frei et al., 2006; Solarino et al., 2007; Sturup et al., 2018). Due to varying data sources and definitions, such studies are often not comparable cross-nationally (Krüsselmann et al., 2021). Second, so far, European studies on firearms have mostly used aggregated data, whilst previous studies have shown that disaggregating homicide can provide invaluable insights to understand broader (counter-) trends of homicides (Aarten & Liem, 2021; Aebi & Linde, 2014; Caman et al., 2017; Stamatel, 2018; Suonpää et al., 2022). Up until now, no empirical study with a focus on Europe specifically, has collected detailed and comparable empirical firearm homicide data.

In this study, the aim is to examine and compare the prevalence and characteristics of firearm homicides with non-firearm homicides in Europe. For academic purposes, this study can form the empirical basis for further work on firearm violence in Europe. Such an empirical basis is needed to extent our knowledge beyond the United States; for future studies that test the applicability of theoretical approaches to firearm violence developed in the United States to other geographical, societal, and political contexts, such as Europe. From a policy perspective, an empirical basis is necessary for informed, evidence-based interventions against firearm violence, particularly in the light of the emergence of new potential security threats related to weapons, such as 3D printed (components of) firearms (Florquin, 2021). This study will address these demands by presenting the trends and characteristics of firearm homicides in five European countries (Denmark, Finland, the Netherlands, Sweden and Switzerland) and by comparing them to non-firearm homicides.

In the following sections, prior research on firearm homicides in Europe is addressed and the context of this research – specifically the homicide rate and firearm availability – laid out. In the methodology, the data sources, definitions, and types of analyses are discussed before presenting the findings. In the final section, we draw comparative conclusions based on our findings and discuss them in relation to firearm availability.

Prior research on firearm homicides in Europe

For most European countries, annual counts of firearm homicides are available through various international databases (Eurostat, 2022). For example, the WHO Mortality Database reports on cause-of-death statistics, including firearm homicides and -suicides (World Health Organization, 2022). Similarly, the UNODC differentiates between homicides committed with firearms, sharp objects and other mechanisms. Based on these data sources, it is estimated that between 1000 and 1500 individuals are killed with a firearm in Europe each year, equalling a firearm homicide rate of around 0.3 per 100.000 population (United Nations Office on Drugs and Crime, 2022). Yet, significant differences exist when comparing firearm homicide rates across European countries, with several countries reporting a rate equal to or lower than 0.1 per 100.000 population (e.g. Poland, Germany, or Spain), whilst others have

firearm homicide rates four (e.g. in Bosnia or Sweden) to 15 times (Albania) higher (United Nations Office on Drugs and Crime, 2022). What is similar across almost all European countries, however, is that the firearm homicide rate has been steadily declining or stagnating since the 1990s, as indicated by a comparative study of WHO data (Duquet & Vanden Auweele, 2021), including in Switzerland (Markwalder & Killias, 2012), Serbia (Rancic et al., 2013), and Denmark (Thomsen et al., 2021). An exception is Sweden, where the firearm homicide rate has more than doubled since 2000 (0.2 per 100.000 population; Duquet & Vanden Auweele, 2021). With this increase, the Swedish firearm homicide rate in 2019 (0.44 per 100.000 population) remains above the European average, yet well below some other European countries (Hradilova Selin, 2021).

The same international data sources provide little information about the victims of firearm homicides. This information is mainly found in national studies. A common finding is that most firearm homicide victims are men. The proportion of male victims varies between 70% in Denmark (Thomsen et al., 2021) to around 80% in Sweden (Granath, 2015). Sturup and colleagues (2019) note that male firearm homicide victimisation in Sweden increased between the 1990s and 2015, particularly for younger men aged 15 to 29; this age group is shot (both lethally and non-lethally) four times as often as victims aged 30 or older in recent years. This increase of lethal gun violence amongst men may also be the driving force behind the overall increase of the national firearm homicide rate.

Most firearm homicides involve male perpetrators. For example, in Italy (Preti & Macciò, 2012) and Denmark (Thomsen et al., 2021), around nine out of ten firearm homicide perpetrators are male. Other studies show that the share of male firearm homicide perpetrators is higher compared to female firearm homicide perpetrators (Trägårdh et al., 2016) and overall homicide perpetrators (Granath & Sturup, 2018; Khoshnood et al., 2021). Through latent class analysis of (almost) lethal firearm violence perpetrators in Sweden, Khoshnood et al. (2021) show that perpetrators tend to be young, in their late 20s, socially deprived, and with prior convictions for violent or property crimes.

When firearms are discussed in homicide studies, it is often in relation to the context in which they are used as a weapon to kill. Prior studies in Switzerland (Markwalder & Killias, 2012), the Netherlands (Liem et al., 2013) and Sweden (Gerell et al., 2021; Khoshnood, 2017) showed that firearms are mostly used in criminal milieu homicides. Similarly, in Denmark, most recent firearm homicides are perpetrated in the criminal milieu context, since domestic homicides committed with hunting weapons have declined rapidly since the 1990s (Thomsen et al., 2021). In Scotland, on the other hand, firearms are used predominantly in rivalry homicides, which are motivated by disputes amongst – often young – men (Skott, 2019).

Existing studies illustrate the fragmented landscape of data on firearm homicides – or firearm-perpetrated violence in general – in the European context. Generally, studies rarely disaggregate by homicide mechanism, obstructing conclusions about firearm homicides specifically. The findings derived from national studies hint at slight differences across countries with regards to the use of firearms in lethal violence. Yet, no study so far has used comparable, detailed data sources to not only report on the prevalence of

firearm homicides, but also the nature of such homicides across several European countries.

Aim of this study

This study aims to explore the prevalence, trends and characteristics of firearm homicides, making use of detailed and comparable homicide data of five European countries: Denmark, Finland, the Netherlands, Sweden and Switzerland for the years 2001 to 2016. We present the firearm homicide rate and characteristics of incidents, victims and perpetrators, compared to non-firearm homicides. Finally, we will discuss the findings in relation to firearm availability and their academic and policy implications.

Research context

The aim of this research demands the use of detailed homicide data disaggregated by modus operandi. In the individual national contexts conducive environments for the (illegal) use of firearms in violence need to be considered, such as the presence of criminal groups or gangs, hunting cultures or the levels of firearms trafficking (Florquin, 2021). In this cross-national comparative approach, firearm homicide rates and characteristics are discussed in relation to the overall homicide rate, as well as the availability of firearms.

