European Commission

Mapping the risk of serious and organised crime infiltrating legitimate businesses

Technical annexes

Edited by Shann Hulme, Emma Disley and Emma Louise Blondes

Migration and Home Affairs

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EUROPEAN COMMISSION

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Abbreviations

AMO	Asset Management Office
ARO	Asset Recovery Office
ATM	Automated teller machine
BvD	Bureau van Dijk
CaaS	Crimes-as-a-Service
CDA	Currency demand approach
CNP	Card-not-present
CSD	Centre for the Study of Democracy
ELV	End-of-life vehicles
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
EMEA	European, the Middle East and Africa
EMPACT	European Multidisciplinary Platform Against Criminal Threats
EUIPO	European Union Intellectual Property Office
FATF	Financial Action Task Force
FinTech	Financial Technology
FIU	Financial Intelligence Unit
FRA	Fundamental Rights Agency
FTZ	Free trade zone
GDP	Gross Domestic Product
GI	Geographical indications
ICA	Intra-community acquisition
IP	Intellectual property
IPR	Intellectual Property Rights
ISS	Incident Information Service
MIMIC	Multiple Indicators Multiple Causes
MOCG	Mobile organised crime group
MTIC	Missing trader intra-community
MVT	Motor vehicle theft
NGO	Non-government organisation
NLP	Neuro-linguistic programming
NPM	New payment method
NPS	New psychoactive substance
OCG	Organised crime group
OHIM	Office for Harmonisation in the Internal Market
OLAF	European Anti-Fraud Office
SEG	Sustainable Eel Group
SOC	Serious and organised crime
SOCTA	Serious and Organised Crime Threat Assessment
TAPA	Transported Asset Protection Association
TED	Tenders Electronic Daily
THB	Trafficking in human beings
T&T	Track and trace

UK	United Kingdom
UNEP	United Nations Environment Programme
UNODC	United Nations Office on Drugs and Crime
USD	United States Dollars
VAT	Value Added Tax
VPN	Virtual Private Network
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organisation

1. Methodology

Shann Hulme, RAND Europe

In this annex we explain the methodological approach of this study. We provide a description of the cross-cutting data-collection activities that were undertaken to address the research questions and the major outputs of the study. This study was reliant upon existing literature and secondary data sources, in addition to primary data collected through interviews with stakeholders, surveys of organisations responsible for asset-seizure and confiscation in the EU, and the collation of cases involving organised crime group (OCG) investment in the legal economy or infiltration of legitimate businesses.

1.1. Major outputs of the study

The study produces a range of outputs through the triangulation of multiple data sources. As shown in the table below, each of these activities and outputs informed a series of recommendations and policy ideas that were produced to address both objectives of the study.

Table 1.1: Outputs of the study informed by data collection activities

Section of main report	Output	Literature review	Interviews	Survey	Secondary data	Proven cases	Case study	
Objective 1								Recommendations and policy ideas
Section 2	Estimates of revenues of selected illicit markets at, where possible, EU and Member State level	•			•			
	Analysis of organised crime involvement and key actors in each illicit market		•					
	Analysis of future trends and dynamics for each illicit market	•	•					
Section 3.1	Analysis of assets and sectors of investment by OCGs in the legal economy		•			•		
	Analysis of modus operandi of investment by OCGs in the legal economy	•	•			•		
Section 3.2	Analysis of availability of statistical data on asset-recovery at Member State level	•	•	•				
	Summary of statistical data on asset-seizure and confiscation	•		•				
Objective 2								
Section 3.3	Micro- and macro-level risk factors for OCG infiltration in legitimate businesses	•			•	•		
Section 3.4	Estimates of size of the underground economy	•						
	Analysis of exploitation of the underground economy by OCGs	•	•				•	
Section 3.5	Analysis of use of NPMs by OCGs, including modus operandi and risks		•			•	•	
Section 3.6	Summary of emerging trends for management of criminal finances	•	•					

1.2. Data collection activities

1.2.1. Literature review

In-depth literature reviews were carried out for each task of the study. The specific purpose of each is provided in Table 1.2.

Table 1.2: Purpose of literature review for each task of the study

Section of main report	Purpose of literature review
2.1–2.9	Identify prior estimates of revenue from the nine illicit markets. Identify what is known about actors in each market, including level of OCG involvement. Horizon-scanning for future trends and dynamics for each market and across the EU, specifically those likely to affect revenue.
3.1	Identify what is known about where and how investments have been made by OCGs in the legal economy, including the type of assets, business sectors and geographic areas.
3.2	Identify what is known about assets frozen or confiscated from OCGs.
3.3	Identify what is known about the misuse of legal entities by OCGs in the EU, including opacity and complexity of corporate structures, business ownership anomalies and emerging enablers and trends.
3.4	Identify links between underground economy and OCG and identify what quantitative data has previously been used to measure it, and what the previous estimates were.
3.5	Scope evidence on the use of NPMs by OCGs (i.e. non-banking funds transfer methods, mobile payment methods, cryptocurrencies).
3.6	Identify future threats with regard to management of criminal finances by OCGs.

The general approach for carrying out the literature reviews is described below.

Step 1: Searching and identifying sources

The first step of the literature search was to enter agreed search terms into Google Scholar and selected databases that catalogue academic and other research literature.

The search terms and databases used for each task are outlined in the table below. Additionally, the full reference lists for each task were shared with the Expert Advisory Group members to identify any missing literature. Interviewees were also asked to recommend pertinent literature relevant to their areas of expertise. The bibliographies of included literature were also scanned.

Table 1.3: Search terms and databases searched

Report section	Search terms and databases searched
2.1. Illicit drugs trafficking	**Search terms:** *Search 1* 'illicit drug' OR 'illegal drug' OR cannabis OR cocaine OR heroin OR amphet* OR meth* OR NPS (AND) Revenue OR value OR size OR scope OR magnitude Search 2 'illicit drug' OR 'illegal drug' OR cannabis OR cocaine OR heroin OR amphet* OR meth* OR NPS (AND) Future OR risk OR threat OR enabler OR actor OR 'organised crime' OR 'criminal organisations' OR 'criminal groups' OR 'criminal networks' **Databases:**

Report section	Search terms and databases searched
	Google Scholar, ProQuest **Grey literature:** EMCDDA, UNODC, Europol, Transcrime
2.2. THB	**Search terms:** 'Human trafficking' OR 'Sex trafficking' OR 'Labour trafficking' OR 'organ trafficking' OR 'forced begging' OR 'forced criminality' (AND) Revenue OR value OR size OR scope OR magnitude OR estimate 'Human trafficking' OR 'Sex trafficking' OR 'Labour trafficking' OR 'organ trafficking' OR 'forced begging' OR 'forced criminality' (AND) Future OR risk OR threat OR enabler OR actor OR 'modus operandi' OR 'organised crime' AND EU or Europ* **Databases:** Google Scholar, JSTOR **Grey literature:** Europol, EUROSTAT, European Commission, UNODC, ILO
2.3. Smuggling of migrants	**Search terms:** 'Smuggling of migrants' AND revenue OR value OR size OR price OR estimate AND EU or Europ* 'Migrant smuggling' AND revenue OR value OR size OR price OR estimate AND EU or Europ* 'Smuggling of Migrants' AND Future OR risk OR threat OR enabler OR actor OR organised crime AND EU or Europ* 'Migrant smuggling' AND Future OR risk OR threat OR enabler OR actor OR 'organised crime' AND EU or Europ* **Databases:** Google scholar, JSTOR, Scopus **Grey literature:** UNODC, Frontex, Europa, Europol, IOM, ICMPD
2.4. MTIC / Value Added Tax (VAT) fraud	**Search terms:** 'VAT fraud' OR 'MTIC fraud' OR 'missing trader fraud' OR 'carousel fraud' AND (revenue OR value OR size) 'vat fraud' OR 'mtic fraud' OR 'missing trader fraud' OR 'carousel fraud' AND (future OR risk OR threat OR enabler OR actor OR 'organised crime') **Databases:** Google, Google Scholar, JSTOR, Scopus search **Generic Google searches, terms used:** - VAT fraud and organised crime in the EU - European Commission VAT fraud - VAT fraud market size EU - VAT fraud market value EU - VAT fraud attributable to VAT - future of VAT fraud - level of organised crime involved in VAT fraud - future of organised crime involved in VAT fraud

Report section	Search terms and databases searched
	- future risks in organised crime - how VAT fraud will be commmitted in the future - trends organised crime VAT fraud - new technologies organised crime will use to commit VAT fraud - link between organised crime and VAT fraud Backward citation checking to see if reported figures were original estimates or reported from other sources.
2.4. Food fraud	**Search terms for Scopus:** Scopus: (TITLE-ABS-KEY AND TITLE-ABS-KEY (revenue OR value OR size OR scope OR magnitude)) AND PUBYEAR > 2009 **Search terms for Google scholar:** 'food fraud market estimate' **Grey literature:** Food Fraud Network
2.4. IPR infringements / counterfeit goods	**Search terms:** *Search 1* Counterfeit IP OR 'pirated goods' OR counterfeit OR 'fake goods' OR 'IPR infringement' OR 'intellectual property' (AND) Revenue OR value OR size OR scope OR magnitude Search 2 Counterfeit IP OR 'pirated goods' OR counterfeit OR 'fake goods' OR 'IPR infringement' OR 'intellectual property' (AND) Future OR risk OR threat OR enabler OR actor OR 'organised crime' OR 'criminal organisations' OR 'criminal groups' OR 'criminal networks' **Databases:** Google Scholar, JSTOR, ProQuest, Scopus, Social Science Abstracts, and Sociological Abstracts. **Grey literature:** The research team searched intellectual property (IP) offices related to the EU, including the EUIPO and each Member States IP office for relevant publications. Only EUIPO produces estimates of loss from IPR infringements.
2.5. Environmental crime	<u>Illicit wildlife trafficking</u> **Search terms:** Scopus: (TITLE-ABS-KEY ('revenue' OR 'value' OR 'size' OR 'scope' OR 'magnitude') AND TITLE-ABS-KEY ('threatened AND species' OR 'wildlife') AND TITLE-ABS-KEY ('smuggling' OR 'poaching' OR 'trade' OR 'market') AND TITLE-ABS-KEY ('Europe' OR 'global')) AND PUBYEAR > 2009 Google Scholar: ('revenue' OR 'value' OR 'size' OR 'scope' OR 'magnitude') AND ('smuggling' OR 'poaching' OR 'market' OR 'trade') AND ('wildlife' OR 'threatened species' OR 'endangered species') AND ('Europe' OR 'global') *anywhere in the article **Databases:** Google Scholar, Scopus

Report section	Search terms and databases searched
	Grey literature: TRAFFIC, WWF Illicit waste trafficking **Search terms:** TITLE-ABS-KEY ('revenue' OR 'value' OR 'size' OR 'scope' OR 'magnitude') AND TITLE-ABS-KEY waste crime OR waste trafficking OR waste dumping AND PUBYEAR > 2009 **Databases:** Google Scholar, Scopus Articles citing the Biard et al., 2014 study
2.6. Illicit firearms	**Search terms:** Firearms OR guns OR SALW AND revenue OR value OR size OR price OR estimate AND EU or Europ* Firearms OR guns OR SALW AND Future OR risk OR threat OR enabler OR actor OR organised crime AND EU or Europ* **Databases:** Google scholar, JSTOR, Scopus **Grey literature:** UNODC, Frontex, Europa, Europol, IOM, ICMPD
2.7. Illicit tobacco	Review of sources identified as part of previous RAND study commissioned by the European Anti-Fraud Office (OLAF) on measuring the illicit tobacco market in the EU **Additional searches:** Google Scholar (since 2010): - tobacco Europe 'organised crime': 5,570 hits; searched the first 15 pages, resulted in 15 hits (including follow-on articles citing the original article) - cigarette Europe 'organised crime': 4,390 hits; searched the first 15 pages, resulted in 4 hits (including articles from special journal issues highlighted by retrieved hits) - cigarette Europe 'organised crime': 6,850 hits; searched the first 15 pages, resulted in 2 hits - tobacco Europe 'organised crime': 7,390 hits; searched the first 15 pages, resulted in 0 hits Generic Google search - 'Organised crime' OR 'Organised crime' OR 'criminal' AND Tobacco AND Europ* filetype:pdf - Tailored (advanced) Google searches - EC (and OLAF), Europol, Eurojust, Interpol, FATF, World Health Organisation (WHO) (and FCTC), OECD, Transcrime, WCO, ITIC, EUIPO, Oxford Economics, KPMG, Euromonitor - 'Organised crime' OR 'Organised crime' OR 'criminal' AND Tobacco
2.8. Cybercrime activities	**Google scholar (since 2010):** cybercrime OR card fraud OR crimes-as-a-service (AND) Revenue OR value OR size OR scope OR magnitude OR estimate OR incidents
2.9. Organised property crime	**Search terms:**

Report section	Search terms and databases searched
	'Property crime' OR burglary OR robbery OR 'vehicle theft' OR 'car theft' OR 'cargo theft' or 'road theft' OR 'cultural goods trafficking' (AND) Revenue OR value OR size OR scope OR magnitude OR estimate OR incidents 'Property crime' OR burglary OR robbery OR 'vehicle theft' OR 'car theft' OR 'cargo theft' or 'road theft' OR 'cultural goods trafficking' (AND) Future OR risk OR threat OR enabler OR actor OR 'modus operandi' OR organised crime AND EU or Europ* **Databases:** Google Scholar, JSTOR **Grey literature:** Europol, EUCPN, Eurostat, Interpol, UNODC, UNESCO, Transcrime
3.1. Investments by OCGs in the legal economy	**Google Scholar search (since 2015):** Investment 'organised crime' Money launder 'organised crime' Legal economy 'organised crime' Articles citing Riccardi et al. (2015); Savona and Riccardi (2015)
3.2. Asset freezing and confiscation	Searches were undertaken of open sources presenting statistical data on assets seizure and confiscation, including specialty literature, similar research performed on the topics, country assessments' reports in the area of home affairs and criminal justice and information published by multiple stakeholders involved, such as international organisations, competent authorities and civil society initiatives. For literature review, majority of the information was collected from: Mutual Evaluation Reports adopted by FATF or FSRBs (especially Council of Europe – Moneyval Committee, for several EU Member States) public data available on the FIU and ARO' websites information identified in respect to AMO's, authorities in charge with receiving/submission of mutual legal assistance request, Eurojust, Europol and European Judicial Network.
3.3. Risk factors for infiltration of organisations	**Search terms:** organised crime, serious and organized crime, money laundering, open government, open government data, criminal assets, financial crime, early warning mechanism of crime, big data, network science, organised crime investments, financial secrecy, risk assessment, confiscation, financial investigation, asset recovery, mafia, transnational crime, public procurement **Databases:** Google Scholar, JSTOR, SpringerLink, SSRN, Scopus, Science Direct, RePEc, NBER databases and the following
3.4. Underground economy	All Google Scholar (since 2010, first 10 pages of results) and general Google Search 1: underground economy construction organised crime Search 2: 'underground economy' construction organised crime Search 3: 'shadow economy' construction organised crime Search 4: 'informal economy' construction organised crime Search 5: 'underground economy' gambling organised crime Search 6: 'informal economy' gambling organised crime Search 7: 'underground economy' prostitution organised crime

Report section	Search terms and databases searched
	Search 8: 'informal economy' prostitution organised crime Search 9: underground economy transport Search 10: transport organised crime Search 11: transport cargo freight organised crime Search 12: transport shipping cargo freight underground informal economy Refer to search strategy used for Section 3.5 (NPMs) for approach to identifying literature relevant to the underground economy and the financial sector.
3.5. New payment methods (NPMs)	**Search terms:** Search 1 'virtual currency' OR cryptocurrency OR bitcoin OR Monero (AND) 'organised crime' OR 'cybercrime' OR 'money laundering' OR future OR risk OR threat OR enabler OR actor OR 'modus operandi' Search 2 'e-money' OR 'mobile money' OR 'prepaid card' OR 'digital wallet' OR e-wallet OR 'mobile wallet' OR PayPal (AND) 'organised crime' OR 'cybercrime' OR 'money laundering' OR future OR risk OR threat OR enabler OR actor OR 'modus operandi' Search 3 'payment service' OR 'innovative payment' OR 'mobile payment' OR 'payment initiation' OR Fintech (AND) 'organised crime' OR 'cybercrime' OR 'money laundering' OR future OR risk OR threat OR enabler OR actor OR 'modus operandi' AND EU OR Europ* Search 4 'money remittance' OR 'money service business' OR 'money transfer' OR 'Western Union' OR 'Money Gram' (AND) 'organised crime' OR 'cybercrime' OR 'money laundering' OR future OR risk OR threat OR enabler OR actor OR 'modus operandi' Search 5 'informal value transfer' OR 'hawala' OR 'underground bank*' OR (AND) 'organised crime' OR 'money laundering' OR future OR risk OR threat OR enabler OR actor OR 'modus operandi' **Databases:** Google Scholar, JSTOR, generic Google serch **Grey literature:** Europol, European Commission, ECB, FATF, World Bank
3.6. Future threats and enablers	Search 1: Generic search to identify persistent and emerging trends/enablers **Search terms:**

Report section	Search terms and databases searched
	('money laundering' OR 'infiltration' OR 'proceeds of crime' OR 'criminal finances') (AND) (foresight OR 'future trend' OR 'emerging trend' OR 'emerging threat' OR 'ongoing trend' OR 'persistent trends' OR 'future enabler') **Databases:** Google, Google Scholar, ProQuest Grey literature: Europol, Interpol, UNODC, RUSI, Transcrime Search 2: Targeted searches for each trend/enabler identified in search 1 **Generic Search terms:** ('money laundering' OR 'infiltration' OR 'proceeds of crime' OR 'criminal finances') (AND) (foresight OR 'future trend' OR 'emerging trend' OR 'emerging threat' OR 'ongoing trend' OR 'persistent trends' OR 'future enabler') **Trend specific search terms:** (OR) *High-value goods*: ('High-value goods' OR 'high-value assets' OR 'Cash-like assets' OR 'tradable lifestyle goods' OR 'Luxury sector') Databases: Google, Google Scholar, ProQuest Grey literature: Europol, Interpol, FAFT, UNODC, Transparency International (OR) *Golden visas schemes*: ('golden visa' OR 'citizenship by investment' OR 'golden passport' (AND) ('organised crime' OR 'proceeds of crime' OR 'illicit' OR 'money laundering' Databases: Google Scholar, Google, ProQuest Grey literature: European Commission, European Parliament, Transparency International (OR) *Green economy*: ('Green economy' OR 'Green investments' OR 'Green Deal' OR 'Carbon credits scheme' OR 'Carbon credits market' OR 'Carbon credits fraud' OR 'Carbon trading fraud' OR 'Carbon trading crime' OR 'Green bonds') Databases: Google, Google Scholar, ProQuest, Springer Grey literature: Interpol, Esisc, Financial Times, OECD, Green climate fund, European Commission (OR) *Brexit*: ('Brexit' (AND) ('organised crime' OR 'proceeds of crime' OR 'money laundering' OR 'criminal justice cooperation' OR 'criminal justice' Databases:

Report section	Search terms and databases searched
	Google Scholar, Google, ProQuest Grey literature: UK Parliament, UK Government, European Commission, Europol (OR) *Covid-19:* ('Covid-19' OR 'Coronavirus' OR 'Pandemic') Databases: Google Grey literature: Europol, Interpol

Step 2: Scanning and applying inclusion/exclusion criteria

We then proceeded to a two-stage scan of the sources. First, to eliminate clearly irrelevant publications we assessed the relevance of each publication based on its title. Second, we assessed the relevance of each of the remaining sources by reviewing their abstracts. The inclusion and exclusion criteria for the literature review of markets is provided in the table below.

Table 1.4: Inclusion and exclusion criteria for market literature reviews

	Inclusion	Exclusion
Time period	Published from 2010 onwards	Published prior to 2010
Geographic region	Revenues generated within the 28 EU Member States	Outside Europe
Geographic scope	EU-level, Member-State level	Neighbourhood, city, municipality
Estimates	Includes estimates of revenue Includes estimates of size/magnitude of market Offers information on the price of illicit goods/services	Does not include information on revenue/value or size/magnitude of market or price of goods/services traded
Actors	Provides information on the actors in the market (i.e. ethnicity of key players, involvement of organised groups, hierarchy of groups, etc.)	
Futures	Provides information on future or emerging trends or dynamics of market	
Applicable to specific markets/areas		
Illicit drugs trafficking	Cannabis Cocaine Heroin Meth/amphetamines Ecstasy/MDMA New psychoactive substances (NPS)	Pharmaceuticals Prescription drugs Medicinal cannabis
Trafficking in human beings	Trafficking for sexual exploitation Trafficking for labour exploitation Trafficking for organ removal Forced begging Trafficking for criminal activities	
Smuggling of migrants	Migrant smuggling Irregular migration	Trafficking in human beings

	Inclusion	Exclusion
Fraud related to organised crime activities	MTIC fraud VAT fraud Carousel fraud Counterfeit goods/IPR infringements Food fraud	Online payment fraud (included in cybercrime markets)
Environmental crime	Illicit waste trafficking Wildlife trafficking	Metal theft Plant theft Water theft Timber theft
Firearms trafficking	Firearms AND 3D printing Alarm firearms Military-grade firearms	
Illicit tobacco trafficking	Illicit whites Counterfeit/illegal manufacturing Cross-border smuggling/ bootlegging	
Cybercrime activities	Card payment fraud (present and not present) Crimes-as-a-service	Child exploitation material Online sale of illegal goods and services (e.g. drugs, firearms)
Organised property crime	Road cargo and freight theft Trafficking in cultural goods Domestic burglary, robbery, motor vehicle theft ATM fraud	Metal theft

Step 3: Following up relevant references from identified sources and interviews

In addition to the formal database search, the following methods were used to identify additional sources:

- **(i) Bibliography search**: Bibliographies of included sources were reviewed for any potentially relevant sources, which were subsequently screened against the inclusion criteria and included in the review if relevant.
- **(ii) Additional sources identified in interviews**: While interviewees were asked to identify key literature and studies, the interviews did not result in the identification of many sources that had not already been identified in the literature review. This is because the reviews were relatively comprehensive.
- **(iii) Additional sources identified by the Expert Advisory Group to the study**: The full literature lists for the entire study were shared with experts, who they were invited to provide input on any additional studies missing. As with the interviews, this resulted in few additional studies suggesting the searches carried out were comprehensive.

Step 4: Reading and data extraction

Individual sources were read, and relevant information was recorded in the extraction templates that had been prepared and tested beforehand. The template prompts the researcher to record information about each source in a systematic way, which allows sources to be compared and assessed. The use of a pre-agreed data-extraction template provides the basis for an objective, independent review of previous methods – minimising the chance of bias. It also facilitates transparency as the information recorded in the extraction template is then recorded in the assessment framework, so readers can see the reasoning and basis of the assessment.

Step 5: Critical assessment and quality appraisal

In addition to extracting information from previous studies, the research team also subjected the information to critical assessment. Prior revenue estimates were subjected to a structured critique that involved assessing reliability, robustness, independence, transparency and replicability. The tool used for this appraisal is provided in the table below.

Table 1.5: Quality appraisal tool for studies of previous revenue estimates

Assessment criterion	Sub-criterion
Reliability (the extent to which the method can yield results that are reliable, i.e., provide a reasonably true estimate of the phenomenon measured free of bias and not dependent on its external factors)	Have the outputs based on the method been peer-reviewed?
	Are data required by this method prone to measurement/recording error? [Note: this refers to data collection only once the sampling has been decided, not processing/analysis]
	Is the method prone to self-reported biases?
	Is the method susceptible to bias?
	Is the method likely to produce an undercount/ overcount of the true extent of the illicit market?
Robustness (the extent to which the method can yield a comprehensive estimate of the phenomenon measured, when applied to a broad range of aspects of the phenomenon under assessment)	Does the method require sampling? If so, does it yield generalisable results?
	Does the method capture a complete estimate of: The size/magnitude of market? The revenues generated?
	Is the method suitable to be applied in all 28 Member States and at the EU-level?
	Are the method's measurements defined correctly?
	Does the method include robustness checks?
Transparency and replicability (the extent to which the method is used transparently and can be replicated)	Has the method been successfully replicated?
	Is the method based on clear and justified assumptions?
	Does the methodology consist of relatively straightforward steps, or does the method consist of complex stages that are susceptible to not disclosing all the details?
	Are there multiple variants of this method that could give rise to uncertainty over how it has been employed or how to interpret its results?

1.2.2. Expert and stakeholder consultation

Stakeholder interviews

We conducted interviews with 102 stakeholders from 66 organisations. Topic guides and the content of interviews were tailored to the expertise of the interviewee. For instance, some interviews focused on specific illicit markets, whereas others focused on methodologies or specific Member State circumstances. Stakeholders were identified through a stakeholder mapping process. Additional experts and stakeholders were identified through literature review and through suggestions from the expert panel and the Commission. A full list of the organisations consulted is provided in the table below.

Table 1.6: Organisations consulted for interviews

Organisation	Stakeholder level
AMO France	Member State / National

Organisation	Stakeholder level
AMO Italy	Member State / National
AMO Netherlands	Member State / National
AMO Romania	Member State / National
ARO Belgium	Member State / National
ARO Ireland	Member State / National
ARO Italy	Member State / National
ARO Portugal	Member State / National
ARO Romania	Member State / National
ARO Sweden	Member State / National
Bulgarian Embassy in Austria – Social and Labour Affairs	Member State / National
Commerzbank AG	Private sector
Council of Europe	EU institution
Council of Europe - Group of States Against Corruption (GRECO)	EU institution
E-liberare	Non-government organisation (NGO)
Elliptic	Private sector
Embassy of Bulgaria in Spain, Department for Labour and Social Issues	Member State / National
Eurojust	Member State / National
European Association for Secure Transactions (EAST)	NGO
European Central Bank	EU institution
European Commission	EU institution
European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)	EU institution
European Union Intellectual Property Office (EUIPO)	EU institution
Europol	EU institution
EU's network of anti-fraud experts (Eurofisc)	Member State / National
FIU Finland	Member State / National
FIU Italy	Member State / National
FIU Romania	Member State / National
Flemish Peace Institute	Member State / National
Food Fraud Network	EU institution
GD Combatting Organised Crime	Member State / National
General Labour Inspectorate – Bulgaria	Member State / National
German Trade Union Confederation, Fair Mobility Advisory Centre Munich	Member State / National
Guardia Civil	Member State / National
International Labour Organisation	International
International Organisation for Migration (IOM) – Bucharest Office	International
Labour Inspectorate – Romania	Member State / National
Member State / National Office for Social Security	Member State / National

Organisation	Stakeholder level
Nature Protection Service (SEPRONA)	Member State / National
Netherlands Institute for the Study of Crime and Law Enforcement (NSCR)	Academic
Office for Social Security – Belgium	Member State / National
OLAF	EU institution
Peace Research Institute Oslo	Academic
Professional Investigation Service Environmental Crime in the Netherlands	Member State / National
Romanian National Agency against Trafficking in Persons (ANÎTP)	Member State / National
Schwarzthal Kapital	Private sector
Scottish Environmental Protection Agency (SEPA)	Member State / National
Sphonic	Private sector
Sustainable Eel Group (SEG)	NGO
Swedish Prosecution	Member State / National
Taxation and Customs Union (TAXUD)	EU institution
Tessiside University	Academic
Tilburg University	Academic
TRAFFIC	NGO
Transported Asset Protection Authority (TAPA)	Private sector
United Nations Educational, Scientific and Cultural Organisation (UNESCO)	International
United Nations Interregional Crime and Justice Research Institute (UNICRI)	International
United Nations Office on Drugs and Crime (UNODC)	International
University of Cardiff	Academic
Università Cattolica del Sacro Cuore	Academic
University of Leeds	Academic
University of Linz	Academic
University of Vienna	Academic
University of Zagreb	Academic
Utrecht University	Academic
West Flanders Prosecutor's Office, Bruges section	Member State / National

Interviews were audio-recorded, and summary notes were taken. The key information was then coded into an interview-notes grid, which served to capture high-level themes from the interviews.

Table 1.7: Number of organisations consulted by stakeholder group

Stakeholder group	Number of organisations consulted
Academic	11
EU institution	9
International organisation	5
National/Member State organisation	31
Non-governmental organisation (NGO)	4

Private sector	6

Expert panel

The research team was supported by a panel of international experts on SOC. At the outset of the study, we held a series of telephone consultations to hear the experts' thoughts, comments and suggestions on:

- The basic parameters of the study;
- The search strategy for identifying relevant literature, and additional literature sources; and
- Our approach for the stakeholder and expert consultation, and which organisations and individuals to approach.

The experts provided feedback on all drafts and deliverables prepared over the course of this study. The experts helped steer the overall approach and made suggestions regarding literature, stakeholders and methodologies. Their inputs were either received in writing or through telephone discussions, although correspondence mostly took place via email. The research team incorporated the experts' inputs as appropriate. In cases where the study team disagreed or considered the suggestions or comments beyond the scope of the study, a justification was provided. The members of the expert panel are listed in the table below.

Table 1.8: Members of the expert panel

Expert	Affiliation
Dr Giulia Berlusconi	University of Surrey
Dr Luca Giommoni	Cardiff University
Professor Michael Levi	Cardiff University
Professor Letizia Paoli	Leuven Institute of Criminology
Dr Lorenzo Segato	React Italy

1.2.3. Surveys

Asset Recovery Offices (AROs), Asset Management Offices (AMOs) and Financial Intelligence Units (FIUs) in the 28 EU Member States were sent an email invitation to participate in a survey, which requested statistical information on assets seized and confiscated from OCGs in their Member States. Potentially due to the COVID-19 pandemic, the response rates to the surveys were much lower than anticipated (13 of 28 AROs, 7 of 28 AMOs and 11 of 28 FIUs responded). Nevertheless, the information that was provided has been used qualitatively to understand, to the extent possible, investments made by OCGs in the legal economy (3.1) and data availability on asset seizure and recovery from OCGs in the EU (3.2 **of the main report**).

1.2.4. Secondary data

Several tasks in the study relied upon quantitative indicators from existing datasets. To calculate estimates of the economic revenue from the illicit markets, secondary data from a range of public sources have been used. Rather than listing them here, each of these datasets are discussed in relation to the methodology employed for deriving market estimates in **2.**

The study also utilised two non-public data sources held by one of the project partners, the Government Transparency Institute, namely the Bureau van Dijk (BvD) company ownership database and Italian public-procurement data. These datasets, described below, were principally used for predicting risk factors for SOC infiltration of legitimate businesses. Results of this analysis are provided in **Section 3.3** of the main report.

Bureau van Dijk – Organisation dataset

Bureau van Dijk (BvD) data contains information on more than 365 million businesses all over the world. It is the largest administrative cross-country, company-level dataset of companies and

provides access to company registry, management, ownership and financial information[1]. The data also provides time-series, allowing for analysis across time.

Despite covering firms in all European countries, the BvD dataset presents some data quality challenges. There are many duplicates and some company classes and sources, particularly regarding small firms, are systematically missing. Data-cleaning techniques were applied to identify duplicates and a weighted sample was used for macro-aggregations (as discussed further in Section 3.3).

DIGIWHIST – Italian procurement data

To empirically evaluate the effect of Italian OCGs or 'mafia-style' groups on corruption in public procurement, we constructed a dataset including yearly observations from more than 1,500 Italian municipalities over the period 2008 to 2014. Detailed information on each open-tendered public contract was taken from a national dataset managed by the Italian anticorruption agency (ANAC), which contains information on all contracts with a reserve price higher than €150,000. The dataset provides information on the auction ID, number of bidders, bidders' names, bids, contract-awarding procedure, reserve price of the contract, categories of work involved in the contract, final price paid by the contracting authority and the timing for the completion of the project. At this stage of the research, we restricted the set of municipalities included to those that experienced an intense and active mafia infiltration in this period.

1.2.5. Cases of SOC investment or infiltration in the legal economy

We identified 81 cases that were accompanied by evidence that OCGs had invested in the legal economy or infiltrated a legitimate business in the EU, covering 14 Member States (as shown in Table 1.9). These cases cannot be considered representative of SOC investment and infiltration in the legal economy across the EU. Several databases and resources were consulted when searching for cases: UNODC SHERLOC[2], Project ANTICORRP[3], European Court of Human Rights (HUDOC) – upheld cases of asset forfeiture[4], KPKONPI Bulgaria[5] and an Italian Media Archive. The search strategy is described in the box below. The types of information were media articles, judicial documents and summaries or transcripts of court proceedings.

Box 1: Search strategy for cases of investments or infiltration in the legal EU economy

UNODC SHERLOC

Key word and crime searches: Search terms 'organised', 'crime', 'asset(s)', 'seizure' and 'business' in a variety of combinations (e.g. or, and, as well as for each independently)

Country by country searches

Skimmed 831 case summaries from EU Member States – paying most attention to those classed as organised crime

European Court of Human Rights

Key word and crime searches: Search terms 'organised', 'crime', 'asset(s)', 'seizure' and 'business' in a variety of combinations (e.g. or, and, as well as for each independently)

Excluded non-EU states (Russia, Moldova), and Italy, Hungary, Bulgaria

JuriFast and Dec.Nat

Search terms 'organised', 'crime', 'asset(s)', 'seizure' and 'business' in a variety of combinations (e.g. or, and, as well as for each independently)

For EU Directives 2014/42 (on asset seizure) –12 results

- 98/733/JHA (Joint Action from 1998 on participation in organised crime, since repealed)
- 2018/1673 (on combatting money laundering)

[1] This data was obtained by the DIGIWHIST project for the purposes of research and analysis of public-procurement performance across Europe.
[2] Available at: https://sherloc.unodc.org/cld/v3/sherloc/
[3] Available at: https://anticorrp.eu/
[4] Available at: https://hudoc.echr.coe.int/eng
[5] Available at: ciaf.government.bg

- 1697/79/EEC (allowing for seizure of assets in light of acts that 'could give rise to criminal court proceedings')
- ETS No. 141 (Convention on Laundering, Search, Seizure and Confiscation)—9 search results none relevant
- ETS No. 173 (Criminal Law Convention on Corruption)
- CETS No. 198 (Council of Europe Convention on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime and on the Financing of Terrorism)
- Council Directive 91/308/EEC of 10 June 1991 on prevention of the use of the financial system for the purpose of money laundering
- Council Framework Decision 2002/584/JHA of 13 June 2002 on the European arrest warrant and the surrender procedures between Member States and subsequent amending act,
- Council Framework Decision 2003/577/JHA of 22 July 2003 on the execution in the European Union of orders freezing property or evidence
- Council Framework Decision 2005/212/JHA of 24 February 2005 on confiscation of crime-related proceeds, instrumentalities and property
- Directive 2005/60/EC on the prevention of the use of the financial system for the purpose of money laundering and terrorist financing
- Council Framework Decision 2008/841/JHA on the fight against organised crime
- EC Third Directive and the Council of Europe Convention CETS No. 198 on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime and on the Financing of Terrorism

Where the available summaries hinted at some involvement of organised crime, national case files were tracked down for further clarification.

Project ANTICORRP and Italian Media Archive

All available records were reviewed for relevance.

The inclusion criteria for these cases were that they:

- involved activities taking place in one of the 28 EU Member States;
- involved OCGs according to the definition specified in the 'Glossary' (see Main Report); and
- provided evidence of investment or infiltration by OCGs in the legal economy.

On this basis, cases were excluded if they involved activities taking place outside the 28 EU Member States, provided no evidence of OCG involvement (e.g. single perpetrators with no known associations), or provided no evidence of investment of infiltration in the legal economy (e.g. if there was only evidence in relation to reinvestment in illicit markets or illicit activities). These cases were used for understanding the nature and modus operandi of investments by OCGs in the legal economy (**Section 3.1 of the main report**) and risk factors for infiltration (**Section 3.3 of the main report**).

Table 1.9: Proven cases of SOC investment or infiltration by Member State

Member State	Number of cases	Percentage of cases (%)
Austria	1	1
Belgium	1	1
Bulgaria	15	19
Croatia	2	2
Czech Republic	11	14
Denmark	1	1
France	1	1
Hungary	4	5

Member State	Number of cases	Percentage of cases (%)
Ireland	1	1
Italy	32	40
Netherlands	1	1
Romania	4	5
Spain	2	2
UK	5	6
Total	**81 cases**	**100**

A codebook was developed for extracting information from cases of infiltration, including details of OCG and offences, investments by OCGs – including type of asset and sector of investment – driver of infiltration, details of the infiltrated business such as geographic location, size, ownership and management structure.

2. Criminal markets

Annexes 2.1 to 2.9 are the full reports on each of the nine criminal markets examined for this study, which build on the summaries in Sections 2.1 to 2.9 of the main report. Each annex includes:

- literature review of prior revenue estimates published since 2010;
- an assessment of the quality of prior estimates;
- methodology for estimating revenues in this study;
- revenue estimates at the EU- and Member-State level, where available;
- discussion of market actors and modus operandi and future trends and dynamics;
- recommendations for improving data-collection and estimation of revenues for each market.

The selection of criminal markets examined in this study

The nine criminal markets were selected for analysis because they were identified as a priority crime area in the EU Policy Cycle/EMPACT (European Multidisciplinary Platform Against Criminal Threats) for the period 2018 to 2021. This study builds upon an existing and growing evidence-base on criminal markets in the EU. Of particular relevance is a 2015 Commission-funded study by Transcrime – Project Organised Crime Portfolio (OCP) – that also sought to produce estimates of the revenues generated in criminal markets in the EU (Savona & Riccardi, 2015).

Table 2.1: Criminal markets and areas examined in this study

	EU Policy Cycle priority crime area for 2018–2021	Examined in previous Commission-funded study	Section of the main report
Illicit drugs	√	√	2.1
Trafficking in human beings (THB)	√	√	2.2
Smuggling of migrants	√		2.3
Fraud	√	√	2.4
Environmental crime	√		2.5
Illicit firearms	√	√	2.6
Illicit tobacco		√	2.7
Cybercrime	√		2.8
Organised property crime	√	√	2.9

2.1. Illicit drugs

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Key findings:

- According to estimates produced by the EMCDDA and Europol (2019) (adjusted for inflation to 2019 values), the annual revenues earned on the EU illicit retail-drug markets were between €27 billion and €36 billion (€31 billion).
- These estimates update the EMCDDA and Europol's previous estimates that found that in 2013 the EU's overall illicit retail-drug markets were worth €24 billion (EMCDDA & Europol, 2016). While comparison of the figures suggests an overall increase in the revenue of the EU's drug markets, caution should be exercised given that the methodologies between the two years are not directly comparable.

- The drug markets are particularly attractive for OCGs as they are highly profitable. Illicit drug markets in the EU are highly competitive, comprising a myriad of loose/horizontal networks acting across the supply chain (including importation, production, distribution and retail). OCGs involved in the EU drugs market are increasingly inter-ethnic and transnational. Nevertheless, these phenomena should not be overstated as some OCGs are still well-established along some trafficking routes.
- The size and composition of groups involved in the EU drug markets varies greatly, not least because no OCG holds a monopoly over drugs' supply chains. While some OCGs are well-established along some trafficking roots, most actors involved in the drug markets are better characterised as loose criminal networks or small enterprises carrying out illicit profit-driven activities, rather than highly structured OCGs.
- Future trends and dynamics identified within the EU drug markets include the increasing production of herbal cannabis, synthetic drugs and precursors within the EU; growing online trade; and the use of cutting-edge technology to maximise production output.

This Annex provides a comprehensive overview of the illicit drugs market in the EU, building upon the summary provided in **Section 2.1** of the main report.

Illicit markets for drugs involve the cultivation, manufacture, distribution, sale and purchase of substances that are subject to drug laws. For this study, the drug markets refer to cannabis, cocaine, heroin, and synthetic drugs (including amphetamine, methamphetamine and MDMA/ecstasy) and NPS. Excluded from this analysis are pharmaceutical and prescription drugs, as well as drugs used for medicinal purposes.

2.1.1. Previous revenue estimates of the EU illicit drug markets

The literature search identified nine studies that contained prior estimates of the illicit drugs market in the EU, published since 2010 (Table 2.2). Among them, the EMCDDA and Europol EU Drug Markets Reports (2019 and 2016), as well as Transcrime's Organised Crime Portfolio study provide the most comprehensive overviews of the European retail drugs market (Savona & Riccardi, 2015). There were four other studies identified that offered estimates of the revenues from specific substances bought in the EU. One study produced estimates for the EU's cannabis market (Caulkins & Kilmer, 2013) and one study estimated the size of the Dutch cannabis market (van der Giessen et al., 2016). One study estimated the revenue from the EU's cocaine market (Transcrime, 2015c). One study estimated the revenue from the EU's heroin market (Transcrime, 2015c) and one assessed the revenue from England/Wales and the Czech Republic's heroin markets (Kilmer et al., 2013). Finally, one study estimated the revenue for synthetic drugs (ecstasy and amphetamine) in the Netherlands (Tops et al., 2018). Although this study presents considerable methodological limitations, it has been included for comparative purposes. Evidently, the geographic scope of these estimates varied, although most estimates covered at least 19 EU Member States.

Each of these studies provide demand-side estimates of the total money spent on drugs by consumers at the retail-level in the EU. Demand-side approaches typically use inputs from consumers' self-reported surveys, which are used for measuring the prevalence and frequency of drug consumption among a population. The simple formula for determining annual consumption C_i is as follows:

$$C_i = V_i \times N_l \times P_r$$

Where:
V_i is the volume of illicit consumption
N_i is the number of last year users
P_r is the amount used per year

The EU-level estimate is calculated as the sum of all Member State-level estimates.

To derive a monetary value, consumption information is combined with data on the retail price of drugs. The EMCDDA and Europol draw upon routinely collected EU law-enforcement data for price. The simple formula for calculating annual revenue R_i is as follows:

$$R_i = C_i \times P_i$$

Where:
C_i is annual consumption
P_i is price

The prices were collected as retail prices and were not adjusted for purity, given the shortage of information. The EMCDDA and Europol have identified this as an important area for future development to improve the quality and completeness of the data and estimates produced.

Some limited studies have also sought to go beyond market revenue to estimate the profits of traffickers at different levels of the supply chain. For instance, the United Nations Office on Drugs and Crime (UNODC) published two reports that estimated the profits from transnational illicit drug trafficking. One study calculated the profitability of the global cocaine market, which includes an indicative figure for Western and Central Europe (UNODC, 2011). The other study estimated the profits generated from illicit opiate-trafficking along the Balkan route (UNODC, 2015a). These studies employed a combination of a demand-side approach (to estimate the overall retail revenue of the drug market in question) and a supply-based approach (using seizure data to adjust for the costs borne by drug traffickers in loss of product due to law enforcement) to estimate the overall flow of drugs trafficked and the gross profit made from drug trafficking. Finally, one study was identified that estimated the size and revenue of the online illicit drugs trade (Kruithof et al., 2016). This study yielded figures related to the illicit online drug markets hosted by eight transnational crypto markets, and estimated the size of the Netherlands' online retail market. The study highlighted that in the context of the entire drugs market, the size of the online trade remains negligible.

2.1.2. Quality of prior revenue estimates

Demand-based approaches are widely deemed to be the most reliable method for estimating the size and revenue of drug markets, because the input data is less susceptible to biases associated with data sources used for supply-based approaches (Kilmer et al., 2011). Supply-based approaches estimate the scope of illicit drug production by drawing on a combination of production, seizure, importation/exportation and average retail price data. This method is limited by the fact that fluctuations in seizure data might reflect changes in law enforcement efforts rather than changing drug trafficking patterns. That said, a demand-based approach also presents methodological limitations, as listed below[6]:

- First, the lack of harmonised data-collection practices across EU Member States leads to data gaps in overall market estimations. Missing data is often imputed from estimations and assumptions, which can undermine the validity of the results. In addition, inconsistent statistical tools used across Member States make it difficult to compare results.
- Second, large-scale surveys that record drug prevalence are prone to reporting biases. Users are likely to underreport their own drug consumption, due to recall problems and/or social desirability bias linked to drug consumption being a stigmatised behaviour.
- Third, survey data is likely to suffer from under-coverage, as they are unlikely to capture consumption patterns of marginalised populations or problematic drug users. While treatment data offers a useful substitute to capture this information, the undercount of high-risk users remains an important caveat for drug market estimates.
- Finally, the price data does not adjust for purity or potency variations.

[6] While these methodological limitations apply to all demand-based approaches, the degree to which they apply may vary across drug markets. For example, underreporting of drug consumption is more prevalent for heroin or cocaine than it is for cannabis because stigma for heroin and cocaine consumption is stronger than it is for cannabis. Similarly, under coverage tends to be higher for heroin, as this drug is more widely consumed by marginalised populations or problematic drug users, whom are less represented in survey data.

Table 2.2: Prior studies estimating the size or revenue of illicit drug markets in the EU[7]

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	EMCDDA and Europol (2019)	2017	Cannabis (resin and herb)	General population survey – number of cannabis users European Web Survey on Drugs – amount of cannabis used EMCDDA routine data collections – price	EU 28	No; disaggregated data not available for confidentiality reasons	1,550.97 tonnes (mid) 1,405.73 tonnes (low) 1,710.33 tonnes (high)	Retail revenue €11,635.04 mil. (mid) €10,533.99 mil. (low) €12,823.34 mil. (high)
1	EMCDDA and Europol (2019)	2017	Cocaine (crack cocaine and powder cocaine)	General population survey – number of cocaine users European Web Survey on Drugs – amount of cocaine used EMCDDA routine data collections – price	EU 28	No; disaggregated data not available for confidentiality reasons	118.56 tonnes (mid) 99.65 tonnes (low) 137.46 tonnes (high)	Retail revenue €9,068.96 mil. (mid) €7,635.30 mil. (low) €10,502.60 mil. (high)
1	EMCDDA and Europol (2019)	2017	Heroin	General population survey – number of heroin users European Web Survey on Drugs – amount of heroin used EMCDDA problem drug use (PDU) indicator data and treatment demand indicator (TDI) data EMCDDA routine data collections – price	EU 28	No; disaggregated data not available for confidentiality reasons	148.86 tonnes (mid) 126.81 tonnes (low) 181.17 tonnes (high)	Retail revenue €7,440.86 mil. (mid) €6,394.04 mil. (low) €9,119.55 mil. (high)

[7] When comparing the market size and revenue of drug markets, it is important to consider each study's adopted measurement units and methodology. For example, while some estimations cover the overall retail revenue of a given drug market, others adjust for the costs borne by drug traffickers. In the latter case, the estimations provided reflect the growth of profit generated by the drug market, which is significantly smaller than the figures suggesting the revenue of the overall retail market.

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	EMCDDA and Europol (2019)	2017	Synthetic drugs (amphetamine, methamphetamine, MDMA)	General population survey – number of synthetic-drug users European Web Survey on Drugs – amount of synthetic drugs used EMCDDA routine data collections – price	EU 28	No; disaggregated data not available for confidentiality reasons	Amphetamines: 61.99 tonnes (mid) 50.99 tonnes (low) 81.18 tonnes (high) MDMA: 59.73 million tablets (mid) 49.70 million tablets (low) 69.76 million tablets (high)	Retail revenue Amphetamines: €1,007.69 mil. (mid) €830,88 mil. (low) €1,283.50 mil. (high) MDMA: €528.63 mil. (mid) €437.33 mil. (low) €619.94 mil. (high)
2	EMCDDA and Europol (2016)	2013	Cannabis (resin and herb)	General population survey – number of cannabis users European Web Survey on Drugs – amount of cannabis used EMCDDA problem drug use (PDU) indicator data and treatment demand indicator (TDI) data EMCDDA routine data collections – price Number of drug users (data drawn from van Laar et al., 2013)	EU 28	No; disaggregated data not available for confidentiality reasons	1,288.5 tonnes (mid) 1,154.2 tonnes (low) 1,789.7 tonnes (high)	Retail revenue €9,313.4 mil. (mid) €8,405.6 mil. (low) €12,851.2 mil. (high)

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
2	EMCDDA and Europol (2016)	2013	Cocaine (crack cocaine and powder cocaine)	General population survey – number of cocaine users European Web Survey on Drugs – amount of cocaine used EMCDDA problem drug use (PDU) indicator data and treatment demand indicator (TDI) data EMCDDA routine data collections – price	EU 28	No; disaggregated data not available for confidentiality reasons	91.0 tonnes (mid) 72.2 tonnes (low) 110.2 tonnes (high)	Retail revenue €5,742.2 mil. (mid) €4,545.9 mil. (low) €6,962.5 mil. (high)
2	EMCDDA and Europol (2016)	2013	Heroin	General population survey – number of heroin users European Web Survey on Drugs – amount of heroin used EMCDDA problem drug use (PDU) indicator data and treatment demand indicator (TDI) data EMCDDA routine data collections – price Number of drug users (data drawn from van Laar et al., 2013)	EU 28	No; disaggregated data not available for confidentiality reasons	138.4 tonnes (mid) 121.4 tonnes (low) 165.5 tonnes (high)	Retail revenue €6,782.7 mil. (mid) €6,041.6 mil. (low) €7,845.6 mil. (high)
2	EMCDDA and Europol (2016)	2013	Synthetic drugs (meth/amphetamine, MDMA)	General population survey – number of synthetic drugs users European Web Survey on Drugs – amount of synthetic drugs used	EU 28	No; disaggregated data not available for confidentiality reasons	Amphetamines: 76.3 tonnes (mid) 52.1 tonnes (low) 101.6 tonnes (high) MDMA:	Retail revenue Amphetamines: €1,828.1 mil. (mid) €1,210.3 mil. (low)

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
				EMCDDA problem drug use (PDU) indicator data and treatment demand indicator (TDI) data EMCDDA routine data collections – price			86.6 million tablets (mid) 78.9 million tablets (low) 94.0 million tablets (high)	€2,497.3 mil. (high) MDMA: €666.1 mil. (mid) €607.0 mil. (low) €723.1 mil. (high)
3	Caulkins and Kilmer (2013)	2010	Cannabis (resin and herb)	General population survey – number of cannabis users European Web Survey on Drugs – amount of cannabis used EMCDDA routine data collections – price	EU 27 (which excludes HR)	Yes		Retail revenue Estimated range from €6.7 billion to €9.8 billion
4	Kilmer et al. (2013)	2004–2006	Heroin	General population surveys – number of drug users National Monitoring Centre for Drug Addition data – number of Czech PHUs National treatment and criminal justice data – number of British PHUs	CZ, England	Yes	Czech Republic: 0.11–0.2 tons England: 8–12 tons	Retail revenue Czech Republic: €51 million (in €2004) England: €2.5 billion
5	Kruithof et al. (2016)	2016	Cannabis	Primary data collected from crypto markets, websites selling licit and illicit products and services on the dark web Literature review: academic, grey literature, and work of journalists and	8 crypto markets (AlphaBay, Cryptomarket, Dark Net Heroes League, Dreammarket, French Dark Net, Hansa, Nucleus, and Python)	No – except for the Netherlands	Volume of cannabis traded on marketplaces over the previous month: 474,455 grams	Monthly revenue: $4,436,803

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
				independent researchers				
5	Kruithof et al. (2016)	2016	Heroin	Primary data collected from crypto markets, websites selling licit and illicit products and services on the dark web Literature review: academic, grey literature, and work of journalists and independent researchers	8 crypto markets (AlphaBay, Cryptomarket, Dark Net Heroes League, Dreammarket, French Dark Net, Hansa, Nucleus, and Python)	No – except for the Netherlands		Monthly revenue: $751,021
5	Kruithof et al. (2016)	2016	Synthetic drugs (stimulants, ecstasy-type drugs, psychedelics)	Primary data collected from crypto markets, websites selling licit and illicit products and services on the dark web Literature review: academic, grey literature, and work of journalists and independent researchers	8 crypto markets (AlphaBay, Cryptomarket, Dark Net Heroes League, Dreammarket, French Dark Net, Hansa, Nucleus, and Python)	No – except for the Netherlands		Stimulants: $3,461,023 (monthly revenue) Ecstasy-type: $2,262,850 (monthly revenue) Psychedelics: $1,020,059 (monthly revenue)
6	Savona & Riccardi (2015)	2014	Heroin	General population survey – number of heroin users European Web Survey on Drugs – amount of heroin used EMCDDA and UNODC routine data collections – price Literature review of previous estimates	EU 19 and Norway	Yes – for Norway and EU 19 (which excludes Belgium, Bulgaria, Cyprus, Denmark, Estonia, Luxembourg, Portugal, Romania and Sweden)		Retail revenue €7,996 million (mid) €6,395 million (low) €10,656 million (high)

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
6	Savona & Riccardi (2015)	2014	Cocaine	General population survey – number of cocaine users European Web Survey on Drugs – amount of cocaine used EMCDDA and UNODC routine data collections – price Literature review of previous estimates	EU 24	Yes – for EU 24 (which excludes Cyprus, Luxembourg, Malta and Sweden)		Retail revenue €6,765 million (mid) €5,040 million (min) €7,575 million (max)
7	van der Giessen et al. (2016)	2012–2014	Cannabis	Comprehensive literature review – secondary analyses on data from available registrations (2012–2014) and previous studies, and expert opinion	NL	Yes	Between 171 and 965 tons (95% IE of 271-613 tons) of cannabis produced in the Netherlands	
8	UNODC (2011)	2009	Cocaine	Household surveys (number of cocaine users) UNODC Annual Reports Questionnaire (cocaine prices)	West and Central Europe (which includes AT, CY, UK, EE, FR, DE, EL, HU, IR, IT, ML, PT, ES, SE)	No		Growth profit from illicit cocaine trafficking: US$26 billion
9	UNODC (2015a)	2009–2012	Heroin	General survey data from World Drug Report and EMCDDA (prevalence data) UNDESA, Population Division data (population data)	Balkan route (including AT, BE, BG, HR, CZ, DK, FR, DE, EL, HU, IE, IT, LU, NL, PL, PT, RO, SK, SI, ES, SE, UK)	Yes		Total revenue from illicit opiates trafficked along Balkan route: $28 billion

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
				Seizure data reported by UN, as presented in World Drug Report Purity data reported by UN Member State to UNODC Price data reported by UN Member State to UNODC				
10[8]	Tops et al. (2018)	2017	Synthetic drugs (ecstasy and amphetamines)	Law enforcement annual reports Seizure data Stakeholder interviews	NL	No		€18.9 billion

[8] The research team notes that the Tops et al. (2018) study presents significant methodological limitations due to its ill-defined methodological process and use of seizure data. Nevertheless, it has been included in the table for comparative purposes. While this estimate was produced at the national level and drew primarily on seizure data, it highlights that the EU's illicit drug markets might be larger in scope, if compared to EU-level estimates.

