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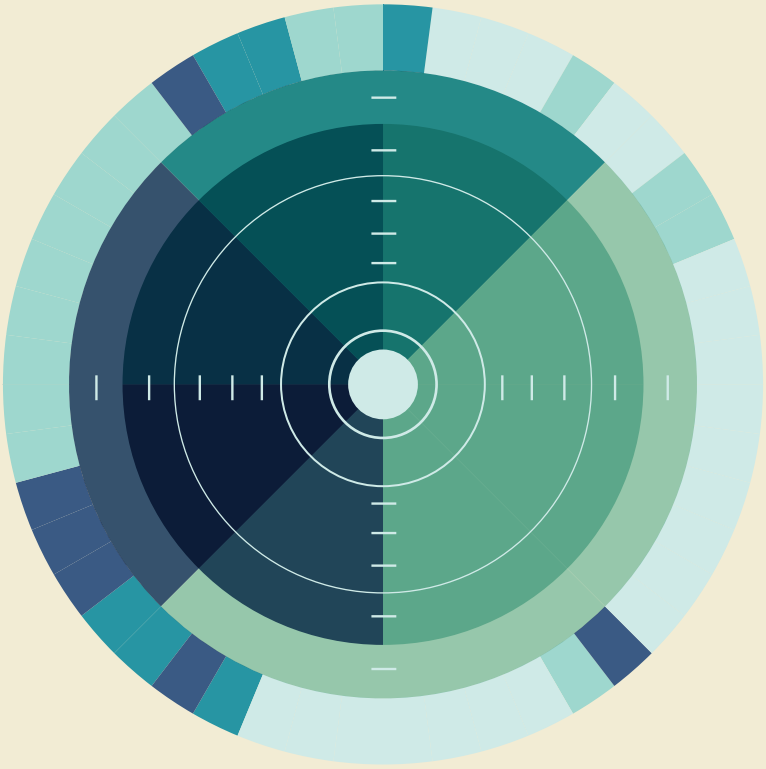
Fighting Illicit Firearms Trafficking Routes and Actors at European Level

Methodological Annex of Project FIRE



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Methodological Annex of the Final Report of Project FIRE – Fighting Illicit firearms trafficking Routes and actors at European level (HOME/2013/ISEC/FP/C1/4000005009)

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Table of contents

List of tables 8

List of figures 9

1. Introduction 10

PART I. ITF in the EU 11

2. Academic and official sources 11
    2.1. Academic and grey literature 11
    2.2. Institutional reports and statistics 12
    2.3. GunPolicy.org 17
3. Interviews with experts 17
4. Case studies 19
5. Web content 21
    5.1. Data collection 21
    5.2. Data cleaning 24
    5.3. Data entry 26
    5.4. Integration of data on seizures from press releases 31
    5.5. Data analysis 35
6. Analysis of firearm marketplaces on the dark web 41
    6.1. Identification of darknet marketplaces 41
    6.2. Data collection and data analysis 42

PART II. The EU's regulatory framework to counter ITF 47

7. Crime proofing analysis 47

PART III. Recommendations on how to improve the prevention of and fight against ITF 49

References 50

Appendix 51

Footnotes 70

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List of tables

Table 1. Data on firearm seizures in official reports at EU level (2010-2015) 12
Table 2. Data on crimes committed with firearms in official reports at EU level (2010-2015) 14
Table 3. Available firearms-related data in official reports and statistics per country (2010-2015) 15
Table 4. Availability and content of specific national firearms reports 16
Table 5. List of the experts interviewed 18
Table 6. List of case studies 19
Table 7. Template for the analysis of investigative cases 20
Table 8. List of keywords to investigate firearm seizures 22
Table 9. List of keywords to investigate deadly and non-deadly shootings 22
Table 10. Lists of variables included in "Other countries", "Other crimes", and "Excluded" worksheets 25
Table 11. List of variables for DFS-EU 26
Table 12. List of variables for DSh-EU 28
Table 13. Number of cases of firearm seizures from online press reviews per country per year (2010-2015) 30
Table 14. Number of cases of deadly and non-deadly shootings from online press reviews per country per year (2010-2015) 31
Table 15. Customs and national LEAs PR availability and information on firearm seizures (2010-2015) 32
Table 16. Number of cases of firearm seizures from customs PR per country per year (2010-2015) 33
Table 17. Number of cases of firearm seizures from LEAs PR per country per year (2010-2015) 34
Table 18. Number of cases of firearm seizures per country per year (2010-2015) 35
Table 19. Aggregation of macro-regions 36
Table 20. Aggregation of geographic origins 36
Table 21. Aggregation of age classes 36
Table 22. Firearm seizures by macro-region (2010-2015) 37

Table 23. Aggregation of number of firearms (2010-2015) 37
Table 24. Analyses and figures based on DFS-EU data 37
Table 25. Number of incidents with illicit firearms per country per year (2010-2015) 38
Table 26. Number of deadly and non-deadly shootings with illicit firearms in the EU (2010-2015) 39
Table 27. Shooting events and incidents with illicit firearms by macro-region (2010-2015) 40
Table 28. Analyses and figures based on DSh-EU data 40
Table 29. Final list of static and dynamic darknet websites 42
Table 30. Number of offers on static darknet websites 42
Table 31. Recorded number of offers on dynamic darknet websites before and after manual cleaning 43
Table 32. Number of offers from static and dynamic darknet websites (11th May 2016 - 11th August 2016) 44
Table 33. List of variables for DOD 45
Table 34. Analyses and figures based on DOD data 46

List of figures

Figure 1. Queries creation process for firearm seizures 23
Figure 2. Queries creation process for deadly and non-deadly shootings 23
Figure 3. The Crime Proofing analysis scheme 48

1. Introduction

This Methodological Annex describes the methodology adopted to collect, organise, and analyse the information used to obtain all the results presented in the final report of Project FIRE "Fighting Illicit firearms trafficking Routes and actors at European level".

Definitions of firearms and illicit trafficking in firearms (ITF)

Project FIRE adheres to the technical definition of firearms provided by Directive 2008/51/EC of the European Parliament and of the Council of 21 May 2008 amending Council Directive 91/477/EEC on control of the acquisition and possession of weapons. Article 1, Paragraph 1 of this Directive defines firearms as:

"Any portable barrelled weapon that expels, is designed to expel or may be converted to expel a shot, bullet or projectile by the action of a combustible propellant", specifying that *"an object shall be considered as capable of being converted [...] if:*

- *it has the appearance of a firearm, and*
- *as a result of its construction or the material from which it is made, it can be so converted"* (EU 2008).

Among firearms, the scope of this study encompasses small arms and light weapons (SALW). Article 4 of the UN International Instrument to Enable States to Identify and Trace, in a Timely and Reliable Manner, Illicit Small Arms and Light Weapons identifies SALW as:

"Any man-portable lethal weapon that expels or launches, is designed to expel or launch, or may be readily converted to expel or launch a shot, bullet or projectile by the action of an explosive". It defines small arms as *"weapons designed for individual use"* and light weapons as *"weapons designed for use by two or three persons"* (UN 2005).

As regards ITF, Project FIRE adopts the following working definition:

"'Illicit trafficking' (in the EU) shall mean the acquisition, sale, delivery, movement or transfer of firearms, their parts or ammunition from, to or within the territory of the EU, if any one of the Member States concerned does not authorise it in accordance with the terms of the EU's Firearms Directive or pertinent national legislation, or if the firearms are not marked in line with the EU's Firearms Directive or pertinent national legislation".

It refers in part to the definition of ITF available in Article 1, Paragraph 2b of the 2008 amendment of the Firearms Directive, but it includes both ITF occurring within the EU without crossing any of the MSs national borders, and ITF to the EU from third countries.

PART I. ITF IN THE EU

The first part of the report concerns the main dimensions of ITF at European level. It adopts a market perspective to study this illicit market and focuses on:

- Illicit supply chain (Chapter 2);
- Demand for illicit firearms (Chapter 3);
- Types of illicit firearms trafficked (Chapter 4);
- ITF routes (Chapter 5);
- Harm caused by ITF (Chapter 6);
- Several cross-cutting issues, including ITF through marketplaces in the dark web (Chapter 7).

All these sections build on different sources described in the following Chapters.

With specific reference to the analysis presented in Chapters 2, 3, 4, and 6, some limitations have complicated the collection of data. The first is the scarcity of public and accessible official information: some countries did not provide any public data on either seizures or the crimes committed with firearms. Secondly, available data are not updated annually or do not have a time series, so that it is impossible to track ITF trends at country level. Because of these difficulties, the research team resorted to the systematic collection of web content to develop new datasets (more details are available in Chapter 5 of this Methodological Annex).[1]

2. Academic and official sources

The research team conducted a comprehensive review of the academic and official sources available at EU and national level. The review collected references to and data on ITF between 2010 and 2015. It covers several types of sources, i.e. academic and grey literature, institutional reports by law enforcement agencies (LEAs) and customs, and the GunPolicy.org website.

2.1 Academic and grey literature

Academic[2] and grey literature[3] afforded understanding of the main features of ITF. In order to gather data for the 28 EU MSs from 2010 to 2015, the research relied on specific keywords, i.e.:

- Gun;
- Firearm;
- Firearms trafficking.

These keywords were translated from English into the official spoken language of each EU country using Google Translate and then validated by native speakers (see Table A in the Appendix).

Queries resulted from the combination of the name of the country and one of the keywords, as follows:[4]

- Name of the country in English AND one "keyword" in English (e.g. Austria AND "gun"; Austria AND "firearm"; Austria AND "firearm trafficking");
- Name of the country translated into the official spoken language AND one "keyword" translated (e.g. Österreich AND "Gewehr"; Österreich AND "Schusswaffe"; Österreich AND "illegaler Waffenhandel").

The search with these strings took the following digital means into consideration:

- Google search engine;
- Google Scholar;
- Scopus database;
- JSTOR database;
- Criminal justice abstract database;
- Online library catalogue of the Università Cattolica del Sacro Cuore.

For each country, an Excel database summarises the available information divided by:

- Author;
- Type of document;
- Title;
- Topic;
- Year of publication;
- Language;
- Information on actors;
- Information on *modus operandi*;
- Information on flows;
- Information on products;
- Information on enforcement;
- Information on seizures;
- Information on regulation;
- Information on other firearm-related issues.

The information collected from the academic and grey literature was used in all the Chapters of Part I.

2.2. Institutional reports and statistics

The main available data on ITF published in official reports at EU level between 2010 and 2015 concern:

- Firearm seizures, e.g. number of firearms seized, types of firearms seized, illicit routes, means of transportation used to smuggle the firearms, and nationality of the smugglers;
- Crimes committed with firearms, e.g. homicides and robberies with firearms, nationality, and age of the offenders;
- Offences against gun laws, e.g. kinds of offences committed by ITF smugglers.

Tables 1 and 2 respectively show the main official data on firearm seizures and on crimes committed with firearms at EU level.

Table 1. Data on firearm seizures in official reports at EU level (2010-2015)

Countries	Specific information	Source
Estonia, Finland, France, Germany, Greece, Latvia, Lithuania, Poland, Romania, Sweden	Firearm seizures by year (2010-2013)	UNODC Study on Firearms 2015
Czech Republic, Estonia, Finland, France, Germany, Greece, Lithuania, Poland, Romania, Spain, Sweden	Types of seized firearms (2010-2013)	
Estonia, France, Germany, Greece, Latvia, Lithuania, Poland, Sweden	Seizures of parts and components (2010-2013)	
Estonia, France, Germany, Greece, Latvia, Lithuania, Poland, Romania, Sweden	Seizures of firearms ammunition (2010-2013)	
Estonia, Latvia, Romania	Origin of reported seized firearms (2010-2013)	
Czech Republic, Netherlands	Origin of seized firearms, % (2010-2013)	
Czech Republic, Estonia, Latvia, Romania, Spain	Reported countries of manufacture of seized firearms and ammunition, % (2010-2013)	
Estonia, Latvia, Lithuania, Romania	Reported countries of departure of seized firearms and ammunition, % (2010-2013)	
Estonia, Latvia, Romania	Reported countries of intended destination of seized firearms and ammunition, % (2010-2013)	
Czech Republic, Estonia, Latvia, Lithuania, Romania, Spain, Sweden	Proportion of reported seizures by means of transportation, % (2010-2013)	
Czech Republic, Estonia, Lithuania, Romania, Spain	Accused firearms traffickers identified as citizens of the seizing country, % (2010-2013)	

Countries	Specific information	Source
Estonia, Netherlands	% of the most frequent makes of seized firearms (2010-2013)	UNODC Study on Firearms 2015
Netherlands	Countries of manufacture of seized firearms (2010-2012)	
Finland, Netherlands	Countries of departure of seized firearms (2010-2013)	
Czech Republic, Finland	Countries of intended destination of seized firearms (2010-2013)	
Czech Republic, Estonia, Germany, Greece, Latvia, Lithuania, Netherlands, Romania, Spain	Most frequent offences associated with firearm seizures (2010-2013)	
Czech Republic, Estonia, Greece, Netherlands, Romania, Spain	Geographic origin of accused firearms traffickers (2010-2013)	
Czech Republic, Estonia, Lithuania, Netherlands, Romania, Spain	Reporting international request for tracing of firearms (2010-2013)	
Czech Republic, Estonia, Latvia, Lithuania, Netherlands	Items seized with firearms (2010-2013)	
Czech Republic, Estonia, Finland, France, Germany, Greece, Latvia, Lithuania, Poland, Romania, Spain, Sweden	Total annual seizures (firearms, their parts and components and ammunition) (2010-2013)	UNODC country fact sheets summary data from country responses on firearm seizures and trafficking 2015
Czech Republic, Estonia, Finland, France, Germany, Greece, Latvia, Lithuania, Poland, Romania, Spain, Sweden	Firearm seizures by type (2010-2013)	
Estonia, Romania	Most frequently seized make of firearm (2010-2013)	
Czech Republic, Estonia, Latvia, Romania	Origin of seized firearms (2010-2013)	
Czech Republic, Estonia, Latvia, Romania, Spain	Top countries of manufacture of seized firearms, % (2010-2013)	
Czech Republic, Estonia, Latvia	Top countries of manufacture, of ammunition, % (2010-2013)	
Czech Republic, Estonia, Finland, Lithuania, Romania	Top countries of destination of seized firearms and ammunition, % (2010-2013)	
Estonia, Finland, Latvia, Lithuania, Romania	Top countries of departure of seized firearms and ammunition, % (2010-2013)	
Czech Republic, Estonia, Lithuania, Romania, Spain	International cooperation in tracing (2010-2013)	
Czech Republic, Estonia, Latvia, Lithuania, Romania, Spain, Sweden	Transportation mode, firearms and ammunition (2010-2013)	
Czech Republic, Estonia, Lithuania, Romania, Spain	Nationality of identified traffickers, % (2010-2013)	
Czech Republic, Estonia, Germany, Greece, Latvia, Lithuania, Romania, Spain	Offences registered (2010-2013)	
Czech Republic, Estonia, Finland, France, Germany, Greece, Latvia, Lithuania, Poland, Romania, Spain, Sweden	International and regional commitments	
Czech Republic, Estonia, Finland, Germany, Greece, Latvia, Lithuania, Romania, Spain, Sweden	Qualitative responses	
Germany, Croatia, Italy, France, Estonia, Denmark	Seizures (2013-2014)	WCO - Illicit Trade Report 2013-2014

Source: Transcrime elaboration

Table 2. Data on crimes committed with firearms in official reports at EU level (2010-2015)

Countries	Specific information	Source
Austria, Belgium, Croatia, Cyprus, Germany, Hungary, Ireland, Lithuania, Malta, Poland, Slovakia, Spain, UK: England & Wales, UK: Northern Ireland	Offences per 100 000 population Intentional homicide: Firearm involved (2010-2011)	European Institute for Crime Prevention and Control, affiliated with the United Nations (HEUNI), European Sourcebook of Crime and Criminal Justice Statistics 2014
Austria, Belgium, Croatia, Cyprus, Hungary, Lithuania, Malta, Portugal, Slovakia, Spain, UK: England & Wales, UK: Northern Ireland	Offences per 100 000 population – Intentional homicide: Completed: Firearm involved (2010-2011)	
Austria, Belgium, Croatia, Cyprus, France, Germany, Hungary, Ireland, Lithuania, Poland, Portugal, Slovakia, Spain, Sweden, UK: England & Wales, UK: Northern Ireland	Offences per 100 000 population – Offences – Robbery: Firearm involved (2010-2011)	
Germany, Hungary, Lithuania, Slovakia, Spain	Offenders per 100 000 population – Offenders – Intentional homicide: Firearm involved (2010-2011)	
Hungary, Lithuania, Slovakia, Spain	Offenders per 100 000 population – Offenders – Intentional homicide: Completed: Firearm involved (2010-2011)	
France, Germany, Hungary, Lithuania, Slovakia, Spain, Sweden	Offenders per 100 000 population – Offenders – Robbery: Firearm involved (2010-2011)	
Hungary, Lithuania, Slovakia, Spain	Percentage of females, minors, and aliens from EU countries among offenders – Intentional homicide: Completed: Firearm involved (2010)	
France, Germany, Hungary, Lithuania, Slovakia, Spain, Sweden	Percentage of females, minors, and aliens from EU countries among offenders – Robbery: Firearm involved (2010)	
Germany, Hungary, Lithuania, Slovakia, Spain	Percentage of females, minors, and aliens from EU countries among offenders – Intentional homicide: Firearm involved (2010)	
Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, UK	Firearms-related deaths (2010-2013)	Firearms and violent deaths in Europe – Flemish Peace Institute 2015
Bulgaria, Czech Republic, Denmark, Finland, Ireland, Lithuania, Slovakia, Sweden, UK	Suicide with firearms (different years)	
Bulgaria, Czech Republic, Denmark, Finland, Lithuania, Slovakia	Types of firearms used in homicides (different years)	

Source: Transcrime elaboration

Focusing on reports and crime statistics published on the websites of national statistical bureaus, relevant ministries, court offices, parliaments, customs authorities, and LEAs, the research relied on specific firearms-related keywords.[5] Table 3 shows the available data on seizures, crimes committed with firearms, and offences against gun law at national level.