All homicide rates of the included countries fall well below the global homicide rate (5.61 per 100.000 population) as well as the European rate (2.56; UNODC, 2019). Based on homicide data from the European Homicide Monitor and population sizes as calculated by Eurostat (2022), Finland and Sweden record the highest homicide rate, with 1.35 and 1.02 homicides per 100.000 population in 2016, followed by Denmark with 0.93 homicides. Significantly lower homicides rates are reported by the Netherlands (0.54 per 100.000 population in 2016) and Switzerland (0.33 per 100.000 population in 2014) (see Table 1).

A common predictor of firearm homicide is firearm availability – a concept difficult to measure. Previous studies have used various proxies, including firearm suicides (Hemenway et al., 2000; Lester, 1991), a combination of firearm suicides and firearm homicides, also known as Cook's index (Cook, 1979; Killias et al., 1993), or data from the International Crime Victim Survey (Killias et al., 2001; Van Kesteren, 2014). In 2018, the Small Arms Survey published a report with an estimation for civilian firearm holdings in the world for the year 2017. This estimation is based on legal firearm ownership,

Table 1. Homicide rate per 100.000 population (2016), number of legally registered and overall estimated firearms per 100 population (2017) in Denmark, Finland, the Netherlands, Sweden and Switzerland.

	Denmark	Finland	Netherlands	Sweden	Switzerland
Homicide Rate[a]	0.93	1.35	0.54	1.02	0.33
Firearm homicide rate[a]	0.19	0.16	0.16	0.3	0.07
Registered civilian firearms per 100 individuals[b]	6	27.8	1.2	19.7	9.4
Estimated civilian firearms per 100 individuals[b,c]	9.9	32.4	2.6	23.1	27.6

[a]Source: European Homicide Monitor, (firearm) homicide rate Switzerland for 2014.
[b]Source: Karp (2018).
[c]This estimation is based on a combination of survey data, expert estimations, and firearm seizure statistics.

estimations of illegal firearm ownership, survey data, firearm seizure statistics, and expert estimations. According to the Small Arms Survey's estimations, the overall estimated firearm ownership in Finland (32.4 firearms per 100 individuals), Switzerland (27.6 firearms) and Sweden (23.1 firearms) is relatively higher than in the other two countries (see Table 1). One explanation for this high (legal and overall) ownership rate is the presence of a hunting culture in both Finland as well as in Sweden (Junuzovic et al., 2019; Mattila et al., 2006). On the other hand, the widespread availability of firearms in Swiss civilian households can be linked to mandatory military service, which requires young men to store their army weapon at home (Ajdacic-Gross et al., 2010; Liem et al., 2011). Furthermore, after the end of conscription, firearms may be bought for a small fee and kept in private possession. Denmark and the Netherlands report significantly lower rates of firearm ownership with 9.9 and 2.6 firearms per 100 population respectively. Interestingly, in the Netherlands, the estimated number of available firearms is more than two times higher than the legally registered number of firearms, meaning that there are more illegal than legally registered firearms in the country (Karp, 2018).

Method

Data sources

Conventional data sources for homicides range from public health resources, such as the WHO, to criminal justice systems (Eurostat, 2022). Yet, common cause of death statistics rarely include any other details on homicide events beyond the count of homicides and a few characteristics of victims, whilst registrations of homicide in the criminal justice system differ significantly per country and are thus incomparable (Aebi et al., 2014; Rogers & Pridemore, 2023; Smit et al., 2012). In an effort to overcome these shortcomings, the European Homicide Monitor (EHM) was established as a joint homicide database. Five countries take part in this study, based on their availability of comparable data: Denmark, Finland, the Netherlands, Sweden and Switzerland (for a detailed overview of the EHM, see Granath et al., 2011; Liem et al., 2013). In the EHM, homicide is defined as an intentional criminal act of violence by one or more human beings resulting in the death of one or more human beings. Cases of involuntary manslaughter, attempted homicides, suicides or abortions are not covered by the EHM and thus not included in the following analyses.

In Denmark, data on homicides are based on autopsy reports, initial police reports, crime scene photos, and other documents that accompanied the overall autopsy files. False positives were removed from the dataset, and cases with suspicions of false negatives reviewed based on autopsy photos, in addition to being verified by police and court data, as well as media reports. Given these data sources, detailed information is available on the incidents, and victims but only partially perpetrators. Next to murder, manslaughter and infanticide, the Danish homicide dataset also includes rare cases of legitimate self-defence and assaults leading to death. Danish homicide data is available for the years 1992 to 2016 and registered at the Department of Forensic Medicine, Aarhus University.

In Finland, information regarding victims, perpetrators and homicide incidents are gathered through the electronic questionnaires completed by the initial police

investigator of each homicide case. In addition to murder, manslaughter, killing and infanticides, assaults leading to death are included in the Finnish Homicide Monitor, which follows the EHM framework. The dataset used in this study was created jointly by the Institute of Criminology and Legal Policy (University of Helsinki), the National Police Board, and the Police University College, and covers the years 2003 to 2016.

In the Netherlands, researchers at the Institute of Security and Global Affairs at Leiden University triangulate homicide data from police data, and court files, which may include forensic psychiatric reports and police interviews, and media reports, which are based on an annual list compiled by Elsevier magazine, a weekly news magazine. The Dutch Homicide Monitor includes homicides committed between 1992 and 2016 that apply to the legal codes of murder, manslaughter and infanticide, but not assaults leading to death or legally justified killings, such as lethal shootings by police officers on duty.

Swedish research data on homicide is curated by the Swedish National Council for Crime Prevention, and available for the years 1990 to 2017. Data homicide sources include police reports, court files and psychiatric examination reports, if available. In addition to murder, manslaughter and infanticide, the Swedish data also covers the legal code of assault leading to death.

Finally, the Swiss Homicide Monitor at the University of St. Gallen gathers information on Swiss homicide cases through the cantonal public prosecution offices and court files. Cases are included if they apply to the legal codes of intentional homicide, murder, manslaughter, homicide at the request of the victim and infanticide. Rare cases of legitimate killings (such as cases of self-defence) are included, whereas assaults leading to death are excluded. Detailed and disaggregated data on homicide incidents, victims, and perpetrators are available from 1990 to 2014.

Slight variations exist in the available data per country and on varying homicide data sources. However, through the use of shared definitions and an extensive codebook (publicly accessible[2]), variations in the data gathering and coding are kept to a minimum. The inclusion or exclusion of assaults leading to death should not meaningfully impact this analysis, as lethal shootings cannot fall in this category.

Operationalizations

The EHM consists of 85 variables, which describe the homicide incidents, - victims, and – perpetrators. In this article, we will focus on the following ten variables.