2.1.3. Methodology for estimating revenues in this study

The literature review identified numerous prior estimates of the revenue from illicit drug markets in the EU. In particular, the EMCDDA and Europol jointly published high-quality estimates in their EU Drugs Market report in November 2019, which represents the best available estimates to date. For the purposes of this study, the EMCDDA/Europol estimates are used and discussed alongside findings from interviews with experts and stakeholders on market actors and future trends and dynamics.

A summary of the approach used in this study for estimating the revenue from illicit drugs – and details of the limitations of this approach – is outlined in the table below.

Table 2.3: Summary of approach for estimating revenue from illicit drugs

Summary of approach	The approach for examining the revenue of retail level illicit drug markets in the EU will use demand-based estimates produced by the EMCDDA/Europol in their latest report released in November 2019 (EMCDDA & Europol, 2019).
Output	Annual revenue from the cannabis, cocaine, heroin, synthetic drugs (MDMA, meth/amphetamine) drug markets in the EU.
Scope and coverage	**Geographical scope**: EU-level estimate **Year(s) of estimate**: 2017, updated to 2019 values **Sub-markets**: Cannabis, cocaine, heroin, MDMA, meth/amphetamine
Data sources	EMCDDA (2019b); EMCDDA & Europol (2019)
Rationale	The EMCDDA/Europol data represents the most robust available estimates for estimating the size and revenue of drug retail markets, as it draws from the most recent country-level data and covers all EU Member States.
Limitations and caveats of this approach	The EMCDDA's reliance on population-level data from self-report surveys – while representing the best-practice approach, means that estimates are likely to underestimate consumption and under-cover marginalised populations. The EMCDDA does not release Member State-level estimates for confidentiality reasons. As such, Member State-level estimates are not reported for this study. In lieu of this, differences across the 28 EU Member States have been explored through in-depth literature reviews and interviews with key stakeholders. It is not possible to estimate the retail revenue from NPS markets in the EU because these drugs are often consumed unknowingly by consumers, when adulterated within other drugs combinations. Moreover, NPS is a dynamic and constantly evolving market with new substances arising regularly. This makes estimation very difficult. For these reasons and as confirmed in interviews with key market experts, it is not possible to derive reliable estimates on NPS in the EU[9]. Nevertheless, this does not discount the importance of this market, particularly given the risks of polysubstance use.

2.1.4. Revenue estimates of the EU illicit drugs market

Table 2.4 below presents the revenue estimates produced by the EMCDDA and Europol and published in the EU Drug Markets Report and related technical report. According to these figures (adjusted for inflation to 2019 values), the revenues generated on retail markets for illicit drugs in the EU – including cannabis, cocaine, amphetamine, MDMA and heroin – was between €27 billion and €36 billion (€30 billion) (EMCDDA & Europol, 2019)[10].

- According to the EMCDDA/Europol's drug markets estimates, cannabis was the largest retail market at between €10 billion and €13 billion (€12 billion), followed by cocaine at between €8 billion and €11 billion (€9 billion), heroin at between €7 billion and €9 billion (€8 billion) and synthetic drugs (amphetamine and MDMA) at between €1.3 billion and €2 billion (€1.5 billion) (EMCDDA & Europol, 2019).

[9] Interview with EU-level stakeholder, 12 February 2020 (#3).
[10] The EU Drug Markets Report and related Technical report (2019) did not estimate the value of the EU's new psychoactive substances' market due to inconsistent consumption data for these drugs.

- The EMCDDA/Europol study does not provide disaggregated Member State-level estimates for confidentiality reasons[11]. However, Savona and Riccardi (2015)'s study (using a different methodological basis)[12], highlighted that the EU's four largest economies – namely Germany, France, the UK and Italy – recorded the highest retail revenues for illicit drugs. It is pertinent to note that in 2015, the UK recorded the highest revenue for cocaine and heroin in the EU. This finding suggests that the EU's overall revenue estimate of the EU retail illicit drug markets might differ with the UK leaving the EU[13]. Notably, EMCDDA and Europol (2019) report that synthetic drugs are increasingly produced in the EU, both for domestic trafficking and exportation, with Belgium, the Netherlands, the Czech Republic and Poland recording the highest wholesale revenues for synthetic drugs.
- Importantly, Savona and Riccardi (2015) noted that overall drug-market estimates and country-level estimates presented in their report are not directly comparable, given that they rely on a range of data sources provided by Member States (such as drug prevalence data), which are produced using different methodological approaches and estimated at different times. For this reason, comparisons between Member States should be made with caution. These results were consistent across the studies identified in the literature review.

Table 2.4: Revenue estimate of the EU retail illicit drug markets

Drug type	Revenue estimates (€ million)		
	Mid	Low	High
28 EU Member States	**30,688.41**	**26,708.13**	**35,514.56**
Cannabis	12,029.87	10,891.46	13,258.50
Cocaine	9,376.71	7,894.40	10,859.00
Amphetamine	1,041.89	859.08	1,327.06
MDMA	546.57	452.17	640.98
Heroin	7,693.36	6,611.02	9,429.02

Source: Estimates produced by EMCDDA are for 2017 (EMCDDA & Europol, 2019), which we updated to 2019 values using Eurostat's HICP (Eurostat, 2020b). Estimates are not disaggregated at Member State level, so these estimates represent 28 EU Member States (including the UK).

The figures presented in the table above update the EMCDDA and Europol's previous estimates published in 2016, which found that in 2013, the EU's overall illicit retail drugs market was worth €24 billion (EMCDDA & Europol, 2016). The cannabis retail market was €9.3 billion, the cocaine retail market was €5.7 billion, the heroin retail market was €6.8 billion, and the synthetic drug retail market was €2.4 billion (EMCDDA & Europol, 2016). While these figures suggest an overall increase in the revenue from the EU's drug markets, these results between the two years are not directly comparable due to changes in the methodology used to estimate market revenue[14].

In 2017, the cannabis market remained the largest drug market in the EU, followed by the cocaine and heroin markets. According to the EMCDDA/Europol, between 2013 and 2017 the cocaine market experienced the largest increase (EMCDDA & Europol, 2019). An EU-level stakeholder claimed this increase can be partly attributed to global growth in cocaine production in third countries, especially in the Andean region[15]. However, the EMCCDA/Europol's87 estimates – calculated based on a demand-side approach – do not reflect how variations in production impact the size of the retail market. While the above figures suggest that the European synthetic drug market is shrinking, the EMCDDA reports that amphetamine, methamphetamine and MDMA are increasingly produced within the EU and exported abroad (EMCDDA & Europol, 2019). Besides,

[11] Interview with EU-level stakeholder, 10 February 2020 (#1).
[12] The OCP project produced its own estimates for the EU cocaine and heroin retail markets, and aggregated existing estimates for the cannabis and synthetic drugs (amphetamine and ecstasy) markets, drawing from Kilmer & Pacula (2009) and Caulkins, Kilmer, & Graf (2013).
[13] In the absence of Member State level estimates, the study cannot deduce a revenue estimate of the EU 27 retail illicit drugs markets.
[14] The EMCDDA/Europol 2019 EU Drug Markets Report drew from a wider range of data sources, improved research methodology and updated data sources compared to that used for the 2016 EU Drug Markets Report. Methodological improvements include extending coverage to more countries participating in the surveys, and adjustment of data-collection instruments to better capture the number of users and the frequency of drug use.
[15] Interview with EU-level stakeholder, 10 February 2020 (#1).

three interviewed stakeholders stressed that the volume of drugs circulating within Europe had significantly increased in recent years, though this is not reflected in the EU retail market revenue estimates[16].

2.1.5. Criminal actors and modus operandi

Table 2.5: Illicit drugs markets – Market actors

Level of OCG involvement	The drugs market is particularly attractive for OCGs as it is highly profitable. The EU drugs market is highly competitive, comprising a myriad of loose/horizontal networks acting across the supply chain (including importation, production, distribution and retail). OCGs involved in the EU drugs market are increasingly inter-ethnic and transnational.
Size and composition of OCGs	The size and composition of groups involved in the EU drugs market varies greatly, least because no OCG holds a monopoly over the illicit importation, trafficking, distribution or domestic production of each drug type. While some OCGs are well established along some trafficking roots, most actors involved in the drugs market are better characterised as loose criminal networks or small enterprises carrying out illicit profit-driven activities, rather than highly structured OCGs.
Modus operandi of OCGs	The modus operandi of actors involved in the EU drugs market varies by drug type. **Cannabis resin** consumed in Europe is primarily produced in Morocco and imported via Spain, France and the Netherlands, while herbal cannabis is largely produced in the Netherlands, Belgium, Italy and Spain, for domestic consumption. **Cocaine** consumed in the EU is sourced in the Andean region and largely trafficked into Europe via the ports of Belgium, the Netherlands and Spain. The quantity of cocaine trafficked in Europe has reportedly grown in recent years. **Heroin** consumed in the EU mainly originates from Afghanistan and is primarily trafficked into the EU via the Balkan route. Evidence suggests that heroin is increasingly manufactured in Europe, using diverted legal precursors as a raw material. The EU has become a significant hub for the production and distribution of **synthetic drugs**, including amphetamine, MDMA and to a lesser extent, methamphetamine. These drugs are largely produced in the Netherlands, Belgium, the Czech Republic and Poland for both domestic consumption and exportation. NPS and precursors for synthetic drugs are mainly sourced from China and India, though also reportedly increasingly manufactured in the EU.
Poly-criminality of OCGs	Although there is limited evidence to support these links, the principal overlapping criminal activities alongside drug trafficking include THB, migrant smuggling and firearms trafficking, which are likely to result from shared trafficking routes. Additionally, substances are apparently used as a means of payment between OCGs involved in the drug markets.
Other key actors	N/A

We identified 16 studies in the literature review that included information on the key actors in illicit drug markets in the EU. The 2017 EU Serious and Organised Crime Threat Assessment (SOCTA) estimated that more than 35% of criminal groups active in the EU are directly involved in European drugs trafficking (Europol, 2017). The drugs market is particularly attractive for OCGs

[16] Interview with EU-level stakeholder, 10 February 2020 (#1); Interview with international-level stakeholder, 10 February 2020 (#2); Interview with EU-level stakeholder, 11 March 2020 (#14).

as it is highly profitable and offers numerous business opportunities given its large consumer base and the variety of products on offer (Savona & Riccardi, 2015). While each drug market presents its own characteristics, this study found that two overall trends characterise the European illicit drugs market.

First, **the EU drugs market is highly competitive, which prevents any single criminal organisation from gaining a monopoly** (Europol, 2017), even when the organisation is structured hierarchically. Savona and Riccardi (2015) report that revenues generated from drug trafficking are distributed across the supply chain. Specifically, two interviewees highlighted the importance of distinguishing levels of OCG involvement at different stages of the drugs supply chain, namely those involved in importing drugs into Europe, producing drugs within Europe, distributing drugs across the continent, and selling drugs to consumers[17]. Other findings from the literature review support these claims. Paoli argued that OCG involvement in the European drugs market is characterised by a range of loose/horizontal criminal networks carrying out various illicit profit-driven activities, rather than monopolisation by a few mafia-type and highly structured organisations (Paoli et al., 2017). Through interviews with incarcerated drug traffickers, Caulkins et al. also found that Italy and Slovenia's cocaine and heroin markets involved a variety of actors at three levels of the market (retail, wholesale and multi-kilo trafficking), suggesting that each category represents an autonomous profit centre rather than a division of a single criminal organisation (Caulkins et al., 2016). Nevertheless, the increased competition within the market does not preclude the strong position of certain OCGs at some levels of the supply chain (Europol, 2017).

Second, **European OCGs involved in the drugs market are becoming more inter-ethnic and transnational**. Europol estimates that 70% of OCGs are multinational in their membership (Europol, 2013a). Despite the economic competition mentioned above, Europol and the EMCDDA report that some European OCGs have increasingly cooperated to facilitate trafficking across the continent (EMCDDA & Europol, 2019). For instance, the EMCDDA and Europol report that Dutch OCGs have collaborated with traffickers of Turkish origin, resulting in two-way trafficking: Dutch OCGs send MDMA and other drugs from the Netherlands to Turkey in exchange for heroin and morphine (EMCDDA & Europol, 2017)[18]. However, the presence of inter-ethnic OCGs operating across the market should not be overstated, as evidence suggests that some ethnic groups have a stronger presence in parts of the market (Saggers, 2019).

The EMCDDA and Europol (2019) suggest that **two-thirds of the OCGs involved in drug trafficking are also involved in other criminal activities**[19]. The principal overlapping criminal activity is THB and migrant smuggling, likely due to shared trafficking routes (Saggers, 2019). Weapons trafficking activities have also been identified as operating alongside the drugs trade. An interview with a market expert highlighted that OCGs involved in illicit trafficking along the Balkan route often export firearms out of Europe in exchange for drugs[20]. Finally, the EMCDDA reports that heroin is often used as a means of payment between OCGs involved in other drug markets. For example, heroin is often exchanged for acetic anhydride, cannabis, synthetic drugs and cocaine trafficked to destinations outside the EU (Saggers, 2019). Similarly, an interviewee claimed that cocaine from the Andean region is imported into the EU in exchange for synthetic drugs, which are sent back to South America[21]. However, these poly-criminality trends should not be overstated as there is limited substantive evidence to support them.

Modus operandi

While the European drugs market has become increasingly inter-ethnic and competitive, each sub-market presents distinct characteristics that are outlined below. As stated above, it is important to distinguish the various levels of OCG involvement at different stages of the drugs market (production, trafficking, distribution and retail), and to emphasise the preponderance of loose criminal networks over highly structured OCGs within each sub-market.

The European **cannabis market** comprises resin and herbal cannabis, which are considered by Europol as two distinct markets regarding illicit trafficking (Europol, 2017). **Herbal cannabis** consumed in Europe is primarily produced in the Netherlands, Belgium, Italy and Spain, although

[17] Interview with EU-level stakeholder, 10 February 2020 (#1); Interview with EU-level stakeholder, 12 February 2020 (#3).
[18] Interview with EU-level stakeholder, 11 March 2020 (#14).
[19] Interview with EU-level stakeholder, 10 February 2020 (#1).
[20] Interview with EU-level stakeholder, 10 February 2020 (#1)
[21] Interview with international-level stakeholder, 10 February 2020 (#2).

the EMCDDA reports that it is difficult to estimate the number of production sites in the EU (EMCDDA & Europol, 2019). Europol also states that some herbal cannabis consumed in the EU is produced in Albania (Europol, 2017). The EU SOCTA 2017 reports that **cannabis resin** consumed in the EU mainly originates from Morocco, entering Europe through Spain, France and the Netherlands (Europol, 2017). According to Europol, Libya has also emerged as an important transit hub for cannabis ahead of transportation to Europe (Europol, 2017). Europol reports that OCGs of Moroccan origin primarily import cannabis resin into Europe, along with OCGs of Dutch and Vietnamese origin (Europol, 2017; Savona & Riccardi, 2015).

Europol suggests that herbal and resin cannabis is mainly trafficked into Europe via couriers, pleasure boats, speed boats, containers, lorries and small aircraft, while cannabis trafficked within Europe is distributed via couriers, private cars, buses, lorries and small aircraft (Europol, 2017). **Overall, Europol concludes that the European cannabis market has become more competitive and specialised** (Europol, 2017). Notably, the EMCDDA and Europol reveal that a range of **loosely organised OCGs are increasingly involved along the resin and herbal cannabis supply chain due to the market's profitable and diverse nature** (EMCDDA & Europol, 2019). In turn, the growing competition has reportedly led to increased violence within these drug markets (EMCDDA & Europol, 2019; Europol, 2017). Nevertheless, Saggers reports signs of growing cooperation between some OCGs involved in the EU's cannabis market. For instance, Albanian-speaking OCGs reportedly liaise with Italian mafia-style OCGs to traffic cannabis along the Italian coast (Saggers, 2019). However, the dynamics that determine these inter-relationships are not currently well-understood. Savona and Riccardi suggest that these market changes likely result from the growing consumer market and increased domestic production (Savona & Riccardi, 2015).

Cocaine imported to Europe is primarily produced in South America – namely in Colombia, Bolivia and Peru – where production has increased in recent years (Europol, 2017). Europol states that a range of OCGs is involved in the EU cocaine market, including Albanian-speaking, British, Dutch, French, Irish, Moroccan, Serbian, Spanish, Turkish and Mexican OCGs (Europol, 2017). An interviewee highlighted that cocaine is primarily imported into Europe via the ports of the Netherlands, Belgium and Spain, although law enforcement agencies are increasingly reporting cocaine seizures in the ports of Finland, Romania and the Balkan States[22]. Saggers reports that cocaine is typically imported into the EU via various traditional means of transportation, including general aviation, as part of large shipments in containers (hidden among legal goods) or in smaller quantities by couriers (Saggers, 2019). Within the EU, cocaine is transported in lorries or private vehicles. Finally, the EMCDDA notes an emerging trend within the European cocaine market, whereby European OCGs use national overseas territories located close to production countries to smuggle cocaine into Europe, since these territories are part of the European single market and European customs territory (EMCDDA, 2018).

Most of the **heroin** imported to Europe is produced in Afghanistan and trafficked into the EU via the Balkan route (UNODC, 2015a). The EMCDDA/Europol EU Drug Markets Report highlights that Turkish OCGs coordinate most of the European heroin trade, benefiting from well-established networks and infrastructure across the continent (EMCDDA & Europol, 2019; Saggers, 2019). While Turkish OCGs are heavily involved in heroin-import activities, the distribution of heroin across Europe is shared by a range of criminal organisations, including OCGs of Dutch, British, Western Balkan, Iranian and Pakistani origin (Saggers, 2019). These groups distribute responsibilities across the supply chain but seem to largely operate within national borders. Europol reveals that although heroin consumed in the EU is mainly imported via the Balkan route in land-shipments, there has been evidence of laboratories manufacturing heroin within the EU. Seizure data reveals that acetic anhydride – the main heroin precursor – is increasingly being exported from Europe (Europol, 2017). This finding was supported by two of the stakeholders interviewed during this study[23]. Heroin is occasionally distributed across the EU in small quantities via post and parcel services, and has increasingly become available on online marketplaces (Europol, 2017).

The EU SOCTA 2017 reports that the EU is a significant hub for the production and distribution of **synthetic drugs**, including amphetamine, MDMA and – to a lesser extent – methamphetamine (Europol, 2017). More specifically, growing amounts of MDMA and amphetamine are produced in the Netherlands and Belgium, and are largely destined for markets outside of the EU, while amphetamine and methamphetamine are increasingly produced in the Czech Republic, Slovakia

[22] Interview with EU-level stakeholder, 11 March 2020 (#14),
[23] Interview with EU-level stakeholder, 12 February 2020 (#3); Interview with EU-level stakeholder, 11 March 2020 (#14).

and Poland for domestic trafficking. Europol states that Dutch OCGs primarily coordinate the trafficking of amphetamine and MDMA produced in the Netherlands and Belgium, and Vietnamese OCGs handle the trafficking of synthetic drugs produced in the Czech Republic, Slovakia and Poland. These findings were supported by two stakeholders interviewed during the study[24].

According to Europol, the pre-precursors[25] and laboratory tools used to produce these synthetic drugs in the EU mainly originate from China and are imported into Europe via parcels, couriers, containers and aircraft (Europol, 2017). Synthetic drugs within the EU are trafficked via parcels, private cars and lorries. As such, Europol suggests that OCGs increasingly use online platforms to traffic synthetic drugs both within and outside of the EU, taking advantage of legitimate postal services to carry out their illicit activities.

Finally, Europol signals that the European synthetic drugs market is highly flexible, with OCGs constantly exploring new avenues to expand and diversify this illicit market. This finding echoes the Spapens (2011) study of synthetic drug traffickers in the Netherlands, which showed that OCGs swiftly adapted to counter law-enforcement measures, and that new criminal groups emerged to replace those dismantled by the police to sustain the synthetic drug market.

NPS continue to pose significant health and security risks in Europe, despite a decrease in the number of first substance detections. EMCDDA (2020) report that over 790 NPS were reported to the EU Early Warning System, of which 53 were detected in 2018. Although most NPS consumed in the EU currently are imported from China and India, Europol reports that some of these substances might be produced in the EU as well. However, a representative from an EU agency highlighted the significant knowledge gaps regarding NPS consumption and trafficking in the EU[26]. More specifically, the interviewee stressed that NPS can be misleadingly sold as traditional drugs, making their detection particularly difficult for law enforcement.

Box 2: Interviewees confirmed increasing violence related to drug trafficking by OCGs in Europe

The EMCDDA and Europol identified an increase in violence within the European drugs market (EMCDDA & Europol, 2019) which was confirmed during stakeholder consultations[27]. This was largely attributed to growing competition and changing models of cocaine and heroin supply. For example, the EMCDDA and Europol reported a growing trend, whereby local users in provincial areas source their drug supply directly from big cities (EMCDDA & Europol, 2019). This is disrupting traditional drug-supply models, with 'elder' suppliers in big cities increasingly trafficking directly with 'younger' dealers in provincial areas. This phenomenon has been reported mainly in the UK, but evidence collected by the EMCDDA and Europol suggests it is also occurring in Belgium, Estonia, Greece, Ireland and Sweden. Such changes have reportedly resulted in increasing levels of violence and exploitation as city-based drug-dealing groups resort to aggression and intimidation to establish themselves and assert dominance in new localities (EMCDDA & Europol, 2019).

According to a stakeholder interview[28], the rising levels of violence within the European Drugs market can be partly attributed to the growth in cocaine production in South America and in cocaine retail markets in Europe. This suggests that cocaine is more readily available in Europe, opening opportunities for mounting OCG involvement. For example, Europol notes an increase in violence in the port of Antwerp, where large amounts of cocaine are imported. In addition, evidence suggests that corruption and intimidation techniques were widespread. According to European port authorities, OCGs have approached port workers in Antwerp and offered up to €5,000 in exchange for a simple conversation.

Finally, the EMCDDA and Europol's collaborative research suggests that levels of drug-related homicides have increased across Europe, though they highlight that precise estimates are difficult to calculate due to methodological challenges and inconsistent data recorded across the EU (EMCDDA & Europol, 2019).

While the law-enforcement evidence presented here suggests increasing levels of violence across the EU drugs market, this trend should not be overstated. The evidence collected to-date is limited and the violence

[24] Interview with EU-level stakeholder, 10 February 2020 (#1); Interview with EU-level stakeholder, 12 February 2020 (#3).

[25] Amphetamine, methamphetamine and MDMA are produced from chemical starting materials called drug precursors. These drug precursors may also have legitimate uses and are strictly regulated at the global level to avoid diversion for illicit use. Yet, to bypass these regulations, OCGs producing illicit drugs in the EU have introduced alternative chemicals, which are then converted into drug precursors to produce synthetic drugs.

[26] Interview with EU-level stakeholder, 12 February 2020 (#3).

[27] Interview with EU-level stakeholder, 12 February 2020 (#3); Interview with EU-level stakeholder, 11 March 2020 (#14).

[28] Interview with EU-level stakeholder, 10 February 2020 (#1).

might result from factors that are not directly related to the drugs market. Future analysis should consider the extent to which these reported levels of violence are sustained over time, and the extent to which they are localised or more widespread.

2.1.6. Future trends and dynamics

Table 2.6: Illicit drug markets – Future trends

Future trends and dynamics	Future trends and dynamics identified within the EU drug markets include the increasing production of synthetic drugs and the diversion of precursors within the EU; growing online trade; and the use of cutting-edge technology to maximise production output.
Impact on market and criminal finances	These changes suggest that drug production and trafficking is likely to increase in the EU in the coming years, creating more opportunities for criminal networks to generate illicit profit.

Six studies identified in the literature review included information on the future trends and dynamics in illicit drug markets in the EU. Drawing primarily on the EU SOCTA 2017 and consultations with stakeholders, the following section highlights four main trends and dynamics.

First, the EMCDDA reports that **synthetic drugs are increasingly produced within the EU due to more sophisticated production processes** (EMCDDA & Europol, 2019). Law enforcement agencies have reported the development of low-cost, non-scheduled chemicals (drug precursors), mainly sourced from China, and industrial-scale equipment that allows larger production runs and methods borrowed from the pharmaceutical industry (e.g. automated production processes) (Europol, 2017). Europol also highlights two consequences of these technological advances for the European synthetic-drug market:

- Amphetamines and MDMA can be produced in larger quantities, which increases the customer base and multiplies health risks associated with drug taking. This is especially problematic given that more chemicals are used to produce them. Europol also highlights the growing environmental implications of such changes: the production of synthetic drugs generates large quantities of highly toxic and dangerous waste as a result of the new production methods and the introduction of new alternative chemicals used to produce drug precursors (this phenomenon is further described below) (EMCDDA, 2019a).
- Synthetic-drug trafficking has become a profitable market for OCGs as they can export drugs outside of Europe and easily reach EU customers, taking advantage of parcel delivery services and online retail platforms. The EMCDDA and Europol report that while the amphetamine, methamphetamine and MDMA produced in the EU is largely destined for the domestic market, Europe is increasingly playing a part in the global drugs market for amphetamine and methamphetamine (EMCDDA & Europol, 2019). According to the EMCDDA and Europol, the combination of these trends is likely to continue to pose a significant challenge for European law enforcement agencies in the future.

Second, **European synthetic-drug producers are increasingly circumventing regulations to produce synthetic drugs in the EU (EMCDDA, 2019a)**. Amphetamine, methamphetamine and MDMA are produced from chemical starting materials called drug precursors. These drug precursors may also have legitimate uses and are strictly regulated at the global level to avoid diversion for illicit use. Yet, to bypass these regulations, OCGs producing illicit drugs in the EU have introduced alternative chemicals, which are then converted into drug precursors to produce synthetic drugs. This finding was supported by one interviewee[29]. Another stakeholder affirmed that seizures of drug precursors had significantly increased in the EU over the past year, though the interviewee warned that this might also result from intensified law enforcement actions[30]. The interviewee also signalled a new trend whereby 'designer precursors' are produced by illegal companies in developing countries and then smuggled into the EU to be used in production of synthetic drugs[31]. Additionally, Europol notes that the **EU is increasingly becoming a producer for the pre-precursors of drugs** (Europol, 2017). For example, pre-precursors and other

[29] Interview with EU-level stakeholder, 12 February 2020 (#3).
[30] Interview with EU-level stakeholder, 16 March 2020 (#22).
[31] Interview with EU-level stakeholder, 16 March 2020 (#22).

chemicals for cocaine production are reportedly being exported to South America, where coca plantations are expanding. A stakeholder also highlighted that solvents and chemicals used for creating precursors for synthetic drugs were increasingly produced in the EU, notably in Poland.[32]

Third, **online trade is becoming more prevalent within Europe's drug markets** (EMCDDA & Europol, 2017). This finding was also supported by three stakeholders interviewed over the course of this study[33]. Online platforms can help drug suppliers improve their business models and increase profit margins by allowing suppliers to deliver drugs directly to consumers via regular postal services. This reduces the risks of getting caught and can enable vendors to reach a greater number of customers (Europol, 2017). According to Kruithof et al. (2016), in January 2016 the online drug market generated a monthly revenue of approximately €12.6 million. While this study suggests that the online drug market is relatively small compared to the street-level drug market, it suggests that drug traffickers might use crypto markets to make large wholesale transactions with the intention of dealing offline. Yet the EMCCDA and Europol found that mid- and low-level transactions are still predominant on illicit online platforms (EMCDDA & Europol, 2017). In a study looking at crypto markets' potential for disrupting international drug trafficking, Demant et al. (2018) found that the distribution of cannabis, cocaine and synthetic drugs on the internet is concentrated in consumption countries (with MDMA also produced in Europe), suggesting that drug online sales operate a regional rather than international level. The EMCDDA and Europol (2017) emphasise that the anonymity offered by online retail platforms is valued by drug traffickers and consumers. Sophisticated encrypted messaging systems and apps as well as cryptocurrencies provide useful tools to avoid law enforcement scrutiny.

Fourth, **cutting-edge technology has helped drug producers across Europe maximise their production outputs**. For example, Europol reports that large-scale cannabis cultivation sites in the Netherlands increasingly use professional growing equipment – such as climate control systems – to produce herbal cannabis. This phenomenon is leading to an increase in productivity and hence to a potential growth of production and trafficking volume. The use of technologies has also been observed within the heroin market. The increase in opium production volume has been attributed to agricultural innovations, such as solar-powered tube wells used in Afghanistan, which have helped increase the surface area used for production (Saggers, 2019). In addition, the increase in production of cocaine in South America has largely been attributed to technology advancements, such as novel cocaine-manufacturing processes, which subsequently result in an increase of cocaine available in Europe (Saggers, 2019). Finally, a stakeholder highlighted that new technologies have facilitated the emergence of Europe's industrial-like synthetic drug production, though the interviewee stressed that these large-scale productions are making OCGs involved in this market less agile[34].

The desk research and an interview with a stakeholder also highlighted **that technologies were used by OCGs to facilitate drug trafficking within Europe**. First, a stakeholder suggested that increasingly, traditional OCGs hire specialised criminal actors to carry out cyber-activities to assist in drug trafficking[35]. For example, the interviewee stressed that OCGs operating in the Netherlands had hacked surveillance technologies in ports to avoid detection. Berry also stressed that technologies deployed in smart cities were exploited by criminal actors to facilitate offline drug trading (Berry, 2018).

2.1.7. Recommendations

This study finds that there are two principal ways in which data collection and estimation on the illicit drugs market could be improved in the EU:

- First, two stakeholders noted that the data gaps identified in the literature review could be filled by **encouraging Member States to consistently collect prevalence data on drugs on an annual basis**[36]. As such, estimates could draw from annual data rather than averages of annual data spanning four to five years.

[32] Interview with EU-level stakeholder, 16 March 2020 (#22).
[33] Interview with EU-level stakeholder, 10 February 2020 (#1); Interview with National-level stakeholder, 25 February 2020 (#35).
[34] Interview with EU-level stakeholder, 10 February 2020 (#1).
[35] Interview with National-level stakeholder, 25 February 2020 (#35).
[36] Interview with international-level stakeholder, 10 February 2020 (#2); Interview with EU-level stakeholder, 12 February 2020 (#3).

- Second, two stakeholders highlighted the need to **better-adjust prices for drugs' purity or potency levels**[37]. One interviewee suggested that improving forensic investigations on drugs could help collect robust data on drug purity level and retail price[38]. Further, the interviewee added that forensic investigations could provide more information about the origin of drugs imported and pertinent data on the health implications of drugs consumed in the EU.
- The key findings, recommendations and actors for actioning or implementing these recommendations are summarised in the table below.

Table 2.7: Recommendations – Illicit drug markets

Key findings	Recommendations	Key actors for recommendations
The EMCDDA produces demand-based estimates of the revenue from the retail market for illicit drugs at the EU-level using routine data collections from Member States on prevalence of consumption and price, and the European Web Survey on Drugs for quantities consumed. However, price data is not adjusted for purity and Member State-level estimates are not published. Of the markets examined in this study, illicit drug markets represent the second-most significant in terms of revenues generated in the EU.	Member States should collect annual prevalence data via general population surveys so that EU-level estimates can be updated annually. There should be continued efforts to harmonise the data collected by Member States. There should be efforts to improve forensic testing of drugs so that price data can be purity-adjusted consistently across Member States. The EMCDDA should share Member States' disaggregated estimates with the European Commission. The work of the EMCDDA in providing a factual overview of European drug problems and a solid evidence-base for informing drug policy should be further strengthened.	Member States European Commission EMCDDA

2.2. Trafficking in human beings

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Key findings:

- According to the estimates produced in this study, the annual revenues derived from trafficking of human beings (THB) for sexual exploitation in the EU range between €0.4 billion and €14 billion.
- This is the first time a reliable estimate at the EU-level has been produced for the criminal revenue generated from THB for sexual exploitation, since all previous estimates referred to wider world regions.
- There is heavy involvement of OCGs in trafficking for sexual exploitation (especially Nigerian OCGs), as well as in trafficking for forced criminality, for begging and for organ removal.
- The typical structure of criminal groups active in this market consists of loose networks, linked by family, kinship or ethnic ties.
- Other key actors are various legitimate businesses involved in the trafficking chain that benefit from victims trafficked for sexual and labour exploitation and other exploitation, including companies in sectors such as transport, hospitality, agriculture, the entertainment industry, construction, catering, etc.
- Criminals increasingly use the internet and technological advances to recruit, control and exploit their victims and to hide the criminal proceeds.
- In addition to the traditional trafficking flow from Eastern Europe to Western Europe, there are multiple and diverse flows of victims trafficked from all over the world to the EU. For THB, Nigeria and China contribute the most.

[37] Interview with international-level stakeholder, 10 February 2020 (#2); Interview with EU-level stakeholder, 12 February 2020 (#3).
[38] Interview with EU-level stakeholder, 12 February 2020 (#3).

This Annex provides a comprehensive overview of THB in the EU, building upon the summary provided in **Section 2.2** of the main report.

THB represents a particularly serious crime and a violation of the fundamental rights and dignity of individuals, which is recognised as one of the main threats in the EU (Europol, 2017c). The two most prevalent forms of THB in the EU are THB for sexual exploitation and labour exploitation (European Commission, 2018c; European Commission, 2020b). In the period 2015–2016, the number of registered victims of THB across the 28 EU Member States was 20,532 (European Commission, 2018c). Sexual exploitation was the most commonly registered form of exploitation, accounting for over half (56%) of registered victims (65% excluding the UK). Trafficking for labour exploitation contributed around one quarter (26%) of the registered victims (15% excluding the UK) and 'other' forms accounted for 18% (20% excluding the UK).

The current study adopts the definitions of THB and exploitation as laid down in Directive 2011/36/EU: 'the recruitment, transportation, transfer, harbouring or reception of persons, including the exchange or transfer of control over those persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation'. The detailed definitions for exploitation – as well as the different forms of THB – are provided in the **Glossary** at the beginning of the main report.

Most of the prior research, estimates and data sources focus on THB for sexual exploitation and labour exploitation – there are very few quantitative analyses for forced begging and organ removal. Nevertheless, their particularly harmful effects for society and especially the victims have qualified these under-investigated crimes as among the high priorities of the Commission. The current section produces quantitative estimates of the market revenue of THB for sexual exploitation, in addition to a qualitative analysis of THB for labour exploitation, forced begging, organ removal and exploitation for criminal activities.

2.2.1. Previous revenue estimates of THB in the EU

We identified 10 studies that produced estimates of some aspect of the THB market in the EU. Of these, three produced monetised estimates for Europe or wider regions, seven produced estimates of the number of victims and one produced an estimate of revenues. There were no studies identified that estimated the overall revenue from the THB market and all its sub-markets.

Prior revenue estimates

The UNODC employed a supply-sided approach to produce an estimate of €2.5 billion annually for the whole European[39] market in trafficking for sexual exploitation in 2007–2008 (UNODC, 2010). The number of identified victims collected for each country by UNODC was multiplied by a value of 20 to account for the hidden population (the real number of victims), and the resulting number of victims was in turn multiplied by a gross assumption of what the annual revenue generated by a victim might be. The assumption was based on very limited information about the sex services, combining accounts from a US study on the number of sex services rendered annually by drug-dependent sex workers in the US with an Italian study about the average price of services.

In a report from 2015 Europol provided estimates on the revenues generated by THB for sexual and labour exploitation, but a closer examination of the provided revenues shows that were drawn from previous estimates by the International Labour Organisation (ILO) from 2005 and 2014, and pertain to wider world regions (Europol, 2015). According to the Europol report, the global annual profits of THB are €29.4 billion, with THB-related sexual exploitation and THB-related labour exploitation amounting respectively to €25.8 billion and €3.5 billion globally (Europol, 2015). The 'EU and developed economies'[40] account for a very large share of the annual profits of sexual exploitation, estimated at €23.5 billion (Europol, 2015). While the exact source and methodology

[39] The guestimate included the 28 EU Member States in addition to Iceland, Liechtenstein, Norway, Switzerland, the Western Balkans and Turkey.
[40] EU 27, UK, Canada, USA, Australia, Gibraltar, Greenland, Isle of Man, Israel, Japan, New Zealand, San Marino, St. Pierre and Miquelon, Andorra, Iceland, Liechtenstein, Monaco, Norway, Switzerland.

for producing these market revenues are not disclosed by Europol, the numbers are consistent with ILO's estimates (de Cock & Woode, 2014), previously cited in the same report.

The identified methodologies from UNODC and Europol (ILO) for estimation of revenues from THB follow the same supply-based approach, which ultimately draws on multiplication of the number of victims with the annual revenue generated per victim.

Prior estimates of the number of victims

The primary source of data on the number of victims for both EU and Member States is the official data on registered THB victims in the EU – disaggregated at the Member State level and by forms of exploitation – which are collected by the Commission and published biannually. The latest available data are for the period 2015–2016 (European Commission, 2018c). The compiled dataset follows the official EU definition of THB in Directive 2011/36/EU and provides proven cases of THB as well as presumed ones (European Commission, 2018c)[41]. The report provides data about numbers of both victims of trafficking for sexual exploitation and trafficking for labour exploitation at Member State level.

The desk research identified several estimates for the hidden population of victims. However, most of these (e.g. ILO's estimates of forced labour (ILO, 2012, 2017), Walk Free Foundation's Global Slavery Index (Walk Free Foundation, 2018a), and others) are based on definitions that differ from that established in the EU anti-trafficking directive. 'Forced labour' or 'modern slavery' are much broader concepts that are only to some extent related to THB (detailed definitions for 'forced labour' or 'modern slavery' are provided in the **Glossary**). As part of their 2012 study, ILO produced the first EU-level estimate for the number of victims of forced labour, including victims of 'forced sexual exploitation' and victims of 'forced labour exploitation' (ILO, 2012).

The only identified approach that is somewhat consistent with the current scope and definition of THB was promoted by UNODC to produce estimates of the hidden population of THB victims at a country level. The approach applies the so called multiple-systems estimation (MSE) method, which is an enhanced capture-recapture method for producing estimates of hidden populations (UNODC, 2018b). The MSE method has been applied in only four Member States so far (Romania, Ireland, the Netherlands and UK) and is based on cross-comparing two or more independent registers listing members from the studied hidden population.

Prior estimates of the annual revenue generated by a victim

The desk research did not identify any source that has systematically collected estimates of the annual revenue generated per victim of THB at the EU or Member State level. While rough regional estimates can be derived from some sources[42], such annual revenues would assume no differences between Member States and would contribute to a significantly higher margin of error.

[41] The data collection guidelines explain the difference as follows: '(…) the relevant formal authority to identify victims of trafficking in human beings in these countries seemed to be the police. In some countries, the status of "victim" could be granted by other authorities such as the immigration service, the state agency for social welfare or mandated NGOs. The term "identified victim" will be used for this category of victims of trafficking in human beings, and can be defined as a person who has been formally identified as a victim of trafficking in human beings by the relevant formal authority in a Member State. But in some cases victims will not report to the relevant formal authority, such as in cases where the victim does not report the crime to the police or does not want to cooperate with the police. The victim may be in need of assistance and support and for this reason contact victim service providers. Also in these cases, the victim could fulfil the constituent elements of the crime of trafficking in human beings and therefore be considered a victim of trafficking in human beings according to the legal definitions. In different studies this category of victims is either called "presumed" or "potential" victims of trafficking in human beings. Article 11 of the Directive 2011/36/EU introduces the "reasonable-grounds indication" for believing that the person might have been subjected to trafficking in human beings. To obtain a figure for the total number of victims of trafficking, data on victims that have not been formally registered by the relevant formal authority as a victim of trafficking should be used. The term "presumed victim" will be used for this category of trafficking victims and could be defined as a person who has met the criteria of the EU Directive but has not been formally identified by the relevant formal authority as a trafficking victim or who has declined to be formally or legally identified as trafficked'.

[42] For example, the 2010 UNODC estimate of €2.5 billion annually was based on the assumption of 140,000 trafficking victims in Europe, which would make the average annual revenue per victim about €17,860. See UNODC (2010) for details on how the number of victims and the market revenue are calculated.

2.2.2. Quality of prior revenue estimates

The prior studies described above were subject to quality appraisal, and several limitations were identified with regards to their methodologies and pertinent datasets:

- **Different definitions of THB used by most of sources** – for example, the ILO's estimates are based on their definition of 'forced labour'. While the ILO include trafficking for sexual exploitation in 'forced labour' and refer to the Palermo protocol in their works, their definition of forced labour – as well as instruments for estimating its scope – deviate significantly from Directive 2011/36/EU, which outlines the scope and focus of the current endeavour. Similarly, Walk Free Foundation's Global Slavery Index estimates the actual number of victims of 'modern slavery', an umbrella term covering a number of coercive and exploitative practices that is not focused on THB alone (Walk Free Foundation, 2018a). This is why estimates on numbers of victims based on this definition could not be directly equalled to victims of THB under the EU Directive.
- **Different geographical scope of estimates** – the identified sources provide estimates for much wider world regions and do not provide revenues at EU- or Member State-level (e.g. ILO, 2012, 2017, Walk Free Foundation, 2018a).
- **Lack of clearly outlined methodology (or a very rudimentary one)** – for example, Europol's estimates do not stem from a clearly outlined methodology that can be replicated.
- **Number of victims of trafficking not known** (hidden population issue) – this issue is also noted in the most reliable source of data for the number of victims, the bi-annual reports on the registered and presumed victims in EU produced by the Commission (European Commission, 2018e). The Commission's first progress report notes with regard to EU-wide reported statistics that given the complexity of the phenomenon, there are solid grounds to expect that the actual number of victims of trafficking in the EU is indeed substantially higher. In other words, the registered victims are a very **conservative** measure of the actual number of victims of THB. Therefore, the official statistics on registered victims alone can be used only as a **lower bound** estimate and should be viewed with great caution, especially on the level of Member States where estimates seem to be prone to a particularly high reporting bias.
- Few attempts have been made at producing an estimate for this hidden population on Member State level. For example, the only relatively reliable approach we identified for estimating the hidden number of victims was capture-recapture and its advanced version, MSE. However, this method has been applied in only four EU countries and not in the remaining Member States. In addition, this approach has also been heavily criticised for its methodology (Gallagher, 2017, Whitehead et al., 2019). Its shortcomings include strong dependence on quality of input data and problems with the assumptions behind the data analysis, which may result in a large margin of error when estimating the hidden population.
- Lack of **reliable data on annual revenue generated by traffickers per victim**, since no institution, national authorities or other stakeholders have systematically collected data on this variable. Calculating the average revenue per victim proves challenging, since this varies depending on factors such as the form of exploitation, industry where the victim is exploited, country of exploitation, duration of exploitation, and modus operandi of traffickers. The few identified sources rely on less robust data acquired through extrapolations, or assumptions based on expert opinions or qualitative studies (CSD, 2019). The only financial data on victims of THB at EU-level is provided by Europol (2015), but the revenue numbers refer solely to ILO estimates for EU and developed countries (i.e. they relate to a wider world region). All cited numbers in the Europol report come from ILO sources, some of which are as old as 2005 and refer to even older estimates.

Table 2.8: Prior studies estimating the size or criminal revenue of THB in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	European Commission (2018c)	2010–2016	All	Official number of registered victims of THB collected by the relevant authorities	EU 28	Yes	Time period / Registered victims of THB 2010–2012: 30,146 2013–2014: 15,846 2015–2016: 20,532	N/A
1	European Commission (2018c)	2010–2016	THB for sexual exploitation	Official number of registered victims of THB collected by the relevant authorities	EU 28	Yes	Time period / Registered victims of THB / THB for sexual exploitation victims 2010–2012: 30,146 / 69% 2013–2014: 15,846 / 67% 2015–2016: 20,532 / 56%	N/A
1	European Commission (2018c)	2010–2016	THB for labour exploitation	Official number of registered victims of THB collected by the relevant authorities	EU 28	Yes	Time period / Registered victims of THB / THB for labour exploitation victims 2010–2012: 30,146 /19% 2013–2014: 15,846 / 21% 2015–2016: 20,532 / 26%	N/A
1	European Commission (2018c)	2010–2016	THB for forced begging, organ removal and others	Official number of registered victims of THB collected by the relevant authorities	EU 28	Yes	Time period / Registered victims of THB / Forced begging victims, Organ removal victims and others 2010–2012: 30,146 / 12% 2013–2014: 15,846	N/A

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
							/ 12% 2015–2016: 20,532 / 18%	
2	UNODC (2010)	2007–2008	THB for sexual exploitation	National authorities mostly	EU 28	Yes	140,000 victims; inflow of 70,000 annually	$3 billion/€2.5 billion
3	Walk Free Foundation (2018a)	2018	THB for forced labour, including forced sexual exploitation	A complex predictive statistical model was built based on both World Poll (by Gallup) surveys (2014–2016) and on multiple systems estimation. The exact methodology, including algorithms are in Walk Free Foundation (2018b). The model includes forced labour (state-imposed forced labour, forced labour exploitation, and forced sexual exploitation of adults and children) and forced marriage components, which are aggregated in combined-country estimates about prevalence rates.	Europe, World, individual countries	Yes	Region / N / Prevalence rate (per 1000) Europe Total: 3.28 million / 3.8 EU Total: 1.16 million / 2.6	N/A
4	UNODC (2018d)	2015–2016	THB for sexual exploitation	MSE-based estimates	RO	Yes	1,300 in 2015; 1,200 in 2016	N/A
5	UNODC (2018c)	2014–2016	THB for sexual exploitation	MSE-based estimates	IE	Yes	98 in 2014; 153 in 2015; 179 in 2016	N/A
6	UNODC (2018b)	2010–2015	THB for sexual and labour exploitation	MSE-based estimates	Netherlands	Yes	5,562 victims in 2010; 8,424 in 2011; 8,435 in 2012; 7,078 in 2013;	N/A

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
							6,702 in 2014; 5,846 in 2015	
7	Bales, Hesketh, and Silverman (2015)	2013	Modern Slavery	MSE-based estimates	UK	Yes	10,000 to 13,000 victims	N/A
8	ILO (2012)	2011	Trafficking for forced labour, including forced sexual exploitation	Secondary data, estimation based on statistical model. The core element is a specially designed national survey for measuring forced labour exploitation of the adult population and forced marriage.	World regions	No	Developed Economies & EU: 1,500,000; Central & South-Eastern Europe (non-EU) & CIS: 1,600,000	N/A
8	ILO (2012)	2012	Trafficking for forced labour, including forced sexual exploitation	Secondary data, estimation based on statistical model. The core element is a specially designed national survey for measuring forced labour exploitation of the adult population and forced marriage.	EU	No	EU: 270,000 victims of forced sexual exploitation, and 610,000 victims of forced labour exploitation	N/A
9	ILO (2017)	2016	Trafficking for forced labour, including forced sexual exploitation	Secondary data, estimation based on statistical model. The core element is a specially designed national survey for measuring forced labour exploitation of the adult population and forced marriage. According to the authors, estimates are not directly comparable to the 2012 estimate of ILO, nor to the 2016 Global Slavery Index, because of differences in scope, methodology and regional groupings.	World regions	No	3,250,000 in Europe and Central Asia	N/A

2.2.3. Methodology for estimating revenues in this study

The general methodological approach used in this study is supply-sided, wherein the number of victims is multiplied by the annual revenue per victim. While the approach provides a straightforward way to calculate the criminal revenue, there are few estimates for both required elements (e.g. number of victims and annual revenue per victim) and all of these suffer from multiple limitations, as discussed in the section on the quality of prior estimates.

Concerning number of victims, the European Commission's dataset remains the only reliable source in the context of the current study for estimating the number of THB victims because: (1) it follows the official EU definition of THB in Directive 2011/36/EU; (2) it provides identified cases of THB as well as presumed ones; and (3) data sources are reliable (mainly public organisations, but also civil society organisations working with victims in many Member States).

Since the literature review did not establish any reliable data regarding annual revenue generated by a victim, the only available data that could be used as a viable proxy is the data on annual revenues generated on the sex service (prostitution) market, collected through desk research for most Member States. The use of data on annual revenues of sex workers[43] has several limitations. First is the problem of definitions – sex workers and victims of THB are two distinct groups and should not be conflated. Prostitution and the sex industry are high-risk sectors for women and children trafficked for sexual exploitation, and victims of trafficking do not consent to their exploitation. Moreover, whether revenues of sex workers are the same as the revenues generated by victims of sexual exploitation for criminals is generally unknown. Second, the country estimates obtained through literature review vary greatly in terms of time of the estimate, the adopted methodological approach and its reliability.

This could lead both to under- and overestimation of the average annual revenues generated for criminals by victims of THB for sexual exploitation. With a disclaimer of the many limitations of this approach, annual revenues of sex workers can be adopted as a proxy of the victims' revenues and used after appropriate statistical adjustments have been made. Henceforth, existing prior estimates related to annual revenues of sex workers were identified for 26 out of 28 Member States. Drawing on these prior estimates, an average sex worker's revenue was estimated for 24 of the Member States (no prior data was identified or produced for Cyprus, Ireland, Latvia and Luxembourg).

A tentative upper bound estimate for the whole of the EU can be produced only if the 'forced sexual exploitation' number produced by ILO is adopted as a proxy of victims of THB for sexual exploitation. The upper bound estimate uses the same annual revenue per victim of trafficking for sexual exploitation as the lower bound, but tries to approximate the hidden population using the only available estimate on the EU-level (as provided by ILO). The identified estimate from ILO is for 2012 (ILO, 2012). Such an approach is in line with estimates produced by Europol, which are also based on ILO's sources for the number of victims.

Since no reliable data for the average annual revenues of victims of THB (except for sexual exploitation) were identified, generation of new estimates for these sub-markets was not conducted and these sub-markets were covered only descriptively.

A summary of the approach used in this study for estimating the criminal revenues from THB for sexual exploitation and the limitations of this approach is outlined in the table below.

Table 2.9: Summary of approach for estimating the criminal revenues of THB for sexual exploitation

Summary of approach	Supply-based estimate using number of registered victims and annual revenue per sex worker as a proxy for annual revenue generated per victim of THB for sexual exploitation.
Rationale	Due to lack of reliable data, this was the only possible approach for estimating the criminal revenue. This is the first time such an estimate has been produced for the THB for sexual exploitation in the EU.

[43] The term 'sex worker' is used by Europol; THB Financial Business Model (2015).

Output	This approach measures the total annual revenue generated from THB for sexual exploitation.
Scope and coverage	Geographical scope: EU-level and Member State Year(s) of estimate: 2016, updated to 2019 values Sub-markets: Only THB for sexual exploitation was covered
Data sources	European Commission (2018c)[44] & ILO (2012) Various sources that provide information on the annual revenue per sex worker on the Member State level, adjusted for inflation and harmonised through statistical procedures.
Key steps	Number of victims for 2016 was directly taken from the European Commission's report and used to estimate the lower bound. ILOs estimate for overall number of victims of forced sexual exploitation (also accounting for the hidden population) was used for the upper bound estimate. Collected national estimates for the annual revenue per sex worker were adjusted first for inflation (with 2016 as the target year), and then all estimates were adjusted towards a mean value[45] to harmonise the estimates. Missing values for four Member States were imputed through multiple imputation. Finally, the two numbers for each Member State were multiplied according to the formula below to produce Total market revenue for each Member State: $Total\ market\ value = Number\ of\ victims * Average\ annual\ revenue\ per\ one\ victim$
Limitations and caveats of this approach	The above approach produces a lower and upper bound estimate of the volume of and criminal revenue from THB for sexual exploitation. The suggested method for estimation is inherently constrained by the lack of more accurate and robust data about the actual size of the hidden population on a Member State level, which makes it impossible to provide a reliable and valid upper bound estimate of the market for each EU country. Another constraint is the lack of data on the share of OCG involvement (as opposed to trafficking by individual perpetrators). Similarly, there is no systematic collection of data on average annual revenues generated by victims of THB, and very few such estimates are available. Hence, the approach uses annual revenues per sex worker as a proxy for the annual revenues generated per victim. Sex workers and victims of THB for sexual exploitation are very different groups that cannot be conflated, and the approach uses only the earnings of sex workers as a rough proxy for the possible revenues generated by the victims of THB for sexual exploitation. The suggested method is expected to produce an underestimate of the market.

2.2.4. Revenue estimates of THB for sexual exploitation in the EU

To estimate the market revenue from THB for sexual exploitation, we adopted a supply-based approach. Due to the unavailability of reliable estimates of the actual number of victims of THB at the EU-level[46], to calculate the criminal revenue we multiplied the number of registered victims from the Commission data collection (European Commission, 2018c) with the annual revenue per sex worker[47] as a proxy for annual revenue per victim of trafficking for sexual exploitation. **Since sex workers and victims of trafficking are very different groups, this approach will**

[44] Numbers for trafficking for sexual exploitation are from Annex Table A1.3 (p 179). Due to lack of information about Romania and Poland in this Annex, data for TSE cases for these two countries is calculated additionally, wherein the total number presented in Table 3.2.2 (p 35) is multiplied by the average Member State percentage of the corresponding type of victims.

[45] The adjustment used linear regression, where the annual revenue per sex worker was the dependent variable and several Eurostat indicators of the standard of living in the country were used as independent variables or predictors. The indicators used in the regression model were 'GDP per capita in PPS', 'Real GDP per capita [SDG_08_10]', 'Final consumption expenditure of households per capita', 'Exports of goods and services per capita', and 'Imports of goods and services per capita'. Individual country estimates were then adjusted towards their predicted values by the regression model. This slightly reduced the large variation in estimates, which probably stemmed from different approaches in producing the different country estimates. Multiple imputations used the same predictor variables listed above.