Table 3. Available data on firearm seizures and firearm offences in official reports and statistics per country (2010-2015)

Country	Information on firearm seizures	Available years	Information on firearm offences	Available years
Austria	/	/	Yes	2010-2012
Belgium	/	/	Yes	2010-2014
Bulgaria	/	/	/	/
Croatia	/	/	/	/
Cyprus	/	/	/	/
Czech Republic	/	/	Yes	2010-2014
Denmark	/	/	Yes	2010-2014
Estonia	/	/	Yes	2010-2013
Finland	Yes	2013-2014	Yes	2014
France	Yes	2013-2014	Yes	2010-2014
Germany	Yes	2010-2014	Yes	2010-2014
Greece	Yes	2010-2013	/	/
Hungary	/	/	/	/
Ireland	Yes	2010	Yes	2010-2013
Italy	/	/	/	/
Latvia	/	/	Yes	2010-2011
Lithuania	/	/	Yes	2010-2014
Luxembourg	/	/	/	/
Malta	/	/	/	/
Netherlands	/	/	Yes	2010-2014
Poland	Yes	2010	Yes	2010-2014
Portugal	/	/	/	/
Romania	/	/	/	/
Slovakia	/	/	/	/
Slovenia	/	/	/	/
Spain	/	/	Yes	2010-2014
Sweden	Yes	2010-2014	Yes	2014
United Kingdom	Yes	2011-2014	Yes	2010-2014

Source: Transcrime elaboration

17 EU countries provided information relating to firearms for most years, especially in the form of general crime statistics. However, only 8 of them published data on firearm seizures.

It emerges from the review of the institutional reports and statistics that there is a lack of homogeneous, updated, and public official data for the 28 EU MSs. Considering these limitations and the aim of carrying out research at European level, Project FIRE did not rely on data from official sources.

In order to fill the gap in the public data, the research team contacted by email the LEAs and customs of the 28 EU MSs asking if they would cooperate with the project. The request encompassed the possibility of sharing data on firearm seizures as well as any other information related to routes used to smuggle firearms, actors involved in this illicit market, *modus operandi*, etc. The number of positive feedbacks was very low (i.e. only 6 countries).[6] For this reason data obtained were not used.

4 EU countries published dedicated firearms reports, i.e. France, Germany, Sweden, and the United Kingdom. Besides providing statistical information on various firearms-related crimes, these reports contained further contextual information. They stemmed from different types of issuers and, except for Germany, were one-time publications (Table 4).

Table 4. Availability and content of specific national firearms reports (2010-2015)

Country	Issuer	Year	Types of available information				
			Actors	*Modus operandi*	Seizures	Gun types	Legal aspects
France	Parliament	2010	Yes	Yes	Yes	Yes	Yes
Germany	Police	2010-2014	Yes	Yes	Yes	No	No
Sweden	Police/ customs	2014	Yes	Yes	Yes	Yes	No
United Kingdom	Parliament	2010	Yes	Yes	No	No	Yes

Source: Transcrime elaboration

The research team systematised the information contained in different forms of publication (e.g. data tables, reports, and online masks) in a dataset and used them in all the Chapters of Part I. Information by country includes:

- Actors (e.g. single smugglers or organised groups, nationality and age of the actors involved);
- Flows (e.g. origin and destination of the products smuggled);
- Products (e.g. brand, type of firearm);
- Enforcement activities (e.g. data on seizures or joint operations and investigations);
- *Modus operandi* (e.g. means used to transport illicit products or examples of illegal manufacturing facilities).

2.3. GunPolicy.org

The research investigated the Gunpolicy.org website because it provides evidence-based, country-by-country data from a range of academic and official sources.[7] It is the world's most comprehensive and accessible Web source for published evidence on armed violence, firearm law and gun control from States all over the world.

The data collection focused on the 28 EU MSs from 1st January 2010 to 30th March 2015. In accordance with the aim of the Project, the automatic data gathering included only selected variables related to the following topics (see Table B in the Appendix):

- Gun Numbers;
- Death and Injury;
- Gun Industry;
- Gun Trade and Trafficking;
- Gun Regulation;
- International Controls;
- Country Profile.

Since websites did not provide any structured method of accessing the data, an *ad hoc* software was developed to collect information for each country. Specifically, the implementation of a web crawler and scraper allowed the simulation of a user connected to the site with a normal browser and the automatic download of the selected data. The programming language adopted was Python because of its simplicity in developing scripting programs and the availability of libraries useful for the purposes of the project. An Excel file gathered all selected data and metadata.[8]

The Gunpolicy.org data have limitations mainly related to the differences in the availability of information in each country, the use of different sources among countries and within the same country for the same variable, and the lack of data for many years in the same variable. As a consequence, these data were not used to analyse ITF in Project FIRE.

3. Interviews with experts

The research team carried out 21 interviews with national and international experts in the field of ITF. The aim of this activity was to profit from their experience and knowledge in order to collect information and discuss with them crucial issues not covered or not updated in the literature.

The experts can be divided in two main categories:

- Practitioners: representatives of LEAs, customs, and prosecutors;
- Scholars: academics and researchers dealing with this illicit market.

They were selected on the basis of the available literature on the topic and the search of institutions and organizations involved in the fight against and the prevention of ITF. In this latter case, the research team selected a specific contact person in each institution and organization.

Once identified, each expert was contacted by email. The aim of this first contact was to present the Project and to ask for cooperation with the Project by providing an interview.

Thanks to the cooperation of the initial experts interviewed, other experts were selected using the snowball method. Table 5 shows the list of people interviewed, together with their professional role. To ensure their anonymity, the names are omitted and replaced by alphabetical letters.

Table 5. List of the experts interviewed (alphabetical order by institution)

Id	Institution	Role
A	Archivio Disarmo	Researcher
B	Arma dei Carabinieri	Officer
C	Arquebus Solutions	Officer
D	Arquebus Solutions	Officer
E	Arquebus Solutions	Officer
F	Federal Criminal Police Office (BKA)	Officer
G	Bureau Bruinsma	Researcher
H	Flemish Peace Institute	Researcher
I	National ballistics Intelligence Service	Officer
J	National Coordinating Public Prosecutor regarding weapons and ammunition	Prosecutor
K	Osservatorio Permanente sulle Armi Leggere e le Politiche di Sicurezza e Difesa	Researcher
L	Peace Research Institute Oslo	Researcher
M	Portuguese Police	Officer
N	Procura of Catania	Prosecutor
O	Procura of Trieste	Prosecutor
P	South Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons	Officer
Q	Small Arms Survey	Researcher
R	Sweden National Forensic Center	Officer
S	Swedish Police	Officer
T	Tilburg University	Academic
U	University of Calabria	Academic

Source: Transcrime elaboration

The research team designed an interview master questionnaire serving as a modular framework for the interviews (see Table C in the Appendix). The master questionnaire consists of 13 ITF-related themes:

- Estimates;
- Products;
- Supplying countries;
- Transit countries;
- Destination countries;
- Demand;
- Wholesale;
- Retail;
- Supply/*modus operandi*;
- Sources – primary market;
- Sources – secondary market;
- Response;
- Regulatory framework.

Two different factors led to the identification of these themes: their general relevance within the scope of Project FIRE, and blind spots remaining after other FIRE research activities including a review of the relevant literature.

Interviews were semi-structured: experts and themes were matched according to the experts' varying areas of expertise. The interviewers adapted the structure dynamically to the course of the interviews, asking interviewees to suggest alternative themes and elaborate on topics that they considered most relevant.

Based on the informed consent given by interviewees, the research team recorded interviews and transcribed them into summaries to facilitate the analysis.

The information collected in the interviews has been used as a source in all the Chapters of Part I, with the exception of Chapter 6.

4. Case studies

A case study on ITF involves analysis of one or several connected cases of illicit movement of firearms in the 28 EU MSs. The aim of this activity was to gain insights on crucial issues not covered or not updated in the literature. Case studies are an important source of information providing:

- Practical examples of operational practices employed by criminals in conducting ITF in the EU (i.e. *modus operandi*, actors involved, routes used to smuggle firearms, links with other crimes, types of products smuggled);
- Practical indications on how to fight against ITF.

The collection of cases moved through various stages:

- Identification of cases of ITF in the EU MSs based on open sources, newspaper articles, interviews with experts and existing contacts, review of the scientific literature, reports by national authorities and institutions;
- Sending of a formal request by email to public prosecutors or appropriate agencies responsible for each case. In the request the research team presented the Project and its aim as well as the reasons to have access to the judicial document related to the case;
- In the case of a positive answer, the person contacted provided the research team with the judicial document. In the majority of cases, the document was sent by email, in others by postal service, and only in one case did the research team have to go to the public prosecutor's office to obtain it. In the case of negative feedback or no feedback, the research team used the newspaper article as the source if feasible;
- Systematization of information in an Excel file.

This procedure led to the collection of 39 cases based on 30 judicial documents and 9 newspaper articles (Table 6). The judicial documents were mainly related to Italian, Swedish and German police operations due to the greater possibility of the research team to contact public prosecutors/experts in those countries.

Table 6. List of case studies

Name of the case	Country	Type of document
N/A	Germany	Judicial document
N/A	Germany	Judicial document
N/A	Germany	Judicial document
N/A	Germany	Judicial document
N/A	Germany	Judicial document
N/A	Germany	Newspaper article
N/A	Germany	Newspaper article
N/A	Germany	Newspaper article
Ada	Italy	Judicial document
Atropos	Italy	Judicial document
Cassiopea	Italy	Judicial document
Cent'anni di storia	Italy	Judicial document
Crimine	Italy	Judicial document
Ferrus Equi	Italy	Judicial document
Harem	Italy	Judicial document
La Svolta	Italy	Judicial document
Matrix Pandora	Italy	Judicial document
Mediterraneo	Italy	Judicial document
N/A	Italy	Judicial document
N/A	Italy	Newspaper article
Nuova Alba	Italy	Judicial document
Olimpia I	Italy	Judicial document
Olimpia II	Italy	Judicial document
Piacente	Italy	Judicial document
Pozzo	Italy	Judicial document
Skunk	Italy	Judicial document
Sniper	Italy	Judicial document
Villaggio Aldisio	Italy	Judicial document

Name of the case	Country	Type of document
Zaleuco	Italy	Judicial document
N/A	Italy	Judicial document
Maximum Risk	Italy and Slovenia	Judicial document
N/A	Spain	Newspaper article
N/A	Sweden	Judicial document
N/A	Sweden	Judicial document
N/A	Sweden	Judicial document
N/A	Sweden	Newspaper article
N/A	Sweden	Newspaper article
N/A	Sweden	Newspaper article
N/A	UK	Newspaper article

Source: Transcrime elaboration

Once collected, the cases were analysed in order to gather information on ITF (Table 7). The analysis consisted in drafting a short document containing:

- Short description of the case with indication of the place of the event, the period of investigation, articles violated and other criminal offences if present;
- Information on actors involved, products, routes, and *modus operandi*;
- Facilitators of the crime, i.e. situations/ characteristics of the case that ensured the successful commission of the crime;
- Institutions responsible for the case and investigative techniques used to fight the crime.

The information collected with the case studies has been used as source material for the final report in all Chapters of Part I of the final report.

Table 7. Template for the analysis of investigative cases

Sections	Description
Case description	This section provides a general overview of the case.
Actors involved	This section describes people who take active part in criminal activities or whose participation contributes to achievement of the criminal aim. Details concern: the number of people involved, gender, members' relationships (e.g. family ties, ethno-religious group), etc. In order to create an offender profile, this section is based on general information only - thus, personal data (name, surname, date of birth, etc.) have not been taken into account.
Product	This section describes type, characteristics and number of weapons involved in illegal gunrunning activities.
Arms' routes	This section provides geographic data on weapons' origins and firearms' routes (source country, vector, and destination country) used in trafficking.
Modus operandi	This part illustrates how trafficking is conducted by criminals through different phases (e.g. preparation, transportation, selling, etc.).
Trafficking facilitators	This section outlines facilitators referring to factors and conditions that may contribute to the success of the trafficking.
Trafficking investigations	This section describes methods implemented by security forces to incriminate traffickers and third parties involved in the charged crime (e.g. seizure, wiretappings, etc.).

Source: Transcrime elaboration

5. Web content

The use of web content to study crimes lacking better data (e.g. organised crime and terrorism) is increasingly common in criminology. Since the 2000s, criminologists have used open sources as a complementary data-gathering approach especially when available data in a certain field of research are scarce (Freilich et al. 2014; Karstedt and LaFree 2006). In the 1990s, computer scientists began to develop automatic or semi-automatic systems to gather different types of information from the World-Wide Web. They were able to run automated tasks (i.e. scripts) allowing for the extraction and systematisation of large amounts of information from websites (i.e. web-scraping). The improvement of web-crawling techniques led to their application in different field of studies, and web content became a source for academic research (Thelwall 2001).

The web content analysis in Project FIRE relies on information on firearm seizures and firearm-related crimes: the former information comes from online newspapers and online press releases from customs and LEAs, the latter only from online newspapers. In both cases the search covered the period from 1st January 2010 to 30th March 2015, and used different keywords to retrieve information on both firearm seizures and firearm-related crimes.[9]

Firearm seizures and firearm-related crimes appeared to be the most suitable available information to approximate ITF. On the one hand, data on seizures can be used as proxies for illicit trafficking. Article 6 of the UN Firearms Protocol highlights the connection between ITF and seizures: *"States Parties shall adopt, to the greatest extent possible within their domestic legal systems, such measures as may be necessary to enable confiscation of firearms, their parts and components and ammunition that have been illicitly manufactured or trafficked"* (UN 2001). Although seizures include cases of mere firearms possession and are also a reflection of differences in law enforcement activities among the EU MSs, they provide the most revealing currently available measure of ITF (UNODC 2015). On the other hand, firearm-related crimes can be used as a proxy for the demand for illicit firearms.

Applying a market perspective to ITF means considering all aspects of the phenomenon, ranging from the illicit production or apprehension of firearms for trafficking purposes to its eventual retail. In order to shed light on the demand for firearms, it is therefore imperative to reveal how and for what purposes illicit firearms are eventually used. Among firearms-related crimes, Project FIRE focuses on deadly and non-deadly shootings because they are likely to be more frequently reported in newspapers than other firearm-related crimes (e.g. gun threats).

Although data collected from open sources are not official and are strongly influenced by the newsworthiness of the events, they made it possible to obtain systematised and comparable data on ITF-related crimes across EU MSs, with a high level of detail and with a large number of variables. Project FIRE thus uncovered an alternative data source to fill the gaps caused by the problems relating to official data (i.e. lack of homogeneous, updated and public official data for all the 28 EU MSs) and developed a new methodology to collect data automatically from the Web.

5.1. Data collection

With regard to firearm seizures and deadly and non-deadly shootings, the research team systematically collected data through the *European Media Monitor* (EMM) News Brief platform, which gathers online articles from news portals worldwide in 60 languages (European Commission's Joint Research Centre and European Commission's Directorate General Communication 2002).[10] The need to automatically collect a large quantity of articles and the absence of a structured service to retrieve information from the EMM site led to the development of an *ad hoc* software solution. Because the search page is the main access point to gather data, the research team implemented a web crawler, i.e. an automated routine able to mimic the behaviour of a real user on a web page. Such tools work by taking as input the parameters of a query (search keywords, time

span, language, etc.) and by downloading all the results. The following phase consisted in a scraping, i.e. a routine that filters the desired information from a web page and saves it in a structured format (like a database table or a spread sheet). This *ad hoc* software was developed by using the Python programming language and the Beautiful Soup library, which has been especially designed to browse web pages automatically.

Keywords fell under three categories:

- Firearm: keywords indicating types of firearms and events involving firearms;
- Seizure: keywords indicating the seizure of illicit products;
- Killing: keywords indicating lethal violence.

Tables 8 and 9 present the keywords used to investigate firearm seizures and deadly and non-deadly shootings committed with firearms.

Table 8. List of keywords to investigate firearm seizures

Firearm category	Seizure category
Firearm	Confiscate
Gun	Seize
Pistol	Seized
Revolver	Seizure
Rifle	
Weapon	

Source: Transcrime elaboration

Table 9. List of keywords to investigate deadly and non-deadly shootings

Firearm category	Killing category
(to) open fire	Assassinate
(was) shot	Assassinated
Firearm	Assassination
Gun	Dead
Gunfight	Death
Gunned down	Homicide
Opened fire	Kill
Pistol	Killed
Revolver	Killing
Rifle	Murder
Shoot	Murdered
Shoot-out	Suicide
Shooting	
Shootout	
Weapon	

Source: Transcrime elaboration

The complete list of keywords translated into the official spoken language of each country is available in the Appendix (Tables D and E). Keywords were translated from English to the other languages using Google Translate and then validated by native speakers. The search used both the English and the official language keywords for each country.[11]

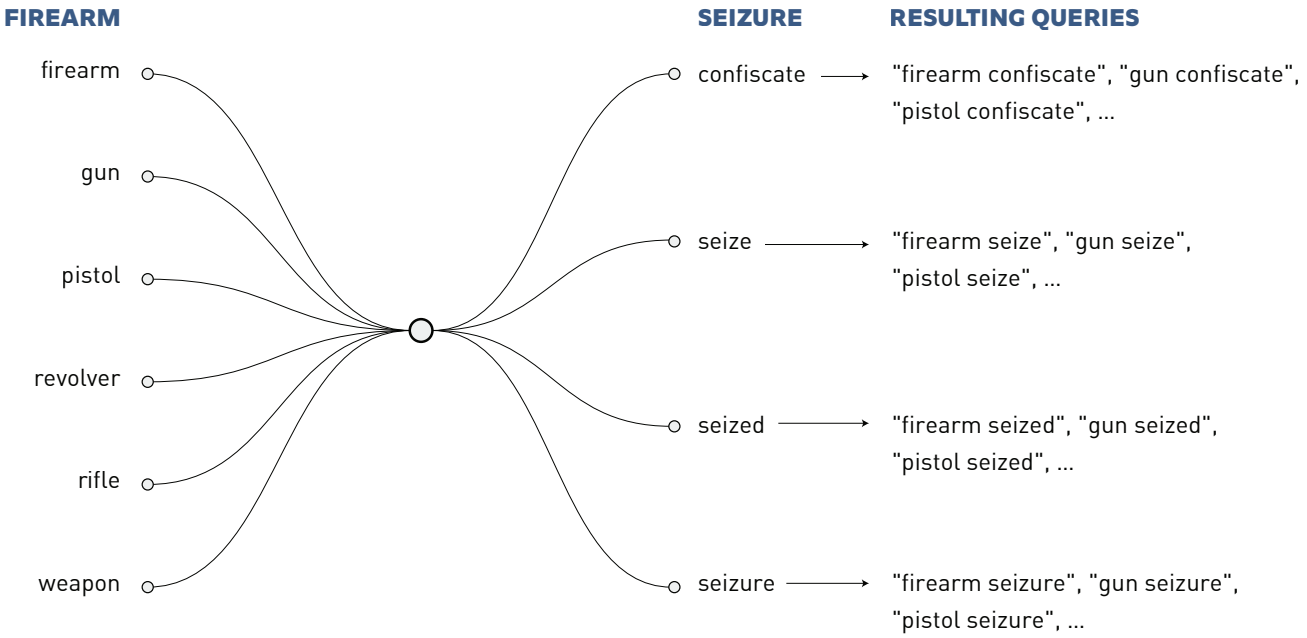
The research team created a set of queries for each country, starting from the translated keywords. The final list of queries to be submitted to the EMM search form derived from computing every possible combination of the keywords in each category, i.e. "Firearm" and "Seizure" in the firearm seizures section, and "Firearm" and "Killing" in the deadly and non-deadly shootings section (Figures 1 and 2).