Modus

The EHM follows the categorisation of causes of death based on external causes of morbidity according to the WHO ICD 10 list of 'Assaults'. Firearm homicides include homicides committed with various types of firearms, including handguns, shotguns or any other type of firearm causing lethal wounds. The category of non-firearm homicides includes both homicides committed with other types of weapons, such as knives or blunt objects, as well as unarmed homicides, e.g. homicide by asphyxiation or drowning. For the sake of this paper, we have recoded these categories into a binary variable, in which homicides committed with firearms form one category and all other homicides form the other category.

Gender

The EHM differentiates between male and female victims and perpetrators, based on the assigned gender during birth.

Age

For the purposes of this research, we report the average age of victims and perpetrators at the time of the homicide, as well as the standard deviation.

Birth country

The birth country for victims and perpetrators is categorised as either the country in which the homicide took place, another European country (continental Europe, excluding Russia and Turkey), or a non-European country. Reporting on the birth country is preferred over the citizenship, as the information regarding the former is more reliable.

Number of perpetrators

Our analyses include all suspected and/or charged perpetrators involved in the case, except the Finnish dataset, that contains information on the main perpetrator of each case only. Any case with two or more suspected perpetrators are considered cases with multiple perpetrators.

Number of victims

A victim is defined as any person who is a victim of lethal violence. Individuals that are non-lethally injured in the same incident are not included. Any case with two or more lethally injured victims are considered cases with multiple victims. This may include cases in which one of the victims was lethally shot, whereas the other victim may be killed using a different modus operandi. In such rare cases, the case was coded according to the most severe method, mainly firearms. In addition, the EHM allows to code the modus operandi for each victim separately, thus ensuring that the victim count per modus operandi is correct.

Clearance

In the EHM, a homicide is considered solved if the police considered the case cleared by arrest of the suspect, or considered it as exceptionally cleared (Liem et al., 2019). Exceptionally cleared cases involve a suspect or perpetrator who is known to the police, but for some reason cannot be (lawfully) arrested. Examples of exceptionally cleared cases include charges being rejected by the prosecutor, perpetrators who committed suicide or perpetrators who left the country and therefore the jurisdiction area (Maguire et al., 2010; Riedel & Boulahanis, 2007).

Crime scene

The EHM differentiates between more than ten different types of crime scenes. For the purposes of this paper, we have collated these types into private and public crime scenes. Private crime scenes include homicides committed in private homes of the victim, perpetrator or another person, and institutions such as homeless shelters or hospitals and hotels. On the other hand, we consider homicides occurring in cars, parks, forests, shops, bars and restaurants, the streets, public transportation or in workplaces to be public crime scenes.

Urban/Rural

Due to large variations in population density per country – a factor commonly used to measure the degree of urbanisation of a specific location – the categorisation of crime scenes into urban or rural is difficult in cross-national comparison. Thus, researchers in each country make such a distinction relative per country, based on national statistic agencies (e.g. the Central Bureau of Statistics in the Netherlands). As a result, this categorisation is not comparable cross-nationally which is why we have only used it in the description of national contexts.

Homicide types

In line with previous research (Aarten & Liem, 2021; Pizarro, 2008), homicides are categorised into intimate partner homicides (IPH), other domestic homicide (child and other family killing), criminal milieu homicides (rip deals, narcotics affairs), robbery killings (commercial businesses, private robberies and street robberies), homicides in the context of nightlife violence, sexual homicides and other homicides, which are largely dispute-related homicides that do not fall in any other category. The type of homicide is determined based on the relationship between victim and perpetrator, motive and context of the incident.

Analyses

The prevalence of firearm homicide is presented as a three-year moving average rate. The use of the moving average minimised the impact from random variations – for example caused by individual events, such as mass shootings. To assess whether the characteristics of cases, victims and perpetrators differed between firearm and non-firearm homicides within countries, we conducted chi-square and ANOVA tests for each country sample for the period 2001–2016; for Switzerland for 2001–2014 and Finland for 2003–2016.

Limitations to the data used

The detailed nature of homicide data collected through the EHM framework allows this study to fill a gap of knowledge on the nature of firearm homicide. Furthermore, it addresses shortcomings of previous studies, mainly the overreliance on highly aggregated trend data from secondary sources. Nonetheless, our study suffers from several limitations. First, although we aim to minimise differences in data collection through the use of a validated coding book, slight differences exist between countries. Specifically, three out of the five countries in our analysis include assaults leading to death in their respective homicide datasets. As this type of legal code usually implies the use of physical force or an object that leads to the death of a victim (Smit et al., 2012), not the lethal shooting with a firearm, we expect no significant impact on the characteristics of firearm homicides. A second shortcoming is the share of unknowns. Tables 2–4 present percentages of known cases. Yet, detailed information regarding victims and perpetrators was not always available, in particular in countries with a relatively high prevalence of uncleared firearm homicide cases. For example, 614 out of the 2499 homicide incidents that occurred in the Netherlands between 2001 and 2016 could not be categorised into a specific homicide typology and were thus not included in our analysis. Furthermore, we excluded variables from the analysis, such as the use of alcohol and drugs, due to very high shares of unknowns. Also, in relation to the EHM is that data is not

continuously updated. Therefore, the current clearance rate of firearm homicides could be higher than displayed in this table, as the data collection system needs manual updates when arrests are made or perpetrators prosecuted.

The other important data source for the interpretation of our findings – the registered and estimated rates of firearm ownership as compiled by the Small Arms Survey in 2018 – should be reviewed critically as well. As pointed out by Karp (2018, p. 10), 'with much of civilian ownership concealed or hard to identify, gun ownership numbers can only approximate reality or reveal only part of it'. The relative unreliability of estimates is caused by several factors, including a lack of registration of legally owned firearms by global law enforcements, continuous legal and illegal production of firearms that never enter any registration system, and illicit trafficking of firearms across countries.

Finally, there are several limits to the generalisation of our findings. Our conclusions are based on observational data from five Western and Northern European countries. As such, they are not representative for European areas, where data availability is much lower, including Eastern or Southern European countries. Nonetheless, using comparable data on firearm homicides allows for pointing out significant differences in the scope and nature of firearm homicides across these countries – differences that other studies have previously alluded to without the availability of such detailed data (Altheimer & Boswell, 2012; Duquet & Vanden Auweele, 2021; Sturup et al., 2019).

Results

Figure 1 presents the three-year moving average of the overall homicide and firearm-homicide rate per 100.000 population for Denmark, the Netherlands and Sweden (1992–2016), Switzerland (1992–2014) and Finland (2003–2016). Case-, victim- and perpetrator details of firearm and non-firearm homicides are presented in Tables 2–4.

Denmark

From 1992 onwards, Denmark has experienced a decrease in the homicide- and firearm homicide rate with a slight uptick since 2010. Yet, the overall firearm homicide rate decreased by around 13% between 1992 (0.31 per 100.000 population) and 2016 (0.27). In total, 315 homicide victims died by gunshot, which equals 23% of all homicide victims.