[46] UNODC multiple-system estimation can be used to produce national-level estimates, but has been applied so far only in a few EU Member States (UNODC, 2018c).

[47] It should be noted that sex workers and victims of THB for sexual exploitation are very different groups that cannot be conflated, and this approach uses only the earnings of sex workers as a rough proxy for the possible revenues generated by the victims of THB for sexual exploitation.

presumably provide a much lower estimate of the proceeds per victim generated by traffickers. Due to these methodological limitations, the market-revenue estimates for the lucrative crime of THB beings are also likely much lower than for other crime areas.

To compensate for the shortcomings of the lower bound estimate, a tentative upper bound estimate for the whole of the EU was produced based on the much higher estimate of ILO[48] for the victims of 'forced sexual exploitation' (which also accounts for the hidden population). The upper bound estimate uses the same proxy values for the annual revenue per victim of trafficking for sexual exploitation, which were applied for the lower bound estimate. Despite the methodological caveats of producing such upper bound estimates by drawing on ILO data, such an approach is also in line with Europol practice of using ILO's estimates as a yardstick for the size of the THB market (Europol, 2015).

However, it must be emphasised that while ILO's definition of victims of forced sexual exploitation is broadly based on the Palermo protocol, it deviates significantly from Directive 2011/36/EU (which we used to outline the scope and focus of the current study). In addition, the latest available ILO estimates for the EU (made for 2012) were published just after the Anti-trafficking Directive was adopted, and data collections in the EU on THB victims have since been developed in relation to the Directive. Therefore, the upper bound estimate does not consider the social and economic developments since 2012, which have had an impact on the number of victims trafficked for sexual exploitation.

The table below presents the estimates of THB for sexual exploitation market at the EU-level and for each of the 28 EU Member States. The results show that a conservative (lower bound) estimate of market revenue is €402 million (€274 million excluding the UK) solely for trafficking for sexual exploitation, hinting at a much higher actual revenue if the hidden population of victims is accounted for. At the same time a tentative estimate of the revenues generated by trafficking for sexual exploitation in the EU shows it could be as high as €13 billion.

Table 2.10: Criminal revenue estimates on THB for sexual exploitation in the EU

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)		
	Mid	Low	High
28 EU Member States	**7,185.93**	**401.94**	**13,969.91**
27 EU Member States without UK		**273.70**	
Austria		9.05	
Belgium		2.46	
Bulgaria		6.30	
Croatia		0.44	
Cyprus		0.99	
Czech Republic		0.07	
Denmark		7.26	
Estonia		0.14	
Finland		1.96	
France		78.30	
Germany		30.00	
Greece		3.63	
Hungary		29.98	
Ireland		2.65	
Italy		50.10	
Latvia		0.55	
Lithuania		0.25	

[48] The most recent estimate available for the EU is for 270,000 persons: ILO (2012).

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)		
	Mid	Low	High
Luxembourg		1.63	
Malta		0.07	
Netherlands		24.20	
Poland		1.92	
Portugal		0.91	
Romania		7.95	
Slovakia		0.41	
Slovenia		1.01	
Spain		7.16	
Sweden		5.01	
United Kingdom		129.73	

Note: Estimates were produced for 2016 and updated to 2019 values using Eurostat (2020b) HICP.

Data on different Member States indicate a disproportionately large contribution of UK, France, Germany, Hungary, Italy and the Netherlands, which together account for 85% of the total market (UK alone accounts for 32% of the €130 million). These differences between Member States stem mainly from the number of registered victims, while the difference between average annual revenues generated per victim are much smaller[49]. Therefore, the relative weight of particular Member States in the total market revenue estimate produced should be interpreted with caution, as it likely stems not only from the actual market size, but also from differences in collecting and providing information about victims of THB (as discussed in the previous section on the quality of prior estimates).

2.2.5. Criminal actors and modus operandi

Table 2.11: THB – Actors

Level of OCG involvement	Heavy involvement of OCGs, in trafficking for sexual exploitation (especially Nigerian OCGs), for forced criminalities and for begging and for organ trafficking. THB for sexual exploitation (especially domestic trafficking) can be organised not only by OCGs, but also by single traffickers often by family members or close person to victim. Trafficking for labour exploitation by OCGs is increasing.
Size and composition of OCGs	Loose networks linked by family kinship or ethnic ties. Three types – small-medium sized OCGs, highly organised OCGs; unorganised domestic traffickers.
Modus operandi of OCGs	Recruitment – 'Lover boy' method for sexual exploitation; use of intermediary companies for labour exploitation. Transport – Land and air, including by vehicles organised by traffickers (EU OCGs). Control – debt bondage, use of threats, psychological and physical abuse.
Poly-criminality of OCGs	Drug trafficking, benefit fraud, smuggling, money-laundering.
Other key actors	Legitimate businesses involved in the trafficking chain who benefit from victims trafficked for sexual and labour exploitation and other exploitation include transport, recruitment agencies, hotels, agriculture, entertainment facilities, construction, catering, etc.

More than 42 studies identified in the literature review included information on the key actors in

[49] The lowest adjusted annual revenue per sex worker was for Poland: €17,468; highest revenues were for Italy and Luxembourg: €92,735 and €118,361 respectively.

THB in the EU and the modus operandi of traffickers. Additional studies were identified that were country focused. In addition, interviews were conducted with 22 international and EU experts, as well as national practitioners working in the field of investigating THB.

With regards to **the level of OCG involvement**, studies and interviewees reveal that THB is a crime that can be conducted by individual criminals with limited organisation in place, or by complex organised criminal networks that govern the entire process of trafficking. International, EU-level and national experts provide diverging viewpoints on the level of control exercised by OCGs on the market. According to a law enforcement stakeholder, the market is **heavily controlled by OCGs**, and international-level expert interviewees noted that the **proportion of OCG convictions related to THB is relatively higher than those in other criminal markets**, such as drug trafficking and smuggling[50]. Consistent with the literature, interviewees revealed that OCGs are especially involved in some of the trafficking sub-markets and forms of exploitation.

In general, based on literature and interviewees, it is concurred that trafficking for sexual exploitation, trafficking for **criminal activities and for begging** and trafficking for organ removal purposes are predominantly conducted by OCGs, due to the necessary complexity of the operation and the highly profitable nature of the crimes[51]. Some noted a decentralisation of the actors involved in cases of THB for **sexual** exploitation, where lone traffickers can organise the scheme and exploit one or two victims who are recruited and exploited domestically[52]. Trafficking for **begging** can be established by OCGs, exploiting many victims for begging and pickpocketing, or it can be organised on a family basis, in which parents exploit their children[53]. In the case of trafficking for **labour exploitation**, it is organised by individuals as well as OCGs (who also use legitimate companies in the process of recruitment and exploitation)[54].

In terms of the **nature of the OCGs involved**, according to Europol 'the typical structure of criminal groups active in THB consists of loose networks, linked by family kinship or ethnic ties (Europol, 2016).' These groups are highly flexible, able to adapt to changing circumstances and respond to new opportunities. Operations are easily shifted to other countries in cases where activities are detected, or when more profitable opportunities are identified (Europol, 2016). In the age of the COVID-19 pandemic, OCGs across the whole trafficking chain rely increasingly on the internet (Europol, 2020a; European Commission, 2020b).

UNODC identified **three types of THB groups** based on the organisation, size and trafficking distances (UNODC, 2014).

- **Small- or medium-sized OCGs, often family- or clan-based,** who engage in sub-regional trafficking. Unlike individual traffickers, these OCGs rarely operate independently, instead relying on other actors in specific phases of the trafficking process. More robust organisational structures are in place, especially when cultural conditions that favour family or local community networks exist (UNODC, 2014). These networks are thus applied into criminal activities[55]. The number of victims being exploited by such OCGs simultaneously is higher in number and the period of exploitation is longer than for individual traffickers.
- **Highly organised, large-scale OCGs** that engage in sub-regional or trans-regional trafficking. These OCGs are more prevalent among non-EU actors, such as Nigerian and Chinese OCGs, and are often family- or kinship-based with members coming from the same community and cultural background. These OCGs handle all phases of the trafficking process independently and are best able to hide their activities via legal businesses – for example, hotels, modelling agencies, labour agencies, nightclubs, massage parlours, manicure parlours, saunas, cafes, bars and likely others (Europol, 2016).
- The last group consists of **unorganised domestic traffickers**. These actors are usually independent, individual traffickers who deceive one or a couple of victims

[50] Interview with International-level stakeholder, 20 February 2020 (#33); Interview with EU-level stakeholder, 26 February 2020 (#36).
[51] Interview with EU-level stakeholder, 20 February 2020 (#33); Interview with EU-level stakeholder, 26 February 2020 (#36).
[52] Interview with Member State stakeholder BE, 26 February 2020 (#37); Interview with EU-level stakeholder, 20 February 2020 (#33).
[53] Interview with EU-level stakeholder, 26 February 2020 (#36).
[54] Interview with EU-level stakeholder, 26 February 2020 (#36).
[55] Interview with EU-level stakeholder/academic, 19 February 2020 (#53).

> interpersonally. They tend to be oriented towards sex trafficking over short distances, mostly domestically, although cases of individual labour traffickers have also been recorded. This type of organisation may include couples, or a trafficker with one or two girls, recruited via the 'lover boy' method. According to investigative authorities, victims do not realise that they are exploited and do not report the situation to the police[56].

According to Europol, the most threatening OCGs are generally those capable of governing the entire process of trafficking, from the recruitment of victims to the reinvestment of the criminal proceeds (Europol, 2016). These OCGs are relatively small (up to 15 persons) but have the ability to simultaneously handle numerous victims and to move them around between different sites of exploitation, having established logistical bases and contacts in source, transit and destination countries (Europol, 2016). The groups do not necessarily have a hierarchical structure and they are able to build flexible networks with cooperating clusters. One cluster is responsible for recruitment, another cluster for transportation and control, another cluster for exploitation. According to EU experts, the clusters can together form a well-functioning OCG[57]. According to a study by Paolo Campana on Nigerian trafficking networks, the logistics of OCG THB networks can be both costly and very labour intensive (Campana, 2016).

A reliable source of information on the **origins of perpetrators of THB** is the data collected by the Commission from the criminal justice systems of Member States on traffickers who are in formal contact with the police and criminal justice systems, prosecuted or convicted across all Member States. The 2018 report reveals that across the period 2015–2016, 7,503 people were in formal contact with the police and criminal justice system (European Commission, 2018e). Most people who were suspected (84%) or prosecuted (87%) in the EU for THB in 2015–2016 with known citizenship were nationals of Member States. Some three-quarters of these were adult men. Bulgaria, Romania and Germany were among the top five citizenships in terms of suspects for both 2010–2012 and 2015–2016. When considering suspects, prosecutions and convictions together, Romania, Hungary, the Netherlands, Poland and Bulgaria were in the top five in 2015–2016 (European Commission, 2018e).

Only 16% of suspects held non-EU nationalities in 2015–2016. Of these, the most frequent countries of citizenship were China, Nigeria, Turkey, Albania and Morocco. (Nigeria, China, Morocco and Albania were the most common non-EU citizenships in 2010–2012.) In terms of prosecutions, the top five non-EU countries of citizenship were Nigeria, Albania, Serbia, Bosnia and Herzegovina and Egypt (European Commission, 2018e).

Modus operandi

THB for sexual exploitation

THB for sexual exploitation is a form of gender-based violence that disproportionately affects women and girls (Yonkova et al., 2017). It is the most prevalent form of trafficking in human begins in the EU and globally. Member States report that traffickers increasingly use the **internet and social networking** tools to **recruit** victims, for logistics, to enable the **exploitation** of victims, and as a marketing platform for prostitution (European Commission, 2018c; European Commission, 2020b). There has been a growing tendency for exploiters to use digital surveillance to monitor their victims remotely and distance themselves from the scene of the crime. Traffickers increasingly rely on digital communication (i.e. social media, messaging apps, VoIP) in all phases of the THB process (European Commission, 2018c; European Commission, 2020b).

The EU SOCTA concludes that OCGs increasingly use **legal businesses** that can conceal exploitations such as hotels, nightclubs and massage parlours (Europol, 2017). Interviews with national investigative authorities reveal that for instance, in Belgium, brothels could be used to conceal sexual exploitation to lower the risk of criminal prosecution[58].

The traditional flows from Eastern Europe to Western Europe has been diversified by different flows of victims from all over the world. The **modus operandi** thus varies across the legal status and ethnic origin of the perpetrators, who recruit, transport and exploit victims in the EU.

According to Europol, **Eastern and Central European OCGs** (mainly Bulgarian, Czech, Hungarian, Romanian and Slovakian) were known to have organised hierarchical structures with strict divisions. Since these countries entered the EU, Bulgarian, Czech, Hungarian and Romanian

[56] Interview with Member State stakeholder BE, 26 February 2020 (#37).
[57] Interview with EU-level stakeholder, 12 March 2020 (#49).
[58] Interview with Member State stakeholder (BE), 26 February 2020 (#37).

OCGs have started relying on more 'flexible structures' as a way of adapting to stricter and more competent law enforcement standards (Europol, 2016). Victims of sexual exploitation are typically **recruited** by the 'lover boy' method of recruitment, where victims are manipulated to become emotionally attached to their exploiters. EU citizens are typically **transported** through conventional channels using their official identification documents, thus making their exploitation lucrative (Shentov et al., 2019).

According to Europol, the **sexual exploitation** of EU nationals no longer relies predominantly on the use of violence and coercion towards victims. Some OCGs increasingly rely on **threats of violence** towards victims and their families rather than attacking the victim (Europol, 2017; European Commission, 2020b).

Europol's reports reveal that non-EU OCGs – Nigerian and Chinese ones being the most prominent – are relatively more organised than their European counterparts (Europol, 2016). Most of the Nigerian groups are so called 'fraternities' often formed in Nigerian universities. The groups are based on gang culture, with a strict hierarchy (Europol, 2020c). Primary **methods for recruitment** involve deception, persuasion, outright abduction or a combination of these. Victims are often misled by false promises of employment opportunities, good working and/or living conditions, and/or a high wage. Victims can also be deceived by their exploiters and travel to a destination point voluntarily, which occurs quite often in 'lover boy' cases where emotional manipulation plays important role. Victims originating from outside the EU are still routinely subjected to violence, debt bondage, passport confiscation and other forms of coercion as an integral part of THB modus operandi (Europol, 2017). Nigerian victims are recruited from their home country through false promises of job opportunities in Europe. Victims fall into debt bondage, which could be more than €30,000 per victim, and are forced to repay this debt through prostitution (Europol, 2020c).

West African victims are often **recruited** and controlled via the exploitation of cultural beliefs related to voodoo rituals. Case studies indicate that Nigerian OCGs favour psychological techniques related to *juju* folk magic for recruiting and keeping victims compliant. The Nigerian example showcases the importance of social capital and social connections – victims are often recruited in their own home, sometimes by a relative or family friend (Gebrewold et al., 2017; UNODC, 2010). Contracts are made between exploiters and victims through the *juju* ritual, which is used to great effect in deterring victims from breaching the agreement because they believe bad omens – even death – will follow. The victims are recruited by Madams, who in most cases have been victims themselves, with false promises of work in shops, hairdressing salons and domestic works. The women and their families are indebted to the traffickers for the transportation and living costs and are thus subjected to exploitation to repay this dept[59]. EU experts, as well as investigators interviewed for this study, assess a slight decrease in the overall presence of Nigerian victims in the EU, which could be the result of declining migration pressure, or the success of law enforcement operations that could lead to the displacement of THB networks[60].

Unlike EU-based OCGs, **Nigerian and Chinese traffickers** are very reliant on falsifying travel documents, and abusing tourist visas and the asylum system (Europol, 2017). Both are known for operating independently in cellular, kinship-based structures and making use of extensive diaspora communities in the EU (Europol, 2017). Non-EU victims are often persuaded to apply for asylum or visa to a Member State, usually in the Schengen Area.

Chinese sex THB networks **recruit** Chinese women via smugglers who obtain tourist visas for them. Once they have arrived at their destination, women are temporarily accommodated by local Chinese diaspora or EU nationals who are paid by the OCGs. Alternatively, Chinese actors manipulate Chinese women emotionally or deceive them with promises of work, luring them into their European exploitation operations (Shentov et al., 2019).

THB for labour exploitation

According to Europol, involvement of OCGs in THB for labour exploitation is increasing in the EU. OCGs cater to the growing demand for cheap labour across many Member States and have access to many potential victims (Europol, 2016). Traffickers often take advantage of discrepancies between national labour legislation in different EU Member States to organise the exploitation of

[59] Interview with Member State stakeholder (SE), 10 March 2020 (#43).
[60] Interview with Member State stakeholder (SE), 10 March 2020 (#43); Interview with EU-level stakeholder, 26 February 2020 (#36).

workers in the grey zone between legal employment and labour exploitation (Europol, 2017). Further details on the link between THB for labour exploitation and underground economic practices is available in Annex 3.4.

According to Europol, victims are usually **recruited** through deception about the nature or conditions of the work, with promises of well-paid jobs with no requirement for qualifications. The recruitment is conducted by online advertisements, newspapers, word of mouth and local employment agencies (Europol, 2016).

The **transport** is typically organised by land in the case of EU nationals. In the case of third country nationals, traffickers provide victims with false documents and sometimes bogus contracts to facilitate travel across borders. Victims are often charged extortionate fees for their travel, which eventually leads to debt entrapment as a tactic to keep them in exploitation (Europol, 2016).

According to the ILO, the **intermediaries** facilitating the link between supply and demand of migrant labour can be criminal networks or disguised legitimate business with close ties to the formal and informal economy in destination countries (Andrees, 2008). In labour exploitation in general, perpetrators either infiltrate or create their **legal business** structures to recruit workers, to engage in a contractual relationship with them, and move them to the country of exploitation. This also serves as a facade for criminal activities because it gives an impression of legitimacy (European Commission, 2020b)[61].

A Europol report reveals that **compliance** is achieved less by the use of force, and more by victims being subject to verbal manipulation, psychological pressure and threats. Victims are told that they have incurred significant costs for their transport, accommodation and arrangement of logistics, which they have to repay with long hours of labour (Europol, 2016 #293; European Commission, 2020b). The workers are offered contracts, sometimes in a language that they do not understand. Sometimes passports are taken by the traffickers when the victims arrive at the country of exploitation, with the excuse that they will be used to register the workers with the social services[62].

Previous studies reveal that the use of intermediaries and **long labour-supply chains** – including cascade subcontracting – are some of the main features in cases of labour exploitation where traffickers also exploit the informal sector (Davies & Ollus, 2019). The role of supply chains (both of products and labour) is also argued to be key to identifying the intersections between the formal and informal economy within forced labour and labour THB (Allain, Crane, LeBaron, & Behbahani, 2013).

THB for forced begging

Traffickers typically target child victims for forced begging through voluntary offers to their families, or **recruit** adults with physical and psychological disabilities. OCGs involved in THB for forced begging specifically target vulnerable people, such as children deprived of parental care, or single mothers (Europol, 2014).

Traffickers target impoverished families and push them into debt with the involvement of complicit money lenders. High interest rates prevent families from paying off debt, prompting them to put children in exploitative situations (Europol, 2014). Monetary transactions between the traffickers and the families can take place and the families subsequently provide the traffickers with the legal documents needed for the minor to leave the country (Europol, 2016). As with other forms of THB, **ethnic and cultural** ties are used by traffickers who mainly target their fellow nationals. **Roma** are flagged by Anti-Slavery Study as particularly vulnerable to THB for forced begging (Anti-slavery, 2014). Young Roma women and girls are especially vulnerable to exploitation and trafficking, which is sometimes arranged by their own families. Children are mainly engaged in street crimes such as pick-pocketing, bag-snatching and shoplifting in crowded and tourist areas. Men are traditionally in charge of the logistics and organisational management of the criminal activities (Europol 2016).

Children usually **travel** under genuine passports of unrelated adults, though multiple identities are used, and the identities of children of close resemblance are used interchangeably to avoid

[61] Interview with EU-level stakeholder, 12 March 2020 (#49).
[62] Interview with EU-level stakeholder, 12 March 2020 (#49).

detection. The traffickers are very flexible and mobile, and children are quickly moved from one country to another upon detection from law enforcement[63].

In the phase of **exploitation**, in the case of minors a lower level of **coercion** is used, as they are dependent on adults. Instead, **pressure** is exerted from their traffickers or relatives to beg and achieve a minimum amount of money. Children often do not consider themselves as victims of exploitation, thus further challenging their identification as victims (Europol, 2014). Nevertheless, EU Directive 2011/36 stipulates that consent of a victim of THB to their exploitation, whether intended or actual, is irrelevant.

Child begging could be accompanied by other auxiliary activities such as selling flowers, candles, tissues, gadgets, newspapers or socks, etc., or offering services, such as washing car windscreens, parking services or playing music. In addition, children are either accompanied by an adult, who collects the money right away, or monitored by an adult, who collects the money at certain times of the day (European Commission, 2012).

THB for forced begging can be organised by **individuals**, exploiting family members or relatives, or it can be managed by a sophisticated OCG, exploiting more than 2,000 victims for begging and petty crime[64]. However, as victims are most likely encountered by non-THB experts, including frontline police officers, begging incidents are dealt with individually and often treated as a minor offence. Authorities rarely detect the organised nature of the group behind the activity[65].

THB for organ removal

The demand for organ transplants has been exploited by trafficking networks that engage in organ trafficking or THB for the purpose of organ removal. The most sought-after organs are kidneys, followed by liver lobes (Shimazono, 2007). While the latter falls within the scope of anti-trafficking legislation, there is little knowledge on the extent and characteristics of the phenomenon. For the 2017–2018 Data Collection of the European Commission only 27 cases of trafficking for organ removal were reported in the whole EU (European Commission, 2020b). THB for organ removal was reported under 'other forms of trafficking' in previous Commission data collection reports. These other forms of trafficking accounted for 12% of victims of THB in 2013–2014 and 18% in 2015–2016. The metadata information of the 2018 report – containing comments from the reporting countries and EU agencies – includes only limited indications of trafficking for organ removals taking place in the EU (European Commission, 2018c).

Prior academic studies reveal that trafficking networks involved in trafficking of persons for organ removal vary in size, division of tasks between actors and geographical scope of activities. Experts point to the predominant involvement of OCGs due to the transnational and highly profitable nature of the crime[66]. A UNODC assessment tool kit states that the severe organ scarcity leads to the functioning of the black market, where OCGs may act as a link between impoverished people who are willing to sell their organs, and those seeking transplants (UNODC, 2015c). Studies delineate several key roles of actors involved in this type of crime, including: brokers, local recruiters, healthcare professionals and facilitators (Bos, 2015).

Brokers typically manage overarching logistics by tracking down lucrative deals, connecting clients, victims and surgeons, and generally managing the whole operation. These actors are usually best placed to coordinate the other roles and make strategic decisions for the group. Brokers negotiate the price of the transplant package and set a fee for the organ supplier. Several brokers may be involved in larger transnational networks. In some cases, doctors/surgeons or directors of hospitals or tissue-matching laboratories may play the role of brokers (Bos, 2015).

Local recruiters procure victims, typically from their own community. Some former victims are told they will only be paid for their organs if they help in the recruitment process. Recruiters typically operate within one country or a specific geographical area and are sometimes involved in other forms of THB (e.g. sexual exploitation, forced labour). The local recruiters receive payments per successful recruit (i.e. resulting in a transplant) (Bos, 2015).

[63] Interview with EU-level stakeholder, 10 March 2020 (#44).
[64] Interview with EU-level stakeholder, 26 February 2020 (#36).
[65] Interview with EU-level stakeholder, 10 March 2020, (#44).
[66] Interview with EU-level stakeholder, 26 February 2020 (#36); Interview with EU-level stakeholder, 20 February 2020 (#33).

Healthcare professionals consist of a variety of medical experts who are necessary for organ transplantation – from surgeons to anaesthesiologists. The low number of prosecutions of doctors in cases of THB for organ removal suggests this is the safest role in the group. Lastly, facilitators are not necessarily directly engaged with the operation, but they enable its functioning by giving the group access to medical facilities, medical licenses and signing off on transplantation surgeries. Thus, facilitators can be a variety of actors – from public officials to low ranking nurses and administrative staff in hospitals (López-Fraga et al., 2017). Unlike OCGs engaged in other forms of THB, actors in this sub-market are opportunists rather than professional criminals: 'they do not specialize in criminal activity' and 'neither do they cater to a specific market'. Their connection to the formal economy is a precondition for the success of the criminal operation (Columb, 2017).

Expert interviews reveal that OCGs revert to **corruption** for the conduct of trafficking for organ removal[67]. Typically, this may involve corrupt police and/or customs officials, officials giving out visa and travel documents, and sometimes officials in the health administration who issue false licenses to hospitals and doctors (Bos, 2015).

THB for criminal activities

Despite the entry into force of the EU anti-trafficking Directive 2011/36/EU – which includes criminal activities as a form of exploitation – this type of THB remains under-researched. Europol reports that victims are increasingly used by THB networks for criminal activities, such as begging, benefit fraud, identity fraud, credit fraud and insurance fraud (Europol, 2015). Notably, Article 8 of the EU Directive calls for non-punishment of criminal activities that perpetrators have been compelled to commit because of THB (European Parliament, 2011). In the Second report on the progress made in the fight against THB (2018), Member States report an increase in trafficking for forced criminality and forced begging (European Commission, 2018d). An additional noted tendency by Member States is the increase of instances of victims entering into sham or forced marriages. Such victims may be subjected to sexual or labour exploitation, forced into childbearing or compelled to marry non-EU citizens to regularise their stay (European Commission, 2018d).

A Europol brief concludes that children are especially vulnerable to trafficking for criminal activities due to their dependency on adults (Europol, 2014). According to Europol, minors are usually recruited from families in difficult economic circumstances. In some cases, children are sold by their families to the traffickers. Thus, they do not consider themselves to be in an exploitative situation, but rather perceive their exploitation as loyalty to their family (Europol, 2014).

A study on THB for the purpose of criminal activities and forced begging in the UK, Ireland, the Czech Republic and the Netherlands and across the EU by Anti-Slavery reports that very few cases are reported in official statistics and many victims are misidentified as offenders. According to the study, victims – most commonly trafficked for forced criminality and begging – come from South-East Europe (many of them of Roma origin) and from South-East Asia (Vietnam and China) (Anti-slavery, 2014).

THB for criminal activities illustrates one of the aspects of the **poly-criminality** of THB. Even if THB is the primary operation of a criminal group, according to Europol it is often facilitated through other illicit activities, such as money-laundering, drug trafficking, illegal immigration, and smuggling money and people (Europol, 2016). Regarding THB for sexual exploitation, perpetrators often make their victims dependent on drugs or utilize pre-existing addictions to control them. Europol reports that victims of THB are often also exploited for the production and trafficking of drugs (Europol, 2016). THB OCGs from Southern Italy and Albania have been documented exchanging drugs – or trading them at privileged prices – with other groups, in exchange for consent to carry out exploitation of THB victims on their territory. Alternatively, OCGs have been known to reinvest income from THB into improving their relations with drug traffickers as part of a complex interplay in a criminal hierarchy (Raets & Janssens, 2019).

2.2.6. Future trends and dynamics

Table 2.12: THB – Future trends

Future trends and dynamics	Increasing use of internet and technological advances. Increased targeting of people with developmental and

[67] Interview with EU-level stakeholder, 26 February 2020 (#33).

	physical disabilities, and increased targeting and use of legal businesses.
Impact on market and criminal finances	Multiple flows into EU criminal markets, diverse flows of victims. Increased demand for sexual services leading to exploitation.

Three studies were identified in the literature review that included information on future trends and dynamics in THB in the EU. Several discernible trends are reported by Member States in the latest reports of the Commission. Member States report that the age of identified victims is decreasing, with children constituting nearly a quarter (23%) of identified victims. Children from Eastern European countries and Roma communities continue to be particularly vulnerable, with traffickers exploiting kinship in order to organize recruitment and exploitation of the child. In addition, people with developmental and physical disabilities are increasingly targeted by traffickers (European Commission, 2018e).

As previously noted, traffickers use physical abuse less frequently, instead using psychological and emotional violence and threats to control victims. This poses additional challenges for detection. Member states also report the increasing number of women as perpetrators of THB; in many cases these women are former victims themselves. Nevertheless, women account for only one quarter of prosecuted and convicted suspects. Around three-quarters of those suspected, prosecuted or convicted for THB are male (European Commission, 2018c).

In the latest EU SOCTA report, Europol identified the following major trends: (1) traffickers continue to rely on the use of social media, VoIP and instant messaging applications at all stages of the THB cycle; (2) THB for labour exploitation is increasing in the EU and traffickers are mostly targeting less regulated industries and those with seasonal demand of labour force; (3) the traditional trafficking flow from Eastern Europe to Western Europe is gradually being replaced by multiple and diverse flows of victims from all over the world – in this aspect, THB flows from Nigeria and China contribute the highest numbers; and (4) traffickers have further increased their use of legal businesses that can conceal exploitation, such as hotels, nightclubs and massage parlours (Europol, 2017).

A Europol report on the future of organised crime reveals that technological advances in robotics, nanotechnology, cryptocurrencies and digital surveillance, as well as the digitalisation of Big Data, could act as enabling factors for traffickers to create new and sophisticated strategies that simultaneously reduce their chances of detection. The ongoing outsourcing of data management to a few consolidated companies on a global level will create new opportunities for cyber-stealing personal data (i.e. identities for victims) or information related to transportation and logistics (Europol, 2017).

According to Europol, organised crime will continue to target vulnerable persons for exploitation, with increasing targeting of EU citizens. Legal business structures will be targeted on an unprecedented scale, both as targets for infiltration and victims of the crime (Europol, 2017).

According to the report on future trends in organised crime, increased socio-economic disparities within and outside the EU will facilitate migration, mobility pressure and THB in this context – the larger these disparities become, the more lucrative THB will be. Higher demand for cheap labour will result in higher levels of THB for labour exploitation. The EU's economic stagnation and relative decrease in prosperity may create immigration pressure on EU citizens in struggling Member States, which will in turn create opportunities for THB of EU citizens outside the EU. As Europol has noted, 'OCGs may respond to an increasing demand for the sexual exploitation of European women in countries with emerging middle classes' (Europol, 2017). The Commission's second progress report identifies migration as one of the socio-economic vulnerability factors that make people fall prey of traffickers (European Commission, 2018d). It is important to note that although traffickers take advantage of vulnerabilities, including immigration pressures, vulnerabilities do not alone result in trafficking. Trafficking is driven by the huge profits it renders to OCGs.

2.2.7. Recommendations

There are two principal ways in which data collection and estimation on THB (for various types of exploitation) could be improved in the EU:

- First, the Commission's data collection on THB provides a sound basis for establishing the number of identified and presumed victims, but an additional step is needed in order

to account for the full extent of the phenomenon – **a reliable estimate is required of the hidden population** that is not registered and therefore not included in the statistics (European Commission, 2018c; European Commission, 2020b).

- Various methods for estimation of hidden populations have been suggested and successfully applied in many other fields, such as problem drug use (EMCDDA & Pompidou Group, 1997). Similar approaches might be discussed, agreed and eventually supported by the Commission for producing estimates of the hidden population of THB victims at Member State level and ultimately on EU-level. Reliable estimates of this population will eventually allow more accurate estimates, not only for THB for sexual exploitation, but also for the other THB sub-markets.
- Second, there is a clear lack of systematically collected data on the annual revenues per victim for the different forms of THB. Collecting such data – especially from identified victims – could greatly facilitate future estimation of the THB market. Currently information on revenues generated by victims is collected within financial investigations related to THB cases, when police or judicial authorities trace finances and assets of perpetrators. The Commission might consider requesting that **Member States' police and/or judicial authorities collect or report this data** along with the number of registered victims.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.13: Recommendations – THB market

Key finding	Recommendation	Actor
The European Commission collects data on the number of registered victims of THB, which provides the basis for the lower boundary estimate of THB for sexual exploitation at the Member State level. However, there is no agreement on how best to account for the hidden population of victims, and the only available proxy for monetising these estimates is the revenues generated through sex work. There are no secondary data sources available for reliably estimating the revenues generated through THB for reasons other than sexual exploitation (i.e. labour exploitation, forced begging, organ removal or participation in criminal activity).	Consideration to be given to how best to estimate the hidden population of THB victims on EU-level by developing further the range of methodologies currently available. This will improve estimation of potential number of victims of THB for various forms of exploitation, including for sexual and labour exploitation. Member States should systematically report to the European Commission and the EU Anti-Trafficking Coordinator information on revenues generated through THB, which is currently collected by police or judicial authorities in the course of their investigations.	Member States, particularly police and judicial authorities EU Anti-Trafficking Coordinator European Commission

2.3. Smuggling of migrants

Quentin Liger, Optimity Advisors

Key findings:

- According to the estimates produced for this study, the annual revenues derived from the smuggling of migrants in the EU range from €165 million to €278 million (€221 million).
- This estimate is lower than previous ones, reflecting the lower number of irregular migrants seeking to enter the EU since the peak of 2015 (FRONTEX, 2020).
- A diverse range of actors within migrant-smuggling networks perform a variety of roles, from small local facility-based operations to larger criminal networks. Over time groups have become more structured and hierarchical, with a more developed use of new technologies including encrypted messaging systems (such as Telegram) or the dark net.

- The phenomenon of migrant smuggling is not expected to subside in the coming years. However, historically the number of migrants smuggled, their country of origin and the routes they have taken have evolved. While migration and smuggling routes change on a regular basis in response to external factors, hubs where the demand and supply of smuggling services meet are rather more stable over time. These hubs are often located in important metropolitan areas.

This Annex provides a comprehensive overview of smuggling of migrants in the EU, building upon the summary provided in **Section 2.3** of the main report.

The smuggling of migrants stems from the demand from some populations to irregularly cross borders due to circumstances including war, persecution and economic hardship. The limited range of legal channels that is available for migration fuels the market for smuggling services. Smuggling of migrants typically occurs when and where borders are fixed, relatively impermeable and protected by a border bureaucracy, which can include border-crossing points, border guards, passport controls, entry visas and stamps on passports when entering or leaving a country (Mountz, 2010). Smuggling of migrants is driven by a demand for and supply of smuggling services to circumvent existing regulation (UNODC, 2018a): traditionally, there have been buyers (migrants) and sellers (smugglers) with access to good information about the market, who were free to join or leave the market and could access resources relatively easily, with relatively low investment and disinvestment consequences (on the Mediterranean). In parallel, some smugglers benefitted from their knowledge of the regions crossed – for instance, this was particularly the case of the Tuaregs in the Sahel region of Africa. This trend has changed in recent years – in Niger for instance, the smuggling of migrants was an activity often carried out by Tuaregs, but the flow of irregular migrants was curbed, partly through initiatives financed by the EU (Comolli, 2019).

The smuggling of migrants is – according to the UNODC (2018a) – a crime involving the procurement for financial or other material benefit of illegal entry of a person into a State of which that person is not a national or resident.

2.3.1. Previous revenue estimates of the EU market for smuggling of migrants

The literature search identified five studies that contained prior estimates of the EU market in smuggling of migrants (as opposed to the phenomenon in other geographical areas).

According to the 2018 UNODC Global Study on Smuggling of Migrants, in 2016 a minimum of 2.5 million migrants were smuggled globally, for an economic return of between $5.5 billion and 7 billion (United States Dollars (USD)) (UNODC, 2018a). At the European level, the 2016 figure for the three Mediterranean routes (the main channels of irregular migration into the EU) stood at 375,000 migrants and a total revenue of between $320 million and $550 million (USD). These estimates only relate to the crossing of the Mediterranean Sea into the EU. In order to have a more holistic picture, the volume and revenue from migrants smuggled within Africa to the north African shore was estimated at 480,000 migrants per year, for a total revenue of between $1.06 billion and $1.514 billion (USD) (UNODC, 2018a). According to a joint Europol-INTERPOL Report on Migrant Smuggling Networks, the annual turnover of the smuggling of migrants to the EU was worth an estimated $6.6 billion (USD) in 2015 alone (Europol-Interpol, 2016).

In both studies, the figures used detection at borders as a proxy for irregular migration, estimating that roughly 90% of people detected have been smuggled. The figure stems from Europol's assessment that over 90% of irregular migrants travelling to the EU have used facilitation services. The share of migrants irregularly entering the EU by air is expected to be significantly lower than by sea, but the detection rates are much lower. Furthermore, to-date no method has been devised to assess secondary movements within the EU, partly due to the free movement principle within the Schengen area[68]. This is despite the fact that smuggling within the EU is known to occur, in particular between Austria and Germany or in the English Channel towards the UK (Europol, 2018a).

[68] Once a person has entered the Schengen area, the absence of border checks at frontiers makes it very difficult to trace them. Some migrant purposefully provide fake names when first recorded in order not to have to ask asylum in the first country or arrival in line with the Dublin principle.

Several publications also provide interesting data on the prices paid by smuggled migrants on certain legs of the migration route, which allows for a relatively good level of granularity in valuing the market. These data generally stem from ethnographic research with smuggled migrants, and show the variation in price linked to the route, the season of travel and the mode of transport. For instance, the cost of being smuggled from Pakistan to Western Europe can vary between $3,000 for a land journey to over $18,000 by air (UNODC, 2015b). Similarly, the passage from Morocco to Spain can vary between €500 on a toy inflatable boat to €3,000 using a jet ski (FRONTEX, 2018). The table below provides a compilation of price-per-passage for routes to or on the way to the EU.

Table 2.14: Price per passage for route to or on the way to the EU

Leg	Price per passage	Type of transport
Turkey–Greece	€1,000–€2,000	sea
Turkey–Bulgaria	€2,500–€3,000	land
Morocco–Spain	€500–€1,000	land/sea
Bangladesh–Europe	€12,000–€18,000	air
Malta–Italy	€1,000	sea
Eritrea–Libya/Egypt	€3,700	land
Somalia–Egypt	€1,800–€3,200	land
Agadez (Niger)–Libyan coast	€1,800–€2,800	land
France–UK	€4,500–€6,900	sea
Libya–Italy	€460–€2,300	sea
India–Europe	€14,000–€27,500	air
Afghanistan–Europe	€9,100–€13,800	land
Pakistan–Europe	€2,800–€7,300	land
Pakistan–Europe	€11,000–€16,500	air

Source: UNODC (2018a).

2.3.2. Quality of prior revenue estimates

The literature highlights the difficulties of assessing the size of the market for the smuggling of migrants. The route taken by migrants to reach their destination can be divided into several legs. For instance, a prospective irregular migrant leaving West Africa will first be smuggled to the Mediterranean coast, before finding passage across the Mediterranean Sea into the EU, from where another smuggler might be paid to assist with the secondary movement of the migrant to the final country of destination. Estimates of the volume and revenue of smuggling is therefore better undertaken by looking at the routes taken by migrants being smuggled. A second difficulty relates to the quick adaptation of smugglers' networks to new situations, which means the routes are constantly evolving (European Commission, 2014b).

All the studies identified used the same method of calculation. They start by assessing the total number of irregular migrants detected at the border of the EU and multiply these figures by the price of smuggling. The number of detected irregular migrants is a robust indicator used by Europol to assess the number of smuggled migrants. It is reliable because most arrivals are by sea and there are facilities – especially in Italy, Greece, Spain and Malta – to detect and count the number of migrants. Second, the migrants arriving do not avoid detection, merely seeking to arrive on the territory of the EU.

The other benefit of using this method is that there is an important granularity of data relating to the first place of arrival in the EU, the route taken by the smuggled migrants, and their country of origin. The main shortcoming of the estimates is that they refer solely to migrants entering the

EU and do not provide any estimate of secondary movement[69] – a phenomenon that is recognised as being underreported.

The estimates hold certain caveats. The aim of the UNODC report was to better understand the phenomenon of the smuggling of migrants, including routes, push- and pull-factors, and volume. Much of the quantitative data presented in the UNODC study do not relate solely to smuggling of migrants or solely to migrants whose passage to the EU has been facilitated. The study also tries to estimate the magnitude and revenue from selected smuggling routes, but for many routes it was not possible to collect sufficient evidence to estimate the number of smuggled migrants or the income from smuggling. Therefore, the global figures presented by UNODC represent minimum values for the magnitude of and criminal revenues from the smuggling of migrants (UNODC, 2018a).

[69] Secondary movement refers to the phenomenon of migrants who – for various reasons – move from the country in which they first arrived, to seek protection or permanent resettlement elsewhere in the EU or Schengen area.

Table 2.15: Prior studies estimating the size or revenue from smuggling of migrants in the EU

	Citation	Year(s) of estimate	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	Europol-Interpol (2016)	2015	Number of migrants entering the EU (detections of illegal border-crossings)	EU 28	No	1 million irregular migrants	$5 billion (USD)
2	UNODC (2018a)	2012-2016	Number of migrants entering the EU (detections of illegal border-crossings)	EU 28	No	375,000 smuggled migrants	$320 million (USD) to $550 million (USD)
3	Europol (2018a)	2018	Number of migrants entering the EU (detections of illegal border-crossings)	EU 28	No	91,699 arrivals	€190 million
4	Optimity Advisors (2014) in European Commission (2015)	2014	Interviews with migrants	Italy, Greece, Bulgaria, Hungary (plus additional research in the United Kingdom, France, Spain, Belgium, the Netherlands, Germany, Poland, Sweden)	No	N/A	Price of leg to smuggled migrant: $1,000 (USD) to $8,000 (USD) for Turkey–Greece leg $500 (USD) to $2,500 (USD) for Libya–Italy leg
5	FRONTEX (2019)	2017, 2018	Data reported by border and coastguard agencies	EU 28	No, but by route	150,114 (2018) 204,750 (2017)	N/A

2.3.3. Methodology for estimating revenues in this study

The methodological approach we adopted in this study for estimating the market revenues from the smuggling of migrants involved collecting data on detection of illegal border-crossings and cross-referencing this data with the reported price of various legs of the journey. The summary of the approach for measuring the revenue from smuggling of migrants in the EU is outlined in the table below.

Table 2.16: Summary of approach for estimating the revenues from the smuggling of migrants

Summary of approach	Demand-based estimate of the smuggling of migrants using information on detections of illegal border-crossings and price paid to smugglers for various legs of the journey.
Rationale	The estimates provide information on the revenue from the smuggling of migrants towards the EU, divided by major routes.
Scope and coverage	**Geographical scope**: EU-level estimate and estimate by main routes **Year(s) of estimate**: 2018, updated to 2019 values
Data sources	Data on **number of illegal border-crossing detections** have been extracted from FRONTEX risk-analysis data (FRONTEX, 2018). The **price of smuggling operations** according to specific routes and modus operandi was sourced from various publications, in particular UNODC (2018a), Optimity Advisors (2015) and journalistic sources (Coles & Nasralla, 2015; Leinez, 2019).
Key steps	- Data on detections of illegal border-crossings along the EU's external borders by different migratory routes, nationalities of migrants detected, etc. was extracted from FRONTEX's risk analysis. Data is presented per migratory route towards the EU. The sum of the routes can therefore be said to represent the total number of detections at the EU's external borders. - Based on findings in the literature (Europol, 2018a; UNODC, 2018a) and interviews, it was assumed that 90% of detected migrants irregularly crossing the EU's external borders (from Step 1) used facilitation services, and therefore paid for an illegal service. A 90% factor was therefore applied to the figures from Step 1. - Data on the price of smuggling per route and leg of the route was applied to the figures. FRONTEX data (from Step 1) provides the nationality of the migrants and in some cases the route (land, sea or air). It was assumed that migrants departed from their country of nationality, and we attempted to build the costs accordingly. As an example, for a migrant from Cote d'Ivoire detected on the central Mediterranean route, the reported price of smuggling between Agadez and the Libyan coast (between €1,800 and €2,800) was added to the price of travel between Libya and Italy (€460 to €2,600). Given the price data are often presented as a range, we calculated the lower, higher and average revenue from the journeys. For each route, the assessment of market revenue used the following formula: $Market\ value$ $= Number\ of\ detected\ illegal\ migrant\ crossings$ $* Share\ of\ detected\ migrants\ who\ paid\ for\ their\ journey\ to\ be\ facilitated\ \left(\begin{matrix}assumed\ to\\ be\ 90\%\end{matrix}\right)$ $* Price\ for\ that\ route$
Rationale for approach	Available information on the revenue from smuggling is not comprehensive and does not allow a systematic overall calculation for a smuggling operation. Generally, the best information is available on price paid by migrants for smuggling services. These values heavily depend on the distance of the smuggling trajectory, number of border crossings, geographical conditions, means of transport, risk of detection, the use of fraudulent travel or identity documents, and other factors.
Limitations and caveats of this approach	While it does provide an overall figure and some granularity, this method has the following limitations:

	- The cost of smuggling operations is highly elastic and it is likely that the cost of smuggling varies according to demand (Optimity Advisors, 2015). Given the limited availability of data, the prices used in this study have been applied regardless of when they were developed, meaning that the results might have limited applicability over time. - The price of smuggling operations also varies according to the safety and comfort of the journey (for instance, the cheapest sea crossing might be on an old boat whose main aim is to reach international seas, while a more expensive crossing on the western Mediterranean route might be on a jet ski). The data availability meant that our method could not account for these differences. - This method does not consider secondary and tertiary movements within the EU. At the time the research was undertaken, there were little data on secondary movements within the EU and to the UK. Furthermore, the methodology used does not allow for a granular assessment of the revenues of the smuggling of migrants along the Western Balkan routes. - This method does not consider the number of irregular migrants using smugglers to enter the EU via air. In this case, the cost of the operation is likely to be mainly related to the procurement of fake or fraudulent documents. While the data from FRONTEX is the best available basis for estimating the number of migrants smuggled into the EU, it is not perfect. First, not all irregular migrants detected used smuggling services; second, not all irregular migrants are detected (and therefore included in the data).

2.3.4. Revenue estimates of the EU market for smuggling of migrants

The table below presents the estimates of smuggling of migrants at the EU-level and for different smuggling routes. The results show that:

- The estimated revenue from the smuggling of migrants in the EU ranged from around €213 million to €363 million.
- The Eastern Mediterranean route constituted the largest market share at between €81 million and €122 million.

A sensitivity analysis shows that unsurprisingly, the figures vary proportionally if the assumption of migrants paying for their journey changes from 90% to 70%, providing a low, high and mid estimate of €165 million, €221 million and €278 million respectively.

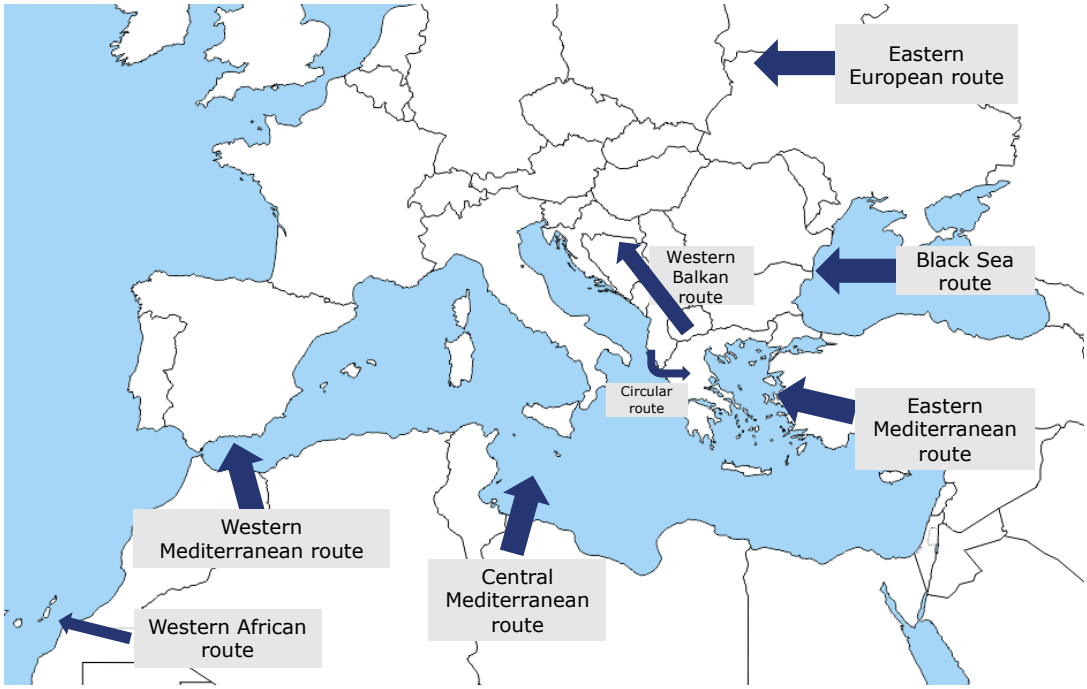
Table 2.17: Revenue estimates of the EU smuggling of migrant market

EU Member State	Revenue estimates (€ million)		
	Mid	Low	High
28 EU Member States*	**287.97**	**212.78**	**363.15**
Western African route	1.03	0.69	1.38
Western Mediterranean route	68.40	49.07	87.73
Central Mediterranean route	70.53	45.60	95.46
Western Balkan route	33.56	24.45	42.66
Eastern Mediterranean route	101.72	81.34	122.10
Black Sea Route	0.00	0.00	0.00
Circular Route	4.18	4.18	4.18
Eastern European route	4.36	4.36	4.36

Notes: *While the smuggling routes do not provide a clear breakdown of estimates per Member State, they do include all detections at the external borders of the Union. Estimates were produced for 2018 for the 28 EU Member States, updated to 2019 values using Eurostat's HICP (Eurostat, 2020b). The estimates by route are the original 2018 estimates.

The map below provides a representation of the main routes operated by smugglers and used by irregular migrants. The routes presented here are in line with the nomenclature used by FRONTEX.

Figure 2.1: Geographical representation on the main smuggling routes



Source: Researchers' construction.

2.3.5. Criminal actors and modus operandi

Table 2.18: Smuggling of migrants – Market actors

Level of OCG involvement	Difficult to assess, but increasing
Size and composition of OCGs	N/A
Modus operandi of OCGs	Network model
Poly-criminality of OCGs	Links to document fraud and THB
Other key actors	Other individuals involved in criminal activities (in a non-organised way), other individuals or groups not involved in criminal activities

The smuggling of migrants is a complex field often involving different smugglers, facilitators and organisations who have a variety of motives. The concept and definition of a smuggler can be hard to pinpoint. Siegel provide an ethnographic assessment of the views geld by migrants of migrant smugglers, and the complexities of relationships between migrants and smugglers (Siegel, 2019).

The organisation and size of smuggling operations vary. According to the UNODC, some smugglers provide limited small-scale services, whereas other smugglers belong to large and well-organised hierarchical criminal operations with transnational links and the capability of organising sophisticated smuggling passages (UNODC, 2018a). According to Optimity, the business of smuggling usually functions as a network model of OCGs, with communication links between smaller groups of actors/facilitators to enable movement of people from one country to another, from source to destination (Optimity Advisors, 2015). There may be multiple OCGs within a country and networks can span borders or have links with other OCGs across borders. Networks cluster to form hubs where the intensity of smuggling activities is greatest (Optimity Advisors, 2015).

According to a study by Tiniti & Reitano, **there is a diverse range of actors within a network, who perform a variety of roles in the smuggling of migrants**: *smugglers/top men, recruiters, guides, drivers or skippers, spotters/messengers, money collectors, forgers (passports / formal documents), suppliers (boat makers, boat owners, car/bus owners), corrupt policy officials (immigration officials), corrupt service providers (train conductors, etc.)* and *enforcers*. Their role and function usually vary according to the type and scale of the smuggling network in

which they are involved, and according to the range of services provided to migrants (Tiniti & Reitano, 2016).

The market for the smuggling of migrants is a flexible one due to low barriers to entry, low skills and (relatively) low capital requirements (Optimity Advisors, 2015). A study by Campana (2017) found that costs to the smugglers of monitoring agents and clients are also likely to be modest, particularly in comparison with THB. Furthermore, given the low barriers to entry, the market entails low levels of organisational complexity. Independent operators often work on behalf of friends and family members, or are migrants themselves trying to reach a destination (Sanchez, 2018). A law enforcement representative interviewed highlighted how as migration enforcement and criminalisation increase, smuggling activities are increasingly being facilitated by local operators, who specialize in the provision of specific tasks (such as Hawala, crossing a specific border, etc.)[70].

According to a law enforcement representative[71], **there has been an increase in the involvement of criminal networks over time**. Groups have become more structured and hierarchical, with a more developed use of new technologies – including encrypted messaging systems (such as Telegram) or the dark net. On the other hand, low-profile facilitators – such as lorry drivers – who are part of the criminal chain work for different criminal organisations in a less structured way. Another trend is the increased use of violence and reckless techniques to extract a profit. A number of contributions from Member States to Europol highlight behaviours putting the lives of migrants at risks.

When OCGs are involved in the smuggling of migrants, they are often also active in other crime areas, especially document fraud and THB. It is also possible that OCGs specialised in the smuggling of migrants cooperate with OCGs involved in other crime areas (Europol, 2018a).

Modus operandi

Optimity's study show how from a **supply-side** perspective, smugglers (sellers) tend to advertise their business where migrants (buyers) can be easily reached, such as in neighbourhoods where diaspora communities live, in refugee camps or via various social networks online (Optimity Advisors, 2015). The study suggests that smugglers' proactive recruitment and misinformation increase the number of migrants who are willing to buy smuggling services. From a **demand side** perspective, evidence suggests that conflicts, civil unrest and security issues in countries of origin often result in a huge growth in the number of irregular migrants and corresponding demand for smuggling services (Optimity Advisors, 2015).

According to the same source, the business of smuggling is best described as a **network model**, with a network of communication links between smaller groups of actors/facilitators to enable movement of people from one country to another, from source to destination (Optimity Advisors, 2015). There may be multiple networks within a country and networks can span borders and/or have links with other networks across borders. Networks cluster to form hubs where the intensity of smuggling activities is greatest.