Queries were the inputs for the crawler collecting contents from the search interface of the website. The scraper returned a list of articles, each one defined by:

- Title;
- URL;
- Source country;
- Publisher;
- Release date.

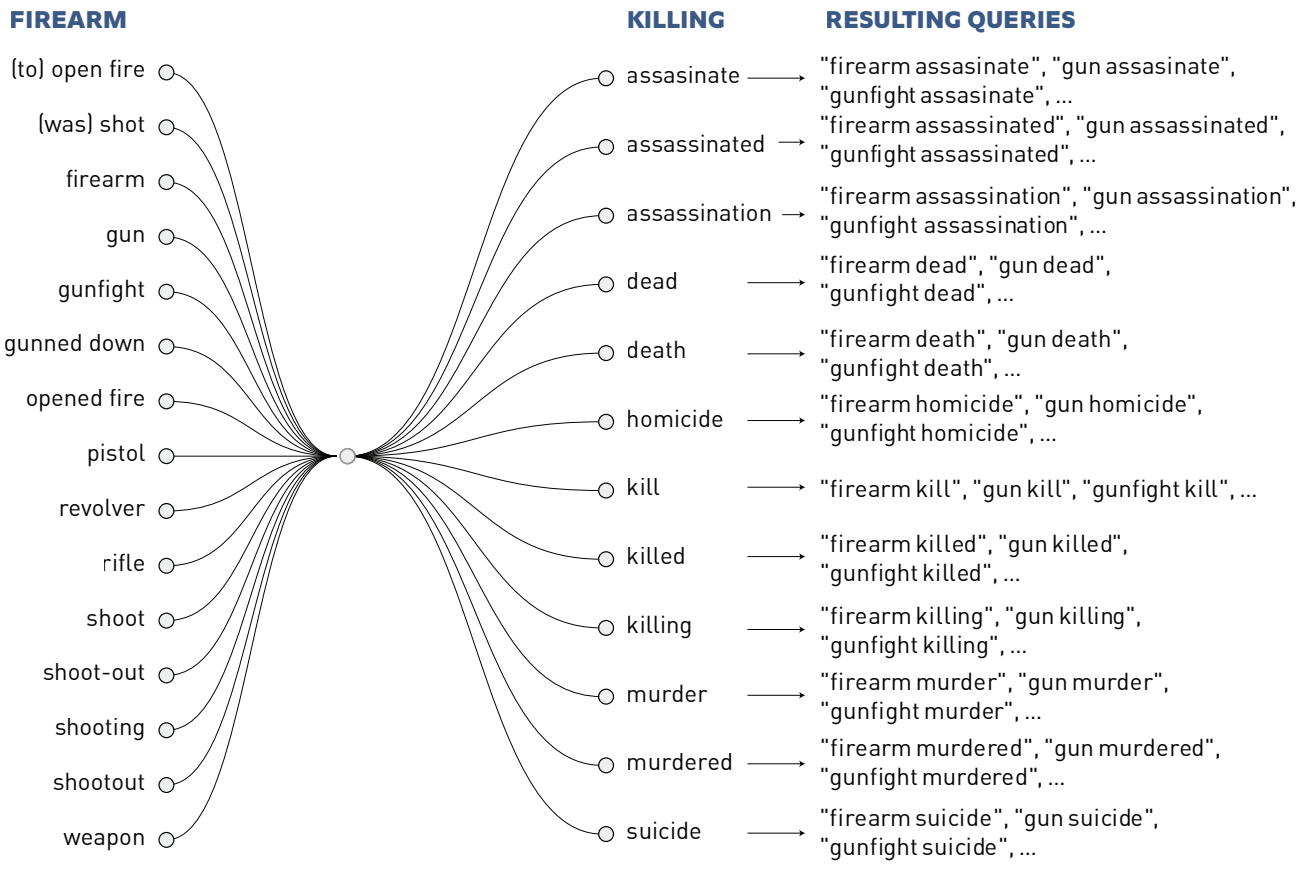
Two filters excluded redundant and not relevant articles. The first removed articles with duplicate URLs, thus obtaining a list of unique items for each query. The second searched for selected stop-words through the texts of the articles, thus excluding items containing one of them. These stop-words were a list of previously extracted named entities that indicated contents outside the scope of the project (e.g. names of politicians frequently related to firearm-related debates or countries outside the EU frequently appearing in news reporting).

Figure 1. Queries creation process for firearm seizures



Source: Transcrime elaboration

Figure 2. Queries creation process for deadly and non-deadly shootings



Source: Transcrime elaboration

The stop-words selection relied on querying the EMM website with the aforementioned queries for a single country (i.e. Italy), and analysing the titles of the resulting articles with an external semantic analysis service in order to extract meaningful entities. The research team selected TextRazor[12] among a list of publicly available services, because it offers automatic entity extraction for a large number of languages and the possibility to enrich data with additional information (e.g. coordinates for geographical entities). The manual review and filter of the total list of named entities found by the semantic analysis retained only relevant stop-words and dropped the ones that might exclude results related to the query topic. The complete list of stop-words is available in the Appendix (Tables G and H).

A subsequent automatic routine tried to retrieve full texts from the URLs collected.[13] The available full texts were submitted to the TextRazor service for the automatic named entities recognition step. Since this service only supports 10 languages (i.e. English, Dutch, French, German, Italian, Polish, Portuguese, Russian, Spanish, Swedish), articles in the remaining languages were translated into English by using the Google Translate service. TextRazor took as input the original texts and returned a list of entities, each one described by the following fields:

- Start position inside the text;
- End position inside the text;
- Confidence of the identification (a number from 0.5 to 10);
- Relevance of the entity inside the text (a number from 0 to 1);
- The identified string;
- The entity ID in its original language;
- The English entity ID;
- Coordinates of the entity if it is a geographical place.

Because a query can return numerous articles related to the same event, an automatic routine aggregated news by topic. An algorithm scanned each line of the "articles" collection, comparing the current item with the next ones included in a pre-determined time period (e.g. a month). The comparison relied on a fuzzy string matching procedure on the article titles in order to identify the ones that shared similar words or characters patterns. Each group of articles with a score greater than a pre-determined threshold was classified under a single event. Articles on a single event thus shared the same alphanumeric code variable named "Group". Each event was saved in the "events" collection of the database, together with:

- The temporal lifespan of the articles;
- The list of related articles;
- A unique alphanumeric ID.

As a result of the execution of all the automatic routines, the database included:

- A "queries" collection, containing all the queries submitted to the scraper;
- An "articles" collection, containing all the articles retrieved for the queries together with their metadata, full text (if any) and named entities (if any);
- An "events" collection, containing all the events found as aggregations of similar articles, together with their associated metadata.

5.2. Data cleaning

All collected articles were then organised into one folder per country including two separate Excel files: one for the articles on deadly and non-deadly shootings and the other for the ones on firearm seizures. In order to facilitate the data cleaning, each Excel file contained different worksheets:

- A worksheet named with the code of the country under analysis: it gathered articles eligible for the data entry;
- "Other countries" worksheet: it gathered articles pertaining to European countries other than the one under analysis (e.g. an article on an event that took place in Belgium when analysing Austria);
- "Other crimes" worksheet: it gathered articles referring to crimes entailing firearms but not concerning the crime under analysis (e.g. an armed robbery without shooting within the Excel file on deadly and non-deadly shootings);

- "Excluded links" worksheet: it gathered articles excluded from the data entry for three different reasons:
  a. Not working (NW): links either no longer working or referring to the general home page of the online newspaper;
  b. Subscription: links referring to articles available only after subscribing to the online newspaper;
  c. Not relevant: links on events that took place outside the research time span (i.e. before January 2010 or after March 2015) or outside its scope (i.e. 28 EU MSs), articles reporting information on the phenomenon in general terms without pointing at some specific event of shooting or firearm seizures (e.g. political debates), and articles without direct reference to the involvement of firearms (e.g. seizures of weapons not better identified);

- "Duplicates" worksheet: it gathers articles recognised by an algorithm as related to crime events already present in the first worksheet named with the code of the country under analysis.

Table 10 presents the variables included in "Other countries", "Other crimes", and "Excluded links" worksheets.

Table 10. Lists of variables included in "Other countries", "Other crimes", and "Excluded" worksheets

Worksheet	Variable	Description	Categories and examples
Other countries	Country	The European country where the firearm-related crime under analysis (i.e. deadly or non-deadly shooting or firearm seizures) occurred	e.g. Italy
	Link	Link of the article	
	Group	Group linked to the article	
Other crimes	Type of crime	The firearm-related crime occurred	e.g. threaten
	Link	Link to the website where the article can be accessed	
	Group	Group linked to the article	
Excluded links	Reason	The reason for exclusion of the article	• NW • Subscription • Not relevant
	Link	Link to the website where the article can be accessed	
	Group	Group linked to the article	

Source: Transcrime elaboration

The data cleaning consisted of different cycles of filters aimed at reducing the large amount of collected articles to the ones that are relevant for the research scope.

The first cleaning cycle excluded articles whose URLs were no longer working. Xenu Link Sleuth is an open source programme filtering broken links. Those links were moved to the "Excluded link worksheet" and classified as "NW".

Secondly, articles sharing the same Group (i.e. articles recognised by the algorithm as related to the same event) were moved to an additional Excel sheet named "Duplicates". This made it possible to reduce the number of articles for the data entry and guaranteed the possibility to retrieve further information about a selected event by checking the stored articles with the same Group.

The third cleaning cycle foresaw manual filtering steps to identify possible outliers in the final articles list. Often keywords match with articles not related to criminal events. Since many newspapers categorise the news according to different sections (e.g. finance,

sport, etc.), links containing not relevant labels were moved to the "Excluded links" sheet. Such links were identified using the following keywords, translated into all European languages using Google Translate:[14]

- /Finance;
- /Economy;
- /Sport;
- /Health;
- /World;
- /TV;
- /Culture;
- /Editorials.

However, not all links allowed information to be grasped about their content. Therefore, the research team carried out a subsequent manual check on the article titles to identify events outside the scope of the research. This check used some filters like toponyms and names appearing frequently in the articles of each country (e.g. Egypt, or names of the Royal Family members in the UK databases) or writing the stop-words with different spellings (e.g. Gaddafi, Gadaffi, Kaddafi). Thanks to this operation it was possible to move many non-relevant articles to the "Excluded links" worksheet.

The research team randomly tested the remaining articles to exclude journals requiring subscription. The random check was performed on journals appearing from a pivot table to be the ones with the highest number of articles. If the subscription was required, all the articles from the same journal were moved to "Excluded links".

A final cleaning cycle perfected the results of the previous ones by checking articles one by one. The research team opened each article, and translated it into English using Google Translate. After glancing at the information reported, it was arranged in the correct worksheet (i.e. kept for the data entry or moved to "Other countries", "Other crimes", or "Excluded links").

5.3. Data entry

As a result of the previous steps, all the articles considered as relevant for the analysis were selected for the data entry. The data entry aimed at systematising the information reported in articles in two distinct databases: 1) Database of Firearm Seizures in the EU (DFS-EU) and 2) Database of Shootings in the EU (DSh-EU).

Table 11 presents all variables included in the DFS-EU, providing details on:

- Temporal and geographic locations of the seizures;
- Firearms seized;
- Actors involved.

Table 11. List of variables for DFS-EU

Variable	Description	Categories and examples
Crime ID	Alphanumeric code consisting of the country code and a progressive numeration. Each firearm seizure was identified by a unique ID. This means that: • Several articles on the same event were gathered in the same Excel row under a unique ID; • Several events reported by the same article were subdivided one per row with different IDs.	e.g. AT0001
Link	Link to the website where the article could be accessed. When several articles were gathered under a unique ID, the corresponding links were joined as well.	
Group	Group related to the article. When several articles were gathered under a unique ID, the corresponding links were joined as well.	
Event_year	Year of the event.	
Event_date	If specified, the date of the event (dd/mm/yyyy).	

Variable	Description	Categories and examples
Event_country	Country where the event took place.	
Event_city	If specified, the city where the event took place.	
X	Longitude of the city where the event took place.	
Y	Latitude of the city where the event took place.	
N. of firearms	Number of firearms seized.	
Firearms_type	The type of each firearm seized.[15] The category "Other" included replicas, airguns, gas pistols, and antique firearms.	• Craft weapon • Machine gun • Other • Pistol • Revolver • Rifle • Shotgun • Sub-machine gun • N/A
Ammunition	If specified, whether ammunition was seized or not.	• Yes • N/A
Storage	If specified, where the firearms and/or the ammunition were stored.	• Car • Farm • Garage • House • Other • Warehouse • N/A
Deadly or non-deadly shooting	If specified, whether the firearms seized were used in a shooting.	• Yes • No • N/A
N. of actors	Number of actors involved in the seizure.	
Actors_nationality	If specified, the nationality of each actor.	
Actors_age	If specified, the age of each actor.	
Actors_gender	If specified, the gender of each actor.	• F • M • N/A
Additional information	Any relevant additional information, including: • More details about the seizure; • Firearms details, including their brand, model, and calibre; • Whether the seizure involved other illicit goods, e.g. drugs; • Details on the origin and destination of the illicit goods.	

Source: Transcrime elaboration

Table 12 presents all variables included in the DSh-EU providing details on:

- Type of event;
- Temporal and geographic location of the events;
- Shooters;
- Injured;
- Victims;
- Suicide victims;
- Firearms involved.

Table 12. List of variables for DSh-EU

Variables	Descriptions	Categories and examples
Crime ID	Alphanumeric code consisting of the country code and a progressive numeration. Each event of deadly or non-deadly shooting was identified by a unique ID. This means that: • Several articles on the same event were gathered in the same Excel row under a unique ID; • Several events reported by the same article were subdivided one per row with different IDs.	e.g. AT0001
Link	Link to the website where the article can be accessed. When several articles were gathered under a unique ID, the corresponding links were joined as well.	
Group	Group related to the article. When several articles were gathered under a unique ID, the corresponding links were joined as well.	
Event_type	Type of event occurred.[16]	• Attempted homicide • Attempted suicide • Homicide • Shooting • Suicide • Combination of these incidents
Event_year	Year of the event.	
Event_date	If specified, the date of the event (dd/mm/yyyy).	
Event_country	Country where the event took place.	
Event_city	If specified, the city where the event took place.	
X	Longitude of the city where the event took place.	
Y	Latitude of the city where the event took place.	
Intentional	If specified, whether the shooter acted on purpose.	• Yes • No • N/A
Type of shooting	If specified, the type of shooting:[17] • Criminal act: event occurred during a criminal act, e.g. thief shot during a robbery; • Organised crime groups (OCGs): event occurred within the organised crime context or among gangs and other criminal groups; • Family: event occurred within the family, characterised by the presence of an emotional attachment between victim and perpetrator, e.g. jealous person killing their former partner; • Interpersonal: event occurred between people that may or may not have known each other, e.g. after a quarrel among neighbours; • Socio-political: event linked to a specific socio-political aim, e.g. terrorist attack.	• Criminal act • OCGs • Family • Interpersonal • Socio-political
N. of shooters	Number of people that actually shot.	• e.g. 2
N. of shooters arrested	If specified, the number of shooters arrested immediately after the event.	• e.g. 1
Shooters_ nationality	If specified, the nationality of each shooter.	• e.g. Austrian; Belgian

Variables	Descriptions	Categories and examples
Shooters_age	If specified, the age of each shooter.	• e.g. 17; 64
Shooters_ gender	If specified, the gender of each shooter.	• F • M • N/A
N. of injured	Number of people injured by the shooting.	
Injured_ nationality	If specified, the nationality of each injured person.	
Injured_age	If specified, the age of each injured person.	
Injured_gender	If specified, the gender of each injured person.	
N. of victims	Number of people victim of the shooting.	
Victims_ nationality	If specified, the nationality of each victim.	
Victims_age	If specified, the age of each victim.	
Victims_gender	If specified, the gender of each victim.	
N. of suicide victims	Number of suicide victims.	
Suicide_ nationality	If specified, the nationality of each suicide victim.	
Suicide_age	If specified, the age of each suicide victim.	
Suicide_gender	If specified, the gender of each suicide victim.	
N. of firearms	Number of firearms used in the event.	
Firearms_type	The type of each firearm used.[18] The category "Other" included replicas, airguns, gas pistols, and antique firearms.	• Craft weapon • Machine gun • Other • Pistol • Revolver • Rifle • Shotgun • Sub-machine gun • N/A
Possession	If specified, whether each firearm used was held licitly or illicitly.	• Licit • Illicit • N/A
Seized	If specified, whether each firearm used was seized.	• Yes • No • N/A
Additional information	Any relevant additional information, including: • More details about the event, people involved, role of the police, previous crimes, etc.; • Firearms details, including their brand, model, and calibre.	

Source: Transcrime elaboration

Data validation completed the phase of data entry. A series of manual filters and pivot tables applied to both databases per each country guaranteed the internal consistency and correctness of the data inputted. They aimed at assuring:

- Compliance with the guidelines for the data entry and appropriateness of data inputted in each cell, e.g. if the number of firearms involved in the crime was two there must be two firearm types;

- The absence of blanks and typographical errors, e.g. if an item of information was missing, the cell must report "N/A";
- Respect for formal aspects like the use of the correct English spelling for the names of cities and not the original one.

Tables 13 and 14 present the number of cases of deadly and non-deadly shootings and of firearm seizures extracted from the online press review per country per year at the end of the data entry process.