Between 2001 and 2016, 179 firearm homicides took place, representing 22% of all homicides. Firearm homicides victims are mostly male (76%) and on average 34.8 years old (SD = 18.8). Most firearm homicides involve only one victim, but in 24%, several victims were killed in one homicide incident. Homicides committed with firearms are distributed almost equally between public (47%) spaces and private (53%) homes. A little over a third of firearm homicides are categorised as being related to dispute homicides (37%) and 27% to criminal milieu homicides. The remaining firearm homicides take place in the domestic sphere, between (ex-) intimate partners (19%) or otherwise related individuals (14%). Over the years, the share of firearm homicides committed in the domestic sphere decreased, whereas criminal milieu and dispute firearm homicides became relatively more prevalent.

Comparing Danish firearm homicide to non-firearm homicides, the former shows several statistically significant differences to the latter. Specifically, males are overrepresented as

victims in firearm homicides $\chi 2(1, 800) = 12.736, p = .00$. They tend to be younger than victims of non-firearm homicides. Furthermore, firearm homicides involve more cases with multiple lethal victims, $\chi 2(1, 800) = 39.944, p = .00$, occur more often in public spaces, $\chi 2(1, 780) = 25.253, p = .00$, and are concentrated more in the criminal milieu $\chi 2(6, 778) = 123.321, p = .00$, than non-firearm homicides.

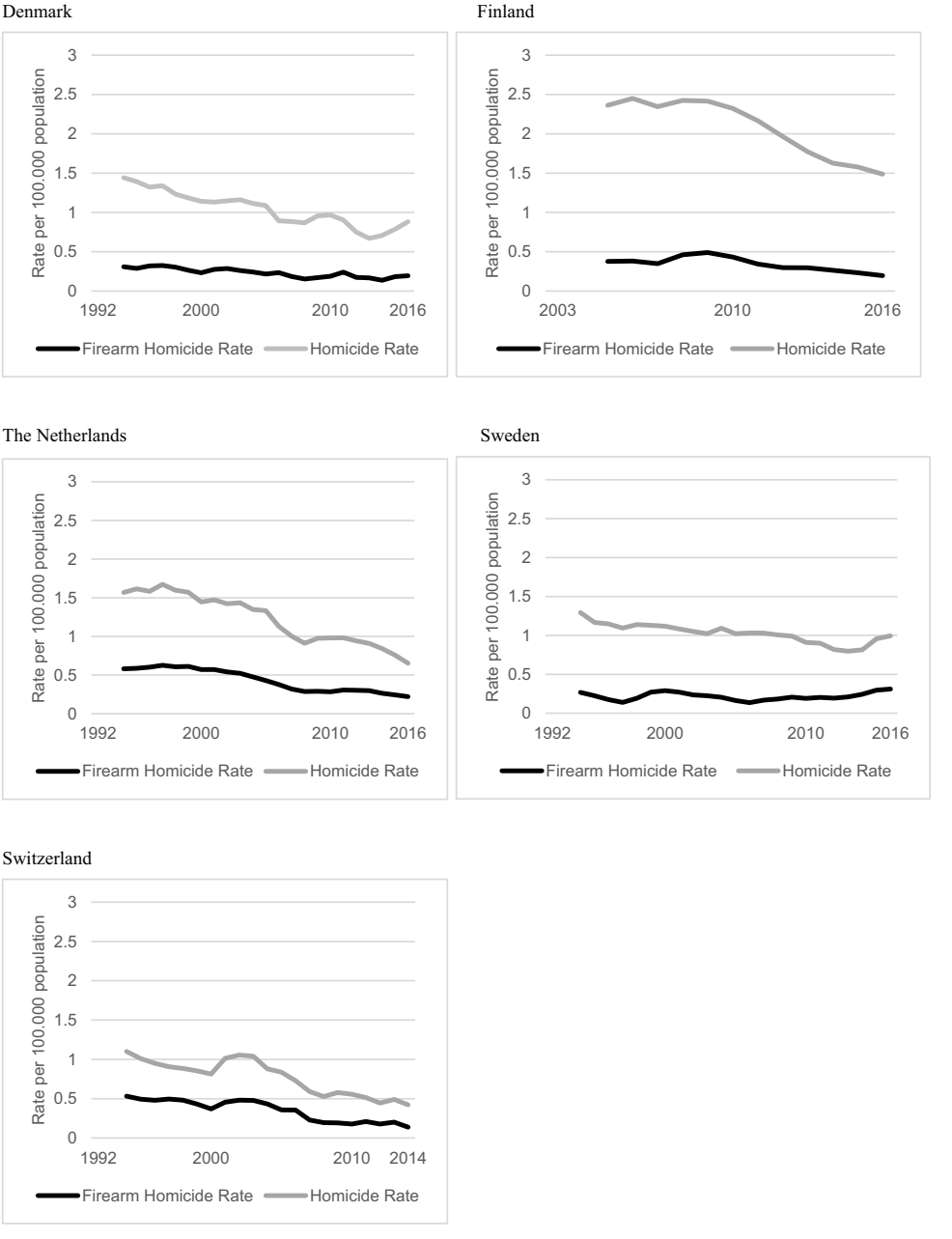

Figure 1. Moving 3-Year Average of Firearm Homicide Rate and Homicide Rate in Denmark, the Netherlands and Sweden 1992–2016, Finland 2003–2016, and Switzerland 1992–2014.

Table 2. Case characteristics of firearm homicides and non-firearm homicides in Denmark, Finland (2003–2016), the Netherlands (2001–2016), Sweden (2001–2016) and Switzerland (2001–2014); % of known cases.