Smuggling of migrants is different to THB. In the case of smuggling, the person is seeking to cross a border (and willingly pays for the service). In the case of THB people do not necessarily cross a border (but can be trafficked within their own country), and are victims of a criminal offence – their consent to such a criminal act is irrelevant. This is not to say that smuggling is not dangerous. In 2016 alone, 4,581 people died at sea on the Central Mediterranean route (UNODC, 2018a). This figure only reflects the human cost for one route and does not consider the likely high number of deaths on the routes from the countries of origin to the Mediterranean coast.

2.3.6. Future trends and dynamics

Table 2.19: Smuggling of migrants – Future trends

Future trends and dynamics	Evolving routes, but stable hubs. Numbers likely to be closer to those from 2018 than the 2015 peaks.

[70] Interview with law enforcement representative, 19 March 2020 (#67).
[71] Interview with law enforcement representative, 19 March 2020 (#67).

Impact on market and criminal finances	Likely to remain the same.

Five studies were identified in the literature review that included information on the future trends and dynamics in the smuggling of migrants in the EU. These studies focus on migration trends over the coming years.

According to the International Centre for Migration Policy Development (ICMPD), given the situation in countries of provenance, **the phenomenon of the smuggling of migrants is not expected to subside in the coming years** (ICMPD, 2020). However, the number of migrants smuggled, their country of origin and the routes they have taken have evolved over time. This is expected to continue in the coming years. One prediction by the ICMPD is that should the peace process in Libya achieve an end to the conflict and bring political stability, the central Mediterranean route might lose importance. On the other hand, Europol expects ongoing turmoil in Syria, Iraq and Iran (which is still hosting over 2.5 million refugees from Afghanistan) to keep the eastern Mediterranean route as a focus of the smuggling of migrants (Europol, 2018a). Smuggling of migrants from Africa is expected to continue (Europol, 2018a). Furthermore, the EU SOCTA report expects an increase in the number of fraudulent documents being used as part of a wider increase in the abuse of legal channels to enter the EU (Europol, 2017). While migration and smuggling routes change on a regular basis in response to external factors, **hubs where the demand and supply of smuggling services meet are rather more stable over time** (UNODC, 2018a). These hubs are often located in important metropolitan areas.

It is important to note that the referenced studies were conducted before the outbreak of COVID-19. While the impact of the global pandemic on the market for the smuggling of migrants is unknown, **it is likely that the increasing limitation in cross-border travel will have lasting effects on the market**. According to the Global initiative against transnational organised crime (2020), the difficulties may stem from:

- Increased pressure on smugglers operating in their communities to cease operations in order to reduce the risk of contagion.
- Increased vulnerability as 'tested' routes are closed and alternatives must be found. The report provides the example of the closure of the weekly convoy between Agadez and Dirkou in Niger, which has been cancelled due to the pandemic. This will drive the price and risk of the operations.
- A temporary increase in the stationary migrant population. Migrants caught by border closures during their journey will be forced to remain where they are until restrictions are eased. This equates to a high risk of humanitarian disaster if the virus, or indeed other illnesses, spread in camps.

2.3.7. Recommendations

There are three principal ways in which data collection and estimation on smuggling of migrants could be improved in the EU:

- From the perspective of the number of migrants being smuggled, data on detections at borders are generally considered to be of very high quality. For reasons that range from the political to the humanitarian, border agencies are considered to have a high detection rate of irregular migrants crossing the external borders of the EU. Furthermore, these data are reported on a monthly basis by law enforcement authorities as well as by the high number of border- and coast-guards involved in data collection. The number of secondary and tertiary movements is much harder to assess for reasons linked to the absence of border checks within the Schengen area.
- A more thorough assessment and compilation of the price of smuggling operations could be developed. Unlike other markets presented in the report, the supply of services for the smuggling of migrants involves many people. For instance, a migrant setting off from West Africa might use one network to cross the Sahel region, and another to cross the Mediterranean Sea. As such, data on the price of smuggling could be collected as a useful resource to assess the size of the market more precisely. A more systematic collection of price data would allow for more granular analysis by transport type (and level of safety).

- A more granular analysis could also be undertaken by considering the interplay between demand and supply and the impact these factors have on the price of services offered to migrants. Given the relative stability of the hubs where smugglers operate, this could be done by increasing data collection in these places.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.20: Recommendations – Smuggling of migrants

Key finding	Recommendation	Actor
Data from FRONTEX on detected illegal border-crossings provide a good basis for estimating smuggling of migrants by sea to Europe via different routes because detection rates are known to be high (even though not all irregular migrants are detected). However, the best available proxy for monetising these estimates is price paid by migrants for smuggling services, which is known to be highly variable depending on demand (due to high price elasticity) and safety and comfort of the journey. Also, available price data is sparse and cannot account for this variability.	Member States should systematically report information on price of smuggling services to the European Commission. Data collection at hubs where smugglers operate – which remain relatively stable – may be a potential approach. Frontex and Europol maintain data on the price paid by smuggled migrants, but this information is not public.	Member States European Commission

2.4. Fraud

Fraud is defined as 'a deliberate act of deception intended for personal gain or to cause a loss to another party' (European Anti-Fraud Office, 2019). There are numerous types of fraud including excise fraud, VAT fraud and missing trader intra-Community (MTIC) fraud, payment fraud, food fraud, identity fraud and IPR infringements or counterfeit goods.

For the purpose of this study we focus on three prominent types of fraud: food fraud, IPR infringements (counterfeit goods) and missing trader intra-Community (MTIC) fraud. Card payment fraud is examined separately in relation to cybercrime in Section 2.8 of the main report and Annex 2.8.

2.4.1. MTIC fraud

William Phillips, RAND Europe

Key findings:

- According to estimates that have been produced by EY (2015) and Frunza (2019) and adjusted for inflation to 2019 values, the annual revenues derived from the Missing Trader Intra-Community (MTIC) fraud market in the EU range between €51 billion and €104 billion.
- The wide range of these figures reflects the difficulty in producing an accurate estimate in this market and hence, the resulting shortage of estimates. Frunza's estimate is the only known estimate that uses a top-down methodology, but is high compared to other estimates – such as EY's, which uses a bottom-up approach.
- A high level of sophistication, organisation and cross-country coordination is required for Missing Trader Intra-Community (MTIC) fraud to take place; hence, OCG involvement is likely. There is evidence of both large OCGs, as well as local and small-scale initiatives.
- Some individual actors are involved but tend to act as part of larger criminal networks. Legitimate businesses can also become involved in fraudulent activity.

- There is expected to be a movement towards less tangible goods and services – such as carbon credits, cloud computing and other online-based products – as well as rapidly consumed goods, such as food. There is also expected to be movement into the green energy market, as this sector continues to grow.

This Annex provides a comprehensive overview of MTIC fraud in the EU, building upon the summary provided in **Section 2.4.1** of the main report.

Value added tax (VAT) is a consumption tax that is applied to the final consumer when they purchase a good or service. According to a report by the Commission, VAT fraud can be defined as the deliberate evasion of this tax; this type of organised fraud includes both intra- and international transactions (Poniatowski et al., 2019). According to Europol, the most common form of VAT fraud is Missing Trader Intra-Community (MTIC) fraud (Europol, 2020e). When goods and services are traded from one EU Member State to another, they are VAT-exempted in the Member State of departure. Fraudsters take advantage of this by trading goods from one Member State to another and subsequently do not pay VAT from final sales of those goods to the relevant tax authority. They then disappear; hence the notion of 'missing trader' (Poniatowski et al., 2019). There is also a more complex form of this fraud, called carousel fraud. As with MTIC fraud, goods are purchased from a Member State or imported from a third country, but they are fictitiously sold through multiple companies within one or more Member States before being the subject of a final sale in another Member State or third country. The first company in the chain does not pay VAT to the tax authority, then disappears. The companies that finally resale or export these goods claim back the VAT reimbursement – even though VAT was not paid to the tax authority in the first place (Europol, 2020e).

2.4.1.1. Previous revenue estimates of the EU market for MTIC fraud

The literature search and expert interviews identified 15 studies that contained prior estimates of the VAT fraud market in the EU. Eleven of these sources estimated MTIC fraud, two sources estimated MTIC / VAT fraud (failing to distinguish between the two) and two sources estimated VAT fraud. Nine of these sources were at the EU-level; six of them estimated MTIC fraud within the UK.

There are two main types of VAT fraud estimation methods: top-down and bottom-up methods (European Commission, 2018b). **Top-down methods** are more macro-oriented, using aggregated indicators, such as national accounts data. The estimation centres on measuring the variance of economic variables or by analysing the links between economic indicators and proxies of fraud. **Bottom-up methods** use individual-level data as opposed to macro data, from sources such as tax returns and risk registers. This can include micro-economic data collected at the household or firm level during audits (Borselli, 2011). Statistical techniques are then applied to determine the amount of missing VAT that could be attributed to fraud.

Frunza (2016, 2019) provides the only methodology that estimates the size of the MTIC fraud market from scratch. These studies used a top-down panel-regression model to link the VAT collected by Member State to their trade gap, using data from Eurostat on collected VAT revenue, intra-EU trade gaps, intra-EU imports and intra-EU exports (Frunza, 2019). Also used was an option-pricing model to establish the market revenue from MTIC fraud. In this method, the main indicator of fraud is when a nation's actual imports exceed the expected economic level, meaning that the MTIC fraud revenue is proportional to the unexpected difference in imports.

Savona & Riccardi (2015) used Borselli's (2011) estimate of the proportion of VAT fraud that is attributable to MTIC fraud and applied this to the VAT gap calculations from the EU's annual report. Borselli estimated VAT fraud based on Eurostat statistics on external trade flows and data on specific fraudulent schemes, but little further detail is given on the methods used (Borselli, 2011). Ernst & Young (EY) used two methods to develop estimates of MTIC fraud in the EU (Fearing et al., 2015). Firstly, they used the Commission's estimate of the VAT gap (Barbone et al., 2013) to estimate the proportion of the gap that can be attributed to MTIC fraud. Secondly, they directly asked Member State tax authorities to estimate the percentage of the VAT gap that is comprised of MTIC fraud, which they then applied to the European Commission's 2011 estimate of the VAT gap.

The United Kingdom's tax authority – Her Majesty's Revenue and Customs (HMRC) – creates a UK-specific estimate of MTIC fraud on an annual basis (HM Revenue & Customs, 2019). HMRC uses data from the Office for National Statistics' (ONS) National Accounts 'Blue Book 2018' on UK total expenditure (including indicators such as household consumption and capital expenditure on housing) and consumer trend data to calculate the VAT gap (HM Revenue & Customs, 2019). However, due to operational reasons, HMRC does not disclose the exact methodology for producing MTIC estimates. These estimates, as well as others from Levi (2014), CSD (2015), Europol (2013a) and Fedeli & Forte (2011) do not write about their methodologies in great enough detail to be discussed here.

2.4.1.2. Quality of prior revenue estimates

Because of the complexity of the fraudulent schemes, it is challenging to attribute VAT revenue losses to VAT and MTIC fraud. Consequently, estimating the scale of MTIC / VAT fraud is a challenging task. Since inter-Member State transactions are involved, there is a high risk of misattributing a VAT loss to the wrong country, or to double-count it. Figures for each individual Member State cannot simply be added up, as this will amplify the double-counting risk (European Commission, 2018b). Thus, estimates in the literature are rare. As a result, most of the literature in this area refers to the VAT gap, but not specifically to VAT or MTIC fraud (European Commission, 2018b). The VAT gap is a much broader term that encompasses several other non-fraudulent concepts such as insolvencies, bankruptcies, maladministration and tax optimisation (European Commission, 2019d).

The main drawback with many of the previous estimates is that most of them do not disclose their methods in enough detail, making it difficult to ascertain the quality of the estimates. Of those that do report a method, in many cases the method simply relies on using estimates from previous studies as inputs. Those estimates that have been used as inputs tend to not have methods detailed. Frunza's method is one of only two original estimates that have been calculated from scratch and the method reported, with the other being EY (2015). Further, Frunza's method is also one of only two methods to disaggregate figures by Member State. The other is the study by Savona & Riccardi (2015), however their calculation relies on previous estimates. EY's method of surveying tax authorities is useful as it gathers information on the opinions of various Member States. However, thorough statistical analysis was not performed, and only eight survey responses were used to produce the EU-wide estimate.

An advantage of Frunza's top-down method is that it uses data from Eurostat, which is publicly available and has enough granularity to enable analysis across the EU. However, this is also a limitation, as the data is reported by EU countries so could be prone to error or underrepresentation. Another limitation of the model is that it relies on the assumption that prior to 2009, MTIC was lower.

Table 2.21: Prior studies estimating the size or revenue of the VAT / MTIC fraud market in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced
1	Borselli (2011)	N/A – an average annual estimate is given	VAT fraud	Not disclosed	EU 27 (excluding HR)	No	€20 billion to €35 billion in lost revenue per year
2	Europol (2013a)	N/A – an average annual estimate is given	MTIC fraud	Not disclosed	EU	No	€100 billion in lost revenue
3	EY (2015)	N/A – an average annual estimate is given	MTIC fraud	Estimated based on data from the Commission's VAT gap report (Barbone et al., 2013)	EU	No	€45 billion to €53 billion in lost revenue
3	EY (2015)	2011	MTIC fraud	Member State tax authorities were asked how much of the VAT gap was attributable to MTIC fraud	EU 26	No	€46.32 billion in lost revenue
4	Fedeli and Forte (2011)	N/A – an average annual estimate is given	VAT fraud	The International VAT Association	EU 28	No	€60 billion to €100 billion in lost revenue per year
5	Frunza (2016)	2013	MTIC fraud	Eurostat	EU 28	Yes	€82.484 billion in lost revenue
5	Frunza (2016)	2014	MTIC fraud	Eurostat	EU 28	Yes	€93.531 billion in lost revenue
6	Frunza (2019)	2015	MTIC fraud	Eurostat	EU 28	Yes	€99.037 billion in lost revenue
7	HM Revenue & Customs (2012)	2010–2011	MTIC fraud	VAT gap estimated using consumption expenditure data with tax receipts; how MTIC fraud was calculated is not declared	UK	N/A	£0.5 billion to £1 billion in lost revenue
8	HM Revenue & Customs (2013)	2011–2012	MTIC fraud	VAT gap estimated using consumption expenditure data with tax receipts; how MTIC fraud was calculated is not declared	UK	N/A	£0.5 billion to £1 billion in lost revenue
9	HM Revenue & Customs (2014)	2012–2013	MTIC fraud	VAT gap estimated using consumption expenditure data with tax receipts; how MTIC fraud was calculated is not declared	UK	N/A	£0.5 billion to £1 billion in lost revenue

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced
10	HM Revenue & Customs (2015)	2013–2014	MTIC fraud	VAT gap estimated using consumption expenditure data with tax receipts; how MTIC fraud was calculated is not declared	UK	N/A	£0.5 billion to £1 billion in lost revenue
11	HM Revenue & Customs (2016)	2014–2015	MTIC fraud	VAT gap estimated using consumption expenditure data with tax receipts; how MTIC fraud was calculated is not declared	UK	N/A	£0.5 billion to £1 billion in lost revenue
12	HM Revenue & Customs (2018)	2015–2016	MTIC fraud	VAT gap estimated using consumption expenditure data with tax receipts; how MTIC fraud was calculated is not declared	UK	N/A	<£0.5 billion in lost revenue
13	Levi (2014)	2012	VAT/MTIC fraud	Not disclosed	EU	No	€20 billion in lost revenue
14	Levi et al. (2013)	N/A – an average annual estimate is given	VAT/MTIC fraud	Not disclosed	EU	No	€20 billion in lost revenue
15	Savona & Riccardi (2015)	2011	MTIC fraud	The authors have applied a percentage (from Borselli (2011)) to the VAT gap figures in Barbone et al. (2013)	EU 26 (excluding CY, HR)	Yes	€29.329 billion in lost revenue

Note: All revenue estimates presented in this table reflect the original years for which they were produced. They have not been adjusted for inflation, as we have done for the final estimates used in the current study.

2.4.1.3. Methodology for estimating revenues in this study

According to our assessment, estimates published by Frunza (2019) are the best available to date. The Eurostat data used in Frunza's analyses provide the requisite level of granularity for analysing differences across the 28 EU Member States. This approach was validated by the research team in an interview with a market expert[72]. However, it is also noted that these estimates are relatively high when compared with some of the other estimates (as shown in Table 2.2). On this basis, we decided to use the estimates produced by EY (2015) as a lower bound. These estimates were chosen as they come from one of the few studies that produce an original estimate and explain their method. For the purposes of this study these estimates are used and discussed alongside findings gathered from interviews with experts and stakeholders on market actors and future trends and dynamics. It is also worth noting that these estimates actually represent revenue losses in the VAT market, not revenues gained by OCGs. However, unlike in other markets, it is likely that the entirety of the revenue loss is directly related to the revenues of the criminal actors involved in the fraud. This is because there are no factors that may create differentiation between these two figures – such as pricing or sales of illicit products – as there are in other illicit markets. This reasoning was ratified by a market expert[73]. A summary of the approach used in this study for estimating the revenue from MTIC fraud and the limitations of this approach is outlined in the table below.

Table 2.22: Summary of approach for estimating revenues from MTIC fraud

Summary of approach	Using figures from Frunza (2019) – which employs a macro top-down approach – and EY (2015), which employs a Member State survey approach.
Rationale	Given the recency of Frunza's estimates; there is little value in re-producing them. The use of Eurostat data in Frunza's analyses are useful in that they provide the requisite level of granularity for analysing differences across the 28 EU Member States. This approach was validated by the research team in an interview with a market expert[74]. However, it is noted that this is a large estimate, so we use EY's estimates to provide a suitable range.
Output	MTIC VAT losses in the EU. The proportion of the VAT gap that is estimated to be attributable to MTIC fraud.
Scope and coverage	**Geographical scope**: Estimates for all 28 EU Member States **Year(s) of estimate**: 2015, updated to 2019 values **Sub-markets**: MTIC fraud
Data sources	Member State survey data; Eurostat data: Collected VAT revenue, intra-EU trade gaps, intra-EU imports and intra-EU exports.
Limitations and caveats of this approach	Frunza's estimates are only as reliable as the data provided to Eurostat, and may be subject to underreporting, thus represent a lower boundary estimate. EY's method is based upon the survey responses of just eight Member States, so despite a weighted average being used, it may not be representative.

2.4.1.4. Revenue estimates of the EU MTIC fraud market

Table 2.23 presents the estimates of the MTIC fraud market in the 28 EU Member States. We provide a lower bound estimate (obtained from a study by EY, 2015) and an upper bound estimate (obtained from Frunza, 2019). According to these figures, adjusted for inflation to 2019 values, annual revenues derived from MTIC fraud ranged between €51 billion and €104 billion.

- The total annual revenue lost to MTIC fraud in the EU was as much as €104 billion (upper bound). The Commission estimated the VAT Gap to be €152 billion in the same year, suggesting that over 65% of the VAT gap could be attributed to MTIC fraud. However, EY's estimate of €51 billion suggests MTIC fraud is around a quarter of the VAT gap (calculated in 2011 to be €193 billion) (Barbone et al., 2013).
- The estimates differ substantially across Member States, according to Frunza's estimates. Italy has by far the highest amount of MTIC fraud at €28 billion, followed by

[72] Interview with private-sector expert, 14 February 2020 (#6).
[73] Interview with private-sector expert, 14 February 2020 (#6).
[74] Interview with private-sector expert, 14 February 2020 (#6).

Germany (€15 billion) and then Spain (€12 billion). Luxembourg has the lowest MTIC fraud (€37 million), followed by Malta (€47 million) and Slovenia (€56 million).

- The five most populous countries in the EU (Germany, UK, France, Italy, Spain) are responsible for MTIC fraud worth €69 billion (two-thirds of the total EU amount).
- To fully determine the extent of MTIC fraud within certain countries, it is also useful to consider how large the MTIC fraud is relative to the total VAT collected in the country, according to Frunza's Member State-level estimates.
- Romania leads the way in this regard, with MTIC fraud losses comprising 43% of total collected VAT revenue. Italy, which has the highest absolute amount of MTIC fraud, has MTIC fraud losses making up 26.9% of VAT revenue. Central, Eastern and Southern European countries show a trend of having high MTIC fraud figures as a proportion of collected VAT.
- In contrast, Northern European countries such as Sweden (2.7%), Finland (1.9%), Luxembourg (1.0%) and the Netherlands (the lowest at 0.8%) tend to have lower proportions.

To fully determine the extent of MTIC fraud within certain countries, it is useful to consider a different metric: how large the MTIC fraud is relative to the total VAT collected in the country. This is shown in Figure 2.2.

- There is a great deal of variation amongst Member States. Central and Eastern European countries feature prominently at the top of Figure 2.2, with seven countries featuring in the top ten (while the other three are Southern European countries). Romania leads the way, with MTIC fraud losses comprising 43% of total collected VAT revenue. Italy, which has the highest absolute amount of MTIC fraud, has MTIC fraud losses making up 26.9% of VAT revenue.
- The bottom of the graph is dominated by Northern European countries such as Sweden, Finland, Luxembourg and the Netherlands (the lowest at 0.8%), with the addition of one Eastern European country – Slovenia.
- There does seem to be some geographic trend to these estimates, with MTIC fraud featuring more prominently as a proportion of VAT revenue in Central, Eastern and Southern European countries. However, when it comes to absolute revenues from MTIC fraud, this is an EU-wide phenomenon. The five most populous countries in the EU (Germany, UK, France, Italy, Spain) are responsible for MTIC fraud worth €69 billion (two-thirds of the total EU amount).

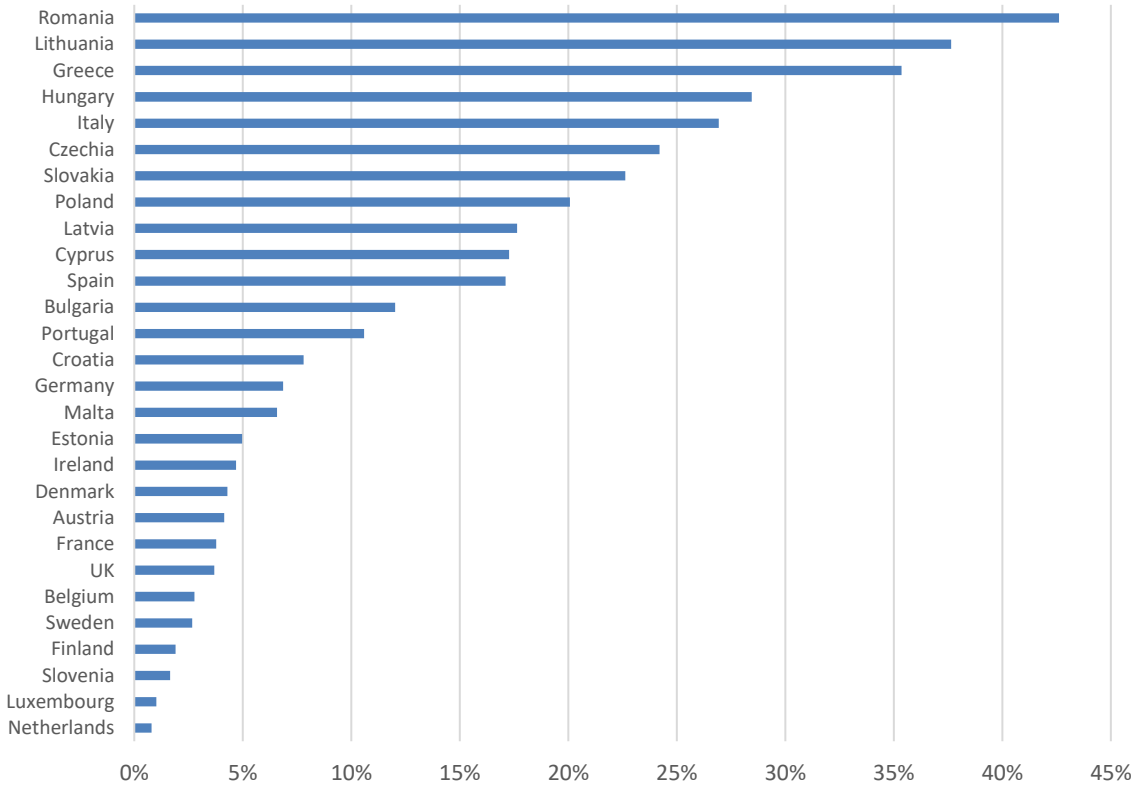
Table 2.23: Revenue estimate of the EU MTIC fraud market

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)	
	Low (EY, 2015)	High (Frunza, 2019)
28 EU Member States	**-**	**103,992**
27 EU Member States (excluding UK)	**-**	**96,767**
26 EU Member States (excluding HR, CY)	**50,858**	**103,271**
Austria		1,163
Belgium		824
Bulgaria		512
Croatia		457
Cyprus		264
Czech Republic		3,231
Denmark		1,119
Estonia		103
Finland		374
France		6,014

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)	
	Low (EY, 2015)	High (Frunza, 2019)
Germany		15,319
Greece		4,667
Hungary		3,322
Ireland		570
Italy		28,083
Latvia		359
Lithuania		1,190
Luxembourg		37
Malta		47
Netherlands		379
Poland		6,329
Portugal		1,687
Romania		5,962
Slovakia		1,304
Slovenia		56
Spain		12,240
Sweden		1,155
UK		7,225

Notes: Estimates produced by Frunza for 2015, updated to 2019 values using Eurostat's HICP (Eurostat, 2020b). Estimates produced by EY for 2011, updated to 2019 values using Eurostat's HICP (Eurostat, 2020b).

Figure 2.2: MTIC VAT loss (% of total VAT revenue)



Source: Research team's analysis of estimates produced by Frunza (2019).

2.4.1.5. Criminal actors and modus operandi

Table 2.24: MTIC fraud – Market actors

Level of OCG involvement	High. A level of sophistication, organisation and cross-country co-ordination is required for MTIC fraud to take place; hence, OCG involvement is likely.
Size and composition of OCGs	Mixed. There is evidence of both large OCGs, and local and small-scale initiatives being involved.
Modus operandi of OCGs	MTIC fraud funds are routinely transferred outside of the EU to bank accounts and jurisdictions protected from EU authorities. There is some level of investment in legitimate businesses to help facilitate fraud (such as logistic companies) and to launder money (cash-intensive businesses, such as nightclubs and restaurants).
Poly-criminality of OCGs	MTIC fraudsters have been known to apply their knowledge and infrastructure to other types of financial crimes, such as investment fraud and excise fraud. There are also links to THB, terrorism, property crime, extortion, drug trafficking, goods smuggling, illicit tobacco trade and loan-sharking.
Other key actors	Some individual actors are involved, but tend to act as part of larger criminal networks. Legitimate businesses can also become involved in fraudulent activity.

We identified 18 studies in the literature review that included information on key actors in the EU VAT and MTIC fraud markets. Savona & Riccardi (2015) state that VAT fraud in its simplest sense can be carried out by a whole range of actors, from individuals to extremely structured criminal organisations. However, when it is scaled up to incorporate cross-border transactions, as is necessary for MTIC fraud, the very nature of the fraud is organised, since companies (legitimate and/or bogus) need to be set up in multiple countries. According to an interview with a law enforcement representative[75], this means that **OCGs are likely to play a significant role in the VAT fraud market**. The involvement of legitimate companies is covered by the Council Framework definition of OCG. Hence, despite legitimate actors not being traditional 'mafia-style' organisations, they still constitute a type of OCG.

To successfully carry out an MTIC fraud scheme, technical knowledge, organisational structure and people power may be required[76]. Savona & Riccardi (2015) note that schemes with even a small degree of complexity may require a specialist workforce, division of labour and legal experts. A VAT fraud market expert[77] stated that since MTIC fraud is a cross-country scheme, it requires inter-country connections, involving several people working together. Borselli (2011) and Mills et al. (2013) ratify this, claiming that MTIC fraud schemes are by their very nature organised, due to the sophistication required to facilitate them. According to Savona & Riccardi (2015) the larger the revenues, the more complex the scheme required, and the more transnational transactions involved, the greater the potential revenues for the criminals involved.

Borselli argues that OCGs are attracted to engage in VAT fraud in its various forms due to the **'large sums available at relatively low risk'** (Borselli, 2011). Lamensch & Ceci (2018) agree with this point of view, reporting on a case of carbon-emissions VAT fraud where an initial €100 million investment could be turned into €600 million in a matter of hours. In the case of the carbon-emissions market, the OECD reports that Europol estimated as much as 90% of the entire market could be fraudulent, mostly due to OCG involvement (OECD, 2016).

The size of the OCGs involved in MTIC fraud is a point of contention. An interviewed VAT fraud market expert[78] believes that most VAT fraud is likely undertaken by local and small-time initiatives, as opposed to traditional crime groups. Europol estimated that as little as 2% of criminal actors could be responsible for as much as 80% of the fraud, suggesting that large organisations may be responsible for much of the crime (European Court of Auditors, 2015). As with many estimates of the size of the fraudulent market, it is not clear how this estimate was

[75] Interview with law enforcement representative, 11 March 2020 (#15).
[76] Interview with law enforcement representative, 11 March 2020 (#15).
[77] Interview with private sector expert, 14 February 2020 (#6).
[78] Interview with private sector expert, 14 February 2020 (#6).

calculated and whether it was evidence-based. This Europol estimate was also reported to the research team during interviews with stakeholders[79]. The nature of VAT fraud does vary, with some forms of fraud primarily involving paperwork and requiring little people power (e.g. labour is not required to help ship physical goods). In this sense, **it is very possible for a large amount of fraud to be carried out by a relatively small number of people**.

On the other hand, a point upon which there is more agreement is the nature of the actors and leaders behind MTIC fraud schemes. All three VAT fraud interviewees[80] identified the UK as particularly prominent contributors of MTIC fraud actors within the EU. In terms of ethnicity, two interviewees[81] identified British nationals of Asian ethnic origin, such as British-Pakistani, British-Indian and British-Bangladeshi, as being ethnic groups involved in this type of crime. According to a VAT fraud market expert[82], the countries where the fraud is planned and where the VAT is defrauded can differ. For example, despite a lot of MTIC fraud leaders originating from the UK, the UK is relatively unaffected by MTIC fraud compared to other countries (see Table 2.23). As we have seen from the estimates in Figure 2.2, **MTIC fraud seems to be more highly concentrated in Southern and Eastern European countries such as Italy and Romania**[83].

According to one MTIC fraud expert[84] the actors in MTIC fraud schemes tend to hire people within the EU to run the fraudulent companies: organising the movement of goods, looking at invoices and signing tax declarations, etc. This can be done by just a handful of employees; in some cases, the companies have just one or two employees. The expert mentioned how sometimes, young vulnerable men who do not belong to an OCG and are just looking to make some money are identified by the leaders and masterminds of the crime – known as the 'directors'. These 'directors' instruct the targeted individuals as to how to establish a company and operate as a front for the company. This sometimes means that the 'front person' has very little knowledge of what is going on. One interviewee[85] also stated that these directors may not even live within the EU, instead opting to live in tax havens outside the EU where profits can be better protected from the authorities.

However, sometimes large OCGs are involved, although less seems to be understood regarding the extent of their involvement. Savona & Riccardi (2015) identified the main OCGs known to be involved in organised VAT fraud as Chinese OCGs, Cosa Nostra (Italy), 'Ndrangheta (Italy), other Italian OCGs, Eastern European OCGs, other Western OCGs and Russian/Georgian OCGs. Although little further information was provided, this seems to be consistent with some of the countries where MTIC fraud relative to total VAT revenue is particularly high (Eastern and Southern Europe) (Frunza, 2019; Poniatowski et al., 2019). Regarding recent litigations where VAT fraud had been suspected, de la Feria (2018) stated that eastern Member States have been the most prominently involved, providing further evidence of high levels of MTIC fraud in Eastern Europe. However, a law enforcement representative interviewed mentioned that the actors who carry out the crimes within the EU can be from a variety of backgrounds. According to one law enforcement interviewee[86], if an OCG is involved, that OCG will usually use people from their own nationality/ethnicity for fraudulent activity.

There is also a link between VAT and MTIC fraud and wider criminal markets. According to multiple sources (de la Feria, 2018; European Court of Auditors, 2015) and expert interviews[87] at least some of **the proceeds from VAT fraud are likely to be invested in other criminal activity**, such as THB and even terrorism (Lamensch & Ceci, 2018). Case studies provided examples where VAT fraud revenues were used to finance activity in property crime, extortion, drug trafficking, goods smuggling, illicit tobacco trade and loan-sharking (CSD, 2015). One interviewee[88] cited the shadow banking system, loan-sharking and drug trafficking as very closely linked crimes. Our law enforcement interviewee[89] said that MTIC fraudsters were likely to also be involved in other types

[79] Interview with law enforcement representative, 11 March 2020 (#15).
[80] Interview with market expert, 14 February 2020; Interview with National / Member State expert, 26 March 2020 (#62); Interview with law enforcement representative, 11 March 2020 (#15).
[81] Interview with private-sector expert, 14 February 2020 (#6); Interview with law enforcement representative, 11 March 2020 (#15).
[82] Interview with private-sector expert, 14 February 2020 (#6).
[83] Interview with private-sector expert, 14 February 2020 (#6); Interview with law enforcement representative, 11 March 2020 (#15).
[84] Interview with National / Member State expert, 26 March 2020 (#62).
[85] Interview with law enforcement representative, 11 March 2020 (#15).
[86] Interview with law enforcement representative, 11 March 2020 (#15).
[87] Interview with private-sector expert, 14 February 2020 (#6).
[88] Interview with private-sector expert, 14 February 2020 (#6).
[89] Interview with law enforcement representative, 11 March 2020 (#15).

of financial crimes – such as investment fraud and excise fraud – since they may already have the required expertise and knowledge of the financial system. Overall, the available evidence is mixed, suggesting that proceeds from MTIC fraud are invested into individual lifestyles – sometimes outside the EU – as well as into other areas of crime, be that general criminality, specialist financial crime or even terrorism.

2.4.1.6. Future trends and dynamics

Table 2.25: MTIC fraud – Future trends

Future trends and dynamics	Movement towards less tangible goods and services – such as carbon credits, cloud computing and other online-based products – as well as quickly consumed goods, such as food. Movement into the green energy market.
Impact on market and criminal finances	MTIC fraud becomes harder to trace, meaning high profits at a relatively low risk.

Seven studies were identified in the literature review that included information on the future trends and dynamics in the VAT/MTIC fraud market in the EU. According to Lamensch and Ceci (2018), over the past 10 years carousel fraud schemes have largely involved goods that are physically small but of high monetary value, such as mobile phones, precious metals and computer parts. However, there is an emerging trend **towards fraudulently trading goods and services such as carbon credits and cloud computing that are less tangible**. This may have come about because the intangible nature of these products requires less people-power to facilitate and allows them to be transferred around Europe at a much faster rate, which also makes them increasingly harder to trace; hence they are more profitable at minimal risk. As reported earlier in this review, OECD (2016) reported that as much as 90% of the carbon-emissions market may be fraudulent.

An interviewed VAT fraud market expert mentioned that more MTIC fraud can be expected on goods and services being **traded online**, using cryptocurrencies to settle trades. According to Borselli et al. (2015), trading over the internet minimises the risk of detection, makes any potential intervention significantly more challenging and makes it harder to trace the goods or to physically locate the organisations that are responsible. Additionally, due to the profitability seen on the carbon-emissions market, Borselli et al. (2015) speculate that there will be an increase in fraud in data traffic, digital services and telecommunications. Further, Lamensch & Ceci (2018) reported evidence of VAT fraudsters moving towards goods that are consumed at a quicker rate, such as food, since their fast consumption makes them difficult to trace. Fraudsters have proven themselves to be quick to react to the market, committing fraud on all types of goods when an opportunity has been present, with the carbon-emissions market being a prime example of this. An interviewed MTIC fraud expert[90] expects to see more MTIC fraudsters moving into the **green certificate market**, as EU countries continue to invest more heavily in greener energy, presenting more opportunities to MTIC fraudsters. However, Lamensch & Ceci (2018) note that MTIC fraudsters appear to act opportunistically. They follow trends in the economy and demand patterns, and are sector-agnostic, meaning all sectors are potentially vulnerable.

KPMG (2016) noted that further consideration should be made of the potential consequences of **Brexit**. The UK's departure from the single market has reduced the number of countries with which OCGs can trade goods VAT-exempt. It is likely that this will simply displace more VAT fraud into other countries, rather than reducing it overall (KPMG, 2016). However, further risk might ensue if the UK government attempts to boost international trade through possible changes in VAT and tax policy, since fraudsters may take advantage by developing new ways to set up VAT fraud schemes (KPMG, 2016).

2.4.1.7. Recommendations

There are two principal ways in which data collection and estimation on VAT/MTIC fraud could be improved in the EU:

- First, the evidence from the literature shows that details on estimation methods are scarce. Hence, the first area that could be improved is simply **to encourage more sources to release details of the methodologies used**. For example, the UK

[90] Interview with National/Member State expert, 26 March 2020 (#62).

government conducts a thorough estimate of MTIC fraud every year, however they do not disclose their methods. Being able to compare methods would allow other researchers and tax professionals to apply these methods to their own data, generating a wider pool of estimates to work with.

- Secondly, **access to more granular data could be improved**. This is an area for which there has already been some progression: in 2017, the Commission announced the launch of the Transaction Network Analysis (TNA) tool (European Commission, 2019c). Using the tool, national tax authorities can share VAT registration data on their domestic traders with other EU Member States. The hope is that this will enable authorities to more closely and accurately monitor intra-EU trade, helping to detect irregularities (UK Parliament, 2018). This can be done by summing up the intra-community acquisition (ICA) of the companies that go on to default on VAT payments (European Commission, 2018b). The ICA is declared by companies that import goods from another EU country, to both state that the initial trade is VAT-exempt, as well as to register that further selling of goods is now subject to taxation.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.26: Recommendations – MTIC fraud

Key finding	Recommendation	Actor
Estimating the size of MTIC fraud in the EU is an incredibly complex task, hence there are relatively few methodologies and estimates in the literature. Several Member State tax authorities do estimate MTIC fraud for their own country, however details of methodologies are not publicly accessible.	Member States should publish their methodologies, to allow for replication. Member State tax authorities should systematically report the VAT registration data of their domestic traders to the Commission, enabling tax authorities to detect irregularities on an EU-wide basis. This will help EU-level authorities to more reliably identify and measure MTIC fraud.	Member State tax authorities European Commission

2.4.2. IPR infringements

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Key findings:

- Estimates of criminal revenues from intellectual property rights (IPR) infringements are limited, and those that exist are susceptible to limitations and biases that result in an underestimate.
- In the IPR infringements market, estimates of loss to legitimate industry – rather than of criminal revenues – prevail. Loss-based estimates are not the same as revenues, and therefore cannot be directly compared to other criminal markets examined in this study for which revenue estimates have been produced.
- The production, transportation and sale of counterfeit goods is a complex process, and is often undertaken by highly organised and hierarchically structured OCGs. Smaller actors are also involved, but often work with – or as part of – larger organisations via informal networks.
- Corrupt officials with inside knowledge of customs or original intellectual property rights have been known to be involved in IPR infringements, as are legitimate businesses that can be used to disguise illicit activity.
- Trade in counterfeits via the internet is expected to increase. Further, technological developments may make it easier and cheaper to manufacture counterfeits. Improved railway connections between the EU and China may enable easier transportation.

This Annex provides a more comprehensive overview of IPR infringements in the EU, building upon the summary provided in **Section 2.4.2** of the main report.

Intellectual property rights (IPR) are the 'protections granted to firms and/or individuals who are the creators of ideas, products, or methods that allow the creators/inventors a period of time in which they can earn exclusive returns on these intangible and tangible products as a way of rewarding them for the risky investment they initially made' (Hoorens et al., 2012, p. vii). As of 2019, the EU Intellectual Property Office (EUIPO) estimated there were 353 IPR-intensive industries in the EU economy (EUIPO, 2019c). These IPR-intensive industries, alongside others that supply them with goods and services, are estimated to account for nearly 40% of the jobs in the EU, and to generate about 45% of the total economic activity in the EU (EUIPO, 2019c).

Four principal types of IPR infringements can be distinguished:

- **Trade secret theft** – the theft of non-public technologies, methods, plans, processes or other sensitive information that give an enterprise its competitive advantage (CREATe & PwC, 2014).
- **Copyright infringement** – occurs when copyrighted materials are distributed outside authorized channels and without payment to the copyright holder. Copyright theft includes illicitly acquiring or using ('pirating') computer software, videogames, movies, television shows, music and published materials (CREATe & PwC, 2014).
- **Trademark infringement** – occurs when a producer fabricates an item that simulates a brand to which they do not own the IPR. An example is that of copied pharmaceutical goods, which is estimated to make up 0.84% of the entire market for pharmaceutical imports (OECD-EUIPO, 2020).
- **Patent theft** – occurs when a producer copies and sells a patented invention (i.e. counterfeits the invention), without the patent owner's permission or without paying any licensing fees (Levi et al., 2013). In technical terms, 'counterfeit' goods refer to cases of trademark infringement and 'pirated' goods refer to cases of copyright infringement (Bekhouche, 2018).

However, different types of IPR violations often overlap with one another and the term 'counterfeiting' is widely used to refer to general IPR violations (Bekhouche, 2018). **Counterfeiting** indicates the selling of products that are deceptive, including articles sold as a legitimate product when they are not, such as adulterated medications (EUIPO, 2016c; Hall et al., 2017; Lavorgna, 2014; Spink et al., 2013), and mislabelling or misrepresenting the origin of geographical indications (Cook, 2013; EUIPO, 2017e). Counterfeit or fraudulent food has not been examined here – see separate discussion in Section 2.4.3.

2.4.2.1. Previous revenue estimates of the EU IPR infringements market

The desktop research identified 22 studies published from 2010 that provided some estimates of IPR infringements in the EU context. The estimates included those measuring revenues generated through the trade in IPR infringements or goods within the EU (five studies, as shown in Table 2.27) and those measuring the economic and social impact of this type of crime (losses or costs) (13 studies). The focus in this study is on criminal revenues, thus loss-based studies are discussed separately under Section 2.4.2.3.

Estimates that used assumptions of the proportion of the legal trade that is comprised of counterfeiting

A study by Calderoni et al. estimated revenues from the illegal counterfeit market in Italy (Calderoni et al., 2014). The methodology involved identifying the economic sectors in Italy that were most at risk of counterfeiting and calculating their legal annual turnovers, by referring to the IPERICO database (which collects information on categories of counterfeited goods that are seized by law enforcement agencies). Next, it was assumed that between 5% and 10% of total trade is a counterfeit market, and this proportion was applied to total turnover for each sector. These assumptions were based on the work of KPMG, and according to the authors are consistent with estimates produced by the European Commission, the WCO and the OECD (KPMG, 2003). Savona & Riccardi (2015) replicated this methodology, but supplemented the estimates with

Eurobarometer survey data from 2011 on the proportion of consumers in each EU 27 country who declared they are strongly willing to accept counterfeit products.

Estimates that used a demand-sided approach

A study by Camerini et al. (2015) used a **demand-side approach** to estimate the total actual and potential consumer spend on counterfeit goods in secondary markets in the EU – that is, where consumers were aware they were purchasing counterfeit goods. To derive the **actual expenditure** on counterfeit goods the study multiplied data on total household consumption (from Household Budget Surveys conducted by Eurostat in 2010) by data on the share of people who intentionally purchased counterfeit articles in the prior 12 months (using data from Office for Harmonization in the Internal Market (OHIM; now EUIPO). To derive the **potential expenditure** the study multiplied total household consumption data (also from Eurostat) by data on the share of people willing to buy counterfeit products (also from OHIM, now EUIPO). The results were then multiplied by the propensity to purchase a specific type of counterfeit product. The formula for this calculation is provided in the box below. Savona & Riccardi (2015) also replicated this methodology to produce estimates.

Box 3: Formula for calculating revenue using demand-side approach

As per Camerini et al. (2015), the simple formula for estimating counterfeit markets in the EU is as follows:

$$AE_{ij} = HC_{ij} * C_i * P_j$$
$$PE_{ij} = HC_{ij} * PC_i * P_j$$

Where:

- AE_{ij} = actual expenditure on intentional consumption of counterfeit products in country *i* for market *j*
- PE_{ij} = potential expenditure on intentional consumption of counterfeit products in country *i* for market *j*
- HC_{ij} = total household consumption in country *i* of market *j*
- C_i = percentage of actual consumers of counterfeit products in country i (actual contextual propensity)
- PC_i = percentage of potential consumers of counterfeit products in country i (potential contextual propensity)
- P_j = propensity to consume counterfeit products related to the type of product j (market specific propensity)

Estimates of revenues from illegal internet protocol television

A study by EUIPO (2019b) estimated the revenues generated from illegal internet protocol television (IPTV), i.e. unauthorised delivery of live and on-demand streaming of television content online (EUIPO, 2019b). The study estimated two elements of illegal IPTV: (1) number of users involved in copyright-infringing IPTV consumption in the EU 28 Member States; and (2) the illegal revenues generated by unauthorised IPTV-subscription providers. The first estimate used data from the Eurostat household survey (2018) for the overall share of the population that watches internet streamed television, and the EUIPO IP Perception Study (2017d) survey for Member State-level data on IPTV piracy. The second estimate used data from Eurostat to define the average household size in EU countries. In addition, detailed analysis of a sample of suspected infringing websites was carried out. An initial dataset based on a list of suspected unauthorised IPTV websites and data on their annual global traffic was provided by the Software Security and Media Technology Company, Irdeto. The formula for estimating the revenue generated is provided in the box below.

Box 4: Formula for calculating revenue from IPTV

As per EUIPO (2019b), the simple formula for estimating revenue generates from illegal IPTV is as follows:

$$Revenue\ generated\ by\ unauthorized\ IPTV\ providers\ (RIPTV,i) = Population\ watching\ unauthorized\ IPTV\ (NP{-}IPTV,i) \div Average\ Household\ size\ (Hi\ ) \times Share\ of\ population\ paying\ for\ unauthorized\ IPTV\ monthly\ subscription\ (Sg,i) \times Average\ Monthly\ subscription\ Price\ (Pg,i)$$

Where:

- RIPTV,*i* – stands for the revenue generated by unauthorised IPTV-subscription providers in a particular EU Member State. This is the resulting indicator obtained by combining the four factors described below.

NP-IPTV,*i* – stands for the population engaged in unauthorised IPTV consumption in a particular EU Member State.

H*i* – stands for the average number of adult equivalents in the household in every Member State. This data is provided by Eurostat. One paid subscription per household is considered in order to adjust paid subscription estimation per household instead of an individual person level. This approach results in a more conservative consumer spending estimate. Average household size in the EU 28 is 1.62.

Sg,*i* – represents the share of population that is willing to pay for a monthly unauthorised IPTV subscription. This is the opposite to an option to stream IPTV for free, e.g. from websites that allow direct streaming for certain channels. This share is computed based on a sample of 460 websites that are suspected of providing unauthorised IPTV services. The sample was selected based on analysis and multiple discussions with cybersecurity experts in the field. It consists of the most-visited websites for unauthorised IPTV services in the European Union, selected based on a comprehensive search algorithm. The sample allows figuring out the proportions of the internet traffic directed towards different types of unauthorised providers, such as subscription IPTV and free-of-charge IPTV streaming.

Pg,*i* – represents the average unauthorised IPTV monthly subscription price. The prices are deducted based on data collection for 460 suspected unauthorised IPTV-providing websites, and varies based on four geographical regions (see EUIPO (2019b) for details).

Seizure data

A study by OECD/EUIPO (2019) used customs seizure data to estimate the imports of counterfeit and pirated products into the EU. This study excluded domestically produced and consumed counterfeit and pirated products.

2.4.2.2. Quality of prior estimates

Limitations of estimates that used assumptions of the proportion of the legal trade that is comprised of counterfeiting

The approach to estimating counterfeit goods markets employed by Calderoni et al. (2014) and Savona & Riccardi (2015) assumed that between 5% and 10% of the legal market is comprised of counterfeit goods. There is **little transparency** around the selection of these proportions and thus the estimates produced may have limited reliability.

Limitations of demand-based estimates

The best available methodology is **demand-based**, as per Camerini et al. (2015) and Savona & Riccardi (2015). However, there are several limitations of these approaches that cause an **underestimation of the market**:

- Consumer surveys, which are a key input of these estimates, are susceptible to self-reporting biases such as underreporting and recall problems. There are also questions around the representativeness of the samples (Camerini et al., 2015).
- These estimates measured secondary markets in which purchasers of counterfeit goods are fully aware, as opposed to primary markets where the counterfeit products are sold to unsuspecting customers (Camerini et al., 2015).

Further, in the case of the approach taken by Camerini et al. (2015), the estimate only covers a subset of markets, and the market-specific propensity is calculated using the results of a survey from Spain, which is then extrapolated to all other Member States.

Limitations of estimates using seizure data

There are a number of limitations of studies that have used seizure data to estimate market value:

- First, **seizure data represents only a fraction of the problem**. Such data are valuable for providing a basis for understanding the range of products that might be impacted by counterfeiting, but do not provide a good measure of the magnitude of the problem. This is because enforcement data reflect an unknown fraction of the total

amount of counterfeiting that actually occurs, and also reflect the subset of cases in which people/organizations are caught.

- Second, **retail price is often not equivalent to sale price, and there are variations by sector and product type**. The seizure values that are applied in these studies (e.g. by OECD/EUIPO, 2019) are typically 'replacement values' or the retail price of the original good. It is inappropriate to use such values when estimating revenues (i.e. the focus of this study) for two reasons:
    - Unauthorised goods are often not sold at a price that is equivalent to the authorised good. For example, they will often be sold much more cheaply and thus the amount of money going to key actors is considerably lower than the retail price. This is particularly the case where customers knowingly purchase an unauthorised good (i.e. the secondary market).
    - It may make sense to use retail value for producing an estimation if the substitution rate is 100%. However, previous research has shown that this substitution rate varies considerably by product type, and we know that some people buy counterfeit goods knowingly and do so because they are cheaper, thus making this assumption flawed.
- Third, **seizure data captures revenues being generated by actors outside the EU**. This study focused on understanding revenues generated by actors operating *within* the EU, whereas seizure data is typically not confined to goods sold by EU actors.

Table 2.27: Prior estimates of IPR infringements in the EU

	Citation	Year(s) of estimate	Sub-market(s)	Data source(s)	Countries included in estimate	Disaggregated at MS level?	Estimate produced (value)
1	Calderoni et al. (2014)	2008	Clothing, accessories of clothing, footwear, electrical equipment, IT equipment, CD, DVD, tape, toys, glasses, watches and jewels, perfumes and cosmetics.	IPERICO database on seizure of counterfeit goods by product category to determine sectors most at-risk of counterfeiting in Italy. Data on turnovers were collected from the I.STAT and AIDA data sets, and the data on employees from I.STAT.	Italy	N/A	€3,028 million (minimum) €6,055 million (maximum)
2	Camerini et al. (2015)	2010	Secondary markets (e.g. consumers who are aware they are buying counterfeit goods) of clothing; footwear; food and non-alcoholic beverages; games, toys, and hobbies; information and communication technology; recorded media; household appliances; jewellery, clocks, and watches; perfumes and articles for personal care; pharmaceutical products and medications.	OHIM, Household Budget Surveys conducted by Eurostat.	28 EU Member States	Yes	Total consumer spend over 10 markets is €9 billion
3	Savona & Riccardi (2015)	2010	Top 10 business sectors sensitive to counterfeiting: Retail sale of computers; telecommunications, electrical household appliances; music and video recordings; games and toys; clothing; footwear and leather goods; cosmetic and toilet articles; watches and jewellery.	Data on turnover of business sectors were gathered from the annual detailed enterprise statistics for trade published, by Eurostat	27 EU Member States	Yes	€21,356 million to €41,353 million
3	Savona & Riccardi (2015)	2010		Eurobarometer survey in 2011 on consumers' willingness to accept counterfeit products.	28 EU Member States	Yes	€42,711 million
4	EUIPO (2019b)	2018	Illegal IPTV	Eurostat household survey data provides indicators for the overall share of population watching internet streamed television. EUIPO IP Perception Study (2017d) survey. Analysis of a sample of suspected infringing websites was carried out.	28 EU Member States	Yes	Revenue generated by the illegal IPTV market: €941.7 million

	Citation	Year(s) of estimate	Sub-market(s)	Data source(s)	Countries included in estimate	Disaggregated at MS level?	Estimate produced (value)
				An initial dataset based on a list of suspected unauthorised IPTV websites, and data on their annual global traffic, was provided by the Software Security and Media Technology Company Irdeto.			
5	OECD/EUIPO (2019)	2014–16	35 product categories	Customs seizure data received from the Commission's Directorate-General for Taxation and Customs Union.	28 EU Member States	No	€121 billion

2.4.2.3. Loss-based estimates of the EU IPR infringements markets

Estimates of loss to legitimate industry due to the IPR infringements market – rather than criminal revenues – prevail. Loss-based estimates are not the same as revenues, and therefore cannot be directly compared to other criminal markets examined in this study for which revenue estimates have been produced. This is because the consumption of a counterfeit good does not necessarily represent reduced consumption of a legitimate alternative. In some counterfeit markets consumers may never have intended to purchase the legitimate good in the first place (Hoorens et al., 2012, p. vii). That is, the substitution rate of a good will vary greatly depending on the sector. Similarly, other estimates of loss incorporating wider economic costs, potential health impacts and consumer-surplus welfare gains of counterfeit good consumption and reputational effects are much higher than revenue estimates.

The table below shows eight estimates from EUIPO reports that estimate the revenue losses incurred by legitimate industries as a result of counterfeit activity.