Table 13. Number of cases of firearm seizures from online press reviews per country per year (2010-2015)*

Country	2010	2011	2012	2013	2014	2015	Tot. per country
Austria	8	9	11	22	15	3	68
Belgium	15	26	13	24	34	14	126
Bulgaria	0	0	0	2	1	0	3
Croatia	4	1	2	7	6	4	24
Cyprus	0	0	0	1	1	1	3
Czech Republic	2	3	3	3	2	1	14
Denmark	10	21	15	34	9	1	90
Estonia	0	0	0	0	0	0	0
Finland	7	8	4	14	8	0	41
France	4	15	60	53	52	15	199
Germany	31	39	62	76	67	25	300
Greece	0	0	0	2	5	4	11
Hungary	1	6	1	1	2	3	14
Ireland	35	27	21	45	33	13	174
Italy	19	31	76	94	146	39	405
Latvia	0	0	0	0	0	0	0
Lithuania	0	1	1	1	2	1	6
Luxembourg	0	0	4	8	3	2	17
Malta	0	0	3	0	0	0	3
Netherlands	34	71	120	84	108	36	453
Poland	0	0	0	0	0	0	0
Portugal	14	11	21	11	11	1	69
Romania	1	1	1	0	2	0	5
Slovakia	0	1	0	0	1	0	2
Slovenia	1	1	0	2	0	0	4
Spain	18	32	44	53	78	16	241
Sweden	35	44	48	67	65	12	271
United Kingdom	16	18	21	29	27	7	118
Tot. per year	255	366	531	633	678	197	2,660

* For 2015, only first three months

Source: Transcrime elaboration of DFS-EU data

Table 14. Number of cases of deadly and non-deadly shootings from online press reviews per country per year (2010-2015)*

Country	2010	2011	2012	2013	2014	2015	Tot. per country
Austria	41	36	24	31	26	5	163
Belgium	35	38	46	24	42	11	196
Bulgaria	20	24	46	53	46	11	200
Croatia	17	7	3	5	7	2	41
Cyprus	0	2	5	7	9	4	27
Czech Republic	2	1	1	0	1	0	5
Denmark	16	12	8	22	14	7	79
Estonia	2	2	1	2	1	0	8
Finland	7	17	17	2	13	1	57
France	80	91	200	167	165	31	734
Germany	38	34	56	44	37	11	220
Greece	27	32	49	75	59	9	251
Hungary	10	8	10	4	6	1	39
Ireland	41	43	40	45	36	11	216
Italy	218	318	417	431	458	102	1,944
Latvia	2	8	3	1	3	0	17
Lithuania	1	0	0	0	0	0	1
Luxembourg	1	0	1	3	3	1	9
Malta	3	0	5	3	2	1	14
Netherlands	2	3	4	2	17	2	30
Poland	13	15	17	26	22	2	95
Portugal	44	49	39	49	47	12	240
Romania	1	0	0	0	0	0	1
Slovakia	7	13	14	13	14	4	65
Slovenia	3	20	6	8	9	0	46
Spain	47	61	53	65	54	12	292
Sweden	82	82	70	68	113	25	440
United Kingdom	71	66	68	87	55	23	370
Tot. per year	831	982	1,203	1,237	1,259	288	5,800

* For 2015, only first three months

Source: Transcrime elaboration of DSh-EU data

5.4. Integration of data on seizures from press releases

Information on firearm seizures extracted from online press was integrated with data from press releases (PR) published by customs and LEAs. The search covered the period from 1st January 2010 to 30th March 2015 and encompassed customs and national LEAs websites for all EU MSs.

Each website with available PR section was translated into English (using Google Translate) and checked to manually identify cases of firearm seizures through selected keywords, namely:

- Firearm;
- Gun;
- Pistol;
- Revolver;
- Rifle;
- Weapon.

Table 15 shows the customs and national LEAs websites with available PR sections and specifies whether they present data on firearm seizures. 17 customs websites and 23 LEAs websites contained available information on firearm seizures. Each link of PR containing one of the keywords was saved in a separate Excel file for each country.

Table 15. Customs and national LEAs PR availability and information on firearm seizures (2010-2015)*

Country	Available years Customs PR	Customs PR on firearm seizures	Available years LEAs PR	LEAs PR on firearm seizures
Austria	2014-2015	/	2010-2015	Yes
Belgium	/	/	2014-2015	Yes
Bulgaria	2010-2015	Yes	2010-2015	Yes
Croatia	2010-2015	Yes	2010-2015	/
Cyprus	2010-2015	/	2010-2015	Yes
Czech Republic	2010-2014	Yes	2015	Yes
Denmark	2010-2015	/	2012-2015	Yes
Estonia	2010-2015	/	2010-2015	Yes
Finland	2010-2015	Yes	2010-2015	Yes
France	2010-2015	Yes	2012-2015	Yes
Germany	2012-2015	Yes	2010-2015	Yes
Greece	2011-2015	Yes	2013-2015	Yes
Hungary	2010-2015	Yes	2013-2015	Yes
Ireland	2010-2015	Yes	2010-2015	Yes
Italy	2010-2015	Yes	2010-2015	Yes
Latvia	2010-2015	Yes	2010-2015	Yes
Lithuania	2011-2015	Yes	2011-2015	Yes
Luxembourg	2010-2015	Yes	2010-2015	/
Malta	2012-2015	/	2013-2014	Yes
Netherlands	/	/	2010-2015	Yes
Poland	2013-2015	Yes	2010-2015	Yes
Portugal	2010-2015	/	/	/
Romania	2010-2015	Yes	2010-2015	Yes
Slovakia	2012-2015	Yes	2010-2015	Yes
Slovenia	/	/	2010-2015	Yes
Spain	2010-2015	/	2010-2015	Yes
Sweden	2012-2015	Yes	2011-2015	/
United Kingdom	2012-2015	/	2015	/

* For 2015, only first three months

Source: Transcrime elaboration

For some countries, additional data on firearm seizures came from ministerial sources and reporting obligations that relate to the UN Programme of Action to Prevent, Combat, and Eradicate the Illicit Trade in Small Arms and Light Weapons (PoA).[19] Some national customs and LEAs also provided data for research purposes.[20] Because these data are not collected systematically but by different agencies for varying categories and time periods, they are hardly comparable.

The organisation and validation of data on firearm seizures collected from the PR followed the steps for the data on seizures extracted from newspaper articles. See Table 11 for the complete list of variables.

Tables 16 and 17 present the number of firearm seizures extracted from customs PR and LEAs PR per country per year at the end of the data entry process. For both LEAs and customs PR, the number of seizures increases from 2010 onwards, maybe as a consequence of limited availability of online archives. Another common feature is that seizures tend to be concentrated in some countries. This is particularly true for customs PR: Germany alone concentrates almost half of recorded seizures. It accounts for 70 seizures, and the other 15 countries all together account for 81 seizures. Among them, 18 come from Lithuania, 13 from Bulgaria, 11 from Finland, and 10 from Romania. Regarding LEAs PR, Poland concentrates 255 out of 1,063 seizures, Hungary, and the Netherlands account for more than a hundred cases (122 and 102 respectively), Ireland, Bulgaria, Italy, Romania, Cyprus, and Spain have between 92 and 59 seizures, and the remaining 11 countries account for 121 seizures in total.

Table 16. Number of cases of firearm seizures from customs PR per country per year (2010-2015)*

Country	2010	2011	2012	2013	2014	2015	Tot. per country
Austria	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0
Bulgaria	4	3	3	0	3	0	13
Croatia	0	1	1	0	1	0	3
Cyprus	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0
Estonia	0	0	0	0	0	0	0
Finland	0	0	0	5	4	2	11
France	0	0	0	0	1	0	1
Germany	0	0	19	20	25	6	70
Greece	0	0	0	3	1	0	4
Hungary	0	0	0	0	0	1	1
Ireland	0	2	0	1	0	0	3
Italy	2	2	1	1	2	0	8
Latvia	0	1	2	2	0	0	5
Lithuania	2	1	3	8	3	1	18
Luxembourg	1	0	0	0	0	0	1
Malta	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0
Poland	0	0	0	0	1	0	1
Portugal	0	0	0	0	0	0	0
Romania	2	2	3	1	1	1	10
Slovakia	0	0	0	1	0	0	1
Slovenia	0	0	0	0	0	0	0
Spain	0	0	0	0	0	0	0
Sweden	0	0	0	0	1	0	1
United Kingdom	0	0	0	0	0	0	0
Tot. per year	11	12	32	42	43	11	151

* For 2015, only first three months

Source: Transcrime elaboration

Table 17. Number of cases of firearm seizures from LEAs PR per country per year (2010-2015)*

Country	2010	2011	2012	2013	2014	2015	Tot. per country
Austria	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0
Bulgaria	17	28	24	11	4	1	85
Croatia	0	0	0	0	0	0	0
Cyprus	11	11	14	8	21	5	70
Czech Republic	0	0	0	0	0	2	2
Denmark	0	0	0	0	0	0	0
Estonia	0	0	1	2	0	0	3
Finland	0	0	0	0	7	1	8
France	0	0	0	16	9	0	25
Germany	0	1	0	0	0	0	1
Greece	0	0	0	9	1	0	10
Hungary	0	0	2	26	68	16	122
Ireland	20	13	13	23	17	6	92
Italy	11	17	18	21	12	1	80
Latvia	3	5	3	3	5	0	19
Lithuania	4	2	16	7	8	3	40
Luxembourg	0	0	0	0	0	0	0
Malta	0	0	0	3	1	0	4
Netherlands	0	0	14	36	36	16	102
Poland	33	41	40	59	63	19	255
Portugal	0	0	0	0	0	0	0
Romania	12	11	9	19	19	7	77
Slovakia	2	0	3	1	1	0	7
Slovenia	1	0	1	0	0	0	2
Spain	7	7	19	12	13	1	59
Sweden	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0
Tot. per year	121	136	177	266	285	78	1,063

* For 2015, only first three months

Source: Transcrime elaboration

Data on firearm seizures emerging from the online press review, customs PR, and LEAs PR were merged into one database. One column named "Source" was added to the final DFS-EU to indicate the origin of the data (i.e. Press review for articles extracted from EMM, customs PR, or LEAs PR). The research team checked this final database for duplicates by looking at the variables reporting the quantities, the places, and the dates. This check regarded cases reporting similar quantities of firearms seized, occurring in the same places, within a couple of days. As a result, the analysis on firearm seizures occurred in the 28 EU MSs from 2010 until 30th March 2015 relied on 3,875 cases (Table 18).

Table 18. Number of cases of firearm seizures per country per year (2010-2015)*

Country	2010	2011	2012	2013	2014	2015	Tot. per country
Austria	8	9	11	22	15	3	68
Belgium	15	26	13	24	34	14	126
Bulgaria	21	31	27	13	8	1	101
Croatia	4	2	3	7	7	4	27
Cyprus	11	11	14	9	22	6	73
Czech Republic	2	3	3	3	2	3	16
Denmark	10	21	15	34	9	1	90
Estonia	0	0	1	2	0	0	3
Finland	7	8	4	19	19	3	60
France	4	15	60	69	62	15	225
Germany	31	40	81	96	92	31	371
Greece	0	0	0	14	7	4	25
Hungary	1	6	3	37	70	20	137
Ireland	55	42	34	69	50	19	269
Italy	32	50	95	116	160	40	493
Latvia	3	6	5	5	5	0	24
Lithuania	6	4	20	16	13	5	64
Luxembourg	1	0	4	8	3	2	18
Malta	0	0	3	3	1	0	7
Netherlands	34	71	134	120	144	52	555
Poland	33	41	40	59	64	19	256
Portugal	14	11	21	11	11	1	69
Romania	15	14	13	20	22	8	92
Slovakia	2	1	3	2	2	0	10
Slovenia	2	1	1	2	0	0	6
Spain	25	39	63	65	91	17	300
Sweden	35	44	48	67	66	12	272
United Kingdom	16	18	21	29	27	7	118
Tot. per year	387	514	740	941	1,006	287	3,875

* For 2015, only first three months

Source: Transcrime elaboration of DFS-EU data

5.5. Data analysis

The analysis of final datasets on firearm seizures and deadly and non-deadly shootings committed with firearms in the 28 EU MSs from 2010 until 30th March 2015 took a number of additional variables into consideration. These allowed a more comprehensible presentation of the results and facilitated the detection of analytically meaningful patterns at regional levels. These variables were:

- The aggregation of macro-regions, i.e. Eastern Europe, Northern Europe, Southern Europe, and Western Europe (Table 19);[21]
- The aggregation of geographic origins for actors and shooters in Eastern European, Northern European, Southern European, Western European, non-EU European, and Other (Table 20);
- The aggregation of age classes for actors involved in firearm seizures and in shootings with illicit firearms (Table 21).

Table 19. Aggregation of macro-regions

Eastern Europe	Northern Europe	Southern Europe	Western Europe
Bulgaria	Denmark	Croatia	Austria
Czech Republic	Finland	Greece	Belgium
Estonia	Ireland	Italy	France
Hungary	Sweden	Malta	Germany
Latvia	UK	Portugal	Luxembourg
Lithuania		Cyprus	Netherlands
Poland		Spain	
Romania			
Slovakia			
Slovenia			

Source: Transcrime elaboration

Table 20. Aggregation of geographic origins

Eastern European	Northern European	Southern European	Western European	Non-EU European	Other
Bulgarian	British	Croatian	Austrian	Albanian	[...]
Czech	Danish	Cypriot	Belgian	Andorran	
Estonian	Finnish	Greek	Dutch	Belarusian	
Hungarian	Irish	Italian	French	Bessaranian	
Latvian	Swedish	Maltese	German	Bosnian	
Lithuanian		Portuguese		Chechen	
Polish		Spanish		Gibraltarian	
Romanian				Kosovar	
Slovakian				Macedonian	
Slovenian				Moldovan	
				Romanian	
				Russian	
				Serbian	
				Swiss	
				Ukrainian	

Source: Transcrime elaboration

Table 21. Aggregation of age classes

Age groups
<15
15-19
20-24
25-29
30-34
35-39
40-44
45-49

Age groups
50-54
55-59
60-64
65-69
70-74
75-79
80-85
>85

Source: Transcrime elaboration

Analysis of firearm seizures

The analysis of the 3,875 firearm seizures focused on various aspects:

- Quantities and dispersion/concentration of firearm seizures across regions and over time;
- Types of firearms seized;
- Different storages;
- Characteristics of actors involved in firearm seizures.

Besides the data aggregations presented above (Tables 19, 20, and 21), this analysis focused also on the aggregation of scales for firearm seizures.

Small-scale seizures involved 1 firearm, medium-scale seizures from 2 to 9 firearms, and large-scale seizures 10 or more firearms.

Tables 22 and 23 show the macro-region where the recorded seizures occurred, and the number of seizures per scale.

Based on the data aggregation, some aspects of firearm seizure in the EU (2010-2015) have been analysed, and some figures have been produced accordingly (Table 24).

The results of the analysis are included in Chapters 2 and 4 of the final report.

Table 22 - Firearm seizures by macro-region (2010-2015)*

	Eastern Europe	Northern Europe	Southern Europe	Western Europe	Tot. EU 28 MSs 2010-2015
N. of seizures	709	809	994	1363	3,875

* For 2015, only first three months

Source: Transcrime elaboration of DFS-EU data

Table 23 - Aggregation of number of firearms (2010-2015)*

	Small scale	Medium scale	Large scale	N/A	Total
N. of seizures	1,893	1,139	243	600	3,875

* For 2015, only first three months

Source: Transcrime elaboration of DFS-EU data

Table 24 - Analyses and figures based on DFS-EU data

Firearm seizures aspects	Analyses and graphic representations
Quantities and dispersion/ concentration of firearm seizures across regions and over time	• Number of seizures and firearms seized per scale of seizure • Minimums, averages, and maximums of firearms seized • Seizures per macro-region • Number of firearms seized per macro-region and year • Map of the number of firearms seized per region • Map of the rate of firearms seized per region
Types of firearms seized	• Types of firearms seized per macro-region
Different storages	• Share of different storages of firearms seized • Storage of firearms seized per macro-region
Characteristics of actors involved in firearm seizures	• Shares of ITF actors and shares of firearms seized • Gender of offenders involved in firearm seizures per macro-region • Geographic origin of offenders involved in firearm seizures • Origins of offenders by scale of firearm seizure • Age of offenders involved in firearm seizures per macro-region • Age of offenders by scale of firearm seizures

Source: Transcrime elaboration of DFS-EU data

Analysis of deadly and non-deadly shootings

The analysis of deadly and non-deadly shootings focused on events where illicit firearms were involved. Some preliminary activities prepared the data for the analysis. These included an assumption on the nature (licit or illicit) of firearms possession when omitted in newspaper articles, the selection of the most reliable data, the subdivision of each event into the incidents of which it consisted (e.g. homicide and attempted homicide), and the aggregation of the selected data according to the type of incidents occurred.

At the end of the data entry process, there was a high number of cases in which it was not specified whether firearms possession was licit or illicit. Due to the lack of official data on the number and/or prevalence of crimes committed with licit and illicit firearms, an assumption made it possible to overcome the drawbacks of limited information in newspaper articles regarding the possession. All missing information was coded as illicit possession, with some exceptions:

- Cases of suicides and attempted suicides: most of cases where the information was provided showed that firearms employed in these events are usually licit;
- Cases in which the police were involved or occurred in hunting scenarios (as reported in the column on additional information).

The analysis of incidents perpetrated with the use of illicit firearms focused on cases that provided reliable information. Some incidents were excluded from the analysis. These included those incidents in which no details were provided on what occurred (e.g. dead bodies found but uncertainty on whether homicides or suicides occurred), as well as suicides and attempted suicides. The latter choice depended on two aspects. On the one hand, many recorded suicides and attempted suicides involved licit firearms. On the other hand, data on suicides and attempted suicides are underreported in the media—in many countries because the media commit to not reporting on them for ethical reasons. Taking into consideration the latest available official data on the number of suicides for many European countries provided by the WHO, the average coverage of cases of suicides collected from online news reaches only 5% in 2014 (World Health Organization Regional Office for Europe 2016).[22]

Throughout the data entry process, each ID identified an event. One event could include more than one incident. The column on the type of the event can show a combination of different firearm-related incidents (e.g. homicide and attempted homicide).

These were classified as deadly or non-deadly shootings:

- Deadly shootings: homicides;
- Non-deadly shootings: attempted homicide, and shootings.[23]

These preliminary activities allowed to obtain a selected database for the data analysis: from 5,800 events corresponding to 6,759 incidents at the end of the data entry process, to 5,241 incidents occurring with the use of illicit firearms, to 4,859 between deadly and non-deadly shootings (Tables 25 and 26). Specifically, the analysis on deadly and non-deadly shootings perpetrated with illicit firearms in the 28 EU MSs from 2010 until 30th March 2015 relied on 4,455 events, corresponding to 4,859 incidents: 2,666 deadly-shootings and 2,193 non-deadly shootings (Table 26).