	Denmark		Finland		Netherlands		Sweden		Switzerland	
	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm
Location										
Public	46.6	26.6	29.1	17.2	66.9	33.8	59.1	30.3	35.6	33.2
Private	53.4	73.4	70.9	82.8	33.1	66.2	40.9	69.7	64.4	66.8
N Missing	20		10		292		20		50	
Significance	***		***		***		***			
Area										
Urban			73.6	83.7	81.2	69.5	80.9	70.8	30.1	49.4
Rural			26.4	16.3	18.8	30.5	19.1	29.2	69.9	50.6
N Missing			10		232		580		271	
Significance			***		***		**		***	
Number Victims										
Single	76	92.7	72.1	92.9	92.9	95.7	89.8	93.8	85.6	92.9
Multiple	24	7.3	27.9	7.1	7.1	4.3	10.2	6.2	14.4	7.1
N Missing	0		2		223		4		36	
Significance	***		***		**		*		**	
Number Perpetrators										
Single			91.2	83.8	43.5	77.1			95.8	94
Multiple			8.8	16.2	56.5	22.9			4.2	6
N Missing			19		223				119	
Significance			**		***					
Type Homicide										
IPH	19	24.8	29.9	20.4	13.2	27.3	16.7	26.8	45	32.2
Other Domestic	13.8	20.5	11.2	12.7	6.4	19.7	5.9	16.4	12.2	17.1
Criminal Milieu	27	2.5	5.6	2.6	43.9	4.5	57	5.5	7.7	8.4
Robbery	1.1	6.4	0.4	1.6	8.9	8.6	1.9	6.4	0.5	3.3
Nightlife	1.7	5.8	2.4	1.6	3.8	2.2	1.5	8.9	0	4.3
Sexual	0	2.6	0	0.7	0.3	3.2	0	1.1	0	1.1
Dispute	37.4	37.4	50.5	60.4	23.5	34.5	17	33.2	34.6	33.6
N Missing	22		25		614		138		36	
Significance	***		**		***		***		**	
Solved										
Solved			100	98.3	75.5	95.4	56.1	89.7	92.5	93.3
Not Solved			0	1.7	24.5	4.9	43.9	10.3	7.5	6.7
N Missing			0		223		138		53	
Significance			*		***		***			
TOTAL N	179	621	251	1272	804	1695	306	1035	222	369

Note: * $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Finland

Finland recorded a decrease of 50% of the firearm homicide rate between 2003 (0.38 per 100.000 population) and 2016 (0.19). The overall homicide rate decreased equally strong during those years. A slight increase in the firearm homicide rate between 2007 and 2009 may be explained with the occurrence of three mass shootings: in 2007, eight pupils were shot and killed during the Jokela school shooting, followed by another ten pupils that died by gunshot less than a year after, during the Kauhajoki school shooting. In 2009, a gunman lethally shot his ex-girlfriend and four employees of a mall in Espoo.

Table 3. Victim characteristics of firearm homicides and non-firearm homicides in Denmark, Finland (2003–2016), the Netherlands (2001–2016), Sweden (2001–2016) and Switzerland (2001–2014); % of known cases.

	Denmark		Finland		Netherlands		Sweden		Switzerland	
	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm
Gender										
Male	76	61.5	58.2	72.4	84.9	59.5	81.2	62.9	49.6	46.5
Female	24	38.5	41.8	27.6	15.1	40.5	18.8	37.1	50.4	53.5
N Missing	0		0		239		0		39	
Significance	***		***		***		***			
Age										
Mean	34.82	40.78	40.2	43.3	36.37	38.55	34.7	41.4	43.28	39.71
Standard Deviation	18.84	20.10	17.2	18.6	12.65	20.63	15.7	20	21.1	20.18
N Missing	0		0		327		153		65	
Birth Country										
Born in Country			94.4	95	49.3	68.9	44.3	72.9	62.2	57.6
Born in Other European Country			4	2.7	10.5	9.6	10.1	8	29.5	22.3
Born in Non-European Country			1.6	2.3	40.2	21.5	45.6	19.1	8.3	20.1
N Missing			3		1023		344		210	
Significance					***		***		***	
TOTAL N	179	621	251	1272	880	1787	325	1101	289	441

Note: * $p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Table 4. Perpetrator characteristics of firearm homicides and non-firearm homicides in Finland (2003–2016), the Netherlands, Sweden and Switzerland (2001–2014), 2001–2016; % of known cases.

	Finland		Netherlands		Sweden		Switzerland	
	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm	Firearm	Non-Firearm
Gender								
Male	95.6	86.8	94.6	86.1	98	90.3	95.1	87.3
Female	4.4	13.2	5.4	13.9	2	9.7	4.9	12.7
N Missing	16		268		16		75	
Significance	***		***		***		**	
Age								
Mean	41.98	36.8	32.16	33.52	36.5	34.6	45.4	36.1
Standard Deviation	15.81	13.85	10.58	13.13	16.9	14.2	18.9	14.06
N Missing	18		675		62		89	
Birth Country								
Born in Country	96.6	92.8	47.8	59.8	62.3	62.8	56.3	54.7
Born in Other European Country	3.4	3.9	9.9	11	9.4	10.4	36.1	23.7
Born in Non-European Country	0	3.3	42.3	29.2	28.3	26.8	7.6	21.6
N Missing	35		839		227			
Significance			***				***	
TOTAL N	206	1222	1292	2201	199	1024	223	379

Note: * $p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.
Note: data for Denmark is missing, due to limited data availability of perpetrator characteristics in the Danish dataset; see methodology.

Including these 23 victims of mass shootings, in total 251 homicides victim were killed with firearms between 2003 and 2016. This accounts for 17% of all homicide victims. Of the 251 firearm homicide victims, 58% are male. Only a little over five percent of victims are not born in Finland. Perpetrators are almost exclusively (96%) male, and mostly born in Finland (97%). The average age of firearm homicide victims and perpetrators is similar, with 40.2 (SD = 17.2) and 41.9 (SD = 15.8) years, respectively. Most firearm homicides involved only one lethal victim (72%) and one perpetrator (91%). Firearm homicides in Finland are somewhat concentrated around urban areas (74%). Furthermore, the majority (71%) takes place in private locations. Half of all firearm homicides (51%) are related to disputes and a little less than one third of firearm homicides (30%) occurs between (ex-) intimate partners. The share of firearm homicides related to disputes increased over the years, whereas domestic firearm homicides decreased. Fewer homicides committed with firearms are related to other domestic settings (11%), the criminal milieu (6%) or nightlife violence (2%). All 251 firearm homicides between 2003 and 2016 were solved by the police.

Finnish firearm homicides are different from other homicides. The share of female victims is higher in firearm homicides $\chi 2(1, 1523) = 20.260, p = .00$, and victims are on average three years younger. No statistical difference exists with regards to the birth country of homicide victims, $\chi 2(2, 1520) = 1.721, p = .42$. On the other hand, perpetrators of firearm homicides are more often male $\chi 2(1, 1412) = 13.043, p = .00$ and older than perpetrators of non-firearm homicides. Compared to non-firearm homicides, firearm homicides take place more often in public spaces $\chi 2(1, 1513) = 19.099, p = .00$, and rural areas, $\chi 2(1, 1513) = 14.408, p = .00$. Multiple victims are more common in firearm homicides $\chi 2(1, 1521) = 96.346, p = .00$, as are incidents that only involve a single perpetrator, $\chi 2(1, 1504) = 9.089, p = .00$. In addition, the social setting of the firearm homicides differs from non-firearm homicides, $\chi 2(6, 1498) = 19.321, p = .00$. They are also cleared more often by the police, $\chi 2(1, 1523) = 4.202, p = .04$.