Table 2.28: Prior estimates of revenue losses to legitimate industry

Sector	Revenue losses from IPR infringements (€ million)	EU Member States covered	Year of estimate	Reference
Toys and games	1,427	Data from 20 MS used, but estimate has been scaled up to reflect EU 28	Annual estimate (based on data from 2007–2012)	EUIPO (2015)
Jewellery and watches	1,892	Data from 18 MS used, but estimate has been scaled up to reflect EU 27 (excluding Croatia)	Annual estimate (based on data from 2007–2012)	EUIPO (2016b)
Handbags and luggage	1,581	Data from 20 MS used, but estimate has been scaled up to reflect EU 28	Annual estimate (based on data from 2007–2012)	EUIPO (2016a)
Recorded music	170	19 MS	2014	EUIPO (2017b)
Spirits and wine	1,260	Data from 19 MS used for spirits and data from 24 MS used for wine, but estimate has been scaled up to reflect EU 28	Annual estimate (based on data from 2008–2013)	EUIPO (2016d)
Pharmaceuticals	10,188	Data from 19 MS used, but estimate has been scaled up to reflect EU 28	Annual estimate (based on data from 2008–2013)	EUIPO (2016c)
Pesticides	1,313	Data from 24 MS used, but estimate has been scaled up to reflect EU 28	Annual estimate (based on data from 2009–2014)	EUIPO (2017a)
Smartphones	4,212	26 MS (excluding Malta and Bulgaria)	2015	EUIPO (2017c)
Tyres and batteries	2,426	Data from 24 MS used for tyres and data from 20 MS used for batteries, but estimate has been scaled up to reflect EU 28	2010–2015	EUIPO (2018)

2.4.2.4. Market actors and modus operandi

Table 2.29: IPR infringements – Market actors

Level of OCG involvement	A high level of organisation is required to operate the supply chain, from manufacturing to transportation, storage and retail. There are some smaller actors, but they often work with larger organisations via informal networks.
Size and composition of OCGs	OCGs have been identified as being highly organised and having a hierarchical structure, typically consisting of around 12 members. However, this varies by market.
Modus operandi of OCGs	Goods are mostly manufactured outside of the EU. Smuggling, corruption, exploitation of free-trade zones and fraud are some of the methods used to avoid the authorities. Sometimes, counterfeits are assembled when inside the EU. A growing proportion of counterfeits is being sold over the internet.
Poly-criminality of OCGs	Counterfeiters are involved in other crimes such as money laundering, drugs trafficking and fraud. Some OCGs use counterfeiting to fund other crime. The same distribution routes, storage facilities and production locations are sometimes used for both counterfeits and other commodities.
Other key actors	Corrupt officials with inside knowledge of customs or original IPRs. Legitimate businesses are used to disguise illicit activity.

We identified 18 studies in the literature review that included information on key actors in the IPR infringements market in the EU. These studies showed there is a **high level of OCG involvement**. According to a joint report from the EUIPO & Europol (2019) OCGs play a major role in the production and transportation of counterfeit goods throughout the EU, and 'most criminal activity involving counterfeiting is undoubtedly performed by OCGs'. According to Savona & Riccardi (2015), putting together an effective supply chain of counterfeit goods requires a high degree of organisation and investment that means counterfeit criminals tend to operate as part of OCGs. That being said, Savona & Riccardi (2015) state that there are many small groups of criminals, usually involved in a whole range of other illicit activities, that play a vital role in endpoint distribution and retail of counterfeits within the EU. According to EUIPO & Europol (2019) and Hall et al. (2017), these criminal actors can work independently, form ad hoc groups, or are part of loosely structured networks that act opportunistically. EUIPO & Europol (2019) report that only a limited number of known OCGs are active in counterfeiting within the EU, however, it is believed they are involved across the entire process, giving them a dominating presence in the EU counterfeiting market.

There are many drivers behind why OCGs choose to engage in the counterfeiting market. Savona & Riccardi (2015) comment that counterfeiting can be very profitable due to high consumer demand, and low production and distribution costs. Chaudhry and Zimmerman (2012), EUIPO (2020a) and EUIPO (2020b) claim that the high profitability of counterfeiting means that OCGs use it as a means to generate revenues to **finance other organised crime activity**. For OCGs involved in other areas of illicit activity, Treadwell (2012) claims that counterfeiting may be an easy market to move into, as they may already have the infrastructure and contacts in place as a result of other illegal endeavours. Further, booming international trade has made it more challenging to trace the origins of goods due to increasingly complex supply chains and delocalised production. Papadouka & Haenlein (2017) state that Free Trade Zones (FTZs) give OCGs the ability to store and distribute their goods tax- and duty-free. There also tends to be limited domestic authority presence and other weak inspection procedures in FTZs, resulting in a **low risk of being caught**. According to Savona & Riccardi (2015), another key driver of OCG involvement in counterfeiting is the **internet**, which has enabled OCGs to reach a wider audience. Further, the legal penalties associated with counterfeiting are relatively less severe, meaning they are failing to deter OCGs from engaging in counterfeiting. OCG involvement and **relatively low legal penalties** may, at least partially, be a result of public and law enforcement attitudes

towards counterfeiting, as reported by EUIPO (2020a). Interviewees[91] commented that counterfeiting may be considered less of a priority than other crimes like illicit drugs and THB, both by law enforcement and the general public.

Due to a wide range of factors – such as cross-country differences in regulations and differing commercial techniques – **OCG structures 'vary largely in terms of size, reach, organisation and legality'** (Hall et al., 2017). According to EUIPO & Europol (2019), most OCGs known to be involved in counterfeiting have an **organised, hierarchical structure**. Evidence suggests there are leaders, designated subordinates and managed groups, each responsible for different parts of the counterfeiting process (EUIPO & Europol, 2019). The identified OCGs tend to consist of 12 members, with 5–6 core members (EUIPO & Europol, 2019). However, this varies depending on the market. A report by OECD-EUIPO (2020) on counterfeit pharmaceuticals found that OCGs typically have between 3 and 10 members. Some actors were also part of 'larger well-established hierarchical groups and sophisticated international networks with elusive structures' (OECD-EUIPO, 2020). Hall et al. (2017) describe many pharmaceutical counterfeiters as belonging to 'loosely structured networks'.

However, the evidence does seem to be consistent concerning the OCGs that are involved. The EU Organised Crime Threat Assessment (2011) (Europol, 2011) notes Chinese OCGs as particularly active in the production, transport and distribution of counterfeit goods. Several sources noted in-depth involvement of Chinese OCGs (Calderoni et al., 2014; Godart, 2010; Hall et al., 2017; Savona & Riccardi, 2015)[92]. This is logical given that China is the main source of counterfeit items across almost all product categories, with 73% of all counterfeits seized by EU customs coming from China; other Asian countries such as Hong Kong and Vietnam are also prominent sources (EUIPO & Europol, 2019). Europol (2017a) notes that OCGs of Asian origin are particularly prominent in the EU. They share some similarities in that they are bound together by ethnic ties, have an extensive network of contacts and have a very disciplined structure and hierarchy. Other notable OCGs involved in counterfeiting include: the Camorra, the Japanese Yakuza, the Russian Mafia, North African OCGs, other Asian OCGs, Eastern European OCGs, Russian/Georgian OCGs and Turkish OCGs (Calderoni et al., 2014; Godart, 2010; Hall et al., 2017; Savona & Riccardi, 2015)[93].

There is strong evidence that OCGs operating in counterfeiting are also **active in other criminal markets**. According to various sources, OCGs linked to IPR crime tend to also be involved in crimes such as drug trafficking, THB, fraud and money laundering. Four sources identified links to the funding of terrorist organisations (Chaudhry & Zimmerman, 2012; Dégardin, Roggo, & Margot, 2014; EUIPO, 2020b; Europol, 2017a; Godart, 2010). IPR crime can be linked to other forms of crime in two main ways: other criminal activity can be used to facilitate IPR crime (or vice versa), or OCGs can engage in different criminal activities that are relatively independent of each other – known as 'parallel' activities (EUIPO, 2020b). OCGs operating distribution networks have been known to use these methods to **transport more than one type of product**, for example, counterfeit goods and drugs (EUIPO & Europol, 2019). This would be an example of a parallel activity. According to a joint Europol-EUIPO report, drug trafficking is the most common type of criminal activity to occur alongside IPR infringements (EUIPO, 2020b). Savona & Riccardi (2015) note that using the same labour, logistics, storage and transportation resources to move both counterfeits and other commodities effectively duplicates revenue streams at little additional cost. The means to manufacture both illicit drugs and counterfeit pharmaceuticals can be similar and according to a law enforcement representative we interviewed[94], raids frequently find both illicit drugs and counterfeit pharmaceuticals on the same premises. Illicit synthetic drugs can have similar manufacturing methods to counterfeit pharmaceuticals, and counterfeiters are also known to use the same routes to traffic cocaine, marijuana and heroin (EUIPO, 2020b).

Additionally, in order to facilitate counterfeit crime, other illicit activities may take place (EUIPO, 2020b). These include 'knock-on' crimes such as customs and VAT fraud (Godart, 2010), corruption of officials[95] and document fraud, and crimes that are undertaken in order to facilitate counterfeiting. Counterfeiters may use these crimes in order to facilitate the sale of their goods. Commonly, administrative documents are forged to show authenticity or to establish a fake

[91] Interview with international-level stakeholder, 19 March 2020 (#24); Interview with EU-level stakeholder, (#18).
[92] Interview with EU level stakeholder, (#18); Interview with international-level stakeholder, 19 March 2020 (#24).
[93] Interview with international-level stakeholder, 19 March 2020 (#24).
[94] Interview with European level stakeholder, 11 March 2020 (#16).
[95] Interview with European level stakeholder, 11 March 2020 (#16).

country of origin (EUIPO, 2020b). Naturally, this type of document fraud is linked to excise and VAT fraud, as goods are traded between countries without declaring VAT or paying excise duties. Two interviewees[96] also noted the connection of counterfeit manufacturing with environmental crime. The OECD-EUIPO (2020) notes that illegal disposal of the by-products of counterfeit manufacturing and the use of counterfeit pesticides can produce wider environmental harm. Further, the **proceeds from counterfeiting can be used to fund other illicit activity**. As mentioned earlier in this review, compared to many other illicit activities, counterfeiting yields high rewards for relatively low risk. OECD/EUIPO (2019) and an interviewee[97] noted that some criminals use counterfeiting as a means to generate vast sums of money to fund other illicit activities.

Aside from OCGs, other actors are instrumental to facilitating the activities of the IPR infringements market. **Corruption of officials** is one example that is a common strategy employed by OCGs across several markets. According to an expert interviewee[98], there have been cases whereby customs employees cooperate with criminals by giving information on what quantities and prices appear suspicious, so that OCGs can make the necessary arrangements to avoid detection. Godart (2010) also highlights the role of individuals with inside knowledge of the original IPRs who may be corrupted for vital information about the original products. The same interviewee mentioned the case of legitimate shop owners who knowingly sell counterfeits provided by OCGs. According to Hall et al., counterfeit pharmaceuticals in particular is a sub-market that involves 'the constant and normalised blurring of the boundaries between legal and illegal businesses' (Hall et al., 2017). Because of the complexity of the supply chain, there are numerous opportunities for **legitimate actors to engage in opportunistic crime**. In an analysis of cases in the UK and the Netherlands, Hall et al. (2017) found that a lot of pharmaceutical counterfeiting was done by individuals and groups who already had infrastructure in place. They owned legitimate businesses – such as pharmacies or gyms – and had the business networks and payment facilities already in place to use their legitimate operations to hide illicit activity from the authorities.

Modus operandi

Europol (2015a, 2017a) reports that OCGs often rely on **manufacturers from outside the EU** (predominantly China and other Asian countries) to produce counterfeit goods, before organising importation and distribution within the EU. According to a joint report from the OECD and EUIPO, the majority of IPR-violating items are still likely to be shipped in bulk (OECD/EUIPO, 2017). Benoit reports that IPR-violating items are frequently shipped along licit supply chains, concealed in licit shipments, or smuggled using traditional smuggling techniques, making them difficult to detect (Godart, 2010; Hall et al., 2017). An IPR infringements expert interviewee[99] added that OCGs can use their **own transportation means** and can **infiltrate the legitimate distribution chain**. European Union (2019) reports that the most common transport modes in terms of number of cases detained are postal, air and express transport, but sea transport by container is the largest in terms of number of articles. OECD/EUIPO (2019) report that **increasing amounts of counterfeits are being shipped by postal services** due to growing demand online. Smaller shipments help counterfeit traffickers avoid detection, since individual packages are more costly for authorities to stop and check. As stated by Chaudhry and Zimmerman (2012) and OECD/EUIPO (2017, 2018), some illicit entrepreneurs may leverage the lack of regulation in FTZs to conceal the origins of their products, produce IPR-infringing goods, reintroduce counterfeit products into the licit supply chain and circumvent tariffs and other regulatory measures of the destination country.

According to Europol (2015a), a popular method used by counterfeiters is to import goods into the EU **without any labels or branding** – which for most goods (excluding ones where safety regulations are not met, such as pharmaceuticals) is technically legal. IPR-infringing branding is then added inside the EU. A related technique is that of 'drop shipping', when goods are imported from outside the EU to an EU country with relatively fewer controls. The products are then shipped onwards to other EU countries and have their **postal stamps altered** to give the appearance that they originated inside the EU. Europol (2017a) state that goods shipped from other EU Member States are perceived as being less likely to be intercepted by the authorities. Some counterfeit goods are even **manufactured within the EU**; Chaudhry and Zimmerman (2012) say that the increasing availability of modelling, printing and scanning technologies is enabling

[96] Interview with European level stakeholder, 11 March 2020 (#16); Interview with EU level stakeholder, (no date) (#18).
[97] Interview with European level stakeholder, (no date) (#18).
[98] Interview with international-level stakeholder, 19 March 2020 (#24).
[99] Interview with international-level stakeholder, 19 March 2020 (#24).

this. One interviewee[100] said that in the absence of owning a shop, some OCGs directly sell their goods to consumers or try to push them onto small shops. According to another stakeholder[101], there are four main ways that OCGs can get their products into the stores of retailers: by threatening to use violence or other coercive means, owning retail outlets whereby they can easily stock counterfeit goods in place of legitimate ones, engaging in loan-sharking to ensure they have leverage over businesses who have borrowed money from them, and by infiltrating the logistics network supplying the goods.

Godart (2010) notes other methods that OCGs can use to get their goods into circulation within the EU: forged documentation to cover illegal imports, front companies created to trick authorities into thinking a shipment is legal, corruption of public officials, corruption of individuals linked to the genuine rights holders and the exploitation of illegal immigrants inside the EU. A Commission report states corruption is more likely where wages for workers and government officials are low and where bureaucracy is high (European Commission, 2018e). According to Chouvy, corruption can help criminal actors gain access to overruns, stolen goods, and the ability to engage in blatantly illicit behaviour, such as the theft of products from the licit supply chain or the introduction of counterfeit goods into it (Chouvy, 2013).

2.4.2.5. Future trends and dynamics

Table 2.30: IPR infringements – Future trends

Future trends and dynamics	More counterfeits are expected to be sold via the internet. Technological developments may make it easier and cheaper to manufacture counterfeits. Expanded railway connections between the EU and China may enable easier transportation.
Impact on market and criminal finances	OCG involvement in streaming services has started to offset reduced revenues from hard copies of films and music. Expanded railway connections with China are expected to reduce transportation costs for counterfeiters. Economic recession could allow OCGs to capitalise on increased demand for cheaper, branded alternatives.

We identified 16 studies in the literature review that included information on the future trends and dynamics in the IPR infringements market in the EU. These studies showed that the **internet** has changed the counterfeiting market. European Union (2019) reports that supply chains for smaller products (and product volumes) have been transformed since transportation logistics can now be facilitated through the postal system. Consequently, direct-to-end-user postal shipping is increasingly common as users become more comfortable with e-commerce. According to Hall et al. (2017) and Schneider and Maillefer (2015) it is possible for criminal actors and legitimate citizens to directly contact producers of IPR-violating goods and receive their products through direct shipping, using standard post and courier services. Further, the IP Crime Group (2019) in the UK notes that counterfeiters are increasingly using e-commerce and other online platforms – such as Facebook, Instagram, Twitter, Gumtree, Amazon and Alibaba – to sell their products. EUIPO & Europol (2019) state the trade in counterfeits is expected to increasingly take place online, and counterfeiters are expected to exploit this by using marketing strategies that will be 'better directed at the ever-increasing number of internet and particularly, social media users'.

In addition, the **increase in internet speeds and advances in mobile technology** have meant that some formerly common physical media carriers, such as DVDs and CDs, have become obsolete as they are now commonly streamed directly from the internet. Consequently, as reported by Eisend, consumers can acquire unauthorised copies without the need to engage in any shipping logistics (Ablon et al., 2014; Eisend, 2019). Notably, software and media companies have responded by shifting to subscription-based services that are easy to use, thus reducing the incentive to use unauthorised products, although there is mixed evidence on whether these shifts have reduced IPR violations in music, films and television (EUIPO, 2019b). Similarly, EUIPO and Europol (2019) report that the growing accessibility of legal streaming opportunities has resulted in fewer illegal downloads. However, counterfeiters have also adapted to these technological and consumer trends. The UK IP Crime Group (2019) states that one-third of all UK adults accessed pirated content. Wider access to the internet and high-speed broadband has facilitated a rise in the number of people streaming television, film, music and sports content, both legally and

[100] Interview with international-level stakeholder, 19 March 2020 (#24).
[101] Interview with EU-level stakeholder, 12 February 2020.

illegally. Hall et al. (2017) notes that some criminals are taking advantage of this by replicating their own illegal versions of streaming platforms such as Now TV, Netflix and Amazon, and offering ways to illegally configure legitimate devices (IP Crime Group, 2019). Bijhan reports that another trend that is increasingly being seen is legal platforms such as Plex and social media sites that allow customers to post their own (including pirated) content (Bijan, 2019).

Technology used in the production of counterfeit goods has become more accessible (Chaudhry & Zimmerman, 2012; EUIPO, 2020a). Computer equipment is constantly improving, making production methods less expensive, expanding the capacity to reverse-engineer a product and allowing for better quality branding and packaging. This is not just being used to counterfeit high-quality and technical products, but also mundane everyday goods, such as toiletries and batteries (EUIPO, 2020a). This would also enable more manufacturing to be done from inside the EU, which would then make exporting to the final consumer easier. The UK IP Crime Group (2019) says an increase in counterfeit production from within the UK has already been seen, with counterfeiters manufacturing, assembling together, re-packaging and adding on branded labels, trademarks and logos as opposed to importing directly from China. Further, Europol (2017a) note there are future technology developments that have the potential to shape the counterfeiting market; 3D printing is one such technology that may be used to produce more sophisticated counterfeit products in the near future.

Rail connections between Europe and China have been improving for years and will continue to do so with the expansion of the China Belt and Road Initiative (Europol, 2017a). Rail freight costs half the price of air freight and is twice as fast as shipping, meaning rail is poised to be a 'logical choice for many counterfeit consignments' in the future (Europol, 2017a). This brings further opportunities for OCGs, as counterfeits can be sent from China and arrive at EU borders in Eastern Europe where checks are less stringent, before making their way into the rest of Europe. Further, the IP Crime Group (2019) notes that in China, transnational railway management systems are becoming increasingly vulnerable to OCG cyberattacks. Criminals are able to hack into database information-management systems, and there is evidence of OCGs developing new concealment techniques that are especially suited for freight trains as a result (IP Crime Group, 2019).

Demographic and socio-economic changes may also affect the demand for counterfeit products. OECD/EUIPO (2016) notes that economic conditions and resulting budget concerns could affect demand for counterfeits. If people can no longer afford the genuine items, they may be more likely to switch to more affordable counterfeit substitutes instead. This is what is known as demand in the secondary market – whereby consumers knowingly purchase counterfeits. This is especially the case in the wake of the COVID-19 crisis, whereby many people will face budgetary constraints as a result of inevitable difficult economic conditions (Gopinath, 2020). Clifford (2010) reported that counterfeiters may respond to socio-economic changes by manufacturing lesser-known brands and cheaper products, given that people's demand may fall for more upmarket products. In addition, EU Member States, alongside many other developed countries, have seen a gradual ageing of the population. Godart (2010) stipulates that there may be an increase in the demand for pharmaceuticals as a result, which could increase the opportunities for counterfeiters to further exploit this market.

A very recent trend has been observed in the midst of the ongoing COVID-19 crisis. The Anti-Counterfeiting Group (2020) and EUIPO (2020a) have noted the growing supply of counterfeit face masks, hand sanitisers, testing kits, thermometers, cleaning products, indoor sports equipment and even COVID-19 treatment drugs. According to an expert interviewee[102], counterfeiters will ultimately follow market trends and use any opportunity to make money, leveraging the latest technological developments, consumer trends and economic conditions. This means the trade of counterfeit goods is a dynamic activity, with OCGs looking to capitalise on any potential new profit opportunities, no matter what the product is (OECD/EUIPO, 2019).

2.4.2.6. Recommendations

There are several ways in which data collection and estimation on IPR infringements could be improved in the EU:

- Chaudhry and Zimmerman (2012) argue there needs to be **more detailed market research on specific product categories**, due to the high level of distinction between different counterfeit sectors. For instance, studies need to be designed differently if they

[102] Interview with international-level stakeholder, 19 March 2020 (#24).

are estimating the amount of illegal movie streaming, compared to the demand for counterfeit pharmaceuticals. Substitution rates, ethical concerns and health and safety concerns all vary from market to market, hence the need for sector-specific research designs.

- More detailed surveys and studies on how consumers feel about counterfeited products in different contexts could be used to inform **more granular and accurate demand-based estimates**. The methodology used by Camerini et al. for estimating the propensity to consume counterfeit products relies on data from a Spanish survey, which was extrapolated to all other EU Member States (Camerini et al., 2015). Using data from more detailed, country-specific surveys – such as EUIPO (2017d) and EUIPO (2019a) – could help to generate more accurate country-specific estimates of criminal revenues.
- Sullivan et al. (2017) argue that **a more harmonised definition of what constitutes a counterfeit good** is needed. Agreeing on a definition that is consistent across Member States will enable better data collection and researchers to study the counterfeit markets more effectively.
- Further, law enforcement authorities of some Member States do not make their information on internal detentions available to the rest of the EU, creating **huge gaps in the available seizure data** (EUIPO, 2019e).
- In addition, seizure data is collected primarily for non-statistical purposes, by individuals with poor knowledge of statistics, meaning the **data is not as easy to use for statistical analysis purposes as it could be** (Butticè et al., 2018).

Table 2.31: Recommendations – IPR infringements market

Key finding	Recommendation	Actor
Estimates of the criminal revenues from IPR infringements are limited, and those that exist are susceptible to limitations and biases that result in an underestimate. In the IPR infringements market, estimates of loss to legitimate industry rather than criminal revenues prevail. Loss-based estimates are not the same as revenues, and therefore cannot be directly compared to other criminal markets examined in this study for which revenue estimates have been produced.	Sector-, product- and country-specific research designs should be utilised to provide more accurate estimates (for example by considering market-specific aspects, such as substitution rates and differences by demographics and countries). Consumer surveys conducted at the Member State level would improve demand-based estimates. A harmonised EU definition of a 'counterfeit good' may enable more standardised data collection and analysis.	Member States European Commission Academic sector

2.4.3. Food Fraud

William Phillips and Susie Lee, RAND Europe

Key findings:

- Due to the lack of available data, no revenue estimates have been produced for food fraud.
- OCG involvement in food fraud is believed to be high, although the available evidence suggests it mostly consists of legitimate food operators engaging in fraudulent activity. However, there have been instances where large and well-known OCGs – such as the Camorra – were involved in food fraud.
- In the future, growing amounts of trade in fraudulent food is expected to take place online. There is also evidence that specific fraud types – such as mislabelling of non-organic foods as organic, and halal fraud – will increase. Further, more advanced production and counterfeiting methods are expected to be developed.

This Annex provides a comprehensive overview of food fraud in the EU, building upon the summary provided in **Section 2.4.3** of the main report.

Food fraud is a collective term used to encompass the deliberate substitution, addition, tampering or misrepresentation of food/feed, food ingredients or food packaging, as well as false or misleading statements about a product for economic gain (Spink & Moyer, 2011). For the purposes of this report, we also include counterfeit food products in this analysis. These intentional infringements may risk public health through poisoning from hazardous chemicals or unsanitary conditions. But even without harm to public health, they can threaten the proper functioning of the internal food market by undermining consumer confidence.

The EU legislation refers to 'suspicions of intentional actions taken by businesses or individuals for the purpose of deceiving purchasers and gaining an undue advantage therefrom, in violation of the EU relevant rules' to distinguish a case of fraud from an unintentional regulatory non-compliance (European Commission, 2019). In some Member States, food fraud can also be referred to as 'food crime', of which OCG activity is believed to be a major component (NFCU, 2016).

2.4.3.1. Previous revenue estimates of the EU Food fraud market

The literature search identified two studies that contained prior estimates of the food fraud market in the EU. A study by the European Union Intellectual Property Office (EUIPO) **estimated the revenue from geographic indications (GI) infringements across 17 EU Member States** (EUIPO, 2016). GI infringements are one of the most common types of food fraud in the agri-food sector, and are referred to as the voluntary practice of misrepresenting the location of the item by mislabelling the product. The estimates relied upon domestic sales and imports data, the wholesale revenue from all GI products of EU origin, and intra-EU trade statistics[103]. The size and the extent of infringement were estimated by using Member State data on GI market controls reported by Member States, and by sampling approximately 100,000 products checked between 2012–2015 by trained inspectors of the EU for GI compliance. Lastly, the average additional premium that consumers are willing to pay for GI products was calculated by taking the ratio between the price of a GI product and non-GI product, separately for each product class (e.g. wines, beers, cheese, etc.). To obtain the total GI infringement in a country, the infringement rate of each product class was weighted by the share of that product class of total GI product consumption in the country. A similar procedure was undertaken to obtain the total infringement within the EU.

The second study was a joint publication by Europol-Interpol (2017) that used information on seizures collected from investigations into high-risk entities across the supply chain of food and beverages (i.e. production, transport, distribution and selling points) to **estimate the revenue from the food fraud market in 67 countries** including 24 EU Member States.

2.4.3.2. Quality of prior revenue estimates

Compared to estimating the costs associated with food fraud, estimating the revenues generated through fraudulent food activities can be difficult. This is because there are not only multiple types of food fraud but also, within one type (e.g., mislabelling), food products with different premiums underlie differences in values when mislabelled. For example, infringing GI for wine yields higher revenue than for beer because there is a higher premium paid for wine (EUIPO, 2016). Only two studies were identified that provided an estimate of food fraud in the, EU and neither covered the EU 28. A food fraud expert interviewed as part of the study noted that estimating the market revenue for food fraud is extremely difficult because the market is complex and hidden. It was noted that to obtain the market revenue, a shared definition of food fraud – and more inspections – among EU Member States would be needed. Estimation of market revenue for sub-markets would be relatively easier; however, data is fragmented[104].

The EUIPO (2016) study only examined the revenue from one sub-market of food fraud: false labelling or GI infringement. Hence, the report underestimates the revenue from the food fraud market in its entirety. A report produced by Europol and Interpol (2017) covers many countries around the globe, including 24 EU Member States. However, the data is not disaggregated

[103] The consultation done for the Commission (DG AGRI) in 2012 by the consulting firm AND International.
[104] Interview with EU-level stakeholder, 12 February 2020 (#5).

sufficiently to provide an understanding of the EU Member States as distinct from other regions. The major limitation of this study is its reliance on seizure data, which is known to fluctuate over time in response to law enforcement operations and effectiveness. Moreover, seizure data is influenced by the detectability of the product, but the location of the seizure may not be the final destination of the products. For food fraud, it is understood there are limited inspections and enforcement activity[105]; which means that the estimates produced are particularly likely to be considerable undercounts.

[105] Interview with EU-level stakeholder, 12 February 2020 (#5).

Table 2.32: Prior studies estimating the size or revenue of the food fraud market in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (revenue)
1	EUIPO (2016)	2012 to 2015	GI infringements (all products)	Data on wholesale revenue from GI products in the EU (collected by the AND Consulting company); Member State data on GI market controls; sampling of GI infringement by EU-trained inspectors	17 EU Member States	No	The EU GI infringement market is totalled at €4.3 billion, and estimated to generate revenues of approximately €2.3 billion due to the premium price paid by consumers
		2012 to 2015	GI infringements (wine)			No	€2.182 million infringing market
		2012 to 2015	GI infringements (spirits)			No	€811.6 million infringing market
		2012 to 2015	GI infringements (cheeses)			No	€644.7 million infringing market
		2012 to 2015	GI infringements (fresh meat and meat products)			No	€402.3 million infringing market
		2012 to 2015	GI infringements (beers)			No	€1.2 million infringing market
		2012 to 2015	GI infringements (fruit, vegetables and cereals)			No	€94.0 million infringing market
		2012 to 2015	GI infringements (other)			No	€277.1 million infringing market
2	Europol and Interpol (2017)	Dec 2017 to Mar 2018	All products	Seizure data collected from participating countries during the 4-month operation period.	67 countries globally, including 24 EU Member States	Partially	The revenue from the food fraud market, based on seizure data, was totalled at €67.7 million globally.
		Dec 2017 to Mar 2018	Alcohol and alcoholic beverages			Partially	€11.1 million fraud market; largest share in Italy (64%), followed by Russia (30%). (Only the countries with over 10% share are shown here).

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (revenue)
		Dec 2017 to Mar 2018	Non-alcoholic beverages			Partially	€0.14 million fraud market; largest share in Spain (73%) followed by Indonesia (20%).
		Dec 2017 to Mar 2018	Sugar and sweet products			Partially	€1.6 million fraud market; largest share in Hungary (37%), followed by Lithuania (29%), Sweden (22%).
		Dec 2017 to Mar 2018	Mixed food products			Partially	€1.46 million fraud market; largest share in Italy (48%).
		Dec 2017 to Mar 2018	Meat and meat products			Partially	€27.9 million fraud market; largest share in Italy (91%).
		Dec 2017 to Mar 2018	Dairy products			Partially	€9.4 million fraud market; largest share in Italy (90%).
		Dec 2017 to Mar 2018	Food supplements/ additives			Partially	€49,000 fraud market; share of the revenue by countries not reported.
		Dec 2017 to Mar 2018	Fruits, vegetables, legumes			Partially	€0.74 million fraud market; largest share in Belarus (41%), followed by Indonesia (21%) and Spain (16%).
		Dec 2017 to Mar 2018	Cereals, grains, and derived products			Partially	€0.69 million fraud market; largest share in Jordan (35%), followed by Indonesia (34%) and Italy (22%).
		Dec 2017 to Mar 2018	Condiments/ sauces			Partially	€0.58 million fraud market; largest share in Indonesia (95%).
		Dec 2017 to Mar 2018	Seafood			Partially	€1.8 million fraud market; largest share in Portugal (14%), followed by Spain (18%) and Switzerland (13%).
		Dec 2017 to Mar 2018	Coffee/tea			Partially	€0.28 million fraud market; largest share in Indonesia (98%).
		Dec 2017 to Mar 2018	Cooking oil			Partially	€0.77 million fraud market; largest share in Italy (84%).

2.4.3.3. Methodology for estimating revenues in this study

The literature review of prior estimates found limited to no secondary data-sources to enable a calculation of the food fraud market across the 28 EU Member States. This finding was confirmed in interviews with market experts[106]. As such, no estimates of market revenue for food fraud have been produced in this study. The remainder of this chapter will discuss opportunities for improving data collection and estimation, and present results from the qualitative analysis on market actors and future trends and dynamics.

2.4.3.4. Criminal actors and modus operandi

Table 2.33: Food fraud – Market actors

Level of OCG involvement	OCG involvement is believed to be high in food fraud, however the available evidence suggests it mostly consists of legitimate food operators engaging in fraudulent activity.
Size and composition of OCGs	Largely unknown. However, there are instances where large and well-known OCGs – such as the Camorra – have been involved in food fraud.
Modus operandi of OCGs	OCGs may use the set-up of legitimate food business operators to infiltrate parts of the food and drink supply chain.
Poly-criminality of OCGs	The infrastructure of a food business may be used to cover the importation of contraband from other illegal markets, such as drugs or illegal wildlife. Connections between food fraud and other counterfeiting activities have been discovered in recent years.
Other key actors	It is suspected that most cases of food fraud are instigated by (initially) legitimate food-business operators.

Four studies were identified in the literature review that included information on the key actors in food fraud in the EU. These studies contained reports of OCG involvement, yet details of the degree of OCG involvement in food fraud, across and within the EU Member States – are not well known.

A recent assessment from the National Food Crime Unit (NFCU) reports that OCG involvement in the food fraud market is not yet common, at least in the UK (NFCU, 2016). An interviewed food fraud expert[107] claimed that **most actors involved in food fraud are food businesses and food business operators engaging in fraudulent activity in order to gain a market advantage** over their rivals. Lord et al. described food fraud as more of an endogenous problem, whereby fraudulent opportunities arise within the legitimate food system as a part of legitimate actors' normal behaviour (Lord et al., 2017). The phenomenon of business operators introducing fraudulent food items into the supply chain in order to cut costs is termed 'industrial drift'. In these cases, there was little evidence to suggest actors were linked with other criminal activities or illicit markets. However, it was also acknowledged that the market may be at risk of increasing OCG presence because it presents low barriers to entry and the controls are light. Furthermore, OCGs are known to be involved in food fraud and there are many examples of this, as reported by EUIPO (EUIPO & Europol, 2019). The NFCU reported that more than 20 OCGs are known to have links to food crime (NFCU, 2016). A possible driver of increasing OCG involvement in food fraud is its relative lack of risk. Lord et al. note that compared to other criminal markets – such as drug trafficking – methods of detection in food fraud are less sophisticated and the penalties for being caught are less severe, meaning food fraud offers large potential rewards at a lower level of risk (Lord et al., 2017).

The actors in food fraud do not necessarily represent the typical conceptions of OCGs, such as hierarchical mafia-style groups (although such groups are also known to be involved to at least some degree). The evidence suggests that many of the market actors are legitimate business operators, who use fraudulent means to conduct their business.

[106] Interview with EU-level stakeholder, 12 February 2020 (#5).
[107] Interview with EU-level stakeholder, 12 February 2020 (#5).

Modus operandi

There are multiple ways that food fraud can be committed. According to PricewaterhouseCoopers (PwC), product ingredients can be swapped for cheaper, lower quality alternatives; product packaging can contain false information; and the branding of legitimate and recognisable companies can be illegally copied (PwC, 2016). EUIPO reported that a common modus operandi for OCGs operating in the fake wine market involves placing low-quality wine inside bottles labelled with the branding of legitimate, expensive producers (EUIPO & Europol, 2019). Sometimes, pure alcohol is added to the wine in order to match the alcohol percentage of the legitimate product. Further, products can be substituted for cheaper versions, targeted at markets for which there is low discernment[108]. For example, counterfeit Italian products – such as prosciutto and olive oil – could be marketed in countries such as China, where the chances of detection may be lower. This can be done by both criminal enterprises and otherwise legitimate operators[109]. However, as demonstrated from Operation HYGIEA, a joint EU-Asian customs operation to seize counterfeit goods, not only high-quality goods are being counterfeited, but also day-to-day basic items, meaning almost all goods types are at risk of being counterfeited (OLAF, 2019).

According to an interviewed expert[110], there is limited evidence of food fraud overlapping with other criminal markets. In part, this is because the lack of traditional, mafia-type OCG involvement in food fraud means there is naturally less of a connection with markets that have a higher level of OCG involvement. However, the interviewee[111] mentioned that criminal organisations have been known to invest their profits from other criminal markets into some types of food crime, simply to make money. Further, other sources do find evidence of poly-criminality. The NFCU report notes that a small number of food businesses are believed to have links to OCGs whose main activity is not in itself related to food fraud (NFCU, 2016). An expert interviewee noted that OCGs may exploit national or EU funding for the agri-food sector, committing other types of financial fraud (Masini, 2018). EUIPO reported a case whereby an Italian criminal organisation operating their own fraudulent slaughterhouse used forged documents to claim a €900,000 subsidy from the Italian government to invest in their business (EUIPO & Europol, 2019). OCGs may also exploit infrastructure surrounding a food business to cover the importation of contraband, such as drugs or illegal wildlife (NFCU, 2016). According to an EUIPO report, law enforcement authorities who detect fraudulent food products regularly find links with the wider counterfeit goods market (EUIPO & Europol, 2019). Counterfeit car parts, clothing, cosmetics, electronic goods, pharmaceuticals, tobacco and toys have all been discovered alongside counterfeit food products in recent raids. This is because OCGs sometimes use the same production locations and distribution routes for both food and other counterfeit goods. (IPR infringements and counterfeit goods are discussed in Section 2.4.2.)

2.4.3.5. Future trends and dynamics

Table 2.34: Food fraud – Future trends

Future trends and dynamics	Growing online presence; specific fraud types, such as mislabelling of non-organic foods as organic, and halal fraud; more sophisticated production and counterfeiting methods.
Impact on market and criminal finances	This is expected to increase revenues for criminals operating in the food fraud market.

Seven studies were identified in the literature review that included information on the future trends and dynamics in food fraud in the EU. These studies showed that although food fraud is not a new type of crime, the **motivation for food fraud may be growing** (Codex Alimentarius Commission, 2017). This is in part owing to:

- **The economic crisis in 2008**, after which the estimated losses due to food fraud increased by 20% according to Gee and Button (2019).
- **Changing structures in the legitimate food supply-chain**. The Codex Alimentarius Commission cite the following: the growing length and complexity of supply networks,

[108] Communication with expert advisor to the study, 15 June 2020.
[109] Communication with expert advisor to the study, 15 June 2020.
[110] Interview with EU-level stakeholder, 12 February 2020 (#5).
[111] Interview with EU-level stakeholder, 12 February 2020 (#5).

the concentration of buying groups and retailers into very few multi-national chains with strong buying power, the advent of refrigerated systems enabling the shifting and long-term storage of large quantities of perishable foods, and the rapid development of technology providing tools for criminals to make illegitimate deals and set up communication networks.

One of the interviewees[112] identified the **online food market**, especially for alcohol and food supplements, as an emerging platform. E-commerce may be attractive to criminals because opening new websites and temporary accounts is easy[113]. The interviewee also noted that food fraud involving e-commerce may include criminal activities by OCGs. According to Food Fraud Advisors (2017), emerging trends in fraudulent activities in the agri-food sector include: growing incidences of halal fraud (as reported by the BBC), and counterfeiting middle-range foods rather than luxury foods. Regarding the latter, recent Interpol-Europol operations discovered counterfeit chocolates and sweets (Europol-Interpol, 2017). The expert interviewee also commented that the mislabelling of non-organic foods as organic is a major trend, especially on food products imported from outside the EU. This may also extend to the use of additives used in foodstuffs to lower costs or enhance flavour etc., but not disclosed on labelling due to their potential negative health implications or illegality[114]. Another interviewed expert [115] claimed that OCGs may move into food types where there is **low awareness from authorities**. The interviewee spoke of a case whereby fraudulent tomatoes and potatoes were sold by OCGs across Italy and Germany, which went undetected due to the inconspicuous and low-priority nature of the goods involved.

According to EUIPO, there is also evidence that criminal actors are generally **becoming more sophisticated and professional** (EUIPO & Europol, 2019). Law enforcement authorities are increasingly reporting the use of counterfeit packaging materials, security rings and labels, as well as more sophisticated production methods. Authorities have seized infrastructure – such as machines, corks and security rings – used for fraudulent alcohol bottling. In the past, food fraudsters would refill the real packaging with fake products, however there is evidence that food fraudsters now operate their own production lines. EUIPO reports that up to one-seventh of all produce from some known legitimate alcohol production lines is fraudulent (EUIPO & Europol, 2019).

2.4.3.6. Recommendations

There are three principal ways in which data collection and estimation on food fraud could be improved in the EU:

- First, one interviewee[116] emphasised the need to achieve a situation where all 28 Member States **consistently and systematically report the inspections that have been made within their country**, through the Administrative Assistance and Cooperation System or by other means. This will enable the creation of a centralised EU-wide database of all records of food fraud activity.
- Second, **advanced data-analytics techniques may be used to increase detection rates**. Marvin et al. built a Bayesian Network model that uses data on past food fraud cases to predict future cases (Marvin et al., 2016). Using data from Rapid Alert for Food and Feed and some data from cases in the US, the model was able to predict the type of food fraud 91.5% of the time. The model only predicts the type of food fraud, but the authors state that given access to more data (such as monitoring and customs data), the model would be able to predict food fraud of any product coming in from any country. The authors note that their model could be used to help authorities design monitoring and control measures to more effectively identify food types that are at an increased risk of fraud, using data on the origin, price and demand of the food. This would improve the likelihood of detecting food fraud, generate more cases and data, and allow better estimation of market size.
- Third, **EU-wide operations such as that of Operation OPSON should continue to be employed** (Europol, 2019a). The resulting enhanced cooperation and vast amount of seized goods are further data points that can help in estimating the true size of the market. It is understood there is relatively limited inspection and enforcement activity

[112] Interview with EU-level stakeholder, 12 February 2020 (#5).
[113] Interview with EU-level stakeholder, 12 February 2020 (#5).
[114] Communication with expert advisor to the study, 15 June 2020.
[115] Interview with international-level stakeholder, 19 March 2020 (#24).
[116] Interview with EU-level stakeholder, 12 February 2020 (#5).

undertaken in food compared to other illicit markets[117], therefore increasing the number of operations targeting food fraud may also result in more cases being detected.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.35: Recommendations – Food fraud market

Key finding	Recommendation	Actor
The complexity of the market and a lack of data means it is not possible to come up with an accurate estimate of the market size. Food fraud is largely undertaken by legitimate food businesses seeking to cut costs, with traditional OCG involvement less common compared to other markets. There is evidence that food fraud will increasingly take place online and that counterfeit food manufacturing methods are becoming more sophisticated.	Member States should consistently and systematically report food inspections that have been made within their country, enabling the creation of an EU-wide database of all records of food fraud activity. Identifying more cases of food fraud will also allow for better estimation. Two ways this could be done are via advanced data analytics and by increasing the scope of large-scale operations, such as OPSON.	Member States European Commission

2.5. Environmental crime

The European Commission defines environmental crime as 'acts that breach environmental legislation and cause significant harm or risk to the environment and human health' (European Commission, 2020a). According to Europol, the best-known offences of environmental crime are:

- **Illicit waste trafficking** involving the improper collection, transport, recovery or disposal of waste.
- **Illicit wildlife trafficking** involving the killing, destruction, possession or trade of specimens of protected wild fauna.
- **Illegal operation of a plant** in which a dangerous activity is carried out, or in which dangerous substances or preparations are stored.
- Production, importation, exportation, marking or use of **ozone-depleting substances** (Europol, 2020b).

This project focuses on illicit waste and illicit wildlife trafficking in the EU.

2.5.1. Illicit waste

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Key findings:

- According to the original estimates produced in this study, the annual revenues derived from the illicit waste market in the EU range between €4 billion and €15 billion (mid-point estimate of €9.5 billion).
- Comparing these estimates with a previous Commission-funded study – known as the BlockWaste project – that used the same methodology, the study finds there has been a growth in the market for both hazardous and non-hazardous waste.
- There is known to be some OCG involvement in the illicit waste market, particularly small, loosely structured groups typically involved in the international shipment of waste from the EU.
- White-collar professionals are key criminal actors in the illicit waste market, exploiting their awareness of the complex waste management system and loopholes in regulations.

[117] Interview with EU-level stakeholder, 12 February 2020 (#5).

- The illegal shipment of end-of-life vehicles and e-waste is expected to increase, and the overall size of the illicit waste market is also expected to grow in the context of the recent Chinese ban on waste imports from foreign countries.

The illicit waste market involves the illegal trading and disposal of waste outside of regulatory frameworks set by national and international waste laws (Europol, 2013b). This can occur with other forms of waste crime, such as deliberate misclassification of waste or operation of illegal waste management sites.

This Annex provides a comprehensive overview of the illicit waste market in the EU, building upon the summary provided in **Section 2.5.1** of the main report.

2.5.1.1. Previous revenue estimates of the EU illicit waste market

The literature search identified two studies containing prior estimates of the illegal waste market in the EU since 2010. A study by Calderoni et al. (2014) – and a subsequent study by Meneghini et al. (2017) known as the BlockWaste project – both employed indirect/residual methods for estimation. In this approach, the amount of waste generated was compared with the amount of waste legally managed, thus deriving the 'gap' or the amount of waste disappearing from the legal market, which was assumed to be a result of illegal disposal. Because the amount of waste legally managed is the sum of waste treated and stored, a method was proposed to adjust the amount by yearly changes in stored waste and legally traded waste. The average price of illegally sold waste was then multiplied to derive a revenue estimate.

The study by Calderoni et al. focused on the Italian illegal waste market, which – as the authors observed – is somewhat different from illegal waste markets in other parts of Europe in that it has a high presence of Italian OCGs (Calderoni et al., 2014). This study utilised data on special waste[118] production and management[119] from the Italian Institute for Environment Protection and Research to estimate the volume of illegally traded special waste in Italy over the period 2007 to 2010. The study used the price of the *legal* services of waste management and then estimated illegal market price by dividing by 3 and 5, based on previous observations by Massari & Monzini (2004) and Vander Beken et al. (2007). The study also distinguished between hazardous and non-hazardous waste[120] (European Parliament, 2008; United Nations Environment Programme [UNEP], 2019).

The BlockWaste project built upon the methodology employed by Calderoni et al. to generate estimates for the illegal waste market across 23 EU Member States from 2010 to 2014 (Meneghini et al., 2017; Suvantola et al., 2017). Data on waste generation, management, and transboundary shipments was obtained from Eurostat's Environmental Data Centre on Waste, and data on country-specific legal waste operations – especially of the quantity of waste stored – was further obtained by contacting national statistical agencies and environmental statistical authorities. Five

[118] Special waste is 'the waste generated by production activities' (The Council of the European Union, Council Directive 1999/31/EC on the Landfill of Waste). It is distinguished from municipal waste, waste from households or waste similar to household waste by nature or composition. Special waste represented more than 80% of the total waste produced in Italy in 2010, and is particularly attractive to criminal operators because it guarantees higher profits.

[119] The amount of waste legally managed was calculated as the sum of the waste subject to final operations (recovery and disposal) and the stock, where the stock was the difference between stored waste in a given year and stored waste in the previous year. Of note, in the BlockWaste project the amount of waste legally managed was calculated as the amount of waste treated minus the amount of waste legally traded. Here, waste treated is described as the total amount of waste subject to final treatment operations, similar to that defined by Calderoni et al. (2014), but incineration is added to recovery and disposal as examples of operations.

[120] Any types of waste can be either hazardous or non-hazardous. In general, hazardous waste poses a greater risk to the environment and human health and thus requires a stricter control regime, although its absolute amount is less than non-hazardous wastes. The properties that render waste hazardous are laid down in Annex III of Directive 2008/98/EC and are further specified by the Decision 2000/532/EC establishing a List of Waste, as last amended by Commission Decision 2014/955/EU (European Parliament, 2008). The Ban Amendment of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) bans EU countries to export hazardous waste to non-OECD and non-EU countries. The Amendment entered into force in December 2019. Some non-hazardous waste – such as paper, metal or plastic – is considered 'green-listed' under the EU Waste Shipment Regulations (EC Regulation 1013/2006) and shipment of this waste for recovery within the EU and OECD does not require the consent of the authorities (UNEP, 2019).

EU Member States – namely Belgium, Cyprus, Luxembourg, Malta, and Slovenia – were excluded from the final analysis, because these countries tended to rely on data from waste treatment operators, rather than waste producers; thus, an underestimate of the amount of waste produced (rather than merely treated) was likely.

2.5.1.2. Quality of prior revenue estimates

This section focuses on assessing only the quality and limitations of the estimates produced from the BlockWaste project (Meneghini et al., 2017; Suvantola et al., 2017), as it is the most up-to-date and relevant study that captures most EU Member States. One of the contributions of the BlockWaste project was to make available a detailed step-by-step guideline for estimating the amount of waste 'disappearing' from the legal waste market, using the publicly available Eurostat data. The estimation method also considered important adjustments, such as the amount of waste legally traded. There were some limitations of the estimates produced by BlockWaste:

- First, the method is reliant upon accurate reporting by either waste producers or legal waste treatment facilities. Poor data collection methods and untruthful declarations may undermine the estimates produced (Meneghini et al., 2017).
- Second, the estimates rely on scarce information from only one country (Italy) on the price of waste that is illegally managed or disposed, thus omitting representation of the illegal waste markets in other countries of the EU.
- Third, the estimates do not capture the entire EU, as the legal waste-generation and management data from Belgium, Cyprus, Luxembourg, Malta and Slovenia was not deemed suitable for inclusion.
- Fourth, it was unclear in the methodology whether and how the amount of stocked waste was incorporated into the calculations.

Table 2.36: Prior studies estimating the size or revenue of the illicit waste market in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (revenue)
1	Calderoni et al. (2014)	2007 to 2010	Hazardous and non-hazardous waste trafficking	Regional-level data on special waste production and management, from the Italian Institute for Environment Protection and Research. Italian data on legal waste management, obtained by contacting a waste disposal company. Price of the *legal* services of waste management used to yield *illegal* market price by dividing by 3 and 5, according to previous observations[121] that prices in the illegal market are between one-third and one-fifth of legal prices.	Italy	N/A	€304 million to €507 million (total waste) €279 million to €466 million (non-hazardous waste) €25 million and €41 million (hazardous waste)
2	Meneghini et al. (2017); Suvantola et al. (2017)	2010 to 2014	Hazardous and non-hazardous waste trafficking	Country-level data on waste generation and waste management for all EU Member States through Eurostat's Environmental Data Centre on Waste. Price data obtained from Italian judicial cases, newspapers and research papers.	24 EU Member States (excluding Belgium, Cyprus, Luxembourg, Malta and Slovenia)	Yes	€1.3 billion to €10.3 billion (non-hazardous waste) €1.5 billion to €1.8 billion (hazardous waste)

[121] Calderoni et al. (2014) does not include a reference for this information.

2.5.1.3. Methodology used in this study for estimating revenues

To estimate the revenues of the illicit waste market in the EU, this study replicates the methodology employed in the BlockWaste project (Meneghini et al., 2017; Suvantola et al., 2017). The methodology involves estimating the quantity of waste disappearing from the legal market in each EU Member State. If all waste disappearing from the legal market is assumed to have been illegally handled, this quantity can be converted into revenues using data on the price of illegally traded waste. Our study provides an update on the BlockWaste estimates by using more current data from Eurostat on waste generation, treatment and shipment.

A summary of the approach used in this study for estimating the market revenue from illicit waste, and the limitations of this approach, is outlined in the table below.

Table 2.37: Summary of approach for estimating revenues from illicit waste

Summary of approach	Indirect approach that replicates the BlockWaste methodology (Meneghini et al., 2017; Suvantola et al., 2017) to estimate the quantity of waste disappearing from the legal market. This estimate is then monetised using information on the price of illegally traded waste.
Rationale	Data from Eurostat represents the only available data source produced at the national level on waste generation and management in the EU, thus allowing for an estimation of the entire market.
Output	The annual revenue from hazardous and non-hazardous waste disappearing from the legal market in the EU.
Scope and coverage	**Geographical scope**: 23 EU Member States (excluding Belgium, Cyprus, Luxembourg, Malta and Slovenia, for which reliable data was not available)[122] **Year(s) of estimate**: 2014 to 2016 (mean value), updated to 2019 values **Sub-markets**: Hazardous and non-hazardous waste
Data sources	Data on waste generated, managed and shipped (imported and exported) from Eurostat's Environmental Data Centre on Waste (Eurostat, 2020a, 2020c, 2020d). Price of illegally traded waste as per the BlockWaste project (Meneghini et al., 2017; Suvantola et al., 2017), which reflects prices charged for illegal trafficking in Italy. Given the limited applicability of Italian prices to other EU Member States, the research team made efforts to identify additional data sources on the price of illegally trafficked waste in Europe, such as through direct requests to law enforcement. Unfortunately, for the most part price information was not able to be shared and where it was available, it did not align with the categories of hazardous and non-hazardous waste as per the Eurostat data. As such, the estimates produced in this study should be interpreted with caution. One benefit of this approach is that the estimates are comparable with the BlockWaste project, thus are useful for providing an indication of changes in the market over time.
Key steps	The analysis replicated the steps taken in the BlockWaste project, as follows: 1. Retrieve data on the annual quantity of **waste generated** for each Member State from Eurostat for 2014 and 2016, and calculate mean value across both years. 2. Retrieve data on the annual quantity of **legally treated waste** for each Member State from Eurostat for 2014 and 2016, and calculate mean across both years. 3. Retrieve data on the **shipments of waste** (imports and exports) from Eurostat for each Member State for 2014, 2015 and 2016. Use this data to calculate **legal waste traded** as a mean over the years under analysis (i.e. 3 years): $Legal\ waste\ traded_{i,j} = Imported\ waste_{i,j} - Exported\ waste_{i,j}$ Where: $i = Member\ State, j = Hazardous\ waste, NonHazardous\ waste$ 4. Calculate the **legal management of waste** for each Member State as follows:

[122] As per the BlockWaste project, many of these countries determine waste generation based on waste treatment – thus, precluding our ability to generate a 'gap' estimate.

	$Legal\ waste\ managed_{i,j} = Treated\ waste_{i,j} - Legal\ Waste\ Trade_{i,j}$ Where: $i = Member\ State, j = Hazardous\ waste, NonHazardous\ waste$ 5. Calculate the **gap** between the quantity of generated waste and the corresponding amount of waste legally managed, which will serve as an estimate for the mean amount of waste disappearing from the legal market over the period 2014 to 2016. $Total\ waste\ gap_{i,j} = Waste\ generated_{i,j} - Legal\ waste\ managed_{i,j}$ Where: $i = Member\ State, j = Hazardous\ waste, NonHazardous\ waste$ 6. Generate revenue estimates by applying price data to gap estimates. A lower, upper and mid-level estimate was produced for both hazardous and non-hazardous waste, using the following price indices: Illegal management of non-hazardous waste: Low – €9 per tonne, Mid – €39.50 per tonne, High – €70 per tonne Illegal management of hazardous waste: Low – €82 per tonne, Mid – €88.50 per tonne, High – €95 per tonne (Meneghini et al., 2017).
Limitations and caveats of this approach	- The gap analysis is reliant upon accurate reporting by either waste producers or legal waste treatment facilities. Poor data collection methods and untruthful declarations may undermine the estimates produced (Meneghini et al., 2017). - Waste treatment and management data from Eurostat was not reliable for five EU Member States, thus precluding us from producing an EU-level estimate. - The estimates rely on scarce and dated information on the price of waste illegally managed or disposed of, and are taken from one country (Italy), thus are not necessarily representative of the illegal market in other countries of the EU. No information on prices for the illegal markets in other Member States were available. - No data was available on stored or stocked waste, therefore the results are likely to be overestimated.