Table 25. Number of incidents with illicit firearms per country per year (2010-2015)*

Country	Deadly shooting	Non-deadly shooting		Excluded incidents			Tot. per country
	Homicide	Attempted homicide	Shooting	Suicide	Attempted suicide	N/A	
Austria	34	7	57	18	2	0	118
Belgium	113	30	55	17	2	0	217
Bulgaria	67	1	37	13	3	0	121

Country	Deadly shooting	Non-deadly shooting		Excluded incidents			Tot. per country
	Homicide	Attempted homicide	Shooting	Suicide	Attempted suicide	N/A	
Croatia	24	9	7	5	0	1	46
Cyprus	17	3	11	3	0	0	34
Czech Republic	5	0	2	0	0	0	7
Denmark	39	12	25	7	2	0	85
Estonia	5	0	1	1	0	0	7
Finland	27	0	25	5	0	0	57
France	419	6	220	67	1	1	714
Germany	145	0	65	40	1	1	252
Greece	132	7	49	11	0	3	202
Hungary	17	9	5	7	1	0	39
Ireland	79	30	96	1	0	0	206
Italy	834	284	403	65	3	0	1,589
Latvia	9	0	2	1	0	0	12
Lithuania	0	0	1	0	0	0	1
Luxembourg	2	3	1	0	0	0	6
Malta	9	5	1	0	0	0	15
Netherlands	24	2	10	0	0	0	36
Poland	40	7	32	7	1	0	87
Portugal	97	50	55	1	5	0	208
Romania	1	0	1	0	0	0	2
Slovakia	31	4	2	12	0	0	49
Slovenia	29	0	11	17	2	0	58
Spain	166	0	96	17	0	15	294
Sweden	137	204	89	5	1	0	436
United Kingdom	164	65	96	17	0	0	342
Tot. per incident	2,666	738	1,455	337	24	21	5,241

* For 2015, only first three months

Source: Transcrime elaboration of DSh-EU data

Table 26. Number of deadly and non-deadly shootings with illicit firearms in the EU (2010-2015)*

Country	Deadly shooting	Non-deadly shooting		Tot. 2010-2015
	Homicide	Attempted homicide	Shooting	
Tot. per incident	2,666	738	1,455	4,859

* For 2015, only first three months

Source: Transcrime elaboration of DSh-EU data

The analysis of the 4,859 between deadly and non-deadly shootings perpetrated with illicit firearms in the 28 EU MSs from 2010 until 30th March 2015 focused on various aspects:

- Quantities and dispersion/concentration of both deadly and non-deadly shootings across regions and over time;
- Intentionality and type of shooting incidents;
- Types of firearms used in deadly and non-deadly shootings;
- Characteristics of shooters;
- Characteristics of people killed and injured during shooting incidents.

Additional variables on the aggregation of macro-regions, of geographic origin, and of age classes of people involved in the shootings (i.e. shooters, victims, and injured) facilitated the analysis (Tables 19, 20, and 21). Table 27 shows how many cases of shootings were recorded for each macro-region. Since shooting events may comprise more than one incident of both deadly and non-deadly shooting, it also shows how many shooting incidents occurred in each macro-region.

Table 27. Shooting events and incidents with illicit firearms by macro-region (2010-2015)*

	Eastern Europe	Northern Europe	Southern Europe	Western Europe	Tot. EU 28 MSs 2010-2015
N. of events	282	1,016	2,076	1,081	4,455
N. of incidents	319	1,088	2,259	1,193	4,859

* For 2015, only first three months

Source: Transcrime elaboration of DSh-EU data

On the basis of the data aggregation, some aspects of shootings in the EU (2010-2015) were analysed (Table 28).

The results of the analysis are set out in Chapters 3, 4 and 6 of the final report.

Table 28. Analyses and figures based on DSh-EU data

Deadly and non-deadly shootings aspects	Analyses and graphic representations
Quantities and dispersion/ concentration of both deadly and non-deadly shootings across regions and over time	• Number of shootings, shooters, victims and injured per macro-region • Shares of shootings per macro-region • Shares of deadly and non-deadly shootings per macro-region • Map of the number of deadly shootings per region • Map of the rate of deadly shootings per region • Map of the number of non-deadly shootings per region • Map of the rate of non-deadly shootings per region
Intentionality and type of shooting incidents	• Shares of intentional and non-intentional shootings • Shares of type of shooting
Types of firearms used	• Types of firearms used in shootings
Characteristics of shooters	• Gender distribution of shooters per macro-region • Age of shooters per macro-region • Geographic origin of shooters per macro-region
Characteristics of victims and injured	• Gender distribution of injured and victims of shootings per macro-region • Distribution of victims by type of shooting, gender and macro-region • Shares of age groups per injured and victims of shootings • Age of victims per macro-region • Age of injured per macro-region • Geographic origin of injured and victims of shootings per macro-region

Source: Transcrime elaborationon of DSh-EU data

6. Analysis of firearm marketplaces on the dark web

The analysis in Chapter 7 of the final report includes data from the dark web, since it is an emerging exchange market for illicit goods (Europol 2015; EY and SIPRI 2014; HM Government 2015). Owing to the novelty of the phenomenon, relatively little research on the extent and reliability of illegal dark web markets has been undertaken. To examine ITF, it was decided to identify and collect data from websites on the dark web that sell firearms.

The main added value of the study is that it provides a first overview of illicit firearms trading on marketplaces in the dark web. There are some limitations to the validity of the data, however. The first concerns the fact that these marketplaces open and close very frequently or change their addresses to avoid detection by LEAs. Secondly, there is a possibility that some websites may be fraudulent. The research team tried to reduce the risk of analysing fraudulent websites by consulting users' reviews and feedbacks. The third limitation is that, in the case of some adverts about firearms, the geographical location of the vendor is not specified on the website, so that in those cases it is impossible to determine the routes and whether the traffic is from, through or to the EU. The fourth limitation is that the validity of some of the collected data, for example on the quantity of firearms per offer, is limited. The findings should therefore be regarded as providing an exploratory overview rather than a representative picture of illicit firearms trade in the dark web.

6.1. Identification of darknet marketplaces

The Onion Router (TOR), a free software that enables anonymous communication and the concealment of the location and usage of the user, allowed identification of darknet websites.[24] It was chosen because of its widespread utilisation, its ease of access, the availability of information on how to use it, and safety concerning possible virus attacks.

The search relied on a number of keywords, i.e. "firearm", "revolver", "pistol", "rifle", "gun", and "weapon" translated into the languages spoken in the 28 EU MSs and validated by native speakers (see Table I in the Appendix). A two-week daily check of the stability of the online presence of each website identified allowed the identification of 23 websites selling firearms.[25] An additional one-week daily monitoring of the 23 websites identified made it possible to determine whether each website was suitable for the analysis. Various criteria were used to make this evaluation. Firstly, the online presence of the website had to be stable, i.e. it had not closed or changed its address. Secondly, the users' reviews and feedbacks had to be positive so that fraudulent websites could be avoided. Thirdly, the websites had to have enough information to allow an analysis of ITF on the dark web.

This more specific monitoring resulted in the selection of a final list of 12 darknet websites for the purpose of data collection and analysis. Some of these websites were static and some were dynamic (Table 29).

Static darknet websites sell fewer models of firearms but they have a stock of them so that the desired quantity can be ordered. The offers on the static websites did not change during the observation period. Dynamic darknet websites, instead, usually rely on private vendors that post ads to sell their private products, very much like eBay. Offers on dynamic websites change frequently and remain online for different time periods. Offers from both static and dynamic websites were included in the analysis because they were useful to obtain a comprehensive overview of ITF on the dark web.

Table 29. Final list of static and dynamic darknet websites

Static darknet websites	Dynamic darknet websites
AA Black Market http://gunsdtk47tolcrre.onion/l/index.php	**AlphaBay Market** http://pwoah7foa6au2pul.onion/challenge.php
Euroguns http://2kka4f23pcxgqkpv.onion/	**Black Market Guns** http://armsmhmd4c3hb5xu.onion/
Glock's & Taurus http://vi5ydynhfco62g4v.onion/	**Dream Market** http://lchudifyeqm4ldjj.onion/
Guns Dark Market http://gunsjmzh2btr7lpy.onion/	**Oasis** http://oasisnvwltxvmqqz.onion/welcome
N/A (name not specified) http://popfilesxuru7lsr.onion/~test11238/index.html	**Outlaw** http://outfor6jwcztwbpd.onion/index.php?step=choose
UK Guns and Ammo Store http://gunsxzzebijng24l.onion/	**Valhalla** http://valhallaxmn3fydu.onion/intl/categories/1000

Source: Transcrime elaboration

6.2. Data collection and data analysis

UCSC-Transcrime manually collected the data from darknet static websites. Table 30 shows the number of offers present at the time of the scraping (26th February 2016):

Table 30. Number of offers on static darknet websites

Static darknet websites	N. of offers
AA Black market	15
Euroguns	6
Glock's & Taurus	21
Guns Dark Market	155
N/A	8
UK Guns and Ammo Store	4
Total	**209**

Source: Transcrime elaboration

POLI and UCSC-Transcrime performed the data extraction process for dynamic darknet websites. The former automatically collected data on a daily basis for three months, i.e. from 11th May 2016 to 11th August 2016. The latter was in charge of the manual data cleaning and systematisation into a database per each dynamic website.

The dynamic darknet websites were monitored daily in an automatic way by using software developed *ad-hoc* for each site. Software of this kind, called "scraper", is often used to collect data from a website if there are no reliable and predefined channels to collect it in a structured manner. Scrapers are designed to mimic the interaction of a real person with the site through a browser by automating mouse clicks and keyboard inputs to gain access. This same concept was applied to explore the sites automatically and download the information for each firearm in the websites. Such routines could not be fully automated due to the presence of CAPTCHA codes (a type of challenge-response test used in computing to determine whether or not the user is human) in most of the login pages of the sites; solving the CAPTCHAs was done manually by POLI.[26]

Regarding the automated data extraction from dynamic websites, the output varied substantially among sites. While some features of the articles were almost always present, i.e. offer description, vendor, and price, some others were seldom found, e.g. details on products, and available quantities. The final output was therefore heterogeneous with respect to the kind and quality of data retrieved. The data collected were systematised in an Excel file for each day of the three-month monitoring of each dynamic website. In order to facilitate further analysis, data included in various Excel files of the same website were merged into a single Excel file.

As the illicit websites were monitored on a daily basis over a period of three months, duplicate entries were collected for each day apart from the initial day that a specific offer was valid during the period of observation. While the vendors and firearms offered remained the same throughout the validity of the offer, the prices and quantities changed in some cases. For the data cleaning process, duplicate offers were thus operationalised as the same product offered by the same vendor, regardless of quantity, date, and price. To identify duplicate entries, a conditional test was accordingly performed and the results were stored in the "Test_value" variable. Further variables were added to the databases to retain possible changes in the duplicate entries regarding the dates of the offer, quantities, and prices (Table 32). Table 31 shows the number of offers on dynamic websites before and after manual cleaning.

Each Excel file of each dynamic darknet website contained various worksheets:

- "Formula" worksheet: this gathered all data extracted and the "Test_value" variable identifying duplicates;
- A worksheet for each website under analysis containing the relevant offers eligible for the data entry;
- "Excluded links" worksheet: this gathered articles excluded from the data entry for four different reasons:
    a. Insufficient information: offers without details on the products, e.g. "Special offers for Christmas. Limited availability";
    b. Custom Listing: this gathered special offers of products created for specific customers. A custom listing resembles "your cart" in online shopping websites, but it is visible to all other customers;
    c. Not relevant: this gathered offers of other illicit products and services, like drugs;
    d. "Duplicates" worksheet: this gathered articles recognised by the formula as duplicates.

Offers take different forms. They may regard one or several firearms, firearm parts and ammunition or any combination thereof. If offers regarded firearms of different types, their respective database entries were split. Starting from a clean database of unique and relevant offers, additional variables were created and filled according to the information contained in the automatically collected variables on products and their descriptions. The various steps of data cleaning and data entry resulted in the creation of the final Database of Offers from the Dark web (DOD). In order to facilitate data analysis, offers from all websites were gathered in one Excel sheet consisting of 651 offers (Table 32).

Table 33 presents all variables included in DOD providing details on:

- Products offered;
- Types of firearms offered;
- Prices;
- Nickname of the vendor;
- Duration of the validity of the offers;
- Origin of the products and available shipping destinations;
- Details on firearms traceability and previous usage.

Table 31. Recorded number of offers on dynamic darknet websites before and after manual cleaning

Dynamic darknet websites	Scraped records	Unique offers	Relevant offers
Alphabay	11,669	437	257
Black market	2,349	32	26
Dream market	4,359	139	94
Oasis	355	43	4
Outlaw	166	49	1
Valhalla	1400	71	60
Total	**20,298**	**771**	**442**
Percentage of total		3.8%	2.2%

Source: Transcrime elaboration

Table 32. Number of offers from static and dynamic darknet websites (11th May 2016 - 11th August 2016)

Static darknet websites	Relevant offers	Dynamic darknet markets	Relevant offers	Offers Total
AA Black Market	15	AlphaBay Market	257	651
Euroguns	6	Black Market Guns	26	
Glock's & Taurus	21	Dream Market	94	
Guns Dark Market	155	Oasis	4	
N/A	8	Outlaw	1	
UK Guns and Ammo Store	4	Valhalla	60	

Source: Transcrime elaboration of DOD data

Table 33. List of variables for DOD

Variables	Descriptions	Categories and examples
ID_Offer	Alphanumeric code consisting of the market code and a progressive numeration. Each offer was identified by a unique ID. If one offer included different models or types of firearm (e.g. pistol and revolver) they were subdivided one per row with the same ID.	e.g. AB001
Market	Name of the darknet market where products were available.	
Date_start ("Date" for static websites)	The date when the offer was published on the darknet market (dd/mm/yyyy).	
Date_end (only for dynamic websites)	The last date when the offer was available on the darknet market (dd/mm/yyyy).	
Number of days (only for dynamic marketplaces)	Calculation of the time difference between date_start and date_end (in days).	
Quantity_start	The quantity of available stocks of the product offered when it was published on the darknet market.	
Quantity_end	The quantity of available stocks for the product offered on the last date that it was on the darknet market.	
Category	The general type of the product on offer.	• Ammunition • Firearm and ammunition • Firearm • Firearm part
Type	The type of firearm offered.[27] The category "Other" included replicas, airguns, gas pistols, and antique firearms.	• Craft weapon • Machine gun • Other • Pistol • Revolver • Rifle • Shotgun • Sub-machine gun • N/A

Variables	Descriptions	Categories and examples
Firearm brand	The brand of the firearm offered.	e.g. Glock
Firearm model	The model of the firearm offered.	e.g. AK47
N. of ammunitions	If ammunition was offered, data field had to be filled in either with the number of bullets offered or with N/A if the exact number was not specified. If no ammunitions were offered, the value was set to 0.	• Value • N/A • 0
N. of amm. X quantity	To be filled in if ammunition was offered and its amount was specified. This was the multiplication of the number of ammunitions and the quantity offered on the publication date.	
Calibre	Automatically filled in if possible. Otherwise to be filled in manually with the calibre of the firearm or ammunition offered.	
Calibre details	To be filled in with specifics on the type of calibre.	e.g. Magnum, ACP
Currency	The currency in which the product is offered.	• BTC • USD • EUR
Price_min	The lowest price of the product during the period in which it was offered in the darknet market.	
Price_max	The highest price of the product during the period in which it was offered in the darknet market.	
Product	Automatically filled in with the information scraped from the dark web. This information was systematised in the other columns.	
Vendor	Automatically filled in with the information scraped from the dark web.	
Description	Automatically filled in with the information scraped from the dark web. This information was systematised in the other columns.	
Origin	Automatically filled in with the information scraped from the dark web. Otherwise to be filled in manually with the country from where the shipment originated.	
Destination	Automatically filled in with the information scraped from the dark web. Otherwise to be filled in manually with the available shipment destinations.	
Previous usage	Whether the firearm had been previously used.	• Used • New • N/A
Serial number	Whether the serial number was abraded, absent, or present.	• Abraded • Absent • Present

Source: Transcrime elaboration

Table 34 shows how the analyses based on DOD focused on the creation of tables and figures on the various aspects.

Table 34. Analyses and figures based on DOD data

Dark web offers	Analyses and graphic representations
Distribution of offers	• Types of firearm-related offers • Duration of firearm-related offers by type of offer (only for dynamic markets)
Firearms offered	• Total of firearms offered by type of firearm • Share of firearms offers by type of firearm • Shares of brands of firearms offered • Distribution of new and used firearms
Firearms shipments	• Countries of origin and destination of firearms shipments

Source: Transcrime elaboration of DOD data

PART II. THE EU'S REGULATORY FRAMEWORK TO COUNTER ITF

Part II of the final report comprises:

- An overview of the EU regulatory framework (Chapter 8);
- A critical analysis of the Proposal for a Directive of the European Parliament and of the Council amending Council Directive 91/477/EEC on control of the acquisition and possession of weapons – COM(2015) 750 final – 2015/0269 (COD) (EC 2015 Proposal for amending the Firearms Directive) (Chapter 9).

With regard to the overview, the research team carried out a review of the existing regulatory documents related to firearms at international and European level.

Focusing on the analysis of the 2015 EC Proposal for amending the Firearms Directive, the research team applied crime proofing analysis to the document.

7. Crime proofing analysis

The Crime Proofing (CP) of legislation is a scientific approach developed by Transcrime in 2006. It aims at assessing and neutralizing the opportunities for crime, inadvertently created by regulation (Calderoni et al. 2006; Calderoni, Savona, and Solmi 2012; Savona 2006).

The core idea is that legislation has potential criminogenic effects, since it may inadvertently create opportunities for criminals to engage in illegal activities. The CP measures these unwanted crime opportunities originating from legislation and highlights possible interventions to proof it against crime by closing legislative loopholes.

In particular, the CP can assess legislation in force (*CP ex post*) or, as in the case of this report, legislative proposals or policy options, also including the "no change" option (*CP ex ante*). It is not prescriptive, but it may motivate regulators to change aspects of existing or forthcoming legislation likely to increase opportunities for crime.

The CP has four aims:

1. Identify any unintended criminal implications/ consequences of existing or forthcoming legislation;
2. Determine whether there is a crime risk, and if so, of what crime and of what magnitude;
3. Analyse pros and cons in terms of crimes arising from each policy option;
4. If policymakers are involved in the CP exercise, suggest solutions likely to reduce the risk (either by reducing opportunities for crime or by introducing policy measures that may mitigate the risk). If policymakers are not involved, the CP may propose recommendations for management of the risks.

The CP consists of two phases: the *Crime Risk Assessment* (CRA), i.e. analysis and identification of possible crime risks due to legislation, and the *Crime Risk Management* (CRM), i.e. implementation of solutions to prevent, reduce or remove the crime risks due to legislation.

The CRA is supposed to be carried out on regulatory acts, given the assumption that only provisions of a prescriptive nature may present actual crime risks. It consists of three steps: the Initial Screening (IS), the Preliminary Crime Risk Assessment (PCRA) and the Extended Crime Risk Assessment (ECRA).

The IS is the first step of the CRA and consists of a selection (based on a checklist of 7 risk indicators) of potentially risky legislation requiring further assessment.

The PCRA is the second step of the CRA and has a twofold objective: on the one hand, it identifies the crime risk unintentionally created by the regulation, while on the other hand it assesses whether more detailed analysis is needed (thus requiring an ECRA). According to the methodology of the CP, a first part of the assessment focuses on the vulnerability of the market (and a second part on the possible risks arising from specific options or actions).