The Netherlands

In the Netherlands, 35% of all homicide victims between 1992 and 2016 were killed with a firearm, which amounts to 1706 firearm homicide victims. The firearm homicide rate decreased by 62% during these years, from 0.58 firearm homicides per 100.000 population in 1992 to 0.22 in 2016. As the overall homicide rate also decreased, the share of homicides committed with firearms remained relatively stable. One mass shooting took place in 2011: a gunman killed six visitors of a mall in Alphen aan den Rijn.

Focusing on the years 2001 to 2016, the victims of firearm homicides are mostly male (85%) and on average 36.4 years old (SD = 12.65). Half of all firearm homicides victims are not born in the Netherlands (51%). The share of male perpetrators is even higher, at 95%. Perpetrators are on average slightly younger than victims, with 32.2 years (SD = 10.6). Similar to the victims, half of all firearm homicide perpetrators are not born in the Netherlands, with 42% born outside Europe, e.g. the Dutch Antilles. Although most firearm homicides only involve one lethal victim (93%), more than half (57%) involved more than one perpetrator. This included not only the shooter, but also those involved in the preparation or the execution of the lethal shooting. Firearm homicide incidents in the Netherlands mostly take place in urban areas (81%), as well as in public spaces (67%). Most

firearm homicides (44%) are connected to activities and conflicts within the criminal milieu. Around 19.6% of firearm homicides are connected to conflicts in the domestic sphere, 24% to disputes between non-related individuals and nine percent to robberies. Between 2001 and 2016, homicides committed with firearms continuously concentrated more and more in the criminal milieu, whereas the share of domestic and dispute related homicides decreased. Three quarter (76%) of firearm homicides between 2001 and 2016 are solved by the police.

The use of firearms in homicides in the Netherlands is largely concentrated in the criminal milieu, whereas homicides with other weapons or unarmed homicides tend to be mostly domestic or dispute related, $\chi 2(6, 2108) = 544.884, p = .00$. Possibly due to this fact, firearm homicides take place significantly more often in public places $\chi 2(1, 2430) = 235.885, p = .00$, in urban areas $\chi 2(1, 2490) = 37.866, p = .00$. Furthermore, they involve more multiple victims $\chi 2(1, 2499) = 8.996, p = .00$ and perpetrators $\chi 2(1, 2499) = 275.192, p = .00$. The share of male victims $\chi 2(1, 2630) = 172.703, p = .00$, and perpetrators $\chi 2(1, 3210) = 52.978, p = .00$, is higher in firearm homicides. Compared to non-firearm homicides, victims $\chi 2(2, 1873) = 79.985, p = .00$ and perpetrators $\chi 2(2, 2922) = 50.031, p = .00$, are born more often outside of the Netherlands.

Sweden

Sweden is the only country in which the firearm homicide rate is higher at the most recent recording in 2016 (0.31 per 100.000 population) than in 1992 (0.27). This 13% increase is the result of a slow decline and a recent increase in the rate. The 509 victims of firearm homicides represent 22% of all homicide victims during those years. Eleven firearm homicide victims were killed across two mass shootings, in 1994.

Victims are mostly male (81%) and on average 34.7 years old (SD = 15.7). More than half (56%) of all Swedish firearm homicide victims are born outside of Sweden. The share of perpetrators that are male is even higher (98%). The average age of firearm homicide perpetrators in Sweden is with 36.5 (SD = 16.9) years slightly higher than that of their victims. More than 60% of firearm homicides perpetrators are born in Sweden. As in most other countries presented here, the vast majority (90%) of firearm homicides involve only one lethal victim. Firearm homicides are concentrated in urban areas (81%) and more than half take place in public locations (59%), as opposed to private ones (41%). A concentration is also visible with regards to the context of Swedish firearm homicides, with two thirds (57%) related to the criminal milieu, and 23% committed in the domestic sphere. Over the years, firearm homicides increasingly concentrated in the criminal milieu. Interestingly, almost half of the firearm homicides remain unsolved (44%) at the time of data registration.

Similarly to the Netherlands, firearm homicides in Sweden differ from non-firearm homicides. They take place more often in public $\chi 2(1, 1321) = 83.067, p = .00$, and urban areas $\chi 2(1, 761) = 8.094, p = .00$ than non-firearm homicides. Furthermore, homicide committed with firearms involve more multiple victims $\chi 2(1, 1337) = 5.799, p = .02$, are less likely to be solved $\chi 2(1, 1331) = 179.157, p = .00$, whilst highly concentrated in the criminal milieu $\chi 2(6, 1203) = 393.594, p = .00$. Most non-firearm homicides, however, take place in the domestic sphere (43.2%) or in the context of disputes (33.2%). Compared to non-firearm homicides, victims of firearm homicides are more often male $\chi 2(1, 1426) = 38.022, p = .00$,

on average seven years younger, and not born in Sweden $\chi 2(2, 1082) = 75.999, p = .00$. Interestingly, the same differences are not visible for perpetrators of firearm homicides compared to non-firearm homicides. Although the share of male perpetrators is significantly higher in firearm homicides $\chi 2(1, 1211) = 12.311, p = .00$, they tend to be slightly older than perpetrators of non-firearm homicides. The distribution of the birth countries of perpetrators is similar for firearm and non-firearm homicides $\chi 2(1, 2) = 0.245, p = .88$.

Switzerland

Finally, in Switzerland, the firearm homicide rate decreased significantly by 74% from 0.53 firearm homicides per 100.000 population in 1992 to 0.14 in 2014. In total, 45% of homicides victims were killed with a firearm in these years, which amounts to a total of 583 firearm homicide victims. One mass shooting was committed in this period, which took place in a local parliament in 2001, resulting in 14 deaths. Another well-known spree-shooting in 1992 claimed the life of six individuals.

Characteristics of victims, perpetrators and incidents of firearm homicides are presented for the years 2001 to 2014: Switzerland is the only country in this analysis for which the share of female firearm homicide victims is slightly higher (50%) than for male victims (49.6%). Victims are on average 43.3 years (SD = 21.1) old at the time of their death. Almost 40% of firearm homicides victims are not born in Switzerland, but in other European (30%) or non-European countries (8%). Almost all perpetrators of firearm homicides, however, are male (95%) and on average 45.4 years (SD = 18.9) old. The share of non-Swiss firearm homicides perpetrators (44%) is bigger than that of the victims. The majority of firearm homicides has only one lethal victim (86%) and one perpetrator (96%). Incidents of firearm homicide in Switzerland are largely concentrated in rural areas (70%) and take place in private spaces (64%). The majority of all firearm homicides are related to domestic conflicts, between current or former intimate partners (45%) or otherwise related individuals (12%). The remaining firearm homicides are mainly attributed to disputes between unrelated individuals (35%). Over the years, the use of firearms in criminal milieu homicides became almost non-existent, thus increasing the share of domestic and dispute homicides committed with firearms. Unrelated to the context of the homicides, almost all (93%) are solved by the police.