2.5.1.4. Revenue estimates of the EU illicit waste market

Table 2.38 presents the original estimates produced for this project of the illicit waste market in the 23 EU Member States for which sufficient data was available. According to these figures, annual revenues derived from illicit waste trafficking range between €3.7 billion and €15.3 billion.

- Annual revenues deriving from illicit **non-hazardous waste trafficking** (both within national boundaries and abroad) range between €1.7 billion and €12.9 billion. As similarly noted by previous research, the wide range obtained for non-hazardous waste may be due to the wide diversity of prices charged for illegal management of different types of waste (Meneghini et al., 2017).
- For **hazardous waste trafficking**, annual revenues range between €2.1 billion and €2.4 billion.
- There are large fluctuations in the revenue estimates across Member States, which is consistent with the findings of Meneghini et al. (2017) and reflects the information biases in Eurostat data collected from Member States on waste management. These limitations must be considered in interpretation of the results.
- In terms of differences across Member States, those with the highest volume of both hazardous and non-hazardous waste disappearing from the legal market are **France, Italy, the UK and Germany**. Those with the lowest volume of both hazardous and non-hazardous waste disappearing are **Greece, Latvia and Croatia** (for hazardous and non-hazardous). However, for non-hazardous waste, Austria ranks the lowest.
- When examining the volume of hazardous waste disappearing as a proportion of waste generated, the UK (64%), Slovakia (57%), Lithuania (54%) and Austria (54%) record the highest, whilst Bulgaria (1%), Estonia (1%) and Greece (3%) record the lowest. For non-hazardous waste, Latvia (30%), Portugal (29%), Lithuania (26%) and Slovakia (23%) record the highest, while Austria (1%), Romania (2%) and Bulgaria (3%) record the lowest.
- Consistent with previous research, hazardous waste seems to be more at risk of illicit waste management than non-hazardous waste. On average, between 2014 and 2016

around 33% of hazardous and 13% of non-hazardous waste disappeared from the legal market.

- We replicated the methodology employed by Meneghini et al. (2017) and found that our estimates – for both hazardous and non-hazardous waste – are higher, suggesting some growth in the market.

Table 2.38: Revenue estimate of the EU illicit waste market

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)								
	Hazardous			Non-hazardous			Total (hazardous and non-hazardous)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
23 EU Member States*	**2,229.01**	**2,065.29**	**2,392.75**	**7,277.61**	**1,658.20**	**12,896.99**	**9,506.62**	**3,723.49**	**15,289.74**
22 EU Member States without UK	**1,870.49**	**1,733.10**	**2,007.89**	**5,057.41**	**1,152.33**	**8,962.45**	**6,927.89**	**2,885.43**	**10,970.34**
Austria	64.47	59.74	69.20	31.00	7.07	54.94	95.47	66.80	124.13
Belgium	-	-	-	-	-	-	-	-	-
Bulgaria	11.24	10.41	12.06	155.76	35.49	276.03	167.00	45.91	288.09
Croatia	5.68	5.26	6.10	33.46	7.62	59.29	39.14	12.89	65.39
Czech Republic	51.35	47.57	55.12	108.39	24.69	192.08	159.74	72.27	247.21
Cyprus	-	-	-	-	-	-	-	-	-
Denmark	20.19	18.70	21.67	102.70	23.40	182.00	122.89	42.09	203.67
Estonia	10.14	9.40	10.89	118.83	27.07	210.59	128.97	36.48	221.48
Finland	13.73	12.72	14.74	-8.91	-2.03	-15.80	4.82	10.69	-1.05
France	524.29	485.78	562.80	777.10	177.06	1,377.14	1,301.39	662.84	1,939.94
Germany	322.14	298.48	345.81	709.13	161.58	1,256.69	1,031.27	460.06	1,602.49
Greece	1.11	1.03	1.19	96.19	21.92	170.45	97.30	22.95	171.64
Hungary	14.62	13.53	15.69	106.36	24.24	188.46	120.97	37.77	204.15
Ireland	16.02	14.85	17.20	132.52	30.19	234.85	148.54	45.04	252.05
Italy	452.64	419.40	485.88	937.78	213.67	1,661.90	1,390.42	633.07	2,147.77
Latvia	3.93	3.65	4.22	31.62	7.21	56.03	35.55	10.86	60.26
Lithuania	8.94	8.28	9.60	70.47	16.05	124.89	79.41	24.33	134.49
Luxembourg	-	-	-	-	-	-	-	-	-
Malta	-	-	-	-	-	-	-	-	-
Netherlands	42.13	39.02	45.21	151.59	34.54	268.63	193.72	73.56	313.85

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)								
	Hazardous			Non-hazardous			Total (hazardous and non-hazardous)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Poland	25.84	23.95	27.74	318.33	72.54	564.14	344.18	96.49	591.88
Portugal	30.02	27.82	32.23	164.05	37.38	290.74	194.08	65.20	322.97
Romania	16.53	15.32	17.74	123.63	28.17	219.07	140.16	43.49	236.82
Slovakia	23.37	21.65	25.08	91.31	20.81	161.82	114.68	42.45	186.90
Slovenia	-	-	-	-	-	-	-	-	-
Spain	97.61	90.44	104.78	583.91	133.04	1,034.77	681.51	223.48	1,139.56
Sweden	114.50	106.09	122.92	222.18	50.62	393.75	336.69	156.71	516.67
United Kingdom	358.53	332.20	384.86	2,220.20	505.87	3,934.53	2,578.73	838.07	4,319.40

Notes: Estimates were produced for 2014–2016 (mean), updated to 2019 values using Eurostat's HICP (Eurostat, 2020b).
*It was not possible to produce estimates for BE, CY, LU, MT, SI.

2.5.1.5. Criminal actors and modus operandi

Table 2.39: Illicit waste – Market actors

Level of OCG involvement	Some degree of OCG involvement is known.
Size and composition of OCGs	Small, loosely structured and not centralised.
Modus operandi of OCGs	Mixing of hazardous/special waste with non-hazardous waste. Selling hazardous/special waste as second-hand goods. Fraudulent documents and reporting.
Poly-criminality of OCGs	Groups involved have criminal histories.
Other key actors	Various actors across the waste stream are also involved, making the profile of actors heterogenous. White-collar professionals such as entrepreneurs or brokers operating within legitimate business.

Six studies were identified in the literature review that included information on the actors in the illicit waste market in the EU. With the increased requirement for proper disposal and management of waste, waste producers – especially those who generate large amounts of waste, such as corporates – are motivated to seek waste management services at a low price. This creates demand for cheaper services for managing waste, and opportunities for profit for criminal actors to undercut legal prices and illegally dispose of waste[123]. As noted by Calderoni et al., illegal waste prices can be between one-fifth and one-third of the price of legal waste prices (Calderoni et al., 2014).

Given the opportunity for profit in this market, **some OCG involvement is known** – particularly in the international shipment of illegal waste from the EU (Geeraerts et al., 2015; Noel, 2018). In terms of the profile of OCGs, one expert interviewed[124] noted that perpetrators often have criminal backgrounds, e.g. previous sentences for drug-related crimes, or having been found to possess firearms. This is consistent with an assessment conducted for the UK Environment Agency in 2018 that found that 20 OCGs involved in the UK waste sector were involved in other crimes, including drugs, financial crimes and violence (Noel, 2018) – though it should be noted that such backgrounds may have been part of the background to their detection, prioritisation and classification as OCGs. With regards to illicit disposal of plastic waste, Interpol (2020) reported a link between OCGs and legitimate pollution-management businesses that are used as a cover for illegal operations.

Available information also underscores that many of the groups involved may be less organised, and are **often small, loosely structured and not centralised** (Bisschop, 2012, 2017; Geeraerts et al., 2015; Massari & Monzini, 2004). As one of the interviewees explained, actors tend to be heterogenous rather than traditional, highly structured organised groups[125]. Various actors are involved at different stages in the waste cycle, from origin (initial transfer of waste generated to waste management specialist) to transit (transportation and storage activities) and destination (treatment, recycling and final disposal) (Massari & Monzini, 2004). Each stage involves different actors, including waste generators, waste collectors, waste management companies, transport and shipping companies, waste treatment operators, shipping agents and waste brokers (Rucevska et al., 2015). Across this supply chain, there is often a thin distinction between legal and illegal actors.

A consistent theme from the literature and interviews with experts was that as well as some involvement of poly-criminal OCGs, complicit **white-collar professionals** are central actors in the illicit waste market. Motivated primarily by the need to reduce the otherwise high costs of legal waste treatment, these actors utilise their awareness of the complex waste management system and loopholes in regulations, to their benefit.

[123] Interview with EU-level specialist in illegal waste market, 12 February 2020 (#04).
[124] Interview with national-level specialist in waste crime intelligence, 8 April 2020 (#31).
[125] Interview with EU-level specialist in illegal waste market, 11 March 2020 (#20).

Modus operandi

Shipping of waste as second-hand goods is a frequent form of illegal waste shipment (Baird et al., 2014; Rucevska et al., 2015). Tyres taken from end-of-life vehicles (ELVs), for example, are sold to developing countries as second-hand even if they are too worn out to be safe and useful. Waste Electrical and Electronic Equipment (WEEE) may also be disguised as second-hand goods[126]. Such illegal activity takes advantage of the vague distinction between 'useful' and 'useless' waste, especially in electronic waste (Rucevska et al., 2015). In this way, the actor profits three times: first, by receiving money in advance by a waste producer for recycling; second, by selling useful components from the waste; third, by illegally selling useless components as second-hand goods to non-EU countries[127].

Another mode of illegal shipment is to mix up waste of different degrees of speciality required for treatment (e.g. paper and hazardous waste), and to report the mixed-up shipment as only one lower priced / less protected category of waste (e.g. paper). For example, a storage site may mix toxic substances with domestic waste (Massari & Monzini, 2004). Illegal actors might purchase lands or empty houses for waste storage and dispose of the waste by burning the entire site[128]. Interviewees consistently highlighted that using fraudulent documents and reporting was a common modus operandi for concealing the illegal transportation of waste and avoiding detection.

2.5.1.6. Future trends and dynamics

Table 2.40: Illicit waste – Future trends

Future trends and dynamics	Overall increase in illegal waste market is predicted, especially in response to the Chinese ban on waste import. Shipment of end-of-life vehicles and e-waste are emerging sub-markets within the EU. Changes are expected due to Brexit.
Impact on market and criminal finances	Due to the Chinese ban, shifts in not only destination countries but also parties involved in trans-boundary illegal waste trade are likely underway. Money-laundering and bribery are likely to increase in frequency and significance.

Three studies were identified in the literature review that explicitly discuss emerging trends in the illegal waste market in the EU. In a 2013 report by Europol, it was expected that the illegal waste market is growing (Europol, 2013b), which seems consistent with our estimates of the illegal waste market compared with the earlier BlockWaste estimates.

Since the ban of solid waste imports by China in January 2018, there has been a **re-routing of illegal waste shipments to emerging import countries**, primarily located in South and South-East Asian countries, and to a lesser extent Eastern Europe (Interpol, 2020)[129]. This includes plastic waste, which has been identified as a growing problem with regard to illicit trafficking in the EU and globally. Interviewees shared cases such as an instant change in such international shipments after the Chinese ban, with waste streams being shipped to other EU countries with less costs for creating illegal dumping/incineration sites (which are often disguised as a recycling company in paperwork). The Chinese ban has likely entailed a shift in not only the destination countries, but also different parties involved in the illegal trade of waste.

A report published in 2016 observed **ELVs and Waste Electrical and Electronic Equipment (WEEE) as emerging sub-markets** within the illegal waste market (EnviCrimeNet, 2016), which is consistent with remarks made by stakeholders interviewed for this study[130]. From a Delphi Study conducted as part of the BlockWaste project, experts expected money-laundering and

[126] WEEE refers to electrical or electronic items that have come to the end of their useful life, and covers a range of equipment that uses electricity. Computers, TV-sets, fridges and cell phones are examples. The Directive on WEEE 2002/96/EC and the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC address the management of WEEE in the EU.
[127] Interview with EU-level specialist in illegal waste market, 11 March 2020 (#20).
[128] Interview with national-level specialist in waste crime intelligence, 08 April 2020 (#31).
[129] Interview with national-level specialist in the shipment of waste, 3 March 2020 (#10); Interview with national-level specialist in waste crime intelligence, 8 April 2020 (#31).
[130] Interview with national-level specialist in the shipment of waste, 3 March 2020 (#10).

bribery to increase in frequency and significance for the illegal waste market until 2030 (Suvantola et al., 2017).

2.5.1.7. Recommendations

There are two principal ways in which data collection and estimation on the illicit waste market could be improved in the EU. Notably, both limitations have been discussed in previous research by Meneghini et al. (2017); Suvantola et al. (2017), however, little improvement seems to have been made.

- First, **systematically report information on price of illicit waste and revenues generated through illicit waste trafficking.** There is little systematic data on the price of illicit waste. Current and previous estimates rely upon information gathered from Italian judicial files and may have limited applicability to the illegal market in other Member States. Moreover, the price data has a large range – particularly for non-hazardous waste – thus the lower and upper estimates produced vary by over €10 billion, which calls into question the reliability of such estimates. Our enquiries revealed that there is little willingness to share price data for the purpose of estimation. Moreover, even where price data is available, there tends to be a misalignment between the unit of that data (i.e. the price of illegally trafficked plastics, tyres, end-of-life-vehicles, etc.) and the categorisation of the Eurostat data (i.e. hazardous and non-hazardous), which leads to challenges for estimation.
- Second, **address gaps and inconsistencies in reporting on waste generation and treatment.** The Eurostat data on waste generation and management is currently only available up to 2016, and there remain gaps in reporting for some Member States, thus precluding an EU-wide estimate.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.41: Recommendations – Illicit waste market

Key finding	Recommendation	Actor
A gap analysis using Eurostat data on legal waste treatment, management and shipment provided the basis for estimating the amount of hazardousness and non-hazardous waste disappearing from the legal market, assumed due to illegal diversion. However, Eurostat data is only available for 23 of the 28 EU Member States (excluding BE, CY, LU, MT, SI) and data on the price of illegally traded waste – required for monetising the gap estimates – is only available for Italy.	Address gaps and inconsistencies in reporting by BE, CY, LU, MT, SI regarding waste generation and treatment. Member States should systematically report information on revenues generated through illicit waste trafficking – which is currently collected by police or judicial authorities in the course of their investigations – to the European Commission.	Eurostat Member States European Commission

2.5.2. Illicit wildlife

Susie Lee, RAND Europe

Key findings:

- The revenues from the European eel market range from €4.7 to a high of €31.4 million. However, there is insufficient data to enable an estimate of the illicit wildlife market as a whole in Europe, and this estimate is a vast underrepresentation of the extent of the phenomenon.
- Actors in the illegal wildlife trade have a heterogenous profile – varying by level of involvement in the supply chain and by species of wildlife trafficked.

- In order to effectively capture/poach, transport and ship wildlife for illegal sale, a certain level of skill and expertise is required. This means that actors in some wildlife markets include those who also operate in the legal trade.
- Transnational OCGs are known to be involved in the illegal trafficking of glass eels from Europe to Asia, and may work with established eel traders to facilitate diversion from the legal supply chain. There are also networks of poachers who covertly fish and supply the illegal market.
- The internet is likely to play an increasing role in facilitating the trade in illegal wildlife products, given the relative ease of connecting sellers to potential buyers.

This Annex provides a comprehensive overview of the illicit wildlife trade in the EU, building upon the summary provided in **Section 2.5.2** of the main report.

Wildlife crime, or the illegal wildlife trade, refers to unlawful activities associated with illegal exploitation and trade of wildlife specimens, covering the entire supply chain from harvesting entire or parts from living organisms, to processing, smuggling, and selling (‘t Sas-Rolfes, Challender, Hinsley, Veríssimo, & Milner-Gulland, 2019; Interpol, 2018). Products range from wild, biological specimens of flora, fauna and fungi for purposes ranging from food to ornaments to construction (Phelps, Biggs, & Webb, 2016). Importantly, one species can provide multiple products that may be traded through different value chains. In addition, different forms or sources of a single product may be either legal or illegal, based on different contexts (e.g., caught within vs. outside of official quotas, farmed vs. wild-caught specimens, domestic vs. international trade, harvested within vs. outside of legally protected areas).

Europe is a major transit region for wildlife trade between continents (e.g., reptile skins), whilst also being a destination (e.g., live reptiles) and source region (e.g., glass eels, birds, falcons) as well as both a transit and a source (e.g., rhino horn and ivory which are sourced from African countries but are transformed and sold as antiques) (Auliya et al., 2016; Bush, Baker, & Macdonald, 2014; Interpol, 2018). Available seizure data indicate that the main commodity types seized in the EU in 2018 were medicinals (both animal and plant-derived), corals and reptile bodies, parts and derivatives (TRAFFIC, 2020). Of the total seizure records, 9% reported an estimated value of the commodities seized. In 2018, the top commodities with a reported value were European eels, live birds, live reptiles, mammal body parts and derivatives, and ivory (TRAFFIC, 2020). In the box below, we introduce some of the main sub-markets. Interviewees noted that illicit wildlife trafficking has the potential to be a high profit crime carrying relatively low risk and it has received relatively little attention until recently[131].

Box 5: Main illicit wildlife markets in the EU

European eels: European eels have been banned for trading beyond European external borders since 2010 (European Commission, 2014a). Due to the high demand for eels in East Asian countries, European eel juveniles (also known as glass eels) are smuggled at a much higher price outside of Europe to Asian countries, where they are farmed and reared to adulthood for consumption (European Commission, 2017b). Illegal trade of glass eels occurs mainly in the four EU source countries (France, Spain, the UK and Portugal), but many other EU Member States (such as Germany, Bulgaria, Greece and Hungary) (Sustainable Eel Group, 2018a) and neighbouring countries (Albania, Macedonia, Morocco, and Russia) (Stein et al., 2016) are believed to be used as transit countries.

Live birds: Illegal killing and taking of wild birds remains a continuing issue in Europe (Brochet et al., 2019). A recent assessment in 2019 indicated that motivations for illegal killing and taking of birds varies in Europe from food, sport and caged birds in Mediterranean Europe, sport and food in the Caucasus, and sport and predator control in Northern and Central Europe (Brochet et al., 2019). The EU is also a market for exotic birds that are non-native to the EU – mainly parrots – that are kept as pets or as caged birds (TRAFFIC, 2020).

Live reptiles: The EU comprises one of the largest live reptile markets (Auliya et al., 2016). Live reptiles imported from across continents are sold either as pets or as part of a collection. The illegal trade of live reptiles involves species regulated under CITES, as well as species that are not CITES-regulated but are nationally protected in their country of origin, but which are often openly offered for sale in the EU (Auliya et al., 2016).

Ivory: Ivory has been banned for international trade since 1989 when African elephants were transferred from CITES Appendix II to Appendix I. China was one of the largest buyer markets for illegally traded ivory,

[131] Interview with expert at NGO-level, 19 March 2020 (#23).

however since introducing a ban on the ivory trade in 2017 there has been an observed decline in ivory demand (WWF, 2019). Until the 1980s, Europe was one of the leading importers and manufacturers of ivory globally (UNEP et al., 2013). Europe remains a key region for re-exporting illegal ivory products (UNEP et al., 2013). As of 2017, the export of raw ivory from the EU was banned, but domestic trade within the EU was permitted for worked ivory originally acquired before 1947 ('antiques') and for ivory produced between 1947 and 1989 with a government-issued certificate (European Commission, 2017a).

2.5.2.1. Previous revenue estimates of the EU illicit wildlife market

We identified 15 studies were that provided data or estimates of the illegal wildlife trade, either at the EU-level or for any EU Member State. Of these, 12 used data on seizures of wildlife, one employed gap analysis to estimate the European eel market in the EU, and three employed survey methods. Only three studies monetised volume estimates to produce an estimate of market revenue.

Seizure data

There are several databases that capture information on seizures of illegal wildlife, globally and in the EU. These include:

- **World Wildlife Seizures (World WISE)** is a developing initiative led by the United Nations Office on Drugs and Crime (UNODC) that assembles **global** reports of wildlife seizure data, mainly from the following sources: United States Fish and Wildlife Service LEMIS system, Annual and Biennial Reports submitted by the Convention on International Trade in Engendered Species of Wild Fauna and Flora (CITES) parties, and the EU Trade in Wildlife Information Exchange (EU-TWIX).
- **EU-TWIX**[132] compiles seizure records submitted by EU Member States and includes seizures occurring within the EU and at EU external borders. Access to the database is restricted to wildlife law representatives from the EU Member States.
- **Elephant Trade Information System (ETIS)** provides **global data** on elephant ivory and other elephant products based on reports from the CITES parties.

Numerous studies have used data from these seizure databases to try to better understand the illicit wildlife market. Global studies have been undertaken by the UNODC using World WISE (UNODC, 2016; 2020), while TRAFFIC has produced global and EU studies drawing upon EU-TWIX and ETIS. The below section provides an overview of the EU-specific studies that have used seizure data. The limitations associated with using seizure data to produce market estimates are discussed in the following sub-section 2.5.2.2.

Multiple species: TRAFFIC has produced annual reports on the illegal wildlife market using EU-TWIX data since 2012, covering years 2007–2011 (average) and annually from 2012 to 2018 (Mundy-Taylor, 2013; TRAFFIC, 2020). The most recent report used data from 2018 and is the only one of these studies to produce information on the value of goods seized (earlier reports only reported the number and volume of wildlife seized). The main commodity types seized in the EU in 2018 were medicinals (both animal- and plant-derived), corals and reptile bodies, parts and derivatives (TRAFFIC, 2020). Of the total seizure records, 9% reported an estimated value of the commodities seized. In 2018, the top commodities with a reported value were **live eels** (€1.9 million), followed by **live birds** (€127,000), **live reptiles** (€81,000), **mammal body parts and derivatives** (€64,000) and **ivory** (€53,000) (TRAFFIC, 2020). It is unclear exactly what the price information related to (i.e. legal or illegal market prices). This was verified by the project team in an interview[133].

Caviar: Available seizure data indicates some degree of illegal trade of caviar in the EU, mostly from countries close to the Caspian Sea. According to an analysis by TRAFFIC of the EU-TWIX database, 7.87 tonnes of illegal caviar were seized by EU authorities during the years 2010 and 2016 (Harris & Shiraishi, 2018). The Member States with the highest total number of seizure records were Germany, followed by France, which is consistent with findings from years 2001 to 2010 (van Uhm & Siegel, 2016). However, 81% of the seizure records during 2010 and 2016 did

[132] EU-TWIX was established in 2005 and has been helping connect enforcement agencies across Europe (through the mailing list) and centralising data on CITES-listed species seizures submitted by EU enforcement agencies from all 27 EU Member States and the UK (through the EU-TWIX database).
[133] Interview with EU-level expert in wildlife crime, 19 March 2020 (#25).

not include information on the country of origin. Where the information was provided, the most frequently reported countries of origin were Hungary, followed by Ukraine and Russia, while Iran is also one of the most frequently reported countries of origin in both EU and US seizure records.

The price of illegally traded caviar is also not clear. According to a recent survey from TRAFFIC on illegal caviar markets in Bulgaria and Romania, prices of caviar varied considerably (£0.4–£4 (GBP) per gram) and did not necessarily correlate with source type and authenticity of caviar (Jahrl, 2013).

Ivory: Lau et al. (2016) examined seizure data from the ETIS database, with a specific focus on seizures made in the UK and reported by the UK to ETIS. There were 154 seizure records between 2010 to 2014, equivalent to 345.5 kg of raw ivory. This number was dwarfed by a total of 110 kg ivory seized in 2015 alone.

Live reptiles: In the Netherlands, 3,074 live reptiles were seized between 2004 and 2017, according to data from the Netherlands Enterprise Agency (Janssen & Leupen, 2019). Information on the total revenue from the seized live reptiles was not available.

Gap analysis

The Sustainable Eel Group (SEG) calculated the discrepancy between the quantities of **European glass eels** required to meet the legal market demand (for restocking programmes and aquaculture use) and the declared European catch in two fishing seasons (2015/16 and 2016/17). This discrepancy would reflect the amount of glass eels not traceable from the legal market.

$$Legally\ caught\ - Legally\ demanded = Untraceable\ from\ the\ legal\ market$$

In each of the two seasons, the proportion of untraceable eels was some 50% (30 tonnes) of the declared European catches. To derive the monetary revenue from trafficked glass eels, this 'gap' estimate was combined with information provided by DUPAN – the Dutch foundation of eels' traders, farmers and professional fisherman – on the illegal price of immature eels at a different production stage (i.e. raw filet and wholesale filet typically sold on the Asian market, rather than live glass eels exported from Europe)[134].

The study applied three other 'gap' scenarios, which generated alternative calculations for the amount of untraceable glass eels. The first considered the quantity of eels proved by enforcement operations in the fishing season 2016/2017 (i.e. 8 tonnes); the second considered the approximate quantity of eels 'guesstimated' by Spanish enforcements for season 2016/2017, alongside illegal, underreported and unregulated (IUU) fishing of glass eels (i.e. 60 tonnes); and the third considered the quantity of eels that circulates as persistent rumour every season (i.e. 100 tonnes).

Ad hoc survey methods

Wild birds: A study on the illegal killing of wild birds was based on a questionnaire survey conducted between 2016 and 2017 among national experts of 28 countries and one territory (Faroe Islands) from Northern and Central Europe and the Caucasus (Brochet et al., 2019). The experts were asked to provide mean estimated numbers of individual birds illegally killed/taken per year. The findings suggested that between 0.2 million and 0.8 million birds in Central Europe and between 0.06 million and 0.2 million birds in Northern Europe are killed or taken illegally per year.

Ivory: The Lau et al. (2016) study of the UK ivory market included, in addition to analysing seizure data, data collected through physical and online market surveys in April 2016, with a focus on the antiques sector. Compared to 2004, fewer individual market stalls in London were offering ivory for sale. The authors raise some possible reasons, including the emergence of online sales and/or stricter legislation; however, due to the difference in survey methods employed in 2004 and the Lau et al. study, the comparison should be interpreted with caution.

Multiple species: A study conducted by the International Fund for Animal Welfare (IFAW) surveyed online wildlife markets operating in France, Germany, Russia and the UK over a six-

[134] SEG used the following parameter/values: 1 kg glass eels (3,500 pcs) – when grown in modern aquaculture – produces 1,260 kg live eels (400 g/pcs, 10% mortality considered), and subsequently 592 kg of raw fillet and 387 kg of processed eel kabayaki fillet. The following values are considered: raw fillet at wholesale level = €12/kg; processed fillet at wholesale level = €36/kg; processed fillet at consumer level = €60/kg.

week period in 2017. The research team surveyed online marketplaces and social media platforms, focusing on freely available wildlife products from searches on the internet. The sales identified during the study period were evaluated at approximately €3,639,588.06 across the four countries examined – €769,886, €1,242,499 and €981,024 for France, Germany and the UK respectively.

2.5.2.2. Quality of prior revenue estimates

Limitations of seizure data

Seizure data can be useful for understanding aspects of illicit markets such as the modus operandi of traffickers and trade routes[135]. However, relying on seizure records to assess the magnitude and economic revenue from the illicit wildlife market can be hindered for several reasons.

- First, **items seized often depend on which species are considered endangered**. Some species may be under national control but are not currently CITES-listed (UNODC, 2016). CITES-listed species also change over time.
- Second, **the degree of effort to detect and intervene in wildlife trafficking changes over time**. Importantly, such effort could also differ by relevant authorities depending on political will, available resources and a variety of other factors. As one of the expert interviewees described, seizures are made when we 'look for them' (UNODC, 2016). Countries that dedicate more efforts to seizing wildlife trafficking consequently report more seizure incidents, which do not necessarily indicate a larger magnitude of trafficking. To the contrary, trafficking could be higher in countries with lower interdiction capacity. Moreover, countries often inspect more on imports than on exports. This tendency can result in less information available for origins of commodities, especially if trade routes span multiple countries (UNODC, 2016).
- Third, inconsistency and insufficient information on commodities undermine the quality and usability of seizure data for generating estimates. Because commodities and their mode of transit are diverse in illicit wildlife, a variety of measurement units are used by different reporting bodies. For example, one seizure incident could involve different volumes depending on where and when the seizure was made (e.g. milligram, kilogram, pills, animal carcasses, etc). It becomes near impossible to standardise these metrics. Comparison between commodities is further complicated due to vast differences in price: for example, one seizure incident of medicinal products has different significance than one seizure incident of glass eels, of which the unit value is much higher. For the majority of seizures, price information is not available, and even if available, the information may only capture a single step within the longer value chain, and differ across years.

The limitations of seizure data were explicitly acknowledged by several interviewees with expertise in the illicit wildlife trade. Moreover, in their World Wildlife Crime Report the UNODC (2016) states: **'Given this level of volatility in both the seizure record and what is known about the underlying markets, it is nearly impossible to give an accurate and consistent estimate of the criminal revenues generated by wildlife trafficking.'**

Limitations of gap analysis

The study by SEG endeavoured to capture the volume, and its associated economic revenue, of the entire illegal **European eel** market. The collection of data across two fishing seasons allowed comparison of the estimated amount of untraceable glass eels over time, and thus made the estimate more robust to temporal fluctuations[136].

One limitation of the estimates produced from the SEG study is that the 'gap' analysis was **reliant upon accurate reporting** of eel catches by fisheries and of market demand by survey respondents. Another limitation is that the analysis only captured the amount of glass eels being diverted from those legally caught, because it takes the discrepancy between declared catches and legal demand. The analysis thus does not reflect any data on the illegal fishing or poaching of glass eels (bolded in the formula below). This means that the economic revenue from the illegal glass eel market estimated by the SEG study is **likely to be an underestimate**, especially given that the illegal trade is sourced from both legally and illegally caught glass eels.

[135] Interview with international-level expert on environmental crime, 4 March 2020 (#09).
[136] SEG is conducting annual market surveys and expect to publish reports regularly to trace trends in the illegal glass eel market.

$$Untraceable\ from\ the\ legal\ market\ + \boldsymbol{Illegally\ caught} = Illegally\ traded\ glass\ eels$$

The amount of illegally caught glass eels is currently unknown. Based on Europol's estimation that approximately 100 tonnes of eels were trafficked from EU to China during the 2017/18 season (Europol, 2018b), it can be guesstimated that approximately 70 tonnes of eels were illegally caught, if we account for the 30 tonnes of glass eels disappearing from the legal market as estimated by the SEG study.

The use of price data on fillet means that the economic revenues estimated by the SEG study reflect those accrued further down in the value chain, where glass eels have been grown to full size and sold for consumption. For the purpose of understanding the economic revenue from the glass eels illegally traded *within the EU*, we update the estimates by applying a range of prices for illegally traded glass eels in Europe.

Limitations of ad-hoc survey methods

Ad-hic survey methods could be a useful technique especially for understanding the trends or patterns in the illegal wildlife market, such as the studies on the UK antique ivory market and the cyber wildlife trade. However, market surveys are often conducted in a selected number of markets for a short period of time, which may not represent the entire cycle of an illegal wildlife market. For instance, IFAW's study on online wildlife trade excluded closed or private groups, password-protected websites and the dark net, and was conducted over a six-week period. As in seizure data, distinguishing legal versus illegal products in the markets is challenging for data collected from market surveys. Lastly, the questionnaire survey method employed in the Brochet et al. (2019) on the study of illegal killing of wild birds, yields data derived from *ad hoc* reporting and/or detection, rather than systematic monitoring. Survey methods for understanding the illegal wildlife market could therefore underestimate the actual size and revenue from the market.

Table 2.42: Prior studies estimating the size or revenue of the illicit wildlife market in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	TRAFFIC (2020)	2018	Various species	Seizure records submitted in the 2018 Annual Illegal Trade Reports (including information on prosecutions) submitted to the EU-TWIX database by EU Member States	EU 28	No	N/A	€2.3 million Live eels (€1.9 million) Live birds (€127,000) Live reptiles (€81,000) Mammal body parts and derivatives (€64,000) Ivory (€53,000)
2	Sustainable Eel Group (2018b)	2016 to 2017	European eels	Data on the amount of glass eel catches declared (questionnaires sent out by SEG to national agencies across Europe and obtained from France, Spain, Portugal and UK) Research paper on the estimate of annual recruitment of glass eels Inputs from the Dutch foundation of eel traders on the price of eels at different production stages	Four EU Member States – France, Spain, Portugal, UK	No	8.8–127.6 tonnes	Between €188 million and €2.27 billion
3	Harris & Shiraishi (2018)	2010 to 2016	Caviar	Seizure data from EU-TWIX database	EU 28	No	7.87 tonnes	N/A
4	Brochet et al. (2019)	2016 to 2017	Birds	Survey of national experts	Central Europe	Yes	Between 0.2 million and 0.8 million birds are killed or taken illegally per year	N/A
4		2016 to 2017	Birds	Survey of national experts	Northern Europe	Yes	Between 0.06 million and 0.2 million birds are killed or taken illegally per year	N/A
5	Lau et al. (2016)	2010 to 2014	Ivory	Seizure data from ETIS database	UK	Yes	345.5 kg raw ivory equivalent	N/A

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
6	IFAW (2018)	2017	Various species	Online survey during 6-week period	France	Yes	N/A	€769,886
6		2017	Various species	Online survey during 6-week period	Germany	Yes	N/A	€1,242,499
6		2017	Various species	Online survey during 6-week period	UK	Yes	N/A	€981,024
7	Janssen & Leupen (2019)	2004 to 2017	Live reptiles	Seizure data from the Netherlands Enterprise Agency	The Netherlands	Yes	3,074 live reptiles	N/A

Note: All revenue estimates presented in this table reflect the original years for which they were produced. They have not been adjusted for inflation, as we have done for the final estimates used in the current study.

2.5.2.3. Methodology for estimating revenues in this study

The literature review identified no prior studies that have estimated the illicit wildlife market in its entirety in the EU. This reflects the lack of comprehensive and reliable data sources enabling such calculations to be made. Several estimates have been produced of the size or revenue of markets for individual species. These estimates have mainly used seizure data or ad-hoc surveys, both of which are susceptible to limitations that deem them unsuitable inputs for reliable market estimates at the EU- and Member State-level.

One study by the SEG[137] employed gap analysis to estimate the volume of European eels disappearing from the legal market, or diverted from the legal supply chain in the EU. Our appraisal of this methodology concluded that the gap estimates produced by SEG represent the most suitable input for assessing the magnitude of the European eels market at the EU-level.

On this basis, we utilised the gap estimates produced by SEG and combined this with updated information on the illegal price of glass eels that are trafficked live from Europe. This results in an estimate of the revenue of the illegal market for European eels' in the EU. The revenue estimate that we produced is slightly different from SEG's because we focused on the price of eels trafficked from Europe, whereas SEG used illicit prices when eel fillet is sold on the destination markets of Asia.

Focusing on European glass eels is but one sub-market of the illicit wildlife markets in the EU. However, available evidence suggests some OCGs are involved in European eel trafficking, which highlights its importance as a focal point (European Commission, 2018d)[138]. A summary of the approach used in this study for estimating the revenue from illegal glass eels and the limitations of this approach is outlined in the table below.

Table 2.43: Summary of approach for estimating revenues from illegal glass eels

Approach	Indirect estimate of the economic revenue from the illegal market for European glass eels that are exported live from the EU. The approach draws upon the 'gap' estimates produced by the Sustainable Eel Group – of the amount of European glass eels disappearing from the legal market – combined with information on the price of trafficking live glass eels from Europe.
Rationale	The rationale for this approach is as follows: • Currently, there is no reliable data for estimating the market revenue for the illegal trafficking of wildlife species other than European eels in the EU. • There is evidence that OCGs are involved in trafficking live glass eels from Europe to Asia (Europol, 2017). • Previous estimates by the Sustainable Eel Group have used price information for eel (raw and filleted) sold in Asian markets. The scope of this study is to understand the illicit revenues generated within Europe. There is considerable value added to glass eel once it is trafficked from Europe to Asia, where glass eels are grown to full size and filleted.
Output	Economic revenue from the illegal market for live European glass eels trafficked from Europe to Asia for fishing seasons 2015/16 and 2016/17.
Scope and coverage	**Sub-market**: European eels **Geographical scope**: EU-level estimate – however, information on the 'gap' is based upon surveys of fishing authorities in the four source countries: France, Spain, Portugal and UK. **Year**: Average of the 2015/16 and 2016/17 fishing seasons, updated to 2019 values.
Data sources	The **volume of glass eels** trafficked was estimated by the volume that was untraceable from the legal market, averaged across the two fishing seasons considered. The amount untraceable was calculated by taking the

[137] SEG is the leading international organisation seeking to accelerate the conservation and management of the European eel. Its methodological approach to producing gap estimates was verified with market experts interviewed in this study.
[138] Interview with expert at NGO-level, 19 March 2020 (#25).

	discrepancy between the quantities demanded by legal market demand and the declared European catch, averaged across the two fishing seasons considered. $$Legally\ caught\ - Legally\ demanded = Untraceable\ from\ the\ legal\ market$$ We chose the estimated quantity (30 tonnes) derived from a scenario that considers the approximate quantity of eels that remained untraceable in the Sustainable Eel Group's market surveys for season 2015/16 and 2016/17. The **price data** were obtained from recent media reports and interviews with market experts. According to a report in the UK, glass eels were priced at more than £1,000/kg for illegal shipping in 2019 (BBC, 2019). Another report mentions that illegal glass eels can fetch up to £4,000/kg (Rana, 2018), while the price of glass eels legally traded is about £150/kg. The range of €1,200–€1,500/kg was reported in another source as the price of immature European eels sold in East Asia for the years around 2015 (European Commission, 2016c), and the €2,000/kg figure was estimated for the fishing season 2018/19 by Europol (Europol, 2019b). The expert consulted[139] shared anecdotal information that €300/kg is paid for fisherman and €150–€800/kg is paid overall for illegal trade. The expert acknowledged that the illegal trade price could reach higher depending on annual supply of glass eels. From this information, we decided to use the price range of €150 to €1,000/kg.
Key steps	We multiplied the average estimated volume of glass eels untraceable from the legal market during the fishing seasons 2015/16 and 2017/18, by the lower (€150) and upper (€1,000) boundary of price range. The mean of €150 and €1,000 (€575) was also used to produce the middle value. $$Volume\ of\ untraceable\ glass\ eels\ \times Price\ per\ kg$$ $$= Economic\ value\ of\ glass\ eels\ untraceable\ from\ the\ legal\ market$$
Limitations of this approach	The estimate of the volume of glass eels 'disappearing' from the legal market in Europe is likely an underestimate, because it focuses only on diversion from the legal supply chain after the eels have been caught and does not capture illegal poaching or fishing[140]. The estimate may be subject to bias because it relies on the accurate reporting by national experts surveyed in the Sustainable Eel Group's survey. The economic revenue from the illegal glass eels market will be an underestimate of the revenue attributable to the entire illegal wildlife market as it focuses on only one species.

2.5.2.4. Revenue estimates of the EU illicit wildlife market

Table 2.44 presents the original estimates produced for this project of the illegal European eel market in the EU, alongside the minimum estimates for other species – namely live birds, live reptiles, mammal body parts and derivatives, ivory, live mammals, live amphibians and animal-derived medicinal products from a report produced by TRAFFIC (2020) using seizure data. The estimate has been adjusted for inflation and are represented as 2019 values. Whilst TRAFFIC (2020) also reported figures for European eels (i.e. €1.9 million), our estimates for this species are favoured here as they overcome some of the limitations of seizure data, such as its susceptibility to underestimation and high volatility.

According to our figures, annual revenues derived from the diversion of European eels from the legal market range between €4.7 million to a high of €31.4 million. Such a wide range is mostly due to the fluctuating price in response to the annual variations in the supply of wild glass eels[141].

[139] Interview with expert at NGO-level, 19 March 2020 (#23).
[140] Interview with expert at NGO-level, 19 March 2020 (#23).
[141] Interview with expert at NGO-level, 19 March 2020 (#23). For various reasons, the annual recruitment of European eels has been declining from the early 1980s to a low point in 2011 (Amilhat et al., 2019; Sustainable Eel Group, 2018b). Although the declining trend seems to have stopped and some increase has been observed during 2011–2019, overall recruitment remains low (Amilhat et al., 2019). Supply of glass eels is also influenced by the availability of Japanese eels, the preferred eels over the European eels. In a year when Japanese eels are more supplied, there is likely a decline in the need for illegal trade of European eels.

Table 2.44: Revenue estimate of one species subject to illegal trade in Europe – European eels

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)			Sub-market	Source
	Mid	Low	High		
FR, ES, PT, UK [(a)]	18.05	4.71	31.39	European eels	New estimate

Notes: European eel estimates were produced for 2015–2017 (mean) and the estimates from TRAFFIC (2020) were for 2018. All estimates have been updated to 2019 values using Eurostat's HICP (Eurostat, 2020).
(a) European eel estimates are derived from gap estimates produced by the Sustainable Eel Group, representing the volume of eels disappearing from the legal market. In Europe, there are legal fisheries of European eels in four Member States: FR, ES, PT, UK – thus, these estimates are comprehensive as to the estimated amount being diverted from the legal supply chain.

2.5.2.5. Criminal actors and modus operandi

In this section, we describe actors and modus operandi of the illegal wildlife market, not only for glass eels but also for other sub-markets.

Table 2.45: Illicit wildlife – Market actors

Level of OCG involvement	In order to effectively capture/poach, transport and ship wildlife for illegal sale, a certain level of skill and expertise is required. This means that actors in some wildlife markets include those who also operate in the legal trade. Transnational OCGs are known to be involved in the illegal trafficking of glass eels from Europe to Asia, and may work with established eel traders to facilitate diversion from the legal supply chain. There are also networks of poachers who covertly fish and supply the illegal market.
Size and composition of OCGs	Asian-based OCGs have been known to send 'fish mules' to smuggle eels by suitcases who – whilst ethnically Asian – may have legitimate European passports.
Modus operandi of OCGs	Document fraud facilitates the smuggling of illegal wildlife products by disguising them as legal products.
Poly-criminality of OCGs	Little known.
Other key actors	Individuals involved in sourcing wildlife products (e.g. eel fisheries) may also take part in illegal trade.

We identified 13 studies in the literature review that included information on the key actors in the illegal wildlife market in the EU. Based on these studies and interviews with market experts, it appears that the degree of OCG involvement differs by sub-markets, and its poly-criminality is little known. Various actors are likely involved at different stages of the supply chain for different wildlife products because the commodity (i.e. wildlife) is sourced from natural resources, hence depending on the wildlife products, a heterogenous profile of actors may be required.

European eels: Existing information indicates the clear presence of transnational OCGs in smuggling eels out of Europe (TRAFFIC, 2020; UNODC, 2020)[142]. According to Europol's report in 2019, individuals from four different OCGs were arrested by the Spanish Civil Guard. Their activities spread across France, Spain and Portugal – the main source countries of glass eels in the EU. A market expert noted that Asian-based OCGs would send 'mules' to smuggle eels by suitcases, and that these people could be ethnically Asian but possess European passports[143]. However, it is also important to note that legal traders may be involved at various points of smuggling glass eels. For example, according to the market expert interviewed[144], preparing live glass eels for shipping in cargo in a good condition would require some degree of knowledge of fisheries, suggesting the possibility that actors involved in legal trading of fish occasionally participate in the trafficking of glass eels. According to UNODC (2020) networks of poachers also acquire glass eels through clandestine fishing and supply these to the illegal market.

Ivory: In a report published in 2017, Pro Wildlife and other organisations suggested that OCGs may be involved in ivory trading in Europe, given the recent trend of an unprecedented number

[142] Interview with expert at NGO-level, 19 March 2020 (#25).
[143] Interview with expert at NGO-level, 19 March 2020 (#23).
[144] Interview with expert at NGO-level, 19 March 2020 (#23).

of large seizures – e.g. shipments of at least 800 kg, as defined by the Elephant Trade Information System (ETIS) – in the EU since the end of 2015 (Pro Wildlife & and other organisations, 2017). However, larger seizures may also reflect increased enforcement effort and awareness, especially given the growing attention on ivory issues, mainly linked to the increase in poaching in Africa and the increased illegal trade and seizures globally (Environmental Investigation Agency (EIA), 2020).

Wild and exotic birds: Since 2005 there has been a trade ban on wild birds to counter the spread of avian flu (Cardador et al., 2018). This resulted in a trade shift from wild-caught birds to captive-bred birds, and there is some evidence that the ban may have increased financial incentives for poaching or encouraged OCG involvement (Cardador et al., 2018; Ribeiro et al., 2019). In 2018, TRAFFIC (2020) reported on a case involving the illegal trafficking of toucans, parrots and macaws in the European region. The 2019 study by Brochet et al. provides evidence for the continuation of the illegal killing of wild birds in Europe, but the magnitude of illegal trade involving these birds and information on main actors are still little known (Brochet et al., 2019).

Live reptiles: Market experts discussed the possibility of OCG involvement in supplying live reptile products for 'collectors', because the sourcing of exotic animals requires specialist knowledge of the animals and their ecology, as well as liaising with poachers in the country of origin, the mules/couriers and the final destinations. Other actors in the illegal live reptile market in the EU involve reptile breeders[145].

Modus operandi

European eels: With regard to illegal poaching, UNODC (2020) indicates that poachers use hand nets, trap nets or small trawling nets to fish glass eels covertly at night. The market expert interviewed[146] described two main modes of smuggling eels that have been illegally poached or diverted from the legal supply chain. First, transport via air by hiding live glass eels in oxygenated, wet plastic bags, packed in suitcases and transported to Asia (Europol, 2018b; UNODC, 2020). OCGs operating as 'fish mules' have been observed concealing eels in suitcases and declaring them as other types of fish (Europol, 2019b; UNODC, 2020). Second, cargo shipment, either declared as other seafood products or hidden under other seafood exports.

Ivory: Compared to other regions, Europe has notably low legal ivory prices. This might drive companies specialised in collecting ivory items to be involved in illegal re-exporting to Asia (Sosnowski et al., 2019). Internet sales are also considered to facilitate marketing of illegal ivory in the EU, with law enforcement facing difficulties in regulating the sale of illegal ivory on, for example, internet auction sites (UNEP et al., 2013).

Live reptiles: There are two main modes for the illegal trafficking of reptiles in the EU. First, a common mechanism for importing CITES-listed reptiles is to falsely report them as captive-bred reptiles, thus increasing the likelihood that a trade permit will be granted (Sina et al., 2016). Second, non-CITES listed reptiles may be imported into the EU after being illegally poached from their habitats, typically third countries. Because there is no legal instrument within the EU that would require operators placing these animals on the market to produce due-diligence in relation to the original obtainment or harvesting, technically these reptiles become 'legal' once they enter the EU.

2.5.2.6. Future trends and dynamics

Table 2.46: Illicit wildlife – Future trends

Future trends and dynamics	Increased reliance on internet-based trade. 'Blackwashing' in caviar.
Impact on market and criminal finance	Internet could facilitate trading in illegal wildlife products, given the relative ease of connecting sellers to potential buyers. The 'blackwashing' strategy could sustain the demand for 'illegally-sourced' caviar.

Within each sub-market of the illegal wildlife market in the EU, information on emerging trends is

[145] Interview with EU-level enforcement on illegal wildlife, 11 March 2020 (#21).
[146] Interview with expert at NGO-level, 19 March 2020 (#23).

relatively lacking. Three studies identified in the literature review included information on the future trends and dynamics in the illegal wildlife market in the EU (European Commission, 2016b; IFAW, 2018; Sina et al., 2016).

Two studies highlight the increased prominence of **internet-based trade** in illegal wildlife products (IFAW, 2018; Sina et al., 2016). According to these studies, online advertisements via social media such as Facebook[147] are actively used for promoting wildlife products that could have been illegally sourced. Except for the Czech Republic, sellers are not required by law to present supporting documentation on the legitimacy a wildlife item. This situation exacerbates the existing difficulty of distinguishing legal from illegal wildlife trade over the internet. According to one of the two studies, conducted by the International Fund for Animal Welfare (IFAW), there has been an increased trend of wildlife traffickers turning to the **dark net** in response to increased enforcement mainly targeting the open internet space (Interpol, 2017; Roberts & Hernandez-Castro, 2017). According to IFAW, even if trade occurs offline, the internet could also facilitate the connection between sellers and buyers (IFAW, 2018).

2.5.2.7. Recommendations

The illegal wildlife market is one of the most difficult to estimate in terms of its size and value. This is evidenced by the lack of available secondary data and the limited number of studies that have attempted to do so. Current understandings of the market rely on seizure records (as reported by various agencies: Environmental Investigation Agency (EIA), 2020; TRAFFIC, 2020; UNODC, 2020), which have high volatility that render them unsuitable for market estimates.

Future efforts should be made to **improve the measurement of the illegal wildlife trade in the EU**, through additional, primary data collection. One approach might be to conduct comprehensive market 'occupancy' surveys for different species, as described by Barber-Meyer (2009).

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.47: Recommendations – Illicit wildlife market

Key finding	Recommendation	Actor
There are no secondary data sources available for reliably estimating the revenues generated through the illegal wildlife trade in the EU. Current knowledge is predominantly reliant upon seizure data, which has high volatility rendering it unsuitable for market estimates. The revenues generated through the illegal trade of European eels – one sub-market of the illegal wildlife market in the EU – can be estimated by using gap analysis of the amount of eels disappearing from the legal market in the four source countries in the EU (France, Spain, Portugal and the UK).	Efforts should be made to improve the measurement of the illegal wildlife trade in the EU, through additional, primary data collection. One approach might be to conduct comprehensive market 'occupancy' surveys for different species.	Member States, including police and judicial authorities, customs authorities European Commission

[147] For example, global wildlife-related foundations and NGOs have partnered with technology companies – such as eBay, Microsoft, Tencent, Facebook, Etsy and Instagram – to bring down the online illegal trade in threatened species (WWF, n.d.).

2.6. Illicit firearms

Quentin Liger, Optimity Advisors

Key findings:

- According to the estimates produced in this study, the annual revenues derived from the illicit firearms market in the EU range from €274 million to €754 million (€408 million).
- The new estimate has a wider range than the previous estimate of between €370 million to €493 million.
- The illicit firearms market does not necessitate a high level of organisation and therefore does not necessarily have to be undertaken by OCGs. There are two broad categories of actors involved in the supply of illicit firearms: single individuals involved in small-scale commerce, and large operators able to systematically and periodically move large quantities of arms and ammunitions (Savona & Riccardi, 2015).
- In line with the relatively low value of the overall market, illicit firearms trafficking does not generate high revenues, and is often a secondary source of income for traffickers.
- Flobert weapons are expected to continue to be widely available in the European market. Creation of 3D-printed firearms is expected to increase, while current and former conflict areas (in particular the former Yugoslavia and the Donbass region) are expected to continue being important sources of firearms.

This Annex provides a comprehensive overview of the illicit firearms market in the EU, building upon the summary provided in **Section 2.6** of the main report.

The revised firearms directive defines illicit trafficking as 'the acquisition, sale, delivery, movement or transfer of firearms, their essential components or ammunition from or through the territory of one Member State to that of another Member State if any one of the Member States concerned does not authorise it' (European Parliament, 2017).

The firearms market has several particularities. Firearms are durable goods with a long lifespan. As such, an important share of the items that are illegally trafficked originated either legally, or from existing stockpiles (mainly stemming from the fall of the Soviet Union, the wars of Yugoslav dissolution and the breakdown in law and order in Albania in 1997). For this reason, the illicit production of firearms is far less important than for other illicit markets (except for the emerging use of 3D printing). Another important source of firearms entering the illegal market is the conversion of non-lethal-purpose weapons (such as alarm and signal weapons), or firearms that were improperly deactivated. If the deactivation did comply with the strict standards of deactivation (as provided for by the Commission Implementing Regulation (EU) 2015/2403), reactivation is often a relatively easy process.

An important aspect of the firearms market is its heterogeneity. Instead, 'illicit markets exist at a regional level as discretely constructed sectors of availability and flow' (Bourne, 2013). This was highlighted by the 2020 UNODC study, which empirically showed that reported illicit firearms trade was mostly local (either within one country or with neighbouring ones), at least in the case of countries reporting data, which included 16 EU Member States. This stems from (i) the relative difficulty of trafficking firearms compared to other illicit goods; and (ii) the relatively low demand for firearms in the reporting countries.

According to a law enforcement representative, demand for firearms is not homogenous: 'different types of criminals want firearms for different reasons, want different types of firearms and have different access to acquisition methods'[148]. Criminal networks can access firearms in different ways:

[148] Interview with law enforcement representative, 28 April 2020.

- Some established OCGs have established a stock of firearms over the years that can be sold or lent to criminals who are part of – or close to – the group.
- Smaller gangs often use the services of specialised firearms traffickers who either have connections to source countries (often in the Western Balkans) or, in some cases, have stashes of firearms readily available[149].

Terrorists and terrorist organisations are another driver of the firearms market. The terrorist attacks using firearms in 2015 in Paris have put this category high on the political agenda, although it has long existed.

A third group that plays a role in the illicit firearms market are **owners of illicit firearms who have no link to criminality or terrorism**. In this case, firearms remained in the possession of the owners after a change of legislation or were inherited by the owners.