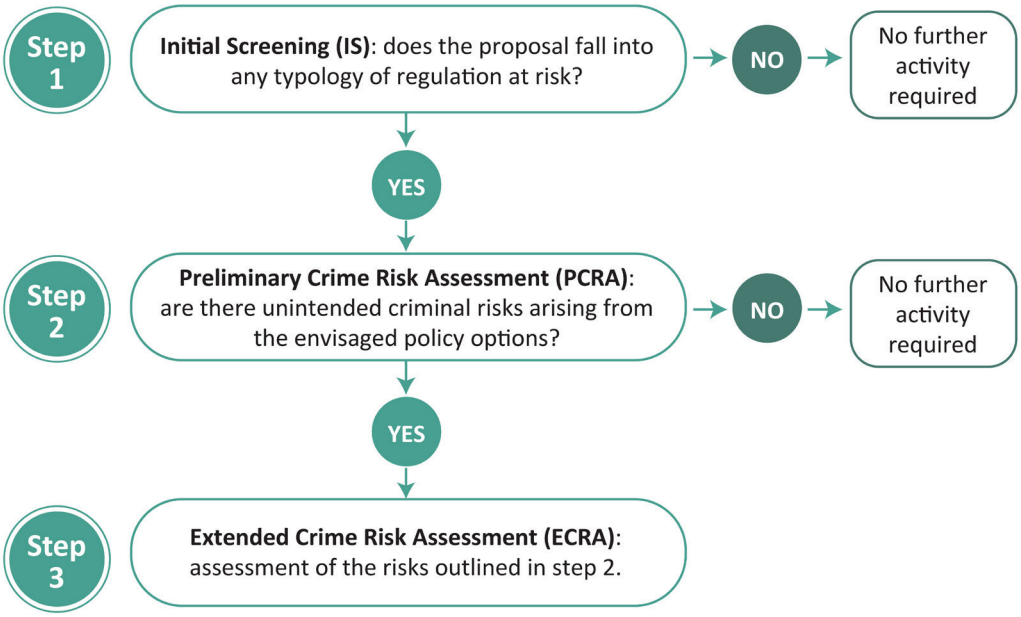
The ECRA is the third and final step of the CRA, and provides an analytical assessment based on a set of indicators. The indicators assess the likely impact of the possible policy options on the crimes, the perpetrators, the victims, and the social costs.

If any measure is found to be at risk in the IS step, the process moves to the PCRA phase, which identifies and assesses the crime risks unintentionally created by legislation. If the PCRA highlights at least a medium/high level of crime risk originating from any measure, the measure moves to the ECRA phase. The level of crime risk influences the transition of a measure to the ECRA stage: whenever the level of crime risk is low, the process stops. The ECRA assesses for each measure at risk the likely impact on crime, perpetrators, victims, and social costs (Figure 3).

The analysis presented in all the three steps has been supported by the existing literature and results from the interviews with experts (Chapters 2 and 3 of this Methodological Annex respectively).

Focusing only on the CRA, Project FIRE tries to develop know-how valuable for identifying and preventing possible crime risks contained in the 2015 EC Proposal for amending the Firearms Directive. The CRM, aimed at reducing possible crime risks through appropriate changes in legislation, should be conducted in close cooperation with those policymakers charged with regulation of the selected market.

Figure 3. The Crime Proofing analysis scheme



Source: Transcrime elaboration

PART III. RECOMMENDATIONS ON HOW TO IMPROVE THE PREVENTION OF AND FIGHT AGAINST ITF

Part III gives recommendations on fighting and preventing ITF at EU level.

It relies on all the results presented in the previous Parts and the interviews with experts (see Chapter 3 of this Methodological Annex for details). Therefore, no specific methodology is provided for this Part.

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Appendix

Table A. Keywords for the collection of data from academic and official sources

Country	Country (original language)	Gun	Firearm	Firearm Trafficking
Austria	Österreich	Gewehr	Schusswaffe	illegaler Waffenhandel
Belgium	Belgique; België (Dutch)	pistolet; geweer (Flemish)	arme à feu; vuurwapen (Flemish)	trafic d'armes; vuurwapens (Dutch)
Bulgaria	България	пистолет	огнестрелно оръжие	трафик на огнестрелни оръжия
Croatia	Hrvatska	pištolj	vatreno oružje	trgovine vatreno oružje
Cyprus	Κύπρος	πιστόλι	πυροβόλο όπλο	διακίνησης πυροβόλων όπλων
Czech Republic	Česko	pistole	střelná zbraň	střelné zbraně obchodování
Denmark	Danmark	gun	skydevåben	skydevåben menneskehandel
Estonia	Eesti	relv; püss; püstol; kahur; prits; laskma	tulirelv	tulirelvadega kauplemise
Finland	Suomi	ase	tuliase	ampuma ihmiskaupan
France	France	pistolet	arme à feu	trafic d'armes
Germany	Deutschland	Gewehr	Schusswaffe	illegaler Waffenhandel
Greece	Ελλάδα	πιστόλι	πυροβόλο όπλο	διακίνησης πυροβόλων όπλων
Hungary	Magyarország	pisztoly	lőfegyver	lőfegyverek kereskedelme
Ireland	Éire	gunna	arm tine	gáinneáil arm tine
Italy	Italia	pistola	arma da fuoco	traffico d'armi
Latvia	Latvija	lielgabals	šaujamierocis	šaujamieroči tirdzniecība
Lithuania	Lietuva	pistoletas	šaunamasis ginklas	šaunamieji ginklai prekyba
Luxembourg	Luxembourg;	pistolet; Gewehr	arme à feu; Schusswaffe	trafic d'armes; illegaler Waffenhandel
Malta	Luxemburg Malta	gun	firearm	Firearm Trafficking
Netherlands	Nederland	pistool	vuurwapen	vuurwapens
Poland	Polska	pistolet	broń palna	handel bronią palną
Portugal	Portugal	pistola	arma de fogo	tráfico de armas de fogo
Romania	România	pistol	armă de foc	traficul de arme de foc
Slovakia	Slovensko	pištoľ	strelná zbraň	strelné zbrane obchodovanie
Slovenia	Slovenija	gun	strelno orožje	trgovina s strelnim orožjem
Spain	España	pistola	arma de fuego	tráfico de armas
Sweden	Sverige	vapen	skjutvapen	skjutvapen människohandel
United Kingdom	United Kingdom	gun	firearm	Firearms trafficking

Source: Transcrime elaboration

Table B. List of data selected for the scraping of Gunpolicy.org

Macro-category	Micro-category	Variable
Gun Numbers	Civilian Guns	Number Of Privately Owned Firearms
		Rate Of Civilian Firearm Possession Per 100 Population
		Number Of Privately Owned Rifles
		Number Of Privately Owned Shotguns
		Number Of Privately Owned Handguns
		Number Of Licenced Firearm Owners
		Rate Of Licenced Firearm Owners Per 100 Population
		Number Of Registered Firearms
		Rate Of Registered Firearms Per 100 Population
	Government Guns	Number Of Military Firearms
		Routine Arming Of Police
		Number Of Law Enforcement Firearms
Death and Injury	Total Number Of Gun Deaths	Total Number Of Gun Deaths
		Rate of all Gun Deaths per 100 People
	Homicide (Any Method)	Number of Homicides (Any Method)
		Rate of Homicides per 100,000 People
	Gun Homicide	Number of Gun Homicides
		Rate of Gun Homicides per 100,000 People
	Handgun Homicide	Number of Handgun Homicides
		Rate of Handgun Homicides per 100,000 People
	Long Gun Homicide	Number of Long Gun Homicides
		Rate of Long Gun Homicides per 100,000 People
	Gun Homicide (Other)	Number of Gun Homicides (Other)
		Rate of Gun Homicides (Other) per 100,000 People
	Suicide (Any Method)	Number of Suicides (Any Method)
		Rate of Suicides per 100,000 People (any method)
	Gun Suicide	Number of Gun Suicides
		Rate of Gun Suicide per 100,000 People
	Hand Gun Suicide	Number of Hand Gun Suicide
		Rate of Handgun Suicide per 100,000 People
	Long Gun Suicide	Number of Long Gun Suicide
		Rate of Long Gun Suicide per 100,000 People
	Gun Suicide Other	Number of Gun Suicide Other
		Rate of Gun Suicide (Other) per 100,000 People
	Unintentional Gun Deaths	Number of Unintentional Gun Deaths
		Rate of Unintentional Gun Deaths per 100,000 People
	Unintentional Handgun Deaths	Number of Unintentional Handgun Deaths
		Rate of Unintentional Handgun Deaths per 100,000 People
	Unintentional Long Gun Deaths	Number of Unintentional Long Gun Deaths
		Rate of Unintentional Long Gun Deaths per 100,000 People

Macro-category	Micro-category	Variable
Death and Injury	Unintentional Gun Deaths (Other)	Number of Unintentional Gun Deaths (Other)
		Rate of Unintentional Gun Deaths (Other) per 100,000 People
	Gun Deaths From Undetermined Cause	Number of Gun Deaths From Undetermined Cause
		Rate of Gun Deaths from Undetermined Cause per 100,000 People
	Handgun Deaths From Undetermined Cause	Number of Handgun Deaths From Undetermined Cause
		Rate of Handgun Deaths from Undetermined Cause per 100,000 People
	Long Gun Deaths From Undetermined Cause	Number of Long Gun Deaths From Undetermined Cause
		Rate of Long Gun Deaths from Undetermined Cause per 100,000 People
	Gun Deaths (Other) From Undetermined Cause	Number of Gun Deaths (Other) From Undetermined Cause
		Rate of Gun Deaths (Other) from Undetermined Cause per 100,000 People
	Justifiable Gun Homicide	Number of Justifiable Gun Homicides
		Rate of Justifiable Gun Homicides per 100,000 People
Gun Industry	Regulation of Firearm Makers	-
	Small Arms Manufacture	-
Gun Trade and Trafficking	Regulation of Firearm Exports	Firearm Exports (Number) - Manufacturers
		Small Arms Exports (US$) - Customs
		Small Arms Exports - World Ranking
	Regulation of Firearms Imports	Small Arms Imports (US$) - Customs
		Firearm Imports (Number) - Customs
	Smuggling Guns and Ammunition	-
	Regulation of Arms Brokers	-
	End User Certificates	-
	Transparency of Small Arms Transfers	-
Gun Regulation	Firearm Regulation – Guiding Policy	-
	Firearm Law	-
	Firearm regulation Authority	-
	Right to Possess Firearms	-
	Restricted Firearms and Ammunition	Regulation of Automatic Weapons
		Regulation of Semiautomatic Assault Weapons
		Regulation of Handguns
		Law Regulates Long Guns
	Gun Ownership and Possession	Genuine Reason Required for Firearm Possession
		Minimum Age for Firearm Possession
		Gun Owner Background Checks
		Reference Required for Firearm Licence
		Domestic Violence and Firearms
		Firearm Safety Training
		Gun Owner Licensing Period

Macro-category	Micro-category	Variable
Gun Regulation	Gun Ownership and Possession	Licensing Records
		Limit on Number of Guns
		Limit on Quantity, Type of Ammunition
	Firearm Registration	Civilian Gun Registration
		Gun Dealer Record Keeping
		Gun Manufacturer Record Keeping
	Gun Sales and Transfers	Regulation of Private Gun Sales
		Regulation of Dealer Gun Sales
	Storage and Transport of Guns and Ammunition	Firearm and Ammunition Storage Regulations - Private
		Firearm and Ammunition Storage Regulations - Dealer
		Firearm and Ammunition Storage Regulations - Government
		Firearm and Ammunition Transport Regulations
	Marking and Tracing Guns and Ammunition	Firearm Marking
		Firearm Tracing
		Ballistic Record of Firearms and Ammunition
	Carrying Guns	Carrying Guns Openly in Public
		Carrying Hidden Handguns in Public
	Penalty for Illicit Firearm Possession	-
	Collection, Amnesty and Destruction Programmes	Surrendered in Gun Amnesty
		Small Arms Destroyed
		Destruction and Disposal Policy
International Controls	Regional Agreements	European Union
		European Union Export Reporting
		United Nations Commission on Crime Prevention and Criminal Justice
	Geneva Declaration on Armed Violence and Development	-
	United Nations Arms Trade Treaty	-
	United Nations Firearms Protocol	-
	United Nations Small Arms Programme of Action (UNPoA)	UNPoA Commitment
		UNPoA Implementation Monitor Score
		UNPoA National Reporting
		UNPoA National Point of Contact
		UNPoA National Coordinating Body
		UNPoA Civil Society Involvement and Support
		UNPoA International Assistance – Donor
International Controls	United Nations Small Arms Register	-
	United Nations Membership	-
	Wassenaar Arrangement	-
Country Profile	Conflict Profile	-
	Global Peace Index	-

Source: Transcrime elaboration

Table C. Master of the interview

1. ITF estimates

- How many firearms get seized in your country/EU every year?
- What is the market value of illicit firearms seized in your country/EU?
- How relevant is the issue of ITF for the internal security of the EU?
- Would you estimate the volume of ITF in your country/EU to be significantly higher than seizures indicate?

2. ITF demand

- Who buys illicit firearms?
  - Organised criminal groups?
  - Other/career criminals?
  - Hobby shooters, hunters, collectors?
  - Citizens who use firearms for other non-criminal purposes?
- What are illicit firearms used for?
  - Mostly to commit crimes or for other reasons?
- How many crimes are committed with the help of illicit firearms?
- What crimes are committed with the help of illicit firearms?
  - Organised crimes/other trafficking operations?
  - Homicides? – How many are committed with (illicit) firearms?
  - Robberies/assaults? – How many are committed with (illicit) firearms?
- Are most crimes committed with illicit firearms rather than legally hold firearms?

3. ITF supply/ *modus operandi*

- Where do most illicit firearms stem from?
- To what extend are organised criminal groups involved in ITF?
  - How are they involved? As wholesalers, organisers, retailers etc.?
- What is the typical scale of ITF?
- Is ITF a lucrative business or rather a side-business?
- How is ITF profitable for criminals? (What are the profits of ITF?)
- What is the risk of detection of criminals involved in ITF?
- What is the level of violence in the *modus operandi*?
- What is the level of corruption in ITF?
- What are typical sizes of ITF shipments?
- What are common transportation modes to ship illicit firearms? – *Modus operandi*
  - Are arms trafficked "personally", e.g. by car?
  - Do traffickers abuse licit modes of transportation, e.g. containers, logistic companies etc.?
  - Are there known cases of government officials or logistics employees being involved?

4. Sources 1/2 – Primary market

- What role do "new" firearms play in ITF within the EU?
- Where do "new" illicit firearms come from? (e.g. from within the EU, other European countries, US etc.)
- Are "new" firearms trafficked from the EU to other parts of the world?
- Are there cases of theft from the European firearms industry?
  - If yes, what is the *modus operandi*?
  - How many arms were stolen?
  - Were employees involved?
  - Were arms stolen for the European market?

- Are there cases of theft from legal gun owners?
- How can legal gun owners participate in ITF?
- What role does illicit conversion of blank-firing arms (gas pistols) play?
  - Is it easy to convert blank-firing arms?
  - What skills are needed to convert blank-firing arms?
  - What materials are needed to convert blank-firing arms?
  - Where are weapons converted?
  - Which blank-firing arms are easiest to be converted?
  - Where do blank-firing arms come from?
- How can the inclusion within the scope of the Firearms Directive of blank-firing weapons and replicas affect ITF? And the inclusion of deactivated firearms?
- What role do stockpiles from the former Eastern Bloc play?
  - Are weapons originating from stockpiles the most relevant source of illicit firearms in the EU?
  - How do traffickers gain access to stockpiles? – *Modus Operandi*?
  - Are stockpiles still existent?
  - Stockpiles from which countries were most critical?
  - How many weapons were diverted from stockpiles?
  - Where are/were weapons from stockpiles destined?
- Are 3D-printed firearms an issue in ITF?

5. Sources 2/2 – Secondary market

- Are illicit firearms in Europe typically "old" weapons?
- Are illicit firearms sold among end-users?
- Are firearms typically being shared, or do they get borrowed?
- Do forensic findings suggest that individual firearms frequently changed in ownership over time?

6. Products

- What is the typical age of illicit firearms?
- What types of arms are trafficked the most?
  - "New" arms?
  - Second-hand arms?
  - Converted arms?
- What specific products are seized/trafficked the most?
  - How do wholesalers operate?
  - What products do wholesalers traffic?
  - Do they engage in trafficking for the European market or for outside markets?
- Are there cases of seizures which involve hundreds or thousands of arms?

7. Wholesale

- Are there signs of involvement of wholesalers in ITF in your country/EU?
  - How do wholesalers operate?
  - What products do wholesalers traffic?
  - Do they engage in trafficking for the European market or for outside markets?
- Are there cases of seizures which involve hundreds or thousands of arms?
- What is the highest number of firearms seized in one operation in your country/EU?

8. Retailing

- Where are illicit firearms typically bought?
- How can the ban on internet sales affect ITF?
- What is the relevance of the dark web in ITF?
- How much do specific types/products of illicit firearms cost?
- Where do retailers obtain arms?
- Do retailers of illicit firearms typically act on their own account, or do they act on behalf of persons behind/criminal networks?

9. Supplying countries

- Do most illicit firearms in the EU originate from inside or outside the EU?
- What are the main supplying countries for illicit firearms?
  - Countries inside the EU?
  - Stockpiles from former Eastern Bloc countries?
  - The role of active conflicts in regions neighbouring the EU? – Ukraine, Syria, Libya etc.

10. Transit countries

- What are the main entry points for illicit firearms to Europe?
- What are the main points of export?
- What is the role of ports?

11. Destination countries

- What are the main ITF destination countries within Europe?
- What are the main destination countries of ITF from Europe to other parts of the world?
  - Conflict areas in areas neighbouring the EU? – Ukraine, Syria, Libya etc.

12. Response

- In your country/ in your organisation, how is ITF being confronted? (Describe organisational/operational structures)
- What forensic systems/data bases are in place?
- What achievements in confronting ITF have been made? (Cases)
- Is the current level of enforcement sufficient? At organisational and political level, is the attention given to ITF proportionate to the threat it poses?
- What organisational/operational changes are foreseen for the future?
- What changes, if any, do you suggest to improve the response to ITF? (regional, national, EU level)
- Is cross-border cooperation on ITF working well? With whom?