In Switzerland, firearm and non-firearm homicides share many characteristics. Both categories of homicides tend to take place in private spaces $\chi 2(2, 577) = 0.004, p = .95$, involve relatively few cases with multiple perpetrators $\chi 2(1, 508) = 0.736, p = .39$, and involve a relatively high share above 50% of female victims $\chi 2(1, 697) = 0.654, p = .42$. Still, some significant differences exist. Specifically, firearms are used more often as a modus operandi in homicides in rural areas $\chi 2(1, 356) = 11.698, p = .00$, and more often in domestic homicides, particularly between intimate partners $\chi 2(6, 591) = 20.631, p = .00$. Multiple victims are also more common in firearm homicides $\chi 2(1, 591) = 8.503, p = .00$. Victims and perpetrators are on average respectively three and a half and nine years older than their counterparts in non-firearm homicides, and more likely to have been born in Switzerland,
$\chi 2(2, 526) = 14.652, p = .00(\text{victims}), \chi 2(2, 483) = 19.867, p = .00(\text{perpe}\textit{trators})$.

Discussion

The aim of this study was at least twofold: to describe the prevalence and characteristics of firearm homicides across five European countries and to explore whether firearm homicides may be considered a unique phenomenon, by comparing them with non-firearm homicides in the same countries. Making use of detailed homicide data collected through the European Homicide Monitor framework, we found that: (1) the prevalence of firearm homicide varies across the countries, (2) the characteristics of firearm homicide vary across the countries and (3) the degree to which firearm homicides display unique characteristics compared to non-firearm homicides varies across the countries.

First, regarding the prevalence, in all but one country, the firearm homicide rate decreased consistently between 1992 and 2016. Only in Sweden did the firearm homicide rate decline slowly, before increasing again, thereby resulting in a higher firearm homicide rate at the end of data recording in 2016. In the same year, Switzerland and Finland report the lowest firearm homicide rates, with 0.14 and 0.19 firearm homicides per 100.000 population respectively. Sweden (0.31 per 100.000 population), Denmark (0.27) and the Netherlands (0.22) report higher firearm homicide rates.

Secondly, the results point to two different country patterns: Finland and Switzerland on one hand, and Denmark, the Netherlands and Sweden on the other. Firearm homicides in Finland and Switzerland share similar characteristics: they occur relatively often in rural areas and in private spaces, such as the home of the victim and/or perpetrator, in hotels or other institutions. Firearms in both countries were a common modus operandi in domestic-related homicides: around 40% of Finnish and more than 60% of Swiss firearm homicides fall in this category. Regarding Switzerland, this share is higher than the estimations in previous studies (Frei et al., 2006; Markwalder & Killias, 2012), possibly due to a decrease of criminal milieu homicides since these publications. This overrepresentation of firearms in domestic homicides may also explain why Finland and Switzerland share a relatively high percentage of female victims of firearm homicides, with 42 and 50% respectively. As pointed out by previous research (Liem et al., 2019; Riedel et al., 2008), this large share of domestic homicides can also account for the exceptionally high clearance rate of firearm homicides of 100% in Finland, and 93% in Switzerland.

On the other hand, Denmark, the Netherlands and Sweden share a different profile that is similar across the three countries. In the Netherlands and Sweden, the vast majority of firearm homicides (67% and 59% respectively) are committed in public spaces, such as public streets, in bars and restaurants, recreational spaces or otherwise publicly accessible locations. In Denmark, a little less than half (47%) of firearm homicides is committed in public. Furthermore, firearm homicides may be classified as largely 'urban violence' in the Netherlands and Sweden, relative to the different national contexts. Also, in all three countries firearm homicides tend to be connected to dispute homicides and activities in the criminal milieu, such as the trafficking or distribution of narcotics. In the Netherlands and Sweden, around half (44% and 57% respectively) fall in this latter category. Firearm homicides in the Netherlands and Sweden exhibit a significantly lower clearance rate than in Finland and Switzerland, with 25% of Dutch firearm homicides and 44% of Swedish firearm homicides remaining unsolved at the time of data collection. This finding is in line with previous studies from the Dutch and Swedish context that correlate the use of

firearms with lower clearance rates – possibly due to the firearm homicides in the criminal milieu, which are often well-prepared and in which the perpetrator and victim are not necessarily known to each other (Bijleveld & Smit, 2006; Kuznecova et al., 2022; Sturup et al., 2015). With regards to the characteristics of victims, the share of male victims in firearm homicides is much higher and victims are younger compared to Finland and Switzerland. The share of male perpetrators is high in firearm homicides in both Sweden and the Netherlands and perpetrators tend to be on average younger than perpetrators in other countries, below the age of 40.

Thirdly, findings suggests that the degree to which firearm homicides are unique compared to non-firearm homicides varies between countries. In Denmark, the Netherlands and Sweden, almost all covariates of firearm homicides differed with statistical significance from non-firearm homicides. In Finland, firearms also display unique characteristics, yet are different from those in Denmark, the Netherlands and Sweden. The unique attributes in Denmark, the Netherlands and Sweden support the profile based on firearm homicides sketched in the previous paragraph. In Switzerland, firearm and non-firearm homicides share relatively many similar characteristics, indicating that the degree of uniqueness is smaller there than in the other countries.

The two country profiles are particularly interesting in relation to firearm availability: in Finland and Switzerland, which form one profile, the registered and estimated firearm availability is relatively high, whilst the prevalence of firearm homicide is low. Firearm homicide resemble other armed or unarmed homicides. In the other profile, the registered and estimated availability of firearms is generally low, yet the firearm homicide rate is high and firearm homicides display unique characteristics. Denmark and the Netherlands form the basis of this profile. Sweden shares similar firearm homicide traits, but the estimated legal and illegal availability of firearms is relatively high. In these three countries, firearm homicide is connected to disputes and incidents in the criminal milieu, resembling US patterns (Savolainen et al., 2000) in the absence of widespread gun availability.

One common factor used in international academic literature to explain variations in firearm homicides is the availability of firearms to the civilian population. Taking together, our findings contradict the general notion – commonly based on international or US studies (Anglemyer et al., 2014; Hemenway & Miller, 2000; Hepburn & Hemenway, 2004) – that a higher rate of firearm availability is correlated with higher firearm homicide rate. Our findings do not support a correlation between firearm availability and firearm homicide prevalence. Specifically, of the five countries included in this study, the two countries with the highest estimated civilian firearm availability – Finland and Switzerland – report the lowest firearm homicide rate. On the contrary, and relative to their low legal firearm availability, Denmark and the Netherlands report high firearm homicide rates. Sweden has both a high firearm availability, as well as a high firearm homicide rate. These findings support previous studies and question the applicability of the availability hypothesis to the European context (Duquet & Van Alstein, 2015; Krüsselmann et al., 2021).