Box 6: Terrorism and firearms

Media reports following a number of terrorist attacks in France sought to identify the provenance of the firearms used by the terrorists, and provide an interesting cross-section of where firearms originated from. One of the firearms used by Mohammed Merah during the Toulouse shootings in France in 2012 was a Colt registered in 1944 (FranceTVinfo, 2016). According to the legal inquest, some of the firearms used by the Kouachi brothers – perpetrators of the Charlie Hebdo shooting – bore Yugolsav army marks and are likely to have originated from the Western Balkans (Duquet, 2016). At least one of the firearms used by the Bataclan attackers appears to have been imported in separate pieces before being assembled in France (Duquet, 2016). Amedy Coulibaly, who carried out the Hypercacher attacks in January 2015, used reactivated automatic rifles that had been sold as acoustic expansion weapons in Slovakia (Florquin & King, 2018). Finally, a failed attack on a police convoy in Paris was undertaken using a legally held firearm (Florquin & Desmarais, 2018).

2.6.1. Previous revenue estimates of the EU illicit firearms market

The literature search identified 24 relevant publications (including edited volumes containing several relevant chapters). These publications provided either quantitative information – such as the size of the market and the revenue from firearms being trafficked – or qualitative data on the flows and modus operandi of trafficking, or trends. While some studies cover all or some Member States, there is a clear focus on Italy, Belgium and Scandinavian countries, reflecting the location of the research institutes carrying out work on illicit firearms (the Flemish Peace Institute in Belgium, Transcrime in Italy, the Peace Research Institute Oslo and Stockholm International Peace Research Institute in Scandinavia).

Existing estimates stem from two primary data sources: **number of seizures** and the **number of unregistered firearms**. Studies seeking to assess the revenue from firearms trafficking have typically used the revenue from the legal firearms trade in order to estimate the illegal trade.

To reach a figure of between €370 million to €493 million, Transcrime used Italian seizure data and extrapolated it to the EU 28 (Transcrime, 2015c). This **supply-side estimate** was built on the revenue from seizures in Italy and assumed that they represented between 8% and 10% of the total revenue from illicit firearms traded in the country.

Demand-side estimates were based on a range of between 10% to 20% of the revenue from firearms produced and net imports in the country. Given data on legal firearms sales were available through Eurostat, the share of 10% to 20% was extrapolated to all other EU Member States. The source of the 10% to 20% assumption in the Transcrime study is not clear.

2.6.2. Quality of prior revenue estimates

There are several limitations to prior estimates of firearms trafficking. The main shortcomings of approaches that utilize **seizure data** include:

- First, there is a risk of underrepresentation given the difficulty in assessing the share of illicit firearms seized.

[149] Interview with law enforcement representative, 28 April 2020.

- Second, there is a risk of over-representation in some Member States with a high number of existing firearms.
- Finally, scaling up the number of firearms seized does not allow for the assessment of the share of trafficked weapons.

The main shortcomings of approaches using data on **unregistered firearms** include:

- First, the method requires assessment of the number of unregistered firearms, which, by definition, is difficult. Estimates are partly based on survey and self-reporting, a method that has limitations (Karp, 2018).
- Second, the methods only allow for the assessment of unregistered firearms (stock) rather than the flow of illicit trade – even less so the share of the trade which is trafficked.

Studies seeking to estimate the **revenue from illegal firearms trafficking** that assume between 10 and 20% of the legal firearms trade was attributable to illicit activities have typically failed to provide methodological explanation for how these estimates were derived (Calderoni et al., 2014; UNODC, 2010).

Assessing the illicit market for firearms in the EU is notoriously difficult and there are some general points to be made about the quality of the studies that do exist. First, **in-depth research into the scale of the problem is lacking**. Policy attention has grown over the years as firearms changed from being a problem specific to criminal groups to one affecting the population at large. This is partly due to the perceived relatively small size of the issue compared to other violent or organised criminal activities in the EU. According to Duquet, 'firearms-related homicides in Europe are among the lowest in the world' (Duquet, 2018). With 0.012 homicides by guns per 100,000 in the EU (compared to 4.46 in the US, 8.2 in South Africa or 20.7 in Brazil for instance (IHME, 2018)), firearms were not perceived as one of the biggest threats to the general population. In addition, large-scale illicit firearms trafficking is quite exceptional in the EU and the illicit firearms market is considered to be modest in size (Duquet, 2018). This has changed over the past decade as terrorist attacks have occurred in which perpetrators used firearms to seek to kill as many people as possible (such as the Utøya attacks in 2011 in Norway, and the 2015 Paris attacks). The second difficulty relates to geographical considerations, with **the bulk of research undertaken either in the USA or in post-conflict zones**. As such, the estimates found in the literature tend to focus on aspects that are related to but different than firearms trafficking, such as the ownership of firearms used for terrorist purposes.

Table 2.48: Price of illicit firearms

	Alarm weapon	Handgun	Pistol	Kalashnikov	Shotgun	Sub-machine gun	Glock
	Price (€)						
Austria							
Belgium	400	500–750	1,000–1,500	2,000–2,500			1,000–2,000
Bulgaria	70						
Croatia		100–250		100–300		475	
Cyprus							
Czech Republic							
Denmark			2,000–2,350				
Estonia							
Finland							
France	300–425	1,000–2,000	1,000–1,500	1,000–1,750	300–650	1,000–2,000	1,850
Germany			4,500				

	Alarm weapon	Handgun	Pistol	Kalashnikov	Shotgun	Sub-machine gun	Glock
	Price (€)						
Greece							
Hungary							
Ireland							
Italy		500–1,100	1,700	2,000		1,000–2,000	3,000
Latvia							
Lithuania							
Luxembourg							
Malta							
Netherlands	300–400	1,000–1,500	1,000–1,500	1,500–3,000		1,500–3,000	3,000
Poland							
Portugal							
Romania	70–135	250–1,875	200	2,500			
Slovakia				500			
Slovenia							
Spain				2,000			
Sweden							
United Kingdom	2,300	800–1,250	3,990–4,845	3,000–7,000		6,800–7,950	

Source: Duquet (2016)

Table 2.49: Prior studies estimating the size or revenue of illicit firearms in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	Karp (2018)	2017	The study focuses on the number of civilian-held firearms overall, rather than specifically on firearms trafficking	National firearms registration statistics General population surveys about firearm ownership (available for 56 countries/territories) Experts' estimates of civilian holdings Where none of these was available, analogous comparisons based on estimates for comparable countries	230 countries and territories, including all 28 EU Member States	Yes	Volume of firearms 857 firearms held by civilians globally (64.2 million in the EU – data is disaggregated by country)	N/A
2	European Commission (2014b)	2013	The study focuses on the illicit market for firearms (including the domestic market)	Seizure data	Seven Member States (DK, EE, FR, EL, LT, PT, UK)	Yes, for seven Member States	Volume of firearms 81,000 firearms trafficked in the EU (and 67 million unregistered firearms)	N/A
3	UNODC (2015c)	2010 to 2013	The study seeks to develop empirical knowledge on illicit firearms trafficking (both domestically and cross-border) by compiling data from judicial and police authorities	Police or judicial authority data on seizures and questionnaires Annual seizures report questionnaire, asking primarily for aggregate data on firearms, their parts and components and ammunition seized during 2010–2013 The significant seizures report questionnaire, asking primarily for detailed information about significant individual incidents related to trafficking seizures	48 countries, including 13 EU Member States (BE, CZ, DE, EE, EL, ES, FI, FR, LT, LV, PL, RO, SE)	Yes, for 13 Member States	Volume of firearms 18,683 firearms seized in 12 Member States (CZ, DE, EE, EL, ED, FI, FR, LT, LV, PL, RO, SE)	N/A
4	UNODC (2010)	2008		Using data from the Small Arms Survey (2009) and applying 'the most commonly cited estimate for the size of the illicit market is	Global estimate	Global estimate	N/A	Revenue from illicit market $170 million (USD) to $320

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
				10%–20% of the licit market' which is not sourced				million (USD) per annum globally
5	Calderoni et al. (2014)	2010		Data stem from previous research at the provincial level on the number of confiscated firearms provided by law enforcement authorities	IT	IT	N/A	Revenue from illicit market €70 million to €141 million in Italy
6	Savona & Riccardi (2015)	2012		Extrapolation from Calderoni et al. (2014)	IT	IT	N/A	Revenue from illicit market Illicit market in the EU worth €247 million to €493 million

2.6.3. Methodology for estimating revenues in this study

The methodological approach we adopted for estimating the market revenue from illicit firearms in this study built upon the approaches by Transcrime and UNODC, using information from Eurostat on the total revenue from firearms produced in the EU, which was combined with information on the price of firearms on the illicit market.

The summary of the approach for measuring the economic revenue from illicit firearms in the EU is outlined in the table below.

Table 2.50: Summary of approach for estimating revenues from illicit firearms sales

Summary of approach	Supply-based estimates refined with available information on price and type of firearms trafficked.
Output	Estimation of the price of illicit firearms sales in the EU.
Scope and coverage	**Geographical scope**: EU-level and 28 Member States. **Year(s) of estimate**: 2012 for production data, 2018 for seizures, 2012–2018 for price data.
Data sources	**Production data** stems from Eurostat, as quoted in the evaluation of the firearms Directive[150]. **Seizure data is** taken from the United Nations Office on Drugs and Crime's data portal. **Data on unregistered civilian-held firearms** from the Small Arms Survey (Karp, 2018). Data on the **price of firearms** is mainly extracted from the Flemish Peace Institute publications; and in one case from a journalistic source (Duquet, 2018).
Key steps	The following steps were followed: 1. Data on the **number of firearms (units)** produced in the EU served as a basis for the estimates. The number of units produced per 1,000 population was calculated and applied to Member States where no production data was available. 2. United Nations Office on Drugs and Crime data on the share of **seizure per type of firearms** was applied to (1) to build an assumption of the type of firearms being trafficked. Where no data was available, the average was used. This provided a breakdown by type of firearms. 3. A factor of **10%** was applied to (1) to derive the share of production that can be deemed to enter the illicit market. In the absence of alternatives, this factor – used by the UNODC (2010) – has the advantage of allowing for a comparison of this estimate with previous ones. 4. **Price data** was applied to (3) for each type of firearm (i.e. pistol, shotgun, sub-machine gun, etc.). Given the price difference due to the type of firearms and the location, this was done both as a range (low, high and mean estimate) as well as per Member State. Where no data was available, we used either the price of a similar type of firearm, or that of a similar country (based on population size and geographical location). $$Firearms\ production * 10\% * Price\ (for\ each\ type\ of\ firearm)$$
Rationale	Data on seizures is becoming more comparable and comprehensive, thanks to the work undertaken by UNODC. However, the data is still very patchy as all countries do not report data, and even when they do, their own data is not always reliable (for a thorough explanation of the issues, see in particular Duquet, 2016). Even if seizure data was comprehensive, it would only reflect the share of the market intercepted by law enforcement, which is likely to only represent a small share of the overall revenue from the market. Taking a **supply-based estimate**, while far from perfect, can provide some insights into the type of firearms being trafficked. As such, the estimates applied here may provide more insights for the point of view of the methodology, than the results themselves.

[150] Study in view of a report evaluating the implementation of Regulation 258/2012.

	The challenge of assessing the revenue from firearms trafficking is to use existing data while strengthening the robustness of the assumption made. The main criticism of the approach taken by the UNODC (2010) and Transcrime (2015) stems from the 10% to 20% factor applied on licit sales of firearms. However, it has not been possible to provide a more accurate factor. The proposed method allows us to add a layer of information in this method by adding a level of granularity linked to the types of firearms being illegally traded.
Limitations and caveats of this approach	Our method has the following limitations: - Production data cannot be closely correlated to the illegal sale of firearms, which is likely to result in an underestimate of the market. - While providing a level of granularity to the estimate, the data on seizure used in (2) is based on a relatively small sample. - The 10% factor applied in (3), whilst used in previous research, is very tenuous. - The price data applied in (4) varies a lot between lower and upper estimates and geographies. Furthermore, data is not currently available for all Member States.

2.6.4. Revenue estimates of the EU illicit firearms market

The table below presents the estimates of the illicit firearms market at the EU-level and for each of the 28 EU Member States. The results show that:

- The annual revenue from the illicit firearms market in the EU comprised between €274 million and €754 million (with the mid estimate standing at €408 million).
- Due to reporting inaccuracies, the estimates appear to underestimate the revenue from the market in some countries (such as France or Belgium) and overestimate that of others (as is the case of Austria).
- The range of estimates is very wide, even though the methodology only provides for a range linked to the price of firearms. This reflects how the revenue from firearms in the overall assessment of the market can vary between locations (up to a tenfold increase).

Given the lack of robustness surrounding the 10% factor used, we undertook a sensitivity analysis using a 5% and 20% factor. The figures vary proportionally to a mid, low and high estimate of €193.55 million, €129.91 million and €356.75 million respectively for 5% and €774.21 million, €519.62 million and €1,417 million respectively for 20%.

Table 2.51: Revenue estimates of the EU illicit firearms market

EU Member State	Revenue estimates (€ million)		
	Mid	Low	High
28 EU Member States	**408.09**	**273.69**	**753.96**
27 EU Member States without UK	**324.555**	**219.174**	**528.571**
Austria	85.38	52.57	141.28
Belgium	5.11	3.22	9.62
Bulgaria	0.33	0.24	0.28
Croatia	25.88	12.82	23.88
Cyprus	0.29	0.20	0.51
Czech Republic	15.59	9.72	26.08
Denmark	9.17	6.32	16.36
Estonia	2.24	1.54	3.99
Finland	8.29	5.72	14.79
France	0.89	0.54	1.46
Germany	31.25	25.57	50.24

EU Member State	Revenue estimates (€ million)		
	Mid	Low	High
Greece	7.50	5.16	13.46
Hungary	6.60	4.11	11.03
Ireland	5.80	3.79	15.64
Italy	58.82	46.65	86.24
Latvia	3.27	2.25	5.83
Lithuania	4.77	3.29	8.52
Luxembourg	0.18	0.12	0.33
Malta	0.31	0.24	0.45
Netherlands	29.53	19.80	60.96
Poland	0.80	0.42	0.90
Portugal	3.88	2.68	6.98
Romania	4.94	3.08	8.27
Slovakia	2.81	1.46	3.12
Slovenia	0.21	0.15	0.19
Spain	3.35	2.47	5.04
Sweden	7.35	5.08	13.13
United Kingdom	83.54	54.51	225.38

Note: Estimates were produced for 2012–2018 (mean) and updated to 2019 values using Eurostat's HICP (Eurostat, 2020b).

2.6.5. Criminal actors and modus operandi

Table 2.52: Illicit firearms – Market actors

Level of OCG involvement	Low
Size and composition of OCGs	Often with links to source market, in particular to the Western Balkans
Modus operandi of OCGs	Ant trade (relatively small shipments) current and former warzones Conversion of Flobert firearms
Poly-criminality of OCGs	Very high, in particular with illicit drugs trafficking.
Other key actors	Collectors

We identified 24 studies in the literature review that included information on the key actors in firearms trafficking in the EU. From the demand-side these studies showed that two main categories of actors fuel demand for illicit firearms: criminals and terrorist organisations.

In terms of supply, **firearms trafficking does not necessitate a high level of organisation and therefore does not necessarily have to be undertaken by OCGs**. Transcrime identified two broad categories of actors involved in the supply of illicit firearms: single individuals involved in small-scale commerce, and large operators able to systematically and periodically move large quantities of arms and ammunitions (Savona & Riccardi, 2015). In line with the relatively low revenue from the overall market, illicit firearms traffic is not very profitable, and often represents a secondary source of revenue for traffickers.

Modus operandi

Firearms are sourced from the following channels:

- **The Western Balkans** region is a major source of firearms in the EU. There is only speculation as to the exact size of the stock of firearms in the region, but it is clearly an important source of firearms and other weapons (including RPGs, hand grenades, etc.).

- **Floberts** are weapons sold legally in some Member States (such as Slovakia or the Czech Republic). They can either be purpose-built alarm weapons, or genuine lethal weapons that have been deactivated to be sold legally. According to a Europol official, they can be reactivated 'in a matter of minutes' and are currently one of the main sources of firearms in the EU (Savona & Riccardi, 2015).
- **Postal services (fast parcels)** – including the illegal import via postal parcels of firearms in pieces, originating from the USA – is a medium that is currently without the slightest possibility of detection. It can also include non-finished pieces without markings, which are therefore untraceable. A variation on this is the import of firearms that are 80% finished and require final drilling and assembly by the buyers (Europol, 2017).
- **Post-conflict countries**. There is currently a high supply of weapons to the Ukraine due to the conflict situation in the country, so in future the risk that this will be a hotspot – similar to the Western Balkans – is high. One Europol official mentioned that there are early signs that some groups involved in the selling of firearms in the country are buying and converting Floberts before selling them in the EU.
- **3D printing** does not represent many cases and is not a current problem, but is an increasing one. The use of firearms using 3D-printed parts in the far-right Halle synagogue shooting shows that it should not be taken lightly. Real additive manufacturing is still in its infancy, but this method is expected to increase in popularity as firearms become more difficult to procure via other methods.
- **Dark net** is important, but is not the main means of trafficking. It provides a marketplace for those who are not connected to existing sources of firearms.

In non-war zones, including the EU, firearms trafficking is closely linked to other (transnational) criminal activities, including drug smuggling, other forms of trafficking and terrorism (Duquet, 2016). According to the EU SOCTA, 45% of OCGs are poly-criminal. Most of them require some firearms, which makes the firearms market important as an enabler rather than in terms of the revenue it represents.

2.6.6. Future trends and dynamics

Table 2.53: Illicit firearms – Future trends

Future trends and dynamics	Increase in Floberts, 3D-printed firearms (or parts of firearms), and new stockpiles of firearms at the EU borders (Ukraine).
Impact on market and criminal finances	N/A

Five studies were identified in the literature review that included information on the future trends and dynamics in illicit firearms trafficking in the EU. These studies showed several trends that have emerged and are likely to continue.

The first trend relates to the **increased availability of Flobert weapons** on the market since the revision of the Firearms Directive (European Parliament, 2017). The Directive targets deactivated firearms and acoustic-expansion weapons, but is less clear on Flobert firearms, which can either be purpose-built or converted. According to the FPI, this leaves arms dealers who owned large stocks of firearms that were deactivated according to older standards with the opportunity to convert them into Floberts and sell them legally (Duquet & Goris, 2018). According to one law enforcement representative[151], this trend is likely to continue until there is a significant change in the legislation of Member States that allow the sale of Floberts.

While **3D printed firearms** do not currently represent many cases, the falling price of printers will make it easier for them to be manufactured. A related problem is that the technology has the potential to create firearms that cannot be detected at security portals.

The use of the **dark net** is another trend that has already started and is likely to continue. A 2017 study by RAND investigated in detail the use of the dark net in the illicit firearms market. The dark net appears to allow individuals with no connection to OCGs to source firearms, as was the

[151] Interview with law enforcement representative, 28 April 2020.

case in the 2016 Munich shootings. Online markets of firearms are not expected to become an important source of firearms in the future, but are likely to continue allowing otherwise criminally 'unconnected' individuals to procure them (Persi Paoli et al., 2017).

Finally, **conflict areas** have traditionally been a source of illicit firearms. Although 25 years have elapsed since the Dayton Agreement ending the war in the former Yugoslavia, and 20 years have passed since the 1997 pyramid crisis in Albania, the Western Balkans is still a key source of firearms in the EU. A Europol representative[152] highlighted the risk of the seeing stocks of weapons building in Ukraine as a result of the war in Donbass: 'it could be the new Bosnia'.

2.6.7. Recommendations

Given the shortcomings and limitations in the method used to estimate the size of the illicit firearms market, several steps could be taken to improve data collection:

- Data on seizures could be more robust. As a follow-up to its 2015 study on firearms, the UNODC has initiated the systematic collection and publication of data on its online data portal. The number of Member States reporting data increased by three to 16 for the 2020 study. Until countries **systematically report data**, this tool will only be partially useful. In our view, it is likely to become a key instrument for researchers in the future.
- Production data is also hard to come by and patchy. 2012 is the last year from which data was available for a wide spectrum of Member States. In the past, the Norwegian Initiative on Small Arms Transfers (NISAT) provided a useful proxy (Norwegian Initiative on Small Arms Transfers, n.d.). NISAT data provided a comprehensive trade database aggregating several sources. Unfortunately, the database ceased being updated in 2017 due to lack of funding. **Ensuring a source of information on firearms production or trade would be beneficial**.
- **Information on the price of firearms has become more readily available**, mainly through research linked to terrorism. The FPI's publication is a valuable source that will soon be complemented on a project undertaken by Europol which will provide greater insight.
- The firearms market is very reactive. As an example, Flobert firearms[153] started appearing on the market in 2016 and are now seen as one of the biggest firearms-related security problems in the EU (Duquet & Goris, 2018). Legally sold in countries such as Slovakia, manufacturers and dealers must register the sales of these firearms. One Europol official[154] mentioned that in the case of one seller, over 70% of sales were done using fake, stolen or lost ID, which makes it very likely they were destined for the criminal market. **A thorough analysis of these weapons registers** would provide valuable insight into the illicit firearms market, including the share of legally sold firearms being used by criminals and the volume of these sales, as well as where they are sold.

The key findings from this study and the related recommendations are summarised in the table below.

[152] Interview with law enforcement representative, 10 March 2020 (#65).
[153] Low calibre pistols that can be easily converted to fire live ammunition.
[154] Interview with law enforcement representative, 28 April 2020.

Table 2.54: Recommendations – Illicit firearms market

Key finding	Recommendation	Actor
Data from Eurostat on the legal production of firearms, combined with information from UNODC on seizure per type of firearm, provides the basis for estimating the illicit firearms market in the EU and its Member States. However, the estimate is reliant upon a tenuous assumption that 10% of firearms produced enter the illicit market. Production data is not up-to-date and there is no ongoing data collection. Price data is improving mainly due to terrorism-related research, although it is not consistently available across all Member States.	Member States should systematically report on firearms seizures using the UNODC online data portal. Efforts to improve information on the price of illegal firearms should continue to be strengthened, such as by Europol and the FPI.	Member States UNODC Europol FPI

2.7. Illicit tobacco

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Key findings:

- According to the estimates produced in this study, the annual revenues derived from the illicit cigarette market in the EU range between €8 billion and €10 billion (€8.3 billion). This is somewhat lower than previous EU-wide estimates.
- This estimate is very sensitive to assumptions about the ratio between the price of licit and illicit products, and replicates parameters used in previous research. It is also limited to cigarettes. There are insufficient data to extend this market estimate to cover additional tobacco products, although the cigarette estimate can be assumed to express most of the total illicit market.
- It is widely assumed that OCGs play a dominant role in the illicit tobacco market. Typically, these groups are characterised as flexible, loosely structured, informal networks of criminals involved in production, transport, import, wholesale and retail.
- Other actors involved in the illicit trade include legitimate international transport and import/export companies, suppliers of materials needed to produce tobacco, and legitimate tobacco manufacturers.
- Ongoing trends that may affect the future include a move towards smaller shipment sizes and an increase in illicit domestic manufacturing. Products other than cigarettes are also expected to increase their market share.

This Annex provides a comprehensive overview of the illicit tobacco market in the EU, building upon the summary provided in **Section 2.7** of the main report.

According to the international Framework Convention on Tobacco Control, illicit tobacco trade refers to 'any practice or conduct prohibited by law and which relates to production, shipment, receipt, possession, distribution, sale or purchase including any practice or conduct intended to facilitate such activity' (WHO FCTC, 2014). While numerous definitions and characterisations can be offered, generally there are five principal sources of illicit tobacco (Antonopoulos & Hall, 2016):

1. Counterfeiting, or the manufacture of fake branded tobacco products;
2. Bootlegging, which involves buying tobacco products in countries with low excise duties in volumes that exceed customs regulations;
3. Large-scale smuggling of untaxed tobacco products;
4. Diversion from legitimate supply chains; and

5. Illicit manufacturing of tobacco products.

Other important definitions frequently used in the context of illicit tobacco markets include tax avoidance, tax evasion and 'illicit whites' (also referred to as 'cheap whites'). The latter are cigarettes manufactured legally in one jurisdiction but sold in another jurisdiction where they are not authorised for sale. A high-profile example is cigarette brand Jin Ling, manufactured in the Kaliningrad area (Russia) and illegally exported to the EU.

For the purposes of this study, in line with the Tobacco Product Directive, the illicit market of tobacco products covers all products in which tobacco is one of the components (European Parliament, 2014). Most prior analytical work and methodological tools in this area are primarily geared towards cigarettes, reflecting their predominant share in both licit and illicit consumption. Correspondingly, this project will put substantial emphasis on estimates pertaining to illicit trade in cigarettes, but no tobacco product is excluded from the scope of this study.

2.7.1. Previous revenue estimates of the EU illicit tobacco market

The literature search identified two regular EU-wide estimates of the EU illicit tobacco market. These were produced by Euromonitor and KPMG. KPMG's work has been elaborated on by Transcrime to produce additional and more detailed estimates. Alongside these EU-wide efforts, Project Pricing Policies and Control of Tobacco in Europe (PPACTE) produced an estimate covering most, but not all, EU Member States. We also identified academic and government-led studies, but none of these matched the scope and regularity of the Euromonitor and KPMG estimates.

Several methodologies have been used to estimate the size of the illicit tobacco market, including:

- **Discarded pack survey** – Discarded cigarette packs are collected in a given area to arrive at a sample of packs that is representative of the overall consumption of packaged cigarettes in that area. Analysis of the packs and other collected data (and sometimes a set of assumptions) are used to determine the illicit share.
- **Consumer survey** – Tobacco consumers are directly asked about their smoking behaviour in a survey. Researchers can decide to also ask users can to present or surrender their tobacco product for inspection.
- **Tax gap analysis** – Recorded tax-paid sales are compared to self-reported consumption (e.g. measured through user surveys), with the difference attributable to illicit trade.

2.7.2. Quality of prior revenue estimates

Existing estimates of the size of the illicit tobacco market are based on a variety of methods, each with strengths and limitations. In this section we discuss the quality of – and methodological considerations surrounding – existing estimates[155]. Note that in the discussion below, we do not discuss the quality of Euromonitor's estimates, as there are few details available on its methodology. For that reason, Euromonitor's estimates are excluded from further consideration, in line with other researchers who have questioned their validity (Blecher et al., 2015; Stoklosa & Ross, 2014).

EU-wide estimates

Project Stella – discarded pack survey

Methodologically, discarded pack surveys – as used for the Project Stella estimates (KPMG, 2019) – have three principal limitations. First, Project Stella's estimates only cover illicit trade in cigarettes. While cigarettes currently appear to represent the lion's share of illicit trade of tobacco products, other products are left out of the scope of the estimate. Theoretically, the method can be applied to any product that comes in packs and are able to be collected and examined; however, in practice the method has been confined to cigarettes. Second, for some products the method can only yield indirect information on their legal status. While it is able to identify products that were found in a member state in which they cannot be sold legally, it cannot directly

[155] For a detailed discussion of methods and data sources that have been or could be used to assess illicit trade with tobacco products, see RAND Europe (forthcoming), 'Study to identify an approach to measure the illicit market for tobacco products'. Santa Monica, CA: RAND Corporation. RR-4448-EC.

determine whether the products were brought to the jurisdiction legally (e.g. as part of travellers' allowance). To address this, Project Stella estimates the share of illicit products among the identified non-domestic packs by making assumptions about the plausible volume of legal cross-border importation of cigarettes based on data on international traffic flows, commuting patterns and other information. The precision of these assumptions is, however, impossible to determine. And third, the method is susceptible to sampling biases. Care needs to be taken to ensure that the areas selected for pack collection yield a sample that is broadly representative of consumption patterns across the population as a whole. For instance, overinclusion in the collection sample of places heavily frequented by tourists, which may result in an overestimate of the illicit trade as more foreign packs may be collected.

Despite these shortcomings, a discarded pack survey is regarded as a comparatively robust method for estimating the illicit trade of cigarettes. Two features of Project Stella, however, further complicate the assessment of the quality of its estimates. First, the research is funded by the tobacco industry, which introduces a conflict of interest. This is compounded by the fact that tobacco companies provide additional input in the form of verifying the authenticity of collected samples and identifying counterfeits. This process is not reviewed by an independent third party. Second, Project Stella offers relatively little detailed information about principal components of its research design. This includes sampling design (e.g. location and timing) and data collection as well as details on the identification of the share of illicit non-domestic packs. For these reasons, existing reviews of Project Stella generally agree that the method is a sound approach towards generating plausible estimates, but criticise the lack of transparency and the inability to independently verify the research (Gallagher, 2017).

Transcrime – regional disaggregation

Based on the results of KPMG's work, Transcrime (Calderoni, 2014) developed a methodology to produce sub-national estimates of the volume of illicit trade. First applied in the Italian context, the method divides the national illicit market reported by KPMG among a country's regions, based on the distribution of smoking prevalence (as reported in national surveys). Further, to reflect the fact that the prevalence of illicit consumption is unlikely to be the same in each region, each regional revenue was adjusted by the share of non-domestic packs found in a given region. Based on these estimates of regional illicit consumption, estimates of regional illicit revenue were calculated using the price of an illicit pack obtained via a review of open sources and press releases and interviews with stakeholders (such as industry experts and criminal justice representatives).

Since Transcrime's approach draws heavily on KPMG's analyses and their underlying data, the same quality considerations apply[156]. In addition, to design a proxy for the differences in illicit consumption across individual regions, the method uses the regional share of identified non-domestic packs. This approach leaves out illicit domestic packs, the presence of which may also vary across regions. The reason for this omission is understandable as the underlying data on discarded packs did not identify illicit domestic packs. As discussed above, future discarded pack collection efforts may be able to address this gap by drawing on data from the EU track and traceability (T&T) system.

Project PPACTE – consumer survey with pack inspection

The estimate produced by Project PPACTE relied on a face-to-face consumer survey asking about the sources of tobacco products in participants' possession. As part of the interview, participants who self-identified as cigarette smokers were invited to show researchers their latest purchased pack of cigarettes or hand-rolled tobacco. The pack was subsequently inspected by researchers for signs of illicit origin (e.g. inappropriate/missing health warning or tax stamp/banderole, or extremely low price).

The combination of consumer surveys and pack inspections represents a comparatively robust methodological approach (IARC, 2012). Consumer surveys have the potential to yield rich data about individuals' smoking behaviour and provide more information about illicit behaviour (e.g. sources, price paid) beyond whether it takes place or not. Surveys are also more effective for discerning tax evasion and tax avoidance. The method can draw on standardised research instruments and can be applied comparatively across many contexts. While the Project PPACTE study was limited to cigarettes and hand-rolled tobacco, consumer surveys can be applied to any tobacco products.

[156] Similarly to KPMG, Transcrime also received funding for their work from the tobacco industry.

Consumer surveys, however, have a number of limitations as well. Chief among them are respondent biases that may result in underreporting of both licit and illicit consumption. Techniques have been developed to mitigate this but underreporting remains a major risk, as acknowledged by Project PPACTE (Joossens et al., 2014). Further, obtaining a representative sample may be difficult, particularly since heavy smoking and illicit tobacco consumption may be disproportionately prevalent among hard-to-reach populations. The combination of surveys with pack inspection can mitigate survey limitations as it involves analysis of physical evidence. However, even pack inspection can be subject to respondent biases as some respondents may be unwilling to submit a pack for inspection, particularly if they know it is illicit. Additionally, unless a pack is surrendered to the research team for further analysis, the verification of the pack's genuineness will not involve a forensic inspection, and so very sophisticated counterfeits may not be caught. Correspondingly, Project PPACTE noted their interviewers were unable to verify the genuineness of the tax stamps on the packs they submitted.

In summary, there are four existing estimates of illicit tobacco market at the EU-level, each drawing on different methodologies. Estimates produced by Euromonitor are based on an inscrutable approach that precludes an assessment of its quality. Estimates produced by KPMG are based on a methodology that is generally regarded as robust and capable of producing high-quality numbers. KPMG's work is also repeated on an annual basis in a generally consistent manner, and is based on large sample sizes. However, details on the method's operationalisation have not been published, precluding replication and thorough examination, and the research effort is not free of conflict of interest due to its funding from the tobacco industry. Transcrime's additional estimates are based on the same data as KPMG's estimates, and therefore share the same limitations. Lastly, Project PPACTE draws on an alternative combination of methods, which is also regarded as comparatively robust. However, this work was a one-off effort and is now a decade old. Lastly, a common limitation of all these estimates is their focus on cigarettes. As such, while illicit trade of cigarettes likely represents a very large share of the illicit market in tobacco products, these estimates still do not achieve full coverage of the illicit market.

National efforts

Several existing national-level studies have also employed the discarded pack methodology and consumer surveys. Similar methodological observations discussed above apply to these studies as well. A number of other methods have been used by other authors; these are discussed in turn below.

Tax gap analysis

A number of analyses employ a comparison between tax-paid sales and self-reported consumption (also referred to as 'tax gap analysis'). The idea behind this method is to compare official data on how many tobacco products were sold in a given jurisdiction during a certain period (typically a year) with information on self-reported consumption, typically obtained via general population surveys, with the difference (i.e. excess consumption) attributable to illicit trade. The principle advantage of this approach is that the method is conceptually clear and relatively straightforward in terms of resources needed. Unlike a discarded pack survey, tax gap analysis can capture all tobacco products (and thus theoretically the entire illicit market), and disaggregations by individual product types may also be possible, depending on the availability of requisite input data.

A primary challenge to tax gap analysis is the necessity to rely on self-reported consumption data, which exposes the method to a variety of respondent biases that may result in underreporting of actual consumption. This would then translate into an underestimate of the total size of the illicit market. For that reason, existing assessments agree that the method is more suitable for the monitoring of trends over time (assuming the direction and magnitude of any biases remain broadly the same over time), rather than for producing absolute estimates of the size of the illicit market. Further, input data irregularities – such as temporal biases in sales data – may result in misestimations of the illicit trade. Legal cross-border traffic also represents a challenge in that consumption by non-residents is typically not captured in national survey data, and private legal exportation/importation may also impact the precision of the estimate. Lastly, while the general principle of the method is the same in every country, data may not be readily comparable across national contexts, which presents an additional challenge for constructing an EU-wide estimate.

Within-country analysis of sales

One national-level estimate of the illicit market by Lakhdar (2008) employed a within-country sales analysis. The principle behind this method is a comparison of sales growth rates among a

country's regions, and an assumption that applying the growth rate experienced by the region least impacted by illicit trade to the entire country produces an estimate of sales expected in the absence of illicit trade. The difference between this expected revenue and actual recorded sales is then inferred to represent the volume of illicit trade in the country.

The main advantage of this method is that it is conceptually straightforward and builds on existing data, so it is therefore relatively easy to implement. However, there is a fundamental limitation to the method in that it builds on an assumption that the growth rate of sales across all regions would be the same in the absence of the black market, which is unlikely to be the case. As such, the method is unlikely to produce a precise estimate, and has not been used extensively in existing literature.

Table 2.55: Prior studies estimating the size or revenue of the illicit tobacco market in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	Prieger and Kulick (2018)	2012	Cigarettes	Mix of sources, driven by expert opinion	25 EU countries (LU, CY and MT excluded)	Yes	77.3 billion cigarettes (12.2% of total consumption)	N/A
2	KPMG (2019)	2018	Cigarettes	Principal data source discarded pack survey, complemented by sales data and traffic modelling	EU 28	Yes	Overall proportion of illicit packs: 8.6%	N/A
3	Transcrime (2015a)	2012	Cigarettes	KPMG work, cigarette price data, expert input	EU 28	Yes (sub-regional as well)	No new estimate	€9.4 billion (range: €7.8 billion to €10.5 billion)
4	Gallus et al. (2014); Joossens et al. (2014)	2010	Cigarettes and hand-rolled tobacco	Consumer survey with pack inspection	17 EU countries[157] (and Albania)	Yes	Overall proportion of illicit packs: 6.5% (ranging from 0% in PT to 37.8% in LV)	N/A

[157] The countries covered in the study were AT, BG, HR, CZ, UK (England only), FI, FR, EL, HU, IE, IT, LV, PL, PT, RO, ES, SE.

2.7.3. Methodology for estimating revenues in this study

Our methodological approach consisted of two parts. First, we updated previous estimates produced by Transcrime (2015b) by drawing on the latest edition of results developed as part of KPMG's Project Stella (KPMG, 2019). This source provides information on illicit consumption as a share of overall consumption in 2018 in all EU Member States, based on a series of industry-sponsored discarded pack surveys. Second, we monetised these results using the latest available information on the price of *licit* cigarettes sold in the EU.

The updated monetised estimate assumes a relationship between the price of licit and illicit products, i.e. how much cheaper illicit products are compared to their licit counterparts. The estimate presented below uses the same assumption as that employed in previous studies on this topic – that the illicit price is two-thirds of the licit price (KPMG, 2019; Transcrime, 2015b). The true revenue from this parameter is difficult to establish as it depends on many factors, such as circumstances of the illicit sale and any quantity discounts, and can be expected to vary across contexts. Still, the limited available insights on this topic suggest that the value selected for our estimate is not unreasonable. The ratio between the price of illicit and licit products reported in various contexts in existing literature (albeit not from the EU) is broadly comparable[158]. For the price of licit products, the updated estimate used the following inputs:

- For the low estimate: price of a 20-cigarette pack of the cheapest brand as reported by WHO (2018 data)[159].
- For the mid estimate: weighted average price (WAP) of cigarettes reported by EC (2018 data)[160].
- For the high estimate, price of a 20-cigarette pack of a premium brand as reported by WHO (2018 data).

A summary of the approach used in this study for estimating the market revenue from illicit tobacco –and the limitations of this approach – is outlined in the table below.

Table 2.56: Summary of approach for estimating revenues from illicit tobacco

Summary of approach	Demand-based estimate based on 1) estimated share of illicit consumption of cigarettes; 2) assumed illicit-to-licit price ratio; and 3) volume of legal sales
Rationale	Builds on the only comparable EU-wide estimate of illicit consumption of cigarettes Replicates and updates previous estimates based on the same methodology
Output	Annual retail revenue from illicit cigarettes in the EU
Scope and coverage	**Geographical scope:** EU-level and Member State-level **Year(s) of estimate:** 2018, updated to 2019 values **Sub-markets:** Headline estimate covers only cigarettes; exploratory estimate covering fine-cut tobacco also produced
Data sources	Data on the extent of illicit consumption reported by Project Stella Data on legal sales and prices in the EU reported by the EC
Key steps	Data on the estimated extent of illicit consumption is applied to the weighted average price of legal cigarettes along with an assumed ratio of illicit-to-licit prices. The lower boundary of the estimate is based on the price of the cheapest pack of cigarettes, the upper boundary is based on the price of a premium pack. The formula for the calculation of the Member State-level estimate of illicit revenue R_i is: $$R_i = C_i \times P_l \times P_r$$

[158] Recent examples of values reported in existing literature include 0.59 in Australia (KPMG, 2018), 0.65 in Mexico (Juarez & Shigematsu, 2019) and 0.62 and 0.67 in Ukraine and Russia, respectively (Brown et al., 2017).
[159] Exchange rates for non-euro countries for 2018 were taken from excise duty tables reported by DG TAXUD (European Commission, 2019b).
[160] Note that in six Member States (EE, EL, FI, FR, LT and LV), the weighted average price reported by the EC was lower than the price of the cheapest pack reported by WHO. In these six instances, we used WHO-reported values for both the 'low' and the 'mid' estimates. The weighted average price is provided in units of 1,000 cigarettes. Our estimate assumes this quantity is perfectly distributed into packs containing 20 cigarettes.

	Where: C_i is the volume of illicit consumption P_i is the price of legal cigarettes P_r is the ratio between the price of licit and illicit products The EU-level estimate is calculated as the sum of all Member State-level estimates.
Limitations and caveats of this approach	The estimate: - is based on data funded by the tobacco industry, and thus is not free of conflict of interest; - incorporates assumptions about key parameters on which there is little evidence, such as the illicit-to-licit price ratio; and - captures only trade with cigarettes, leaving out other, albeit less prevalent, tobacco products.

2.7.4. Revenue estimates of the EU illicit tobacco market

The table below presents the estimates of the illicit tobacco market at the EU-level and for each of the EU Member States. The results show that:

- The revenue from the illicit market with cigarettes in the EU in 2018 was approximately €8 billion. This estimate is very sensitive to assumptions about the ratio between the price of licit and illicit products, and replicates parameters used in previous research (Transcrime, 2015).
- There are substantial differences across individual Member States. The largest illicit market for cigarettes is in the UK, followed by France, Italy and Germany. Together these four countries account for two-thirds of the European illicit cigarette market by revenue.
- There are insufficient data to extend this market estimate to cover additional tobacco products, although the cigarette estimate can be assumed to express most of the total illicit market.

Update and monetisation of previous estimates

Table 2.57 presents the results of the updated estimate of the cigarette market broken down by individual Member States. Using the weighted average price of cigarettes, the overall revenue from the market is approximately €8 billion. By far the largest national markets are in the UK and France, driven in both countries by both comparatively high prices of cigarettes and high estimated prevalence of illicit consumption. Using the price of the cheapest cigarette pack instead of the weighted average price does not alter the overall results by much. By contrast, using the price of premium products increases the revenue estimate closer to €10 billion.

The updated headline revenue is slightly lower than the 2012 estimate produced by Transcrime, which put the revenue from the EU cigarette market at €9.4 billion (range €7.8 billion to €10.5 billion). This difference is broadly reflective of the estimated decrease in the illicit trade of cigarettes in recent years – for instance, through its series of successive estimates, KPMG reported that the overall volume of illicit consumption decreased from 57 billion cigarettes in 2014 to 44 billion in 2018 (KPMG, 2019). Still, there is a large overlap between the ranges of the Transcrime and the updated headline estimates.

Table 2.57: Revenue estimates of illicit cigarettes

EU Member State	Revenue estimates (€ million)		
	Mid	Low	High
28 EU Member States	**8,309.15**	**8,012.62**	**1,0087.48**
27 EU Member States without UK	**6,190.19**	**5,954.33**	**6,985.64**
Austria	93.25	89.31	111.64
Belgium	101.20	94.67	113.60
Bulgaria	45.31	40.84	49.90

EU Member State	Revenue estimates (€ million)		
	Mid	Low	High
Croatia	41.22	28.90	50.65
Cyprus	14.49	12.86	16.59
Czech Republic	110.85	110.23	138.04
Denmark	30.59	27.62	34.12
Estonia	16.23	16.23	23.86
Finland	94.22	94.22	107.27
France	2,038.49	2,038.49	2,117.91
Germany	514.29	488.82	601.62
Greece	513.51	513.51	605.67
Hungary	64.24	61.02	73.63
Ireland	257.38	255.60	311.83
Italy	635.81	534.29	734.65
Latvia	47.88	47.88	58.70
Lithuania	56.04	56.04	66.71
Luxembourg	1.56	1.42	1.80
Malta	10.67	9.95	11.17
Netherlands	134.89	131.43	153.33
Poland	440.97	428.53	554.32
Portugal	52.96	48.14	60.18
Romania	448.52	445.56	509.22
Slovakia	38.55	34.53	48.10
Slovenia	50.80	44.87	59.34
Spain	279.37	247.23	309.04
Sweden	56.93	52.12	62.76
United Kingdom	2,118.95	2,058.30	3,101.84

Notes: Estimates were produced for 2018 and updated to 2019 values using Eurostat's HICP (Eurostat, 2020b). Please note that for some, but not all, countries input parameter data are available for 2019. However, given the possible relationship between the model parameters, we opted to use 2018 values for all input data in order to achieve a unified reference year.

The table above presents the result of the main estimate of the revenue of the illicit market. In the following sections, we present two additional considerations and reflections on themes pertaining to efforts to estimate the revenue of the illicit tobacco market.

Examining the relationship between licit and illicit prices

As discussed above, when considering the results of the updated headline estimate, it is important to note its sensitivity to the value of the ratio of illicit to licit prices. To illustrate, changing the value of this parameter from 0.67 to 0.59 (a value recently reported by KPMG in Australia) reduces the overall revenue estimate by almost €1 billion.

Furthermore, it is likely that, unlike in the headline estimate, the revenue from the illicit-to-licit price ratio is the same across individual national markets or types of illicit products. For instance, it is reasonable to assume that at least some counterfeit products are sold at a price that is identical to the price of a legal product if deception is maintained in the supply chain. In fact, a notably lower price may be counterproductive, due to its potential to arouse suspicion.

Since the Stella dataset includes an estimation of the proportion of counterfeit products as a share of total illicit consumption, it is possible to estimate by how much the overall revenue from the market changes, depending on the extent of deception pertaining to counterfeit products[161].

Table 2.58 presents the results of applying three different deception levels: a) perfect (100% deception, i.e., where all counterfeit products are sold as if they were genuine); b) high (75% deception); and c) some (50% deception). The table shows that incorporating deception into the estimations has only a limited impact. Even the most dramatic scenario of perfect deception for all counterfeit products increases the revenue from the overall headline estimate by only about 6%.

Table 2.58: Exploration of differential illicit-to-licit price ratio for counterfeit products, 2019

	Revenue estimate (€ million)		
	Mid	Low	High
Perfect (100%) deception	8790.45	8488.51	10696.14
High deception (75%)	8668.19	8367.44	10541.09
Some deception (50%)	8545.93	8246.37	10386.04

Notes: Estimates were produced for 2018 and updated to 2019 values using Eurostat's HICP (Eurostat, 2020b).

Examining the illicit market for other tobacco products

The illicit market for cigarettes represents only a subset (albeit very large) of the overall illicit market for tobacco products. Regrettably, there are currently no high-quality large-scale data on the extent of the illicit consumption of tobacco products other than cigarettes, precluding the construction of a robust estimate for additional tobacco products.

Still, it may be helpful to engage in an analytical exercise to offer at least an indication of what may be obscured by the inability to construct an estimate for other tobacco products. As indicated by multiple experts consulted for this study, fine-cut tobacco (used in what are referred to as 'roll-your-own cigarettes') is generally considered the second-most important trafficked product, after boxed cigarettes. This is also reflected in a 2017 Eurobarometer on 'Attitudes of Europeans towards tobacco and electronic cigarettes', which found that in spite of the dominant preference for boxed cigarettes across the EU, hand-rolled cigarettes are also used by 29% of smokers (European Union, 2017). The EC publishes data on the sales of fine-cut smoking tobacco as well as its price across the EU[162]. It is possible to apply the two key parameters from the cigarette estimate (share of illicit consumption and illicit-to-licit price ratio) to these data on fine-cut smoking tobacco[163]. While this application of the key parameters is almost certainly not reflective of reality, this exercise provides at least a very broad indication of the volume of the illicit fine-cut tobacco market if it broadly resembled that of boxed cigarettes.

Table 2.59 presents the results of this exploratory estimation exercise. It shows that if the share of illicit consumption of fine-cut tobacco in each Member State was similar to that of cigarettes, and identical assumptions could be made about the illicit-to-licit price ratio, the EU-wide illicit market for fine-cut tobacco would be valued at approximately €658 million. This corresponds to approximately 8% of the headline estimate for the cigarette market. In this exploratory estimate, France has the largest illicit market in fine-cut tobacco, stemming from comparatively high

[161] Caution is required as currently the only available data on the extent of counterfeit consumption in the EU come from industry-sponsored studies, which rely on the tobacco industry to verify the authenticity of collected samples. This makes the results impossible to scrutinise and subject to strong conflict of interest.
[162] Price data are available only for a subset of EU Member States. For the purposes of this exploratory estimate, we divided countries with missing data into two groups – EU15 and newer member states – and used an average price reported in these respective groups, weighted by the volume of sales in each country. Note that using an EU-wide average for all countries with missing data or unweighted group averages would result in only a very minor upward revision of results.
[163] Note that since there is no existing estimate of the absolute volume of illicit packs of fine-cut tobacco, we applied the parameter of the share of illicit consumption to legal domestic sales of fine-cut tobacco, as reported in EC releases for consumption of fine-cut tobacco. In addition to other limitations, this approach ignores legal importation as well as exportation of tax-paid products.

tobacco prices as well as a high assumption of illicit consumption. Germany, by far the largest EU market for *licit* fine-cut tobacco, has a comparatively lower estimated revenue from the illicit market, primarily due to a much smaller estimated share of illicit consumption in the country.

Table 2.59: Exploratory revenue estimates of the illicit fine-cut tobacco market in the EU, 2019

EU Member State	Revenue estimates (€ million)
28 EU Member States	**658.45**
27 EU Member States (excluding UK)	**524.48**
Austria	3.30
Belgium	34.59
Bulgaria	0.93
Croatia	0.80
Cyprus	1.06
Czech Republic	4.03
Denmark	0.81
Estonia	0.49
Finland	7.28
France	180.88
Germany	76.30
Greece	58.53
Hungary	19.14
Ireland	6.36
Italy	21.80
Latvia	0.82
Lithuania	1.22
Luxembourg	2.67
Malta	0.21
Netherlands	41.66
Poland	26.28
Portugal	2.65
Romania	0.44
Slovakia	1.04
Slovenia	1.91
Spain	28.80
Sweden	0.50
UK	133.97

Notes: Estimates were produced for 2018 and updated to 2019 values using Eurostat's HICP (Eurostat, 2020b).

2.7.5. Criminal actors and modus operandi

Table 2.60: Illicit tobacco – Market actors

Level of OCG involvement	OCGs are assumed to accrue a large share of the revenue, but no concrete estimates exist.
Size and composition of OCGs	Actors involved are typically flexible, loosely structured, informal networks of criminals that collaborate on an ad-

	hoc basis, which may or may not meet the definition of OCGs.
Modus operandi of OCGs	Smuggling unlicensed or counterfeit products into the EU, smuggling legitimate products within the EU, manufacturing unlicensed or counterfeit products within the EU, or diverting products from the legitimate supply chain.
Poly-criminality of OCGs	OCGs may use established smuggling routes to trade other illicit goods, such as illicit drugs, weapons or diamonds. They may also engage in e.g. THB, forgery of documents and money-laundering.
Other key actors	International transport and import/export companies, and legitimate tobacco manufacturers.

We identified 37 studies in the literature review that included information on the key actors in the illicit tobacco market in the EU. These studies showed that it is **widely assumed OCGs play a dominant role in the illicit tobacco market**. Claims about high levels of OCG involvement are made by for example the EU (European Commission, 2011, 2013, 2016a, 2017c, 2018a; Michalopoulos, 2017), international organisations (OECD, 2008; WHO, 2015) and academic and non-academic researchers (Borkowski & Twomey, 2019; Melzer & Martin, 2016; Tracit, 2019) alike. Several characteristics of the illicit tobacco trade underpin this assumption, such as:

- Smuggling or bypassing customs agencies of countries through which the illicit tobacco is trafficked can be challenging, given the sheer size and bulkiness of shipments, which may require participation of highly organised groups (Melzer & Martin, 2016); Transcrime (2015a) found that 94.8% of seized cigarettes were smuggled and distributed by large-scale actors who were typically part of transnational criminal networks. At the same time, these groups accounted for less than one-quarter (23%) of all actors reported to be involved in the illicit tobacco trade.
- According to Europol, illegal tobacco factories in the EU that have been detected and closed down by national law enforcement and customs agencies, as well as organisations such as OLAF and Europol, are often run by well-established OCGs (EUIPO & Europol, 2019; KPMG, 2019).
- The OECD (2008) reports that trading and distribution networks often have very complex and sophisticated logistics and finances, requiring planning and organisation.

Box 7: Attractiveness of illicit tobacco trade to OCGs

The illicit tobacco trade is considered to be attractive for a variety of reasons:

- It is perceived as a **low-risk, yet high-reward** source of revenue, as criminal sanctions are often lenient (particularly in comparison to other forms of illicit trade) and law enforcement powers or capacity are often limited or deployed to other higher priority tasks (Allen, 2012; Borkowski & Twomey, 2019; CSD, 2015; Ellis, 2017; Interpol Office of Legal Affairs, 2014; Johnston et al., 2016; Melzer & Martin, 2016; Skinnari & Korsell, 2016; Transcrime, 2019; WCO, 2015)[164]. Moreover, Transcrime (2019) found evidence that differences in sanctions between EU Member States have an impact on the routes traffickers decide to use. Relatedly, illicit tobacco thrives in areas where levels of corruption are high (Ellis, 2017; Tracit, 2019; Vujović, 2015)[165].
- It can be an appealing well-paid **alternative source of income for people under poor socio-economic conditions**, such as people living in places where unemployment is high (Antonopoulos & Hall, 2014; Johnston et al., 2016; Vujović, 2015). Similarly, it may be an attractive complimentary revenue stream to small legitimate businesses struggling to break even or make profits (Antonopoulos & Hall, 2014; Skinnari & Korsell, 2016)[166].
- The trade in tobacco is – unlike for example illegal drugs – dominated by legal supply chains because tobacco itself is not an illegal substance, and illicit trade represents only a fraction of the global total. This means distribution **can be done more openly**, commonly predicated on movements and resources involved in legal supply chains (CSD, 2015; FATF, 2012; OECD, 2008; Skinnari & Korsell, 2016).
- According to the WCO and Interpol, seizures of illegal tobacco consignments **rarely lead to the prosecution of the individuals who plan and direct operations** (Interpol Office of Legal Affairs, 2014; WCO, 2015).

[164] Interview with academic expert, 19 February 2020 (#7).
[165] Interview with EU-level representative, 23 March 2020 (#27).
[166] Interview with academic expert, 19 February 2020 (#7).

- **Production costs are considered very low** (after an initial investment in manufacturing and packaging equipment) (Interpol Office of Legal Affairs, 2014; Melzer & Martin, 2016)[167]. This is mainly a result of the fact that tax makes up the lion's share of the retail price of tobacco products (OECD, 2008; WCO, 2015). At no stage does the production process require sophisticated technology.
- **Counterfeited products have a ready market**, as it is very difficult for the consumer to distinguish a counterfeited pack from a genuine product based on physical inspection alone (Melzer & Martin, 2016; WCO, 2015).
- **Purchasing and consuming illicit tobacco can be socially accepted** as it is often perceived as a minor, victimless crime and an economic necessity because of high prices of genuine products, a fact that is sometimes blamed on the government (Ellis, 2017)[168].