13. Regulatory framework

- Which practical law enforcement problems can be identified due to the current regulatory framework?
- Are there known loopholes at EU and national levels that traffickers exploit?
- Are there examples of legislation that facilitate identification of critical national regulations?
- In terms of regulation, what best practices can be identified, and where?
- What is your stance/preferences regarding the upcoming legal revisions of the EU regulatory framework on firearms?
- What are the amendments that might have a negative effect on ITF?
- What are the main challenges in finding a more effective regulatory framework?
- Are you in favour of regulatory centralisation at EU level?
- What are common arguments against/in favour?
- Can the inclusion of the collectors within the scope of the Firearms Directive reduce their involvement in ITF? And the inclusion of brokers?
- What consequences can the introduction of unique marking on imported firearms have on ITF?
- How can the ban of semi-automatic firearms for civilian use affect ITF?
- What can be the effect of the obligation for MSs to destroy the seized Cat. A firearms on ITF?
- What can be the effect of the introduction of a maximum duration limit to the licenses of Cat. B firearms?
- How can the introduction of marking requirements upon the deactivated firearms influence ITF?
- What can be the effects upon ITF of a better exchange of information between MSs?

Source: Transcrime elaboration

Table D. List of keywords for firearm seizures

D. 1

Category	English	Bulgarian	Catalan	Croatian	Czech	Danish	Dutch
Firearm	firearm	огнестрелно оръжие	arma de foc	vatreno oružje	střelná zbraň	skydevåben	vuurwapen
	revolver	револвер	revòlver	revolver	revolver	revolver	revolver
	pistol	пистолет	pistol	pištolj; revolver	pistole	pistol	pistool
	rifle	пушка	rifle	puška	puška	riffel	geweer
	gun	пистолет	pistola	pištolj	pistole	gun	pistool
	weapon	оръжие	arma	oružje	zbraň	våben	wapen
Seizure	seize	конфискува	confiscar	zaplijeniti	chytit	beslaglægge	in beslag nemen
	seized	обзет	confiscada	zaplijenjeno	chytil	beslaglagt	in beslag genomen
	seizure	припадък	confiscació	zapljena	záchvat	beslaglæggelse	inbeslagname
	confiscate	конфискувам	confiscar	Konfiscirati; zaplijeniti	zabavit	konfiskere	confisceren

D. 2

Category	English	Estonian	Finnish	Flemish	French	German	Greek
Firearm	firearm	tulirelv	tuliase	vuurwapen	arme à feu	Schusswaffe	πυροβόλο όπλο
	revolver	revolver	revolveri	revolver	revolver	Revolver	περίστροφο
	pistol	püstol	pistooli	pistool	pistolet	Pistole	πιστόλι
	rifle	vintpüss	kivääri	schietwapen	fusil	Gewehr	τουφέκι
	gun	relv; püss; püstol; kahur; prits; laskma	ase	geweer	pistolet	Gewehr	πιστόλι
	weapon	relv	ase	wapen	arme	Waffe	όπλο
Seizure	seize	haarama; kinni rabama	takavarikoida	grijpen; in beslag nemen	saisir	beschlagnahmen	προβαίνω σε κατάσχεση
	seized	konfiskeerima	takavarikoitiin	gegrepen; in beslag genomen	saisis	beschlagnahmt	κατασχεμένος; δικαστικό πειστήριο
	seizure	konfiskeerimine; arestimine	takavarikointi	beslaglegging	saisie	Beschlagnahmung	κατάσχεση
	confiscate	konfiskeerima	takavarikoida	aangegrepen	confisquer	konfiszieren	κατάσχω

D. 3

Category	English	Hungarian	Irish	Italian	Latvian	Lithuanian	Maltese
Firearm	firearm	lőfegyver	arm tine	arma	šaujam-ierocis	šaunamasis ginklas	arma tan-nar
	revolver	revolver	gunnán	rivoltella	revolveris	revolveris	revolvers
	pistol	pisztoly	piostal	pistola	pistole	pistoletas	pistola
	rifle	puska	raidhfil	fucile	šautene	šautuvas	xkubetta
	gun	pisztoly	gunna	pistola	lielgabals	pistoletas	gun
	weapon	fegyver	arm	arma	ierocis	ginklas	arma
Seizure	seize	megragadják	urghabh	sequestrare	konfiscēt	pasinaudoti	jaħtfu
	seized	lefoglalt	urgh-abhadh	sequestrate	konfiscēti	areštuotas	maqbuda
	seizure	elkobzás	urghabháil	sequestro	konfiskācija	konfiskavi-mas	qbid
	confiscate	lefoglal	coigistigh	confiscare	konfiscēt	konfiskuoti	jikkonfiskaw

D. 4

Category	English	Polish	Portuguese	Romanian	Slovak	Slovenian	Spanish	Swedish
Firearm	firearm	broń palna	arma de fogo	armă de foc	strelná zbraň	strelno orožje	arma de fuego	skjutvapen
	revolver	rewolwer	revólver	revolver	revolver	revolver	revólver	revolver
	pistol	pistolet	pistola	pistol	pištole	pištola	pistola	pistol
	rifle	karabin	fuzil	pușcă	puška	puška	rifle	gevär
	gun	pistolet	pistola	armă	pištole	puška; orožje; pištola	pistola	vapen
	weapon	broń	arma	armă	zbraň	orožje	arma	vapen
Seizure	seize	zawładnąć	seqüestrar	confisca	chytiť	zaseči	incautar	beslagta
	seized	zajęte	seqüestrar	ocupat	chytil	zasežena	incauta-do	beslagtog
	seizure	konfiskata	seqüestro	confiscare	záchvat	zaplemba	incau-tación	beslag
	confiscate	konfiskować	confiscar	confisca	zabaviť	zapleniti; zaseči	confiscar	konfiskera

Source: Transcrime elaboration

Table E. List of keywords for deadly and non-deadly shootings

E. 1

Category	English	Bulgarian	Catalan	Croatian	Czech	Danish	Dutch
Firearm	gun	пистолет	pistola	pištolj	pistole	gun	pistool
	gunned down	застрелян; свален	abatut a trets	ustrijeljen	zastřelen	skudt ned	neerges-choten
	gunfight	престрелка	tiroteig	obračun	přestřelka	våbenkamp	vuurgevecht
	weapon	оръжие	arma	oružje	zbraň	våben	wapen
	firearm	огнестрелно оръжие	arma de foc	vatreno oružje	střelná zbraň	skydevåben	vuurwapen
	revolver	револвер	revòlver	pištolj; revolver	revolver	revolver	revolver
	pistol	пистолет	pistol	pištolj	pistole	pistol	pistool
	rifle	пушка	rifle	puška	puška	riffel	geweer
	shoot	стрелям	disparar	pucati; strel-jati; pucanj	střílet	skyde	schieten; vuren
	(was) shot	застрелян; получавам	va rebre un tret	(bio) upucan	zastřelen	skudt	neerges-choten
	shooting	стрелба	tret	pucanje	střelba	skydning	schieten; vuren
	shootout	стрелба	tiroteig	pucnjave	přestřelka	skyde løs (på)	vuurgevecht
	shoot-out	престрелка	tiroteig	ispucavanje	-	ildkamp	vuurgevecht
	(to) open fire	да открият огън	obrir foc	otvoriti vatru; otvoriti pucn-javu	zahájit palbu	at åbne ild	vuur openen
	opened fire	откри огън	va obrir foc	otvrena vatra; otvorena pucnajva	zahájená palba	åbnede ild	opende vuur
Killing	homicide	убийство	homicidi	umorstvo / ubojstvo	zabití	mand-drab	moord
	murder	убийство	assassi-nat	umorstvo / ubojstvo	vražda	mord	moord
	murdered	убит	assassi-nat	ubijen; umoren	zavražděný	myrdet	vermoord; om het leven gebracht
	suicide	самоубийство	suïcidi	samoubojstvo	sebevražda	selvmord	zelfmoord
	death	смърт	mort	smrt	smrt	død	dood
	dead	мъртъв	mort	mrtav	mrtvý	døde	dood
	assassination	убийство	assassi-nat	ubojstvo	vražda	snigmord	moord
	assasinate	убивам	assassi-nar	ubiti	zavraždit	attentat or snigmyrde	vermoorden
	assassinated	убит	assassi-nat	ubijen; umoren	zavražděn	myrdet (or snigmyrdet)	vermoord
	kill	убивам	matar	ubiti; usmrtiti	zabít	dræbe	vermoorden (verb)
	killed	убит	-	ubijen; umoren	zabil	dræbt	vermoord
	killing	убийство	matança	ubijanje	zabíjení	drab	moord

E.2.

Category	English	Estonian	Finnish	Flemish	French	German	Greek
Firearm	gun	relv; püss; püstol; kahur; prits; laskma	ase	geweer	pistolet	Gewehr	πιστόλι
	gunned down	maha laskma	ammuttiin	neerges-choten	abattu	niederges-chossen	πυροβολήθηκε
	gunfight	tulistamine	ammuske-lu	vuurgevecht	fusillade	Feuergefecht	ένοπλη συμπλοκή
	weapon	relv	ase	wapen	arme	Waffe	όπλο
	firearm	tulirelv	tuliase	vuurwapen	arme à feu	Schusswaffe	πυροβόλο όπλο
	revolver	revolver	revolveri	revolver	revolver	Revolver	περίστροφο
	pistol	püstol	pistooli	pistool	pistolet	Pistole	πιστόλι
	rifle	vintpüss	kivääri	schietwapen	fusil	Gewehr	τουφέκι
	shoot	(maha) lask-ma	ampua	schieten	tirer	schießen	πυροβολώ
	(was) shot	tulistati; lasti (maha)	ammuttiin	is neerges-choten	abattu	erschossen	πυροβολήθηκε
	shooting	laskmine	ammunta	schietpartij	tournage	Schießen	πυροβολισμός
	shootout	tulevahetus avalikuskohas	ammuske-lu	schietpartij	fusillade	Schießerei	ανταλλαγή πυροβολισμών
	shoot-out	võistlus et kes paremini tulistab; ala et kes paremini märki tabab; nagu duell	-	-	décharge	-	η τελειωτική μάχη
	(to) open fire	tulevahetuse avama	avata tuli	het vuur openen	ouvrir le feu	Feuer eröff-nen	ανοίγω πυρ
	opened fire	avasid tu-levahetuse; lahingu	avasi tulen	geopend vuur	ouvert le feu	eröffnete das Feuer	άνοιξα πυρ
Killing	homicide	mõrv	murha	moord	homicide	Totschlag	ανθρωποκτονία
	murder	tapmine; mõrv; mõrva-ma	murha	moord	assassiner	Mord	δολοφονία
	murdered	mõrvatakse	murhattiin	vermoord	assassiné	ermordet	δολοφονημένος
	suicide	enesetapp	itsemurha	zelfmoord; zelfdoding	suicide	Selbstmord	αυτοκτονία
	death	surm; surma-juhtum	kuolema	dood	mort	Tod	θάνατος
	dead	surnud	kuollut	dood	mort	tot	νεκρός
	assassi-nation	salamõrv	salamurha	moord	assassinat	Attentat	δολοφονία
	assasin-ate	reetlikult tapma	salamur-hata	vermoorden	assasinate	ermorden	δολοφωνώ
	assassi-nated	reetlikult tapetud	salamur-hattiin	vermoord	assassiné	ermordet	δολοφονημένος
	kill	tapma	tappaa	vermoorden; doden	tuer	töten	σκοτώνω
	killed	tappis	tapettiin	vermoord	assassiné	getötet	σκοτωμένος
	killing	tapmine	tappo	vermoorden; doden	meurtre	Tötung	φόνος

E. 3

Category	English	Hungarian	Irish	Italian	Latvian	Lithuanian	Polish
Firearm	gun	pisztoly	gunna	pistola	lielgabals	pistoletas	pistolet
	gunned down	lőtték le	scaoil-eadh agus maraíodh	freddato	nošauts	nusautas	zastrzel-ony
	gunfight	-	troid go bás le gunnaí	scontro a fuoco	-	susišaudymą	strzelanina
	weapon	fegyver	arm	arma	ierocis	ginklas	broń
	firearm	lőfegyver	arm tine	arma da fuoco	šaujamierocis	šaunamasis ginklas	broń palna
	revolver	revolver	gunnán	rivoltella	revolveris	revolveris	rewolwer
	pistol	pisztoly	piostal	pistola	pistole	pistoletas	pistolet
	rifle	puska	raidhfil	fucile	šautene	šautuvas	karabin
	shoot	lő	lámhach	sparare	šaut	šaudyti	strzelać
	(was) shot	lőtték	bhí lámhaigh	girato	nošauts	nušautas	zastrzel-ony
	shooting	lövés	lámhach	tiro	šaušana	šaudymas	strzelanie
	shootout	-	-	sparatoria	-	susišaudymas	Strzela-nina
	shoot-out	-	troid go bás le gunnaí	-	-	-	-
	(to) open fire	tüzet nyitni	tosaigh ar lámhach	aprire il fuoco	atklāt uguni	atidaryti ugnį	otworzyć ogień
	opened fire	tüzet nyitot-tak	thosaigh ar lámhach	aperto il fuoco	atklāja uguni	apšaudė	otwarty ogień
Killing	homicide	emberölés	dúnmharú	omicidio	slepkava	nužudymas	zabójstwo
	murder	gyilkosság	dúnmharú	omicidio	slepkavība	nužudymas	morderst-wo
	murdered	meggyilkolt	dúnmharaíodh	assassi-nato	nogalināts	nužudyta	zamor-dowany
	suicide	öngyilkosság	féinmharú	suicidio	pašnāvība	savižudybė	samobó-jstwo
	death	halál	bás	morte	nāve	mirtis	śmierć
	dead	halott	marbh	morto	miris	miręs	martwy
	assassina-tion	orgyilkosság	feallmharú	assassinio	slepkavība	nužudymas	morderst-wo
	assasinate	assasinate	feallmharaigh	assassin-are	assasinate	assasinate	zamor-dować
	assassinated	meggy-ilkolták	feallmhara-ithe	assassi-nato	noslepkavots	nužudytas	zamor-dowany
	kill	megöl	maraigh	uccidere	nogalināt	nužudyti	zabić
	killed	elesett	mharaigh	ucciso	nogalināti	užmuštas	zabity
	killing	gyilkolás	marú	uccisione	nogalināšanu	nužudymas	zabijanie

E. 4

Category	English	Portuguese	Romanian	Slovak	Slovenian	Spanish	Swedish
Firearm	gun	pistola	pistol	pištoľ	gun	pistola	vapen
	gunned down	morto a tiros	împușcat	zastrelený	ustreljen	abatido a tiros	Nedskjuten
	gunfight	tiroteio	schimb de focuri	prestrelka	strelni dvoboj	tiroteo	skottväxling
	weapon	arma	armă	zbraň	orožje	arma	vapen
	firearm	arma de fogo	armă de foc	strelná zbraň	strelno orožje	arma de fuego	skjutvapen
	revolver	revólver	revolver	revolver	revolver	revólver	revolver
	pistol	pistola	pistol	pištoľ	pistol	pistola	pistol
	rifle	fuzil	pușcă	puška	puška	rifle	gevär
	shoot	disparar	a împușca	strieľať	ustrelil	disparar	skott
	(was) shot	baleado	împușcat	zastrelený	ustreljen	recibió un disparo	blev skjuten
	shooting	disparo	împușcare	streľba	streljanje	disparo	skjutning
	shootout	tiroteiro	schimb de focuri	prestrelka	-	tiroteo	eldstrid
	shoot-out	-	-	-	-	-	eldstrid/ skottväxling
	(to) open fire	abrir o	a deschide focul	zahájiť paľbu	odpreti ogenj	abrir fuego	(att) öppna eld
	opened fire	abre o	foc deschis	zahájená paľba	odprt ogenj	abrió fuego	öppnade eld
Killing	homicide	homicídio	omucidere	zabitie	umor	homicidio	dråp/mord
	murder	assassinato	crimă	vražda	umor	asesinato	mord
	murdered	assassinado	ucis	zavraždený	umorjena	asesinado	mördad
	suicide	suicídio	sinucidere	samovražda	samomor	suicidio	självmord
	death	morte	moarte	smrť	smrt	muerte	död
	dead	morto	mort	mŕtvy	mrtev	muerto	död
	assassination	assassinio	asasinat	vražda	atentat	asesinato	lönnmord
	assasinate	assassinar	assasinate	zavraždiť	assasinate	asesinar	lönnmörda
	assassinated	assassinado	asasinat	zavraždený	umorjen	asesinado	lönnmördad
	kill	matar	ucide	zabiť	ubiti	matar	döda
	killed	matado	ucis	zabitý	ubit	matado/ asesinado	dödade
	killing	matança	ucidere	zabíjanie	ubijanje	matanza	dödande

Source: Transcrime elaboration

Table F. List of keywords for firearm trafficking

F. 1

Category	English	Bulgarian	Dutch	Flemish	French	German
Firearm	firearm	огнестрелно оръжие	vuurwapen	vuurwapen	arme à feu	Schusswaffe
	revolver	револвер	revolver	revolver	revolver	Revolver
	pistol	пистолет	pistool	pistool	pistolet	Pistole
	rifle	пушка	geweer	schietwapen	fusil	Gewehr
	gun	пистолет	pistool	geweer	pistolet	Gewehr
	weapon	оръжие	wapen	wapen	arme	Waffe
Trafficking	trafficking	трафик	handel	handel	trafic	handel
	smuggling	контрабанда	smokkel	smokkel	contraband; trafic	schmuggel

F. 2

Category	English	Italian	Polish	Portuguese	Spanish
Firearm	firearm	arma	broń palna	arma de fogo	arma de fuego
	revolver	rivoltella	rewolwer	revólver	revólver
	pistol	pistola	pistolet	pistola	pistola
	rifle	fucile	karabin	fuzil	rifle
	gun	pistola	pistolet	pistola	pistola
	weapon	arma	broń	arma	arma
Trafficking	trafficking	traffico	przemyt	tráfico	tràfico
	smuggling	contrabbando	szmugiel; kontrabanda	contrabando	contrabando