In the European context, firearm availability does not seem to determine the prevalence of lethal firearm violence, according to our findings. Yet, the degree to which firearms are legally available may determine the characteristics of firearm homicides within a country. In the Netherlands and Denmark, the legal availability of firearms is

relatively low. In these countries, firearm homicides mostly occur in the criminal milieu – a context in which illegal firearms are common. In Finland and Switzerland, the legal availability of firearms is relatively high, possibly due to a longstanding hunting culture in Finland, and mandatory military service in Switzerland (Killias & Markwalder, 2012). Here, we see that firearms are used not just in one specific, but various contexts, from domestic violence to disputes and organised crime activities. Thus, the more widespread legal firearm ownership, the more similar the characteristics of firearm homicides will be to homicides committed with other weapons that are evenly readily available, such as knives or blunt objects. Specifically, as legal firearms are mainly kept in private homes, it is to be expected that the share of domestic homicides committed with firearms is higher in countries with high legal availability. This suggestion is supported by our findings in Finland and Switzerland.

Sweden represents an interesting outlier to the two profiles illustrated in this discussion so far. The legal firearm availability amongst the Swedish population is relatively high (19.7 per 100 population), yet firearm homicides are highly concentrated in the criminal milieu. As such, Sweden represents a mixed profile. One explanation for this relates to the types of firearms that are legally available: relatively heavy hunting guns, which are rarely used in criminal activities. As such, it is to be expected that most firearms used in homicides in Sweden are smaller handguns bought or acquired illegally by the perpetrators. In addition, Swedish studies on firearm violence argue that the current increase of firearm violence is connected to an increase in activities from gangs and criminal groups that have easy access to illegal firearms through illegal trafficking of firearms (Khoshnood, 2018; Sturup et al., 2018).

Similar in-depth analyses of correlates of firearm violence for the other countries are mostly missing, although each peculiar national context brings its own conducive environment for firearm violence. For example: the high firearm availability but relatively low firearm homicide rate in Switzerland may be connected to mandatory military service for the male population with the option to keep the military firearms for a small fee after the end of service (Reisch et al., 2013). No other European country has a similar process. In the Netherlands, on the other hand, conflicts between criminal groups engaged in the illegal trafficking of cocaine through the ports of Rotterdam or Antwerp, in Belgium, fuelled a so-called weapon-race in recent years, which may explain the characteristics of victims and offenders observed in this study (Liem & Krüsselmann, 2022). Further detailed studies for each national context are required to provide a better understanding for each peculiar national context, in particular with regards to the question in which situations legal or illegal firearms are used.

Conclusion

This is the first study to explore not just the trends but also the nature of firearm homicides in Europe, through the use of detailed, disaggregated data collected in the European Homicide Monitor framework. From our findings, two profiles of firearm homicides in Europe emerge, indicating that firearm homicides in Europe are not a homogenous phenomenon: in Finland and Switzerland, firearm availability is high, yet the prevalence of firearm homicide is relatively low in these countries compared to Europe overall. In these countries, firearms are used in various contexts, ranging from domestic violence to disputes. Homicides committed with

firearms are largely similar to homicides committed with other or no weapons. In Denmark and the Netherlands, on the other hand, firearm availability is low whilst the firearm homicide rate is higher than in Finland or Switzerland. Here, firearms are mainly used in homicides connected to the criminal milieu. As such, firearm homicides display unique characteristics compared to non-firearm homicides. Sweden displays a mixed profile, with high legal availability but a concentration of firearm homicides in the criminal milieu.

The inclusion of only five countries in this study already asks for further research on the causes of the cross-national differences encountered in this descriptive study, including the availability of legal and illegal firearms or other socio-cultural factors. Altheimer and Boswell's (2012) study set in the United States indicates that firearm homicides and homicides overall may be influenced by different mechanisms, such as urbanisation or deprivation. Some of their findings contradict commonly accepted explanations for homicide rates overall when applied to firearm homicides specifically. As their analysis was based on broader global regions, their findings can thus only partly be used in the European context. Still, they warrant the need for similar research in Europe. Together with the inclusion of Eastern- and Southern European in cross-national comparative research and data collection on non-lethal shootings, such explanatory research on cross-national differences together could add to the long-overdue improvement of our understanding of firearm violence in Europe. This descriptive and exploratory study proves the need for detailed, disaggregated, and comparative data on the subject and serves as the basis for any future explanatory approaches to lethal firearm violence.

Next to enabling future explanatory research on firearm violence for academic researchers, this study can help to inform policies that address the illegal use and trafficking of firearms. In the 2020–2025 EU action plan on firearms trafficking, building an improved intelligence picture is one of the priorities to combat the trafficking and illegal use of firearms in the European Union (European Commission, 2020). A detailed and comparable data collection of lethal or non-lethal firearm violence is currently lacking (Duquet & vanden Auweele, 2021). Yet, past research has found positive effects of targeted gun control policies, for example directed at firearm storage in private homes in several European countries (Krüsselmann et al., 2021). Disaggregated studies like the present one are necessary to unveil the nature of firearm violence in each national context for such targeted interventions.

Given the overall low quantity of academic studies on firearm violence findings should encourage other researchers to explore this phenomenon more thoroughly in the future. Specifically, more systematic gathering of comparable data on firearm homicide and non-lethal shootings is required to fully understand the nature of firearm violence in Europe. The European Homicide Monitor is an example of a framework for data collection that could be applied in other countries.

Notes

1. Based on judicial data, the UNODC database on homicide per mechanism does not include data on all countries, e.g. the firearm homicide rate for Africa is based only on entries for only eleven countries. Rates are calculated using the last available rate for firearm homicides (2016 for most countries), https://dataunodc.un.org/data/homicide/Homicide%20rate%20by%20mechanisms.

2. https://www.universiteitleiden.nl/en/research/research-projects/governance-and-global-affairs/european-homicide-monitor#tab-1.

Acknowledgments

We would like to thank Dr. Martti Lehti (1963-2021) and research assistant Linda Anning for their work with the Finnish Homicide Monitor.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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Data availability statement

Due to the personal data included in the European Homicide Monitor, the raw data cannot be made available. However, the coding manual for the European Homicide Monitor as well as the syntax of the analyses are made available on the Open Science Framework webpage for this research: https://osf.io/s3mxj/

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