Source: Transcrime elaboration

Table G. List of entity stop-words

aaron hernandez	bob welch	faisal shahzad	joe biden	louis van gaal	mussolini
abbas	bond girl	federico fellini	john barry	luciano lutring	mónica spear
abdelbaset al-megrahi	bonnie and clyde	fidel castro	john f. kennedy	lucio dalla	nanni moretti
abdulmutallab	brad pitt	francesco rosi	john gilligan	luigi tenco	napoleon
abel ferrara	bradley cooper	francesco totti	john gotti	lyndon b. johnson	nawaz sharif
ahmadinejad	breivik	franco battiato	john kerry	madonna	ned kelly
al capone	bruce lee	frankie fraser	john lennon	malala yousafzai	netanyahu
al pacino	bruno contrada	franz ferdinand	john mcafee	malcolm x	nicholas green
alain resnais	caravaggio	gabrielle giffords	john mccain	mandela	nidal malik hasan
aldo moro	carla bruni	gaddafi	john paul ii	manela	nigel farage
alexander litvinenko	carlo alberto dalla chiesa	george clooney	johnny depp	mao	norman tebbit
ali abdullah saleh	carlo giuliani	george w. bush	joker	marcin kasprzak	néstor kirchner
amanda knox	carlo lizzani	gerry adams	jong-un	marco pantani	o. j. simpson
amy winehouse	carlo mazzacurati	giorgio ambrosoli	joseph petrosino	marco tullio giordana	obama
angelina jolie	carlos the jackal	giuliano gemma	joseph stalin	marek hamšík	odysseus
anita ekberg	carmelo bene	giuliano montaldo	joss stone	margaret thatcher	oliver stone
anjem choudary	cesare battisti	giulio andreotti	josé mourinho	marilyn monroe	olivia newton-john
anna politkovskaya	charles manson	giuseppe fava	jovan belcher	mario monicelli	olof palme
anna proclemer	chavez	giuseppe garibaldi	juan carlos	mark david chapman	oriana fallaci
anni dewani	che guevara	giuseppe impastato	julian assange	mark wahlberg	orson welles
anton chekhov	chokri belaid	giuseppe mazzini	julius caesar	martin luther king	paolo borsellino
antonio ingroia	chris kyle	heydrich	junior seau	martin luther king jr.	paolo di tarso
ariel sharon	christopher dorner	hillary clinton	justin bieber	martin mcguinness	paolo pasolini
assad	claudio scajola	hitchcock	karzai	massimo troisi	papa benedetto
balotelli	clint eastwood	hitler	keanu reeves	matteo renzi	paul gascoigne
ban ki-moon	cobain	horst faas	kennedy	matthew mcconaughey	paul walker
batman	colin farrell	hrant dink	khomeini	max hastings	peter falk
benazir bhutto	courtney love	ilaria alpi	kim jong-il	mehmet ali a ca	peter hitchens
beppe grillo	cristina fernandez	imran khan	kim jong-un	michael bloomberg	petraeus
berlusconi	dante alighieri	james bond	kofi annan	michael jace	philip seymour hoffman
bernardo provenzano	david berkowitz	james brady	kray twins	michael jackson	piers morgan
bettino craxi	david cameron	james eagan holmes	kurt cobain	michelle obama	pietro calabrese

bhutto	david carr	james gandolfini	lady gaga	mick jagger	pietro perugino
bill clinton	david kelly	jared lee loughner	lapo elkann	mike nichols	pino daniele
bill cosby	diego maradona	jennifer hudson	larry flynt	mitt romney	pino puglisi
billy the kid	dokka umarov	jeremy bamber	laura pausini	mohamed elbaradei	pinochet
billy wright (loyalist)	elton john	jeremy clarkson	laurent gbagbo	mohamed morsi	pio la torre
bin laden	enrico de pedis	jeremy thorpe	lee harvey oswald	monica bellucci	pio of pietrelcina
birdman	enrico letta	jihad jane	lenin	mubarak	pistorius
bob dylan	erdogan	jimmy fontana	libero grassi	mumia abu-jamal	politkovskaya
bob marley	erich priebke	jimmy ryce	lino banfi	musharraf	pope francis
poroshenko	theo van gogh	pupetta maresca	trayvon martin	richard iii	viktor yanukovych
primo levi	tiberio murgia	putin	troy davis	richard nixon	vincent van gogh
prince charles	tiziano	queen	tupac	riina	virna lisi
prince philip	tom cruise	quentin tarantino	valeria golino	robert bales	vittorio arrigoni
prince william	tony blair	ratko mladić	veronica guerin	robert f. kennedy	walter bonatti
princess diana	tony scott	reeva steenkamp	viktor bout	robert fisk	warhol
robin van persie	whitey bulger	roger waters	william shakespeare	saddam hussein	arafat
robin williams	whitney houston	ronald reagan	winston churchill	saint george	yoko ono
rodney king	william hague	rubin carter	yanukovych	salvador allende	zine el abidine ben ali
salvatore giuliano	zoran Đinđić	sarkozy	sean taylor	shahbaz bhatti	sherlock holmes
salvo d'acquisto	Željko ražnatović	senzo meyiwa	sergio leone	spike lee	tayyip erdogan
stephen lawrence	subcomandante marcos	suge knight	suu kyi		

Source: Transcrime elaboration

Table H. List of geographic stop-words

United States	Damascus	Bahrain	Indonesia	Punjab	Uzbekistan
Afghanistan	Florida	Miami	Islamabad	Kentucky	Malaysia
Syria	California	Tahrir	Pennsylvania	Ghana	Kuwait
Egypt	Ottawa	Aleppo	Nevada	Niger	Panama
Israel	Washington	Daraa	Hama	Darfur	Utah
Libya	Benghazi	Newtown	Kyrgyzstan	Temple Mount	New Zealand
Pakistan	Algeria	Australia	Caucasus	Bangui	Tennessee
Boston	Senegal	Herat	Caracas	Pyongyang	Farah
Gaza	Denver	Maryland	Virginia	Uganda	Michigan
Russia	Missouri	Nairobi	Tibet	Homs	Iguala
New York	Chile	Alabama	Taksim	Kansas	San Francisco
Nigeria	Istanbul	Haiti	Ivory Coast	Naro	Rwanda
Tunisia	West Bank	Burma	Rio de Janeiro	St. Louis	Camacho

Yemen	Empire State Building	Central African Republic	Tyre	Birmingham	Liberia
Iraq	Mogadishu	Dallas	Quetta	Madagascar	Dominican Republic
Brazil	Arizona	Sudan	New Jersey	Nablus	Manhattan
India	Fort Hood	Sirte	Kerala	Aden	Khamis
Mexico	Sinai	Tel Aviv	Pretoria	Maghreb	Bahrain
Canada	Baghdad	Japan	Santa Monica	Acapulco	Fort Knox
Turkey	Middle East	Bangladesh	Togo	Alexandria	Maiduguri
Cairo	Hollywood	Phoenix	Oklahoma	Sidi Bouzid	Kansas
Kabul	Tunis	Houston	Mosul	Wyoming	Missouri
Palestine	Las Vegas	America	Times Square	Quebec	North Kivu
Argentina	White House	Beirut	Sri Lanka	Nebraska	Copacabana
China	Ohio	Burundi	Ta'izz	Latakia	Rio de Janeiro
Texas	Gaza	Tucson	South Carolina	Eritrea	Balochistan
Venezuela	North Korea	Congo	Taiwan	Wall Street	Pakistan
Lebanon	Cuba	Africa	New Orleans	Maracaibo	Watertown
Tripoli	Cleveland	Brooklyn	Vietnam	Atlanta	Massachusetts
Somalia	Karachi	Sydney	Cambodia	Montreal	Abuja
Kenya	Manila	Sudan	Ecuador	Aurora	Jenin
Thailand	Colorado	Port Said	Wisconsin	Nepal	Malindi
Iran	Connecticut	Ankara	Toronto	Tiananmen	Soviet Union
Los Angeles	Tehran	Beijing	Ethiopia	Eilat	Sochi
Seattle	Kandahar	Buenos Aires	Mombasa	Pacific Ocean	Seoul
Philippines	Mali	Tiber	Guinea	Costa Rica	Harlem
Bangkok	Chicago	Peru	Grozny	Guatemala	Tokyo
Chechnya	Colombia	Jordan	Illinois	Dubai	Baltimore
Africa	Arabia	Georgia	Kano	Lahore	Cameroon
Jerusalem	Peshawar	Delhi	Hebron	Hong Kong	Mindanao
Morocco	Honduras	Dagestan	Korea	Oregon	Bahia
Chapel Hill	Fortaleza	Kunming	Dalmatia	Juba	Rochester
North Carolina	Abidjan	San Antonio	Palm Beach	Erbil	Norfolk
New Mexico	Red Sea	Maluku	Tigris	Gatumba	Alaska
Miletus	Fallujah	Sahara	Mandera	Quantico	Tremseh
Faisalabad	Portland	Tobruk	Nile	Zanzibar	Jerusalem
Derna	Oregon	Curitiba	Pasadena	Oklahoma City	Guangzhou
Belgorod	Assam	Benin	Pittsburgh	Hiroshima	Kandhar
Kazakhstan	Golan	Sichuan	Beslan	Hurghada	Columbia
Kunduz	Kirkuk	Singapore	Orlando	Isla Margarita	Riyadh
Minnesota	South Carolina	Angola	Helmand	Alcatraz	Veracruz
Suez	Kennedy	Fukushima	Qatar	Kayes	Tawergha
Duma	Louisiana	Idaho	Zintan	Tulsa	Rehana
Oakland	Troy	Edmonton	Santiago	Hudson River	San Diego
Detroit	Mosul	Arkansas	Odisha	Hialeah	Congo
Jalalabad	Uruguay	Ramadi	Lagos	Bolivia	Puerto Rico
Abbottabad	Minneapolis	Jakarta	Lydia	Beit Lahia	Casamance

Jerusalem	Kathmandu	Mauritania	Bamako	Santo Domingo	Rafah
Berkeley	Sharm el-Sheikh	Kinshasa	Jisr al-Shughur	Rawalpindi	Maseru
Sevastopol	Ingushetia	Indiana	Romney	Chihuahua	Ilorin
Ajdabiya	Bali	Paraguay	Taipei	Andes	Zinjibar
Austin	Cyprus	Sierra Leone	Sakhalin	Argonne	Ruston
Jordan River	Bukavu	Montana	Mongolia	In Amenas	Oaxaca
Asia	Giza	Guliston	Abkhazia	Algiers	Mar del Plata
Liran	Monterrey	Douma	Arbia	Ar-Raqqah	Dakar
Tiananmen	Iowa	Idlib	El Salvador	Tagab	Haiphong
Ferguson	Ramallah	Jalisco	Khasan	Kapisa	Segesta
Galkayo	Conakry	Siberia	Bethlehem	Lesotho	Niamey
Delaware	Algiers	Cape Town	Kab-ardino-Balkaria	Zimbabwe	Beqaa
Mozambique	Tamaulipas	El Paso	Nicaragua	Buda	Panjshir
Tripoli	Daraya	Jamaica	Port-au-Prince	Soweto	Qatif
Lebanon	Yellowstone	Phnom Penh	Rustenburg	Manama	Azawad
Moncton	Kismayo	Tafas	Ouagadougou	Iwo Jima	Gulf of Aden
Borno	Mumbai	Ghazni	Shanghai	Paita	Andhra Pradesh
Burkina Faso	Volgograd	South Dakota	Kyoto	Ra's Lanuf	Antioquia
Milwaukee	Belize	Babylon	Carthage	Bishkek	Kurram
Kurdistan	Zawiya	Maine	El Alamein	Armenia	Maguindanao
Curuguaty	Baniyas	Lima	Nagorno	Pune	Rutshuru
Negev	Sunset Boulevard	Vancouver	Karabakh	Caribbean	Euroa
Chad	Santa Barbara	Ko Tao	Emirates	Kobe	Ashkelon
Bani Walid	Queens	Memphis	Porto Alegre	Downing Street	Seiyun
Omaha	Brega	Minya	Ashdod	Antakya	K2
Nebraska	Guantanamo	Indianapolis	Long Island	Uttar Pradesh	Red Square

Source: Transcrime elaboration

Table I. List of keywords used to identify marketplaces on dark web search engines

I. 1

Category	English	Bulgarian	Catalan	Croatian	Czech	Danish	Dutch
Firearm	firearm	огнестрелно оръжие	arma de foc	vatreno oružje	střelná zbraň	skydevåben	vuurwapen
	revolver	револвер	revòlver	revolver	revolver	revolver	revolver
	pistol	пистолет	pistol	pištolj; revolver	pistole	pistol	pistool
	rifle	пушка	rifle	puška	puška	riffel	geweer
	gun	пистолет	pistola	pištolj	pistole	gun	pistool
	weapon	оръжие	arma	oružje	zbraň	våben	wapen

I. 2

Category	English	Estonian	Finnish	Flemish	French	German	Greek
Firearm	firearm	tulirelv	tuliase	vuurwapen	arme à feu	Schusswaffe	πυροβόλο όπλο
	revolver	revolver	revolveri	revolver	revolver	Revolver	περίστροφο
	pistol	püstol	pistooli	pistool	pistolet	Pistole	πιστόλι
	rifle	vintpüss	kivääri	schietwapen	fusil	Gewehr	τουφέκι
	gun	relv; püss; püstol; kahur; prits; laskma	ase	geweer	pistolet	Gewehr	πιστόλι
	weapon	relv	ase	wapen	arme	Waffe	όπλο

I. 3

Category	English	Hungarian	Irish	Italian	Latvian	Lithuanian	Maltese	Polish
Firearm	firearm	lőfegyver	arm tine	arma	šaujamierocis	šaunamasis ginklas	arma tan-nar	broń palna
	revolver	revolver	gunnán	rivoltella	revolveris	revolveris	revolvers	rewolwer
	pistol	pisztoly	piostal	pistola	pistole	pistoletas	pistola	pistolet
	rifle	puska	raidhfil	fucile	šautene	šautuvas	xkubetta	karabin
	gun	pisztoly	gunna	pistola	lielgabals	pistoletas	gun	pistolet
	weapon	fegyver	arm	arma	ierocis	ginklas	arma	broń

I. 4

Category	English	Portuguese	Romanian	Slovak	Slovenian	Spanish	Swedish
Firearm	firearm	arma de fogo	armă de foc	strelná zbraň	strelno orožje	arma de fuego	skjutvapen
	revolver	revólver	revolver	revolver	revolver	revólver	revolver
	pistol	pistola	pistol	pištole	pištola	pistola	pistol
	rifle	fuzil	pușcă	puška	puška	rifle	gevär
	gun	pistola	armă	pištole	puška; orožje; pištola	pistola	vapen
	weapon	arma	armă	zbraň	orožje	arma	vapen

Source: Transcrime elaboration

Footnotes

1. Web content is a sub-category of open sources. The latter are any *"publicly available information appearing in print or electronic form. Open source information may be transmitted through radio, television, and newspapers, or it may be distributed by commercial databases, electronic mail networks, or portable electronic media such as CD-ROM's. It may be disseminated to a broad public, as are the mass media, or to a more select audience, such as grey literature, which includes conference proceedings, company shareholder reports, and local telephone directories"* (Steele 1995, 457). For the purposes of Project FIRE, 'web content' refers to online newspapers, online press releases and dark-web contents.

2. The academic literature consists of scientific works written by researchers, scholars, experts in the field, etc. and published in scientific journals.

3. The grey literature encompasses informally published written materials such as publications by private or public organisations, technical and research reports, research projects, graduation and Ph.D. theses, or presentations for conferences, seminars, etc.

4. There are two exceptions to this process: translation from English to Latvian was not validated and only English keywords were used for Malta.

5. These keywords correspond to those used for the collection of academic and grey literature. They were translated from English into the official spoken language of each EU country using Google Translate and then validated by native speakers (see Table A in the Appendix).

6. The countries that provided data and information were: Czech Republic, Denmark, Estonia, Greece, Lithuania, and Portugal.

7. http://www.gunpolicy.org/.

8. This database is not publicly available.

9. In the first place, keywords related to firearms trafficking were also included (see Table F in the Appendix). A pilot study combined validated keywords on "firearms" with "trafficking" or "smuggling" for some countries (i.e. Belgium, Bulgaria, France, Italy, the Netherlands, Poland, Portugal, Spain, Sweden, and the UK) for a limited time span (i.e. 2014-30/03/2015). The results revealed that this keywords combination identified very few relevant cases. For instance, in Italy among the 2,427 articles extracted within that time span, only 17 were actually relevant.

10. http://emm.newsbrief.eu/. The website collects and aggregates by country a wide range of online news websites and enables a rapid search through the entire database. It is updated every 10 minutes.

11. There are two exceptions to this process: translation from English to Latvian was not validated and only English keywords were used for Malta.

12. https://www.textrazor.com.

13. Note that at this step some items could be lost if they are not found at their origin.

14. The presence of "/" before the keywords ensured the filtering of only the links with such terms in the URLs paths.

15. This classification is based on the Study on Firearms by UNODC (2015).

16. When there are no victims the event was classified as a shooting or, if the article clearly stated so, as an attempted homicide.

17. This classification is an adaptation of the one used in the Global Study on Homicide by UNODC (2012).

18. This classification is based on the Study on Firearms by UNODC (2015).

19. These countries are: Bulgaria, Croatia, Denmark, France, Germany, Ireland, Lithuania, Portugal, Slovenia, Spain, and the UK.

20. Data refer to firearm seizures in: Denmark, Estonia, Greece, Lithuania, and Portugal.

21. The aggregation of macro-regions and ethnic origins followed the grouping scheme of European sub-regions by the UN Statistics Division. Differently from the UN scheme, however, Estonia, Lithuania and Latvia were grouped under Eastern Europe instead of Northern Europe. This decision was based on the rationale that in terms of the factors that influence shootings at regional levels, these resemble Eastern European countries rather than Northern European countries.

22. Data extracted from the European Detailed Mortality Database by the World Health Organization Regional Office for Europe on the categories of: intentional self-harm by handgun discharge, by rifle, shotgun, and larger firearm discharge, by other and unspecified firearm discharge (ICD codes: ICD-10: X72-X74). This percentage refers to the 17 countries providing data on 2014 (i.e. Austria, Croatia, Czech Republic, Estonia, Finland, Germany, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Spain, and Sweden).

23. When there were no victims, the event was classified as a shooting or, if the article clearly stated so, as an attempted homicide.

24. The TOR search engines used to identify marketplaces were:
    - Hidden Wiki, a website that functions as a directory for other onion websites and is structured like Wikipedia (available at http://kpvz7ki2v5agwt35.onion);
    - TORCH, a search engine for onion websites (available at http://xmh57jrzrnw6insl.onion);
    - Grams, a search engine for dark net markets (available at http://grams7enufi7jmdl.onion);
    - Sinbad, a search engine for onion websites (available at http://sinbad66644fr5lq.onion).

25. The websites contained in the initial list were: The Armory, Nucleus, Luckp 47, EuroGuns, UK Guns and Ammo Store, Middle-heart, Evolution, Agora, BMG, Arsenal Arms Market, Arsenal Arms Market 1, Alphabay Market, Valhalla, Oasis, Dream Market, Glock's & Taurus, N/A (name not specified), Guns Dark Market, AA Black Market, Manufrance, Black Market Guns, Crime Network, and Outlaw.

26. The scrapers were developed in Node.js, a JavaScript framework and runtime engine, and Nightmare.js, a high-level browser automation library. Such tools were adopted because of their simplicity. In order to comply with the onion routing protocol (a technique for anonymous communication over a computer network used by Deep Web sites to avoid user tracking), the TOR browser was also used as a proxy to reach the markets. The codes for the scrapers are available at https://github.com/densitydesign/Deep Web_scrapers.

27. This classification is based on the Study on Firearms by UNODC (2015).