However, very few of the identified studies go beyond the simple statement that OCGs have a strong presence in the illicit tobacco market. Indeed, few publications specifically examine the precise extent of OCG involvement, and substantiate this with evidence beyond mere anecdotal reasoning. In fact, several publications reviewed were critical of this representation of the illicit market. For example, Caneppele et al. found that most of the criminological literature argued that most forms of illicit trade in tobacco could actually be run by individuals (Caneppele et al., 2013). Similarly, Antonopoulos & Hall concluded that the illicit tobacco trade in the UK did not appear to be dominated by stable, hierarchal OCGs, but instead stated that the trade is 'a very organic and fragmented business, which does not require a great degree of sophistication and management of finance and resources' (Antonopoulos & Hall, 2016). This observation was seconded by an expert interviewee in this study, who noted that large groups with formal structures were extremely rare[169].

Despite the lack of evidence for the presence of highly organised, hierarchical OCGs involved in the illicit tobacco market and the fragmented and decentralised nature of this market, individual criminals and groups of criminals tend to operate in networks. Typically when **the nature of OCG involvement in this market** is discussed, these groups are characterised as flexible, loosely structured informal networks of criminals involved in production, transport, import, wholesale and retail, where membership is undefined, collaboration is based on mutual benefit of individuals and is sometimes without specific objectives (Antonopoulos & Hall, 2016; CSD, 2015; Ellis, 2017; Interpol Office of Legal Affairs, 2014; KPMG, 2017; Transcrime, 2015a). These networks generally extend beyond national borders, including both internal and external EU borders (Chionis & Chalkia, 2016). Often the groups involved in the illicit trade of tobacco are small OCGs or opportunistic, independent criminal entrepreneurs who co-exist and collaborate, often on an ad-hoc basis, to maximise their mutual profits (Antonopoulos & Hall, 2016; Interpol Office of Legal Affairs, 2014; Savona & Riccardi, 2015). There do not appear to be major barriers to entry; hence illicit trade with tobacco products is open to a variety of different actors. These actors operate using different models, rely on various sources of financing and represent a wide variety of nationalities and age groups (Di Nicola & Terenghi, 2016; L'Hoiry, 2012). Business relations rely on trust and social or acquaintanceship ties (L'Hoiry, 2012). Gounev & Bezlov (2010) distinguished three **types of networks** that are typically found in the illicit tobacco supply chain in the EU:

- **Large criminal networks**, which usually include a dozen trading companies that take advantage of the suspension of taxation in the transfer of goods through duty-free zones and ports. Goods get 'lost' in the many transits they pass through and are then smuggled and distributed by the criminal network involving wholesalers and retailers.
- **Counterfeiting networks**, which illegally produce tobacco on EU territory.
- **Networks of warehouse owners**, where bootleggers can store their illicit products.

In addition, Gounev & Bezlov (2010) reported that wholesale brokers between sellers and wholesalers play an important role by securing transit of goods (including for example through payment of bribes). The operations of these middle-men are the most hidden from law enforcement, according to a Swedish study (Skinnari & Korsell, 2016). Transcrime developed a similar characterisation with three groupings of criminal actors involved in the illicit trade of tobacco: 1) large-scale, transnational criminal networks; 2) medium-scale traffickers; and 3) small-scale, independent smugglers (Savona & Riccardi, 2015; Transcrime, 2019). The networks involved in illicit tobacco trade typically involve the first, but may involve medium- and small-scale actors for smuggling and/or distribution as an integral part of their network. Reflecting on such categorisations, one interviewee offered a qualification that large international networks

[167] Interview with EU-level representative, 30 March 2020 (#29).
[168] Interview with academic expert, 19 February 2020 (#7).
[169] Interview with academic expert, 19 February 2020 (#7).

rarely conform to a 'traditional' mafia-style conceptualisation of OCGs, but are instead much more likely to involve legitimate businesses in their criminal activities[170]. Similarly, the Center for the Study of Democracy (CSD) found that large operations are usually funded by legal businessmen with links to legal tobacco manufacturers, transport businesses and import/export company owners. These **criminal ties** were often based on ethnic, business, familial, neighbourhood or prison links (CSD, 2015). These themes were also discussed by Transcrime, who found that half of all actors involved in the illicit trade in tobacco products are Eastern European, predominantly from Romania, Lithuania and Poland (Savona & Riccardi, 2015). These countries are geographically located at the external borders of the EU. About one-quarter were non-EU European actors, such as Ukrainians, Moldovans and Belarusians. One interviewee also noted the involvement of Polish groups in illegal manufacturing schemes, including those not necessarily located on Polish territory[171].

The second biggest group of actors from the EU involved in the illicit tobacco trade were found to be from Southern EU Member States, mainly Greece, Italy and Spain. Transcrime's data showed that the latter group were relatively more involved in large-scale trade operations (closely following actors from Eastern European Member States as the most prevalent group), whereas the small- and medium-scale trade was dominated by actors from Eastern European Member States and non-EU Europeans. These data were based on information from seizures by law enforcement, through which it cannot be determined whether the individuals involved were individual smugglers or members of OCGs (Savona & Riccardi, 2015). Rather, seizures were reported as cases and do not describe the number of people involved or their nationality[172]. A more recent Transcrime report found that the OCGs involved in large-scale cigarette smuggling are mainly active in Russia, Ukraine and Belarus (Transcrime, 2019). In addition, the report notes that OCGs were widely present in Albania, Bulgaria, Romania, Kosovo, North Macedonia, Greece and Turkey, harnessing their multi-ethnic makeup to operate on an international level.

It is not surprising that most of these countries are geographically located at the Eastern border of the EU, as Europol and EUIPO reported that illicit cigarettes are mainly produced in Ukraine, Belarus, Moldova and Russia (EUIPO & Europol, 2019; Gounev & Bezlov, 2010). Counterfeited cigarettes on the other hand mainly originate from China and, to a lesser degree, Vietnam. There are established links between criminal networks supplying the European illicit tobacco market and China and countries that were formerly republics of the Soviet Union (Gounev & Bezlov, 2010). At the same time, one interviewed expert cautioned against concluding that any particular national groups specialise in smuggling, and observed that a large number of European nationalities were involved in smuggling activities.

Poly-criminality by groups involved in illicit trade in tobacco has been noted by a number of sources. According to Europol and the EU Intellectual Property Office, OCGs trading in illicit tobacco are sometimes also involved in migrant smuggling, drug trafficking, forgery of documents, tax offences and money-laundering (EUIPO & Europol, 2019)[173]. Additional complementary criminal activities mentioned by other sources include fuel laundering, trafficking of people, alcohol, weapons, diamonds, timber and antiquities, counterfeit luxury clothes, counterfeit medical products, and stolen goods – such as cars – and establishing illegal gambling dens (Allen, 2012; Chionis & Chalkia, 2016; CSD, 2015; Di Nicola & Terenghi, 2016; Ellis, 2017; FATF, 2012; OECD, 2008; Savona & Riccardi, 2015; Transcrime, 2019).

OCGs use established smuggling routes to trade different illicit goods (Ellis, 2017). When the opportunity arises, tobacco smugglers may decide to engage in the trade of other illicit products, as well as the other way around when traffickers of, say, narcotics decide to use their trade routes to smuggle illicit tobacco. According to Interpol, smugglers often do not limit themselves to the trafficking of a single illegal commodity (Interpol Office of Legal Affairs, 2014). CSD also found that tobacco smugglers rarely switch to other commodities altogether, but rather invest in other criminal activities (CSD, 2015). Illicit tobacco has sometimes been used by aspiring smugglers as a low-risk entry product to fund other, riskier illicit activities that require bigger financial investments (Ellis, 2017; Interpol Office of Legal Affairs, 2014). Transcrime found that the three main trafficking routes that tobacco smugglers use to traffic illicit tobacco into Europe are all known to be used for other illegal products as well, including the trafficking of drugs and human beings (Transcrime, 2019).

[170] Interview with academic expert, 11 February 2020 (#13).
[171] Interview with EU-level representative, 18 March 2020 (#28).
[172] Interview with academic market expert, 11 February 2020 (#13).
[173] Interview with EU-level representative, 18 March 2020 (#28).

Several authors have linked revenues from illicit tobacco to **funding terrorist organisations** (ASH Scotland, 2016; EUIPO & Europol, 2019; European Commission, 2016a; Melzer & Martin, 2016; National Research Council, 2015; Savona & Riccardi, 2015; Tracit, 2019). For this reason, Europol regards illicit tobacco smuggling and other excise fraud as an enabler and source of revenue from other crime (Europol, 2020d). However, it is often unclear to what extent these groups are directly involved in the tobacco smuggling and how important this revenue stream is to fund their operations.

Several other actors can be involved in the illicit trade of tobacco products. For example, tobacco trafficking commonly involves legitimate international transport and import/export companies, whose involvement is crucial in handling the sheer volume of smuggled goods[174]. Other legitimate businesses that may be involved, knowingly or unknowingly, could be the suppliers of materials needed to produce tobacco, such as filters[175]. In addition to these actors, a number of publications in the peer-reviewed literature argued that legitimate tobacco manufacturers may also be directly and indirectly involved in the illicit tobacco market (ASH Scotland, 2016; CSD, 2015; Maftei, 2012; National Research Council, 2015; Tracit, 2019; US National Cancer Institute & WHO, 2016; WHO, 2015; WHO FCTC, 2014). Based on large quantities of internal tobacco industry documents, WHO concluded that tobacco manufacturers have used illicit trade to promote their brands, increase their market shares, open closed markets and prevent governments from increasing duty fees and taxes on tobacco, and introducing standardised/plain packaging (WHO, 2015; WHO FCTC, 2014). In a 2000 civil action, the Commission accused Philip Morris International (PMI), RJ Reynolds and Japan Tobacco International (JTI) of an 'ongoing global scheme to smuggle cigarettes, launder the proceeds of narcotics trafficking, obstruct government oversight of the tobacco industry, fix prices, bribe foreign public officials, and conduct illegal trade with terrorist groups and state sponsors of terrorism' (US District Court, 2000). Two cases have since been settled by paying large fines.

In its 2016 annual illicit tobacco trade report (then called Project SUN), KPMG concluded that OCGs were found to be using increasingly **diverse trade routes and modus operandi** (KPMG, 2017). Ellis distinguishes three ways in which OCGs are involved in illicit tobacco trade (Ellis, 2017):

- smuggling legitimate products within the EU;
- smuggling unlicensed or counterfeit products into the EU; and
- manufacturing unlicensed or counterfeit products within the EU.

Due to tax differences, smuggling legitimate products within the EU (i.e. tax evasion) can be lucrative. This can have several manifestations. For example, operators of established manufacturers may use their surplus tobacco-manufacturing capacity to create additional genuine but unregistered products, which can then be smuggled to other markets (OECD, 2008). CSD found three additional ways of smuggling legitimate products within the EU (CSD, 2015). Firstly, by stealing shipments of legitimate products, e.g. from supermarkets, kiosks or other retail outlets (CSD, 2015). Secondly, legally produced tobacco products can also be resold online, typically in a different market where excises are higher to maximise profits. And thirdly, although this may apply less to OCGs, individuals or small groups of entrepreneurs may purchase small quantities of tobacco products (sometime exceeding customs regulations) abroad (e.g. on holiday), where tobacco prices are lower, and then resell these products on the black market of their home country. Existing data suggest that cross-border importation within the EU is relatively common. While not necessarily indicative of the extent of illicit trade – as a large share of importation may be for personal consumption – a flash Eurobarometer in 2008 found that one-third of EU citizens who travelled to another EU country returned with cheap cigarettes (Eurobarometer, 2009).

Trafficking tobacco from outside the EU usually involves the shipment of containers through legitimate distribution systems (L'Hoiry, 2012). Criminals can either set up a new legitimate import/export company or use existing international transport companies that are willing to occasionally ship illegal tobacco or 'look the other way' (Chionis & Chalkia, 2016)[176]. Therefore, legitimate businesses are, wittingly or unwittingly, usually involved in this type of illicit tobacco trade (CSD, 2015)[177]. Containers are predominantly shipped via land and maritime

[174] Interview with EU-level representative, 18 March 2020 (#28).
[175] Interview with academic expert, 19 February 2020 (#7); Interview with academic expert, 11 February 2020 (#13).
[176] Interview with Member State-level representative, 21 April 2020, (#92).
[177] Interview with EU-level representative, 23 March 2020, (#27).

routes. Complex and frequently changing transit routes with falsely declared destinations and fake companies are used to make it complicated for the authorities to keep track of the products[178]. Special economic zones and particularly FTZs are often involved to avoid stringent regulatory checks (Holden, 2017)[179]. Typically, some containers will be loaded with genuine excise goods under temporary suspension schemes imported from outside the EU, and documentation is switched during transit for containers with illicit products (Europol, 2017; WCO, 2015). When large volumes of illicit tobacco are smuggled, criminals use a wide variety of **tactics to conceal their criminal activities**, including activities such as using cover loads or drones (EUIPO & Europol, 2019; OECD, 2008; WCO, 2015), yachts (Melzer & Martin, 2016) and courier and airmail parcel services or the internet (OECD, 2008); and establishing registered import and export businesses (Borkowski & Twomey, 2019; Ellis, 2017) with frequent use of straw ownership[180]. Furthermore, OCGs have engaged in bribing customs officials, hacking transit systems and undervaluing goods (Transcrime, 2019). One interviewee explained that OCGs involved in the manufacture of illicit tobacco are rarely involved in the distribution or selling of the goods, to avoid the risk of being caught and limit who knows what[181]. Rather, several different groups – including legitimate businesses – work together in a coordinated way, each taking care of one part of the supply chain.

Harder to detect is small-scale smuggling of smaller quantities by a large number of participants. This is an increasingly organised activity known as **'ant-smuggling'**, which allows OCGs to spread the risks of seizures over a larger number of consignments (KPMG, 2019; US National Cancer Institute & WHO, 2016). KPMG found that the number of seizures of shipments by truck, van, train and ships declined, whilst personal and car seizures increased in number and volume (KPMG, 2019). **Domestic illegal production** appears to be on the rise in the EU, which reduces transport costs for the criminals and helps them avoid the heavy border controls at the EU's external border. Risks associated with importing raw materials are significantly lower than the final product. Ellis found that OCGs acquire raw materials both within Europe (mainly in Italy, Greece, Spain, Poland and Bulgaria) and outside Europe due to lower prices, accessibility and sometimes for quality considerations (Ellis, 2017). Machinery is widely available and is acquired either within Europe or Asia (FATF, 2012; Gounev & Bezlov, 2010). According to KPMG, OCGs are increasingly focused on local manufacture rather than importing illicit tobacco from outside the EU (KPMG, 2019). Moreover, to avoid detection and seizure of the entire operations, the different stages of manufacturing (drying tobacco, cutting, manufacturing the end product, and packaging) are increasingly conducted in different geographical locations. The Organisation for Economic Co-operation and Development (OECD) found in 2008 that domestic illegal production was mainly located in Germany, Poland, the Netherlands, the Czech Republic and Greece (OECD, 2008). According to one interviewee, illicit manufacturers operate in a cell-like manner, using production lines of limited size. Security approaches employed by illicit manufacturers include limiting knowledge about production plants to a narrow group of people, as well as technical features such as CCTVs, mobile phone jammers and soundproofing[182].

2.7.6. Future trends and dynamics

Table 2.61: Illicit tobacco – Future trends

Future trends and dynamics	Ongoing trends that may affect the future include a move towards smaller shipment sizes and an increase in illicit domestic manufacturing. Products other than cigarettes are also expected to increase their market share.
Impact on market and criminal finances	A move towards other tobacco products would diversify the market/consumption patterns.

We identified 10 studies in the literature review that included information on the future trends and dynamics in the illicit tobacco market in the EU.

- According to Borkowski & Twomey, the prevalence of illicit cigarette smuggling in the EU has remained broadly stable since 2005 (Borkowski & Twomey, 2019). What has

[178] Interview with EU-level representative, 18 March 2020, (#28).
[179] Interview with EU-level representative, 23 March 2020, (#27).
[180] Interview with EU-level representative, 18 March 2020, (#28).
[181] Interview with EU-level representative, 18 March 2020, (#28).
[182] Interview with EU-level representative, 18 March 2020,(#28).

changed are the size of shipments and the preferred modus operandi of criminals engaged in the illicit tobacco trade.

- Smuggling of legitimate products in large quantities seems to have decreased; 'cheap whites' started dominating large-scale seizures; and the presence of illicit tobacco factories with large production capacities operating on EU territory has increased[183]. It is possible the future will see a continuation of these trends.
- Products other than cigarettes are also expected to increase their market share, with possible implications for the illicit trade[184].
- Further deepening of cross-border trade and diversified shipments (e.g. e-commerce parcels) may make controls more difficult and could strain resources[185].

2.7.7. Recommendations

Based on the findings above, there appear to be three principal gaps in current data that hamper efforts to produce national and EU-wide estimates of the illicit tobacco market:

- First, currently, the only available EU-wide data on the extent of illicit consumption of tobacco products are produced in a manner that is not free of conflicts of interest due to reliance on funding from tobacco manufacturers, and use methods that precludes the verification and replication of its results. This makes the key input data impossible to scrutinise, and by extension, problematic to use. The Commission is currently in the process of **exploring possibilities to conduct independent market estimates** that would potentially draw on a combination of methods and make use of newly available T&T data[186], which would go a long way towards plugging this first gap.
- Second, there is little systematic data on the price of illicit products at various stages of the illicit supply chain. As a result, it is impossible to develop a good understanding of how the proceeds for the illicit trade accrue to various types of participants, including OCGs. It also necessitates the use of broad assumptions, the appropriateness of which is currently impossible to assess. Sparse and limited individual data points on this topic can be found in existing literature; however, these are wholly insufficient to capture the variety of contexts in which illicit tobacco products are sold, nor the variety of factors that influence the price of illicit products.
- Lastly, while several studies have been conducted on illicit trade of cigarettes, much less is known about illicit trade in other tobacco products. Some existing studies, for instance those based on a tax gap methodology, include other tobacco products in their scope due to their inability to distinguish individual tobacco products, but very little research and data collection has been dedicated specifically to illicit trade in tobacco products other than cigarettes. This is perhaps understandable as cigarettes represent the lion's share of tobacco consumption and will continue to do so for some time. However, the share of other tobacco products (as well as other smoking products not containing tobacco) is projected to grow in the future, and **data collection and research efforts should reflect this trend**.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.62: Recommendations – Illicit tobacco market

Key finding	Recommendation	Actor
The basis for estimates of the illicit tobacco market is industry-sponsored discarded pack surveys, combined with data on the legal sale and prices of tobacco from the European Commission. However, the estimates rely upon assumptions about the illicit-to-licit	OLAF should continue to explore possibilities for generating independent market estimates that would potentially draw on a combination of methods and make use of newly available T&T data. These estimates should attempt to	Member States OLAF European Commission

[183] Interview with EU-level representative, 18 March 2020 (#28); Interview with EU-level representative, 30 March 2020 (#29); Interview with Member State-level representative, 21 April 2020 (#92).
[184] Interview with EU-level representative, 18 March 2020 (#28).
[185] Interview with EU-level representative, 23 March 2020 (#27).
[186] For more information, see: https://ec.europa.eu/health/tobacco/tracking_tracing_system_en

Key finding	Recommendation	Actor
price ratio, for which there is currently limited evidence available. There is currently no high-quality large-scale data on the extent of the illicit consumption of tobacco products other than cigarettes, precluding the construction of a robust estimate for additional tobacco products.	cover a range of tobacco products and not be limited to cigarettes. Member States should systematically report information on the price of illegal tobacco and its determinants – which is currently collected by police and judicial authorities in the course of their investigations – to OLAF.	

2.8. Cybercrime activities

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Key findings:

- The absence of commonly agreed definitions and taxonomies of cybercrime hinder the identification, reporting and monitoring of cybercrime trends, and make it difficult to understand the true scope of the phenomenon.
- There are severe challenges associated with estimating the revenues from the cybercrime market. No prior estimates of the total revenue of the EU cybercrime market were identified by this study.
- Reliable EU-wide data on card payment fraud is collected by the European Central Bank, which includes both online and offline fraudulent activity. The data shows that card payment fraud amounts to at least €1.8 billion. Card-not-present fraud, which is more likely to be conducted by online or virtual means, accounts for 73% of this revenue, and this share is growing.
- Groups of cybercriminals operate in varying structures, depending on the crime they are committing. Cybercriminals increasingly specialise, commercialise and collaborate in their operations, creating a more complex cybercrime supply chain. However, organisation may not equal organised crime. The level of OCG involvement is very difficult to establish in this market.
- Future trends may include more offerings, more diverse products and services, increased specialisation and more integrated/comprehensive packages of cybercrime-as-a-service.

This Annex provides a comprehensive overview of cybercrime activities in the EU, building upon the summary provided in **Section 2.8** of the main report.

There is no clearly articulated, globally accepted **definition of cybercrime** and many different definitions have been put forward by practitioners and researchers. According to Europol, cybercrime can be perceived as criminal acts that are committed online by using electronic communications networks and information systems (European Commission, 2019a). Additionally, cybercrime is often divided into two overarching categories:

- **cyber-enabled crime**, which refers to existing crimes that have been transformed in scale or form using the internet (e.g. online fraud, online trade in counterfeits, etc.); and
- **cyber-dependent crime**, which uses a digital system as both target and means of an attack (e.g. malware, ransomware, distributed denial of service (DDoS) attacks, etc.).

The concept of cybercrime encompasses a vast range of crimes, and cybercrime taxonomies are as plentiful and contested as the definition of cybercrime. The absence of commonly agreed definitions and taxonomies hinders the identification, reporting and monitoring of cybercrime trends, and makes it difficult to understand the true scope of the phenomenon.

Within the context of this study, the analysis of the illicit cybercrime market included two components:

- card fraud (card present and card not-present (CNP))187; and
- Cybercrime-as-a-Service (CaaS).

The study did not include an examination of child exploitation materials and child abuse perpetrated online, as the available evidence suggests that there is little OCG involvement in these crimes[188]. Moreover, the online sale of illegal goods like drugs, firearms and tobacco will also be excluded, as they are already covered in the other markets examined as part of this study (and it is important to avoid double-counting).

Card fraud refers to a broad set of activities, including:

- counterfeit, lost and stolen, and mail-not-received fraud (intercepted cards);
- identity (ID) fraud (theft of card credentials and account takeover);
- false ATM fraud;
- phishing, pharming, hacking and carding189;
- 3D-Secure fraud;
- device manipulation, including point-of-service (POS) terminal and ATM breaches, manipulation of consumer's Personal Computers (PCs) and mobile phones; and
- data breaches into processing or card data-storage infrastructure (Nets, 2019).

Within the context of this study, attention has been placed on card-not-present fraud, which is more likely to be conducted by online or virtual means.

CaaS refers to tools, resources or services to conduct or engage in cybercrime being offered for sale, either through direct contacts between sellers and buyers or through organised marketplaces (often found on the dark net). CaaS is not a homogenous concept and can refer to the trade in a wide variety of cyber-related product and service offerings, hacking tools, hacking services, and supporting enablers such as bullet-proof hosting services. Table 2.63 features an overview of common CaaS products and services offered in CaaS marketplaces. Within the context of this study, the variety of offerings makes it challenging to analyse market dynamics and sizes, as different research studies utilise varying definitions of CaaS and include different products and services in their analysis.

Table 2.63: Overview of common CaaS products and services

Category	Definition	Examples
Initial Access Tools	Enable a user to perform arbitrary operations on a machine in order to then deliver Payloads; can automate the exploitation of client-side vulnerabilities.	Exploit kit (hosted or as-a-service) Zero-day vulnerabilities (and weaponised exploits)
Payload Parts and Features	Goods and/or services that create, package, or enhance Payloads to gain a foothold into a system.	Packers Crypters Binders Obfuscation/evasion
Payloads	Imparts malicious behaviour, to include destruction, denial, degradation, deception, disruption, or data exfiltration.	Botnet for sale
Enabling Services	Assists a user in finding targets or driving targets to a desired destination in order to use an Initial	SEO Services Spam services

[187] Card present fraud has been included in the cybercrime market, rather than under a separate fraud category, as the studies estimating its scope and magnitude are typically conducted in parallel with CNP fraud (such as by the ECB).
[188] The aspect of this market that has the most involvement from organised crime is live-streaming. However, the organised crime groups are situated in non-EU countries, primarily in Asia.
[189] Carding is a form of credit card fraud where a stolen credit card is used to charge prepaid cards.

Category	Definition	Examples
	Access Tool and/or Payload; Attack vectors and scaling methods.	Pay-per-install and affiliates Phishing and spear-phishing services Services to drive/find traffic Fake website design and development
Full Services (as-a-service)	Package of Initial Access Tools, Payloads, and Payload Parts and Features to conduct attacks on a customer's behalf; can provide the full attack lifecycle.	Hackers for hire Botnets for rent Doxing DDoS as a service
Enabling and Operations Support Products	Ensure that Initial Access Tools and Hacking Services (Enabling or Full Service) will work as needed, are set up correctly, and can overcome 'speedbumps' or obstacles.	Infrastructure (e.g. leasing services, virtual private network (VPN) services, bulletproof hosting, compromised sites and hosts) Cryptanalytic services (e.g. password cracking, password hash cracking) CAPTCHA breaking

Source: Adapted from Ablon et al. (2014).

2.8.1. Previous revenue estimates of the EU cybercrime market

The literature search identified no studies that contained prior estimates of the revenue from the cybercrime market in the EU. However, three publications were identified that explicitly included an estimate of total revenues generated through card fraud and/or CaaS.

The European Central Bank's (ECB) estimates of **card fraud** in Single Euro Payments Area countries are based on the data countries collect through their oversight framework on card payments schemes (CPSs) (ECB, 2018). These CPSs must report on volumes and revenues of transactions and fraudulent transactions. The report summarizes data collected from 22 CPSs – including schemes such as Visa Europe and MasterCard Europe – and the disaggregation of the reporting and the use of common definitions allows the ECB to calculate total numbers. The ECB card fraud data are useful in establishing general trends in prior years, but less so in capturing dynamic changes, as the data are outdated by the time they are published[190].

Though not focusing on the EU, McGuire (2018) estimated the global revenues of all **cybercrime**[191] by estimating and then adding up five of the most lucrative categories of revenue-generating activities, namely:

- illicit, illegal online markets;
- trade secrets and IP theft;
- data trading;
- crimeware and Cybercrime-as-a-Service (CaaS); and
- ransomware (McGuire, 2018).

To calculate the estimates of these separate categories, McGuire used recent estimates (on sub-categories) produced by other researchers. The resulting overall estimate is limited to a number of activities and the revenues are often invisible; the author suggests the study's findings represent 'a highly conservative estimate – the real figure is likely to be significantly higher' (McGuire, 2018, p. 45). Moreover, lower point estimates in revenue ranges were selected to compensate for the costs associated with the criminal activities, which the author acknowledged 'is a somewhat arbitrary approach, but since other attempts to estimate the costs of engaging in cybercrime have not been convincing…, it is probably as good as any other' (McGuire, 2018).

Often, publications that present market revenue estimates are not clear or transparent about the sources of their estimates[192]. In general, the estimates produced are inconsistent and are often

[190] Feedback provided by expert advisor to the study.
[191] Note that McGuire's definition of cybercrime is much wider than the scope of this case study (which is limited to card fraud and Caas.
[192] For example, a report by UK Finance (2019, p.4), which merely states 'criminals successfully stole £1.2 billion through fraud and scams in 2018' (UK Finance, 2019).

produced by stakeholders with a vested (commercial) interest in the outcomes (Anderson et al., 2013; Moore et al., 2009). Estimates usually include a selection of a wide variety of activities and services, use different data(sets) and different methodologies of varying quality, and have different levels of transparency about their approach.

Existing estimates commonly have a global or national-level focus. An estimate specifically focused on the EU was not found in the literature. Some studies estimate the size of sub-sections of markets, e.g. estimating profits and losses in underground markets. One example of such a study is a UK Home Office study from 2018 that estimated earnings of buyers of stolen financial data from samples of transactions from the open web and dark web, using a sample of 18 forums and 15 shops hosted on the clear and dark web (HOSAC, 2018).

However, all these estimates have significant caveats and should be approached with caution as to their accuracy and validity. It is noteworthy that the UK Home Office Costs of Cyber Crime Working Group concluded that 'no estimate of the overall cost of cybercrime, that could be interpreted with a high level of confidence, was identified in the literature' (HOSAC, 2018). Measurements of the costs (rather than focusing on revenues) of cybercrime are faced with the same challenges and are equally controversial (Lewis, 2018). In fact, the estimates found in the literature are predominantly focused on costs (which are likely to be an order of magnitude higher than the revenues generated by cybercrime). For example, Detica & Cabinet Office (2011) developed a causal model to map the impact of cybercrime on the UK economy, which produced an estimate that was widely questioned for its reliability and accuracy (Anderson et al., 2013; HOSAC, 2018). To provide an overview of the evidence on actual costs, what can reasonably be estimated and which figures can be gauged only based on assumptions, Anderson et al. (2013) produced a set of highly caveated estimates for a number of separate lucrative cybercrime activities (Anderson et al., 2013). In a follow-up article in 2019, Anderson et al. explained how others had added the separate costs categories and presented it as a total for global cybercrime, ignoring the authors' warning that this would be 'entirely misleading' without the provided context and the authors' caveats and cautions (Anderson et al., 2019).

2.8.2. Quality of prior estimates

There are severe challenges associated with estimating the economic revenue from the cybercrime market and the total annual revenue generated by OCGs. First, research into the economics of cybercrime focuses almost exclusively on the costs of cybercrime rather than the value or revenues generated by cybercriminals. Second, the field of cybercrime research suffers from an overall lack of reliable data and data sources – particularly authoritative and longitudinal studies. Much cybercrime activity, especially in relation to CaaS, takes place in online marketplaces (both on the open internet and the dark web) that are challenging to identify, access and collect data for. These types of marketplaces are also highly dynamic and fluid, with markets regularly being closed, taken down by law enforcement, or overtaken by new entrants. A significant portion of trade within this market is also done using privacy-enhancing or privacy-preserving technologies, which make it challenging or impossible to access certain information (e.g. use of the TOR network, encrypted messaging, VPNs, cryptocurrencies, etc.).

Lastly, even when research is conducted into the costs or economics of cybercrime, it tends to suffer from a range of challenges and limitations, including:

- **Contested or varying definitions**. As previously noted, this research field suffers from contested definitions and conceptual confusion of key concepts and factors of analysis. This includes the conceptualisation of 'cybercrime', which products or services are included in analysis of CaaS, or simply the use of different terms for the same concept across different studies. It also extends to non-cybercrime specific factors of analysis, including defining 'costs' or 'revenue'. Studies have employed different definitions of cost, meaning that they ultimately measure conceptually different things, or try to measure cost for differing cybercrimes, which ultimately makes meaningful comparative analysis challenging. It may also mean that certain costs, revenues or types of cybercrime are inaccurately analysed or even not measured at all.
- **Inconsistent research approaches and results**. A range of methods have been used to analyse the cost of cybercrime and the revenue from cybercrime markets, including costs in anticipation, costs as a response, and costs as-a-consequence, which also utilise different factors of analysis such as annual cost, cost by attack/incident, cost by sector, victim losses, etc. More concerningly, even when studies employ similar methodological approaches, they have reached significantly varied and inconsistent results. A study by

the UK Home Office highlighted that estimates for the annual cost of cybercrime to the UK public sector provided by methodologically similar studies ranges from £1.2 million, to £3 billion, to £27 billion – which significantly questions the reliability and accuracy of these approaches (HOSAC, 2018). The lack of a common or consistent approach and criteria for conducting this type of research has resulted in standalone studies that are rarely comparable, and are often only relevant in a particular context.

- **Methodological weaknesses and over-reliance on survey data**. A survey is a common method used by studies seeking to estimate the cost or revenue from cybercrime, which are often subject to methodological weaknesses such as a lack of random probability sampling. There is also a range of challenges in relying on surveys as the primary source of evidence in relation to costs or revenue from cybercrime. Firstly, surveys typically collect unverified, self-reported data and assumptions. Secondly, surveys are often only representative of a fraction of the ecosystem surveyed. Cybercrime costs may also be highly concentrated within a population, meaning that representative sampling of the population does not result in a representative sampling of costs (Florencio & Herley, 2011). Thirdly, surveys results can be skewed by extreme responses from a few respondents. For example, Florencio & Herley illustrated how a single individual claiming $50,000 in losses in an n=1,000-person survey can result in an estimated $10 billion loss over the population; or how one unverified claim of $7,500 in phishing losses turns into an estimate of $1.5 billion in total losses (Florencio & Herley, 2011). Fourthly, exploring rare occurrences or unfamiliar factors in surveys, non-response error can result in incorrect data being captured (through dishonesty, exaggeration or misunderstandings). And lastly, small-scale surveys or case studies may be useful to provide context of the difficulties in estimating cybercrime costs or revenue, but they do not enable wider extrapolation of results and should not be interpreted as representative of cybercrime overall.
- **Insufficient, incorrect or biased data**. Surveys are often used in the absence of reliable and accessible data, which highlights the challenges associated with the insufficient and fragmented nature of data related to costs or revenue from cybercrime. There is a vast amount of cybercrime data generated by various organisations, little of which is relevant to the costs or revenue from cybercrime. Moreover, data sharing protocols are lacking. Overall, available cybercrime-related data also tends to suffer from under- and overreporting, intentional or unintentional bias (e.g. response effects or sampling bias), or lack of cross-jurisdictional information. In relation to bias or lack of independent research, many research reports on the cost or revenue from cybercrime are published by cybersecurity companies that may have ulterior motives, such as overexaggerating the risks associated with cybercrime to promote a particular product or service (MONEYVAL, 2012).
- **Questionable assumptions**. Several studies on the cost or revenue from cybercrime develop their estimates based on assumptions that are not clearly explained, not documented or of questionable rigour. The lack of clearly documented assumptions makes it challenging to validate or assess the robustness of the estimates provided, or to reproduce the studies themselves (HOSAC, 2018).
- **Revenues may be significantly lower than costs**. Within the context of this study it is also worth emphasising that most research into the revenue from cybercrime focuses on costs. Anderson et al. (2019) emphasised that criminal revenue is significantly lower than direct losses and much lower than total losses, for example a botnet that 'earned about $3m a year by promoting Viagra was costing about a hundred times that much, as it was responsible for about a third of the world's spam in 2011 – and spam costs the industry about $1bn a year' (Anderson et al., 2019).
- **The global and border-agnostic nature of cyberspace**. The 'borderless' nature of cybercrime makes it inherently difficult to assess where, geographically speaking, costs, revenue and value is generated, transferred or spent. The opaque nature and attribution complexity of cybercrime results in a relatively unsophisticated understanding of who is engaged in cybercrime activities or illicit markets, where they are based, and how money flows across these platforms and networks. While there are geographical communities on the internet, for example predominantly Russian or Chinese communities, the organisation of users engaged in illicit activities is relatively dynamic, fluid and skills-driven compared to 'offline' crime and organised crime[193].

[193] Interview with cybercrime academic expert, 12 February 2020 (#12).

Table 2.64: Prior studies estimating the size or revenue of the EU cybercrime market in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (size)	Estimate produced (revenue)
1	ECB (2018)	2016	Card payment fraud (present and non-present)	ECB's oversight framework on card payments schemes (CPSs).	SEPA countries (EU 28 Member States + EFTA countries + European microstates)	Most data on SEPA level, but some data are available in disaggregated form	17.3 million cases of card fraud using cards issued in SEPA	€1.8 billion
2	McGuire (2018)	2018	1) CaaS 2) Cybercrime	Mixed methods approach, consisting of interviews with cybercriminals, analysis of forum conversation log data, expert interviews and a review of secondary materials.	Global	No	N/A	CaaS revenues: $1.6 billion (USD) Cybercrime revenues: $1.5 trillion (USD)

Note: Estimates of the revenue from cybercrime and CaaS are not considered reliable, as discussed above.

2.8.3. Methodology for estimating revenues in this study

For the purposes of this study, we present the estimates from one of these studies – that is, **the estimated revenue of card payment fraud** in the EU as reported by the European Central Bank (ECB, 2018). As a result of ECB's role in the oversight of card payment schemes (e.g. Visa Europe), the latter have to report volumes and values of (fraudulent) transactions on a country-level, and using common definition and templates, to the ECB (ECB, 2018). The ECB uses this data – together with data shared by national banks of the individual EU member states on domestic payment-card schemes – to draw up the recurring Card Fraud Report. Fraud figures are categorised as card present and card-not-present (CNP) payments. The former includes transactions at ATMs and point-of-sale (POS) terminals, and further distinguishes 'lost and stolen', 'card not received', 'counterfeit' and 'other'. The latter distinguishes between 'online' and 'mail or telephone' fraud.

The information published in the ECB's Card Fraud Report covers almost all card payments made with cards issued within the Single Euro Payments Area (SEPA) and acquired worldwide. This means that transactions are captured to the extent that the payment service provider is geographically within SEPA. SEPA includes all EU member states, the UK, the four European Free Trade Association countries and four microstates with monetary agreements with the EU. According to representatives of the ECB, the figures are a representative indication for card fraud in SEPA[194]. Since the ECB card fraud data are outdated by the time they are published, the data are useful in establishing general trends in prior years, but less so in capturing dynamic changes[195].

A summary of the approach used in this study for estimating the market revenue from card payment fraud and the limitations of this approach is outlined in the table below.

Table 2.65: Summary of approach for estimating revenues from card payment fraud

Summary of approach	Estimate based on data collected by the ECB on card fraud within SEPA (which are used to calculate the total revenue from card fraud and the share of card-not-present fraud in the EU and by Member State)
Rationale	It builds on a reliable EU-wide dataset, which is absent for any other form of cybercrime
Output	The total revenue from fraudulent transactions conducted (total card fraud and the proportion of card-not-present fraud) using cards issued within Single Euro Payments Area and acquired worldwide
Scope and coverage	**Geographical scope**: EU-level and Member State level **Year(s) of estimate**: 2016, updated to 2019 values **Sub-markets**: Card present and card-not-present fraud
Data sources	The European Central Bank's Fifth report on card fraud, September 2018
Limitations and caveats of this approach	Only captures reported fraudulent transactions Delay in data availability Data not very detailed/high-level Little is known about perpetrators Unclear whether losses equal revenues for criminals

2.8.4. Revenue estimates of card payment fraud in the EU

Table 2.66 below presents the estimates of card payment fraud derived by the ECB, as well as the share of CNP fraud, at the EU-level and for each of the Member States. The results show that CNP fraud makes up 73% of the €1.8 billion total revenue from card fraud in the EU. It is therefore the largest category of card fraud.

The ECB's 2018 card fraud report noted **CNP fraud** was the only form of card fraud that had seen an increase in absolute and relative terms since the previous report (ECB, 2018). Representatives

[194] Interview with private-sector representatives, 6 May 2020 (#91).
[195] Feedback provided by expert advisor to the study.

at the ECB underlined that overall card fraud levels were stable over the past five years, but that the share of CNP is growing and they expected a further relative increase in future iterations of the report[196].

The ECB's 2018 card fraud report further showed that ***card present* fraud** consists for around two-thirds of fraud in POS transactions, and one-third at ATMs, but both are constantly reducing in volume and proportion (ECB, 2018). This is considered by the ECB to be the result of the implementation of several regulatory requirements and the adoption of fraud prevention and detection security tools that complicate card-present fraud, including (ECB, 2018):

- revision of the Payment Services Directive (PSD2), and the authorisation and registration requirements under this directive (e.g. strong customer authentication);
- migration of cards and terminals to EMV (Europay, Mastercard, and Visa – the creators) technical standards;
- wider usage of geo-blocking;
- physical security measures at terminals;
- deactivation of the usage of the magnetic stripe for cards;
- application of guidelines on the assessment of card payment schemes introduced by the Eurosystem; and
- implementation of 3D Secure, risk-based analysis and tokenisation.

As card present fraud becomes more complicated, CNP fraud is increasingly seen as easier to commit[197].

The table below also shows that there is quite some **difference country by country**. The share of CNP fraud ranges from 41% of all card fraud in Portugal to 84% in Lithuania. This can partly be explained between differences in card usage, such as the number of cards and the number and revenue from transactions per inhabitant. Countries with a large market for online transactions, such as the UK, France, Spain and Scandinavian countries, tend to face larger CNP fraud shares, as there are more attack vectors[198]. Indeed, in the 2018 Card Fraud Report the ECB observed that in countries where card usage was limited, levels of fraud were relatively low. In addition, the report noted that in spite of being a very small percentage of all transactions made, cross-border transactions (both within and outside SEPA) accounted for almost two-thirds of all card fraud in SEPA in 2016.

Table 2.66: Revenue estimate of card payment fraud in the EU

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)			Proportion CNP
	Mid	Low	High	%
28 EU Member States		**1,816.43**		**73%**
27 EU Member States without UK		**1,015.81**		
Austria		21.40		81%
Belgium		38.71		75%
Bulgaria		2.99		61%
Croatia		1.53		71%
Cyprus		1.52		76%
Czech Republic		4.26		66%
Denmark		56.74		72%
Estonia		1.24		63%
Finland		22.26		62%
France		442.96		73%

[196] Interview with private-sector representatives, 6 May 2020, (#91).
[197] Interview with private-sector representatives, 6 May 2020, (#91).
[198] Interview with private-sector representatives, 6 May 2020, (#91).

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)			Proportion CNP
	Mid	Low	High	%
Germany		149.95		66%
Greece		3.81		77%
Hungary		2.78		74%
Ireland		46.04		82%
Italy		75.74		69%
Latvia		1.44		66%
Lithuania		0.76		84%
Luxembourg		3.70		69%
Malta		1.47		71%
Netherlands		32.13		74%
Poland		6.69		56%
Portugal		20.92		41%
Romania		3.61		67%
Slovakia		1.71		79%
Slovenia		1.25		62%
Spain		63.09		66%
Sweden		43.12		70%
United Kingdom		764.62		77%

Notes: Estimates were produced by the ECB (2018) for 2016 and updated to 2019 values using Eurostat's HICP (Eurostat, 2020b).

2.8.5. Criminal actors and modus operandi

Table 2.67: Cybercrime – Market actors

Level of OCG involvement	Cybercriminals increasingly specialise, commercialise and collaborate in their operations, creating a more complex cybercrime supply chain. However, the level of OCG involvement is very difficult to establish. Organisation may not equal organised crime.
Size and composition of OCGs	Groups of cybercriminals operate in varying structures, depending on the crime they are committing. Networks of criminals are hierarchical in nature and adopt clear roles based on their skillset. Participants may only know each other online.
Modus operandi of OCGs	Cybercrime activities are coordinated through online forums.
Poly-criminality of OCGs	Cybercrime services and platforms are utilised by and support other forms of criminality, resulting in a platform economy for criminality online.

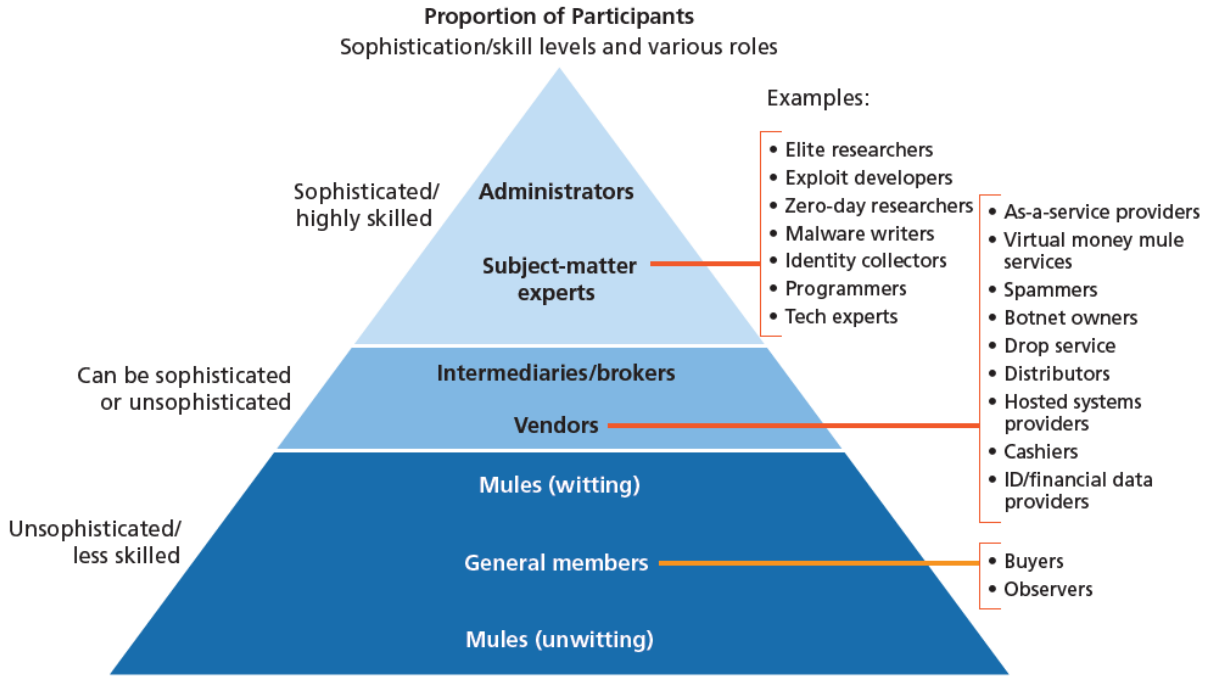
We identified 15 studies in the literature review that included information on **key actors in the cybercrime market in the EU**. These studies showed that in comparison to conventional criminals, who are commonly young men on the fringe of society who suffer from multiple deprivations or drugs or alcohol abuse, cybercriminals are often educated and capable (Moore et al., 2009). Their reason for resorting to cybercrime may be a lack of job opportunities and ineffective policing. Cybercrime offers significant financial gains against low risks, as attribution and prosecution are very difficult (Blakeborough & Correia, 2019; Levi et al., 2015; McAfee, 2018; McGuire, 2018; Nagy & Mezei, 2016; Nets, 2019). Moreover, the cybercrime market is easily accessible, anonymous and fast-paced. Prosecution by law enforcement is further complicated by the borderless activities of cybercriminals, who often operate outside their jurisdiction.

The **anonymised and cryptographic nature of the cybercrime market** makes it very complicated to obtain information about the characteristics of the perpetrators, their organisation and their modus operandi. At the same time, some studies have found cybercrime is organised as it is becoming more attractive as a lucrative profession for able hackers (Ablon et al., 2014; Chon & Broadhurst, 2014; Choo & Smith, 2008; Grabosky, 2007; Huang et al., 2018; McGuire, 2018; Nets, 2019; Williams, 2001).

The Federal Bureau of Investigation (FBI) identified 10 **specialisations that (groups of) individuals adopt in a typical cybercrime**: 'coders or programmers', 'distributors or vendors', 'technical experts', 'hackers', 'fraudsters', 'hosters', 'cashers', 'money mules', 'tellers' and 'leaders' (Chabinsky, 2010). Ablon et al. (2014) provide a slightly more detailed overview of the hierarchy, roles, skills levels and participants operating on the black market (see

Figure 2.3: Cybercrime) (Ablon et al., 2014). The black market is characterised by easy entry, but Ablon et al. also note that reaching the top tiers and involvement in high-level, sophisticated crimes requires networking and a good reputation.

Figure 2.3: Cybercrime



Source: Ablon et al. (2014).

Huang et al. (2018) developed a categorisation of six basic **types of organisation structures** typical in the execution of organised cyber-attacks, each of which have their own advantages and disadvantages:

- '**a Swarm** refers to a group of hackers who work together in viral forms that have a minimal, if not non-existent, chain of command;
- **a Hub** refers to the structuring scheme in which there is a core group of hackers around which peripheral associates gather;
- **a Clustered Hybrid structure** combines online and offline activity and typically operates in a similar way as [a] Hub, focusing on specific activities or methods;
- **an Extended Hybrid structure** is like the Clustered Hybrid structure but incorporates many associates and subgroups, while retaining a level of coordination sufficient to ensure the success of operations;
- hierarchies refer to [a] **structure reminiscent of traditional organisations** as well as criminal groups but take advantage of online technology to facilitate activities; and

- **an Aggregate structure** refers to a loosely organised group of hackers committed only to temporary collaboration and often without a clear goal.'

Online forums play an important facilitating role for communications and networking for collaboration between cybercriminals, as do family ties, friendships and online relationships (Huang et al., 2018). Most hacker forums have hierarchical systems. Top-down, this hierarchy is usually characterised by administrators at the top, followed by moderators, reviewers, reviewed vendors and general members (in that order). According to Huang et al. (2018) the cybercrime ecosystem can be seen as 'a complete cyber-threat capability supply chain', consisting of vulnerability discovery, resistance operation (avoiding detection), delivery of cyber-attacks, marketplace support, re-purposing gains to enable further attacks, human resources and technological support. Moreover, this level of organisation has facilitated the emergence of CaaS.

Despite the increasing complexity of cybercriminal operations through the division of labour, organised cybercrime seems to lack the structure and hierarchy of conventional OCGs (Nagy & Mezei, 2016). There is also limited evidence that established 'offline' OCGs harness IT to support and improve their existing criminal practices (Levi et al., 2015). Rather, organised groups involved in cybercrime are perceived as flexible networks of diverse, high-skilled individuals who rarely meet outside of cyberspace. The exploration of **organised crime involvement in the cybercrime market further presents methodological challenges**:

- **It is unclear what 'organised' crime refers to in the cybercrime context**. Beyond cybercrime, definitions of organised crime have been widely discussed and contested, with current practices subjected to criticism for being of a 'low standard' or overly inclusive (Leukfeldt, Lavorgna et al., 2017). Within cybercrime, this field of enquiry is still emerging and additional information on the actors involved, their characteristics and modus operandi is required to enable fruitful analysis and discussion.
- **Not unlike offline organised crime, organisation may not equal organised crime**. Previous research has shown that many actors engaged in cybercrime or illicit activities online are highly networked, cooperate extensively and learn from or teach others as part of their criminal career. However, this type of organisation may not constitute organised crime as such, and there are significant indications that cybercrime comprises characteristics opposed to traditional notions of OCGs (e.g. fluidity, geographic-agnostic cooperation, non-hierarchical structures, etc.) (Hutchings, 2014; Wall, 2015).
- **Convergence between cybercrime and organised crime is assumed, and lacks strong empirical evidence**. As previously noted, several reports have made links between cybercrime and organised crime, often emphasising that this connection is increasing or deepening, but these assumptions are rarely backed by significant evidence-based research and analysis (Levi et al., 2015; Lavorgna & Sergi, 2016). This may be particularly important in relation to allocating resources to counter organised crime without accurate research and analysis on how to deal with emerging challenges posed by cybercrime.
- **Lack of attribution and understanding of motivations**. Attribution complexity makes it difficult, and in some instances near-impossible, to identify what type of actor ultimately carried out a cybercrime or illicit activity. There is a range of actors engaged in activities that ultimately could be considered cybercrime (e.g. individual hackers, 'professional' cybercriminals, state actors, etc.) and it may be technically complex to understand which actor is responsible for which incident. The motivation behind cybercrime can equally make it difficult to understand the actors involved in crime or illicit activities (e.g. incidents that may seem to be criminal in nature may be conducted by a state). Limited empirical research has shown 'that even if the criminal networks considered display the minimum set of characteristics to consider them as OC, if we only look at their structure and composition, they mostly fail to meet the existing definitions of OC when it comes to the characteristics of criminal activities carried out and social functions of these networks' (Leukfeldt, Lavorgna, et al., 2017).

A wide range of **modus operandi** are applied in cybercrime. Conceptually, in a typical operation by organised cybercrime, a leader decides on a target and assigns or hires technical experts to launch the attack and provide the infrastructure and resources necessary (e.g. dedicated servers, VPNs or botnets) (PANDA SECURITY, 2010; Positive Technologies, 2018). The technical experts develop malware, bots, spam, fake websites, keyloggers and social engineering strategies that will be used to trick victims into sharing their confidential information (such as passwords or bank or credit card details). Typically, the communication to the victim pretends to be from their

legitimate bank (e.g. their website, telephone number or email). Potential victims are targeted through e.g. email, social media and fake websites. Commonly, the stolen data is then sold to other cybercriminals on the black market (typically the same place as where the technical experts were hired), as the risk of getting caught is much lower compared to taking money directly out of the account. This is one method the original perpetrators use to cover their tracks, which further complicates investigations into (all) the people behind cybercrimes. The bank details and copied magnetic strips are offered on CaaS platforms (such as dark net marketplaces and forums), which can be used to e.g. transfer money directly, shop online or clone cards. Money transfers usually involve 'cashers' (sometimes also referred to as 'cashiers') to help launder the money. Cashers transfer money from the account of a victim to the account of a 'money mule', who may be tricked through fake job adverts into accepting the stolen funds and immediately transferring it to another account, taking a commission (which they may have been led to believe is legitimate), but also becoming personally liable for the money transfer (Moore et al., 2009; PANDA SECURITY, 2010). These transfers often rely on payment services such as Western Union. Other channels used by cashers to launder money are online poker games and auctions (Moore et al., 2009), though Levi (2009) noted that e-gambling was a difficult format through which to launder significant sums rapidly or over time.

Cybercrime services and platforms are utilised by and support other forms of criminality, resulting in a platform economy for criminality online (McGuire, 2018). Takedowns of illicit online markets have shown that these platforms also offer goods from other illegal markets, such as illegal drugs, firearms, counterfeited goods, identity and other formal documents and toxic chemicals. RAND Europe's Dark Web Observatory – a database of product listings and vendors collected by crawling and scraping a number of prominent dark web marketplaces, discussion forums and other websites – shows that most products offered on the dark web are predominantly other criminal goods and services rather than CaaS (Table 2.68).

Table 2.68: Dark net listings by category

Category	Listings
Drugs	375,170
Fraud	52,937
Counterfeits	34,001
Digital Goods	33,691
Guides and Tutorials	29,830
Other	19,660
Services	8,630
Jewellery	3,404
Weapons	1,938
Electronics	711
Uncategorised	43,432

Source: RAND Corporation, Dark Web Observatory (2020).

Other types of fraud that cybercriminals are involved in include fake lotteries, unlawful gambling operations, stock scams and advance-fee frauds (Moore et al., 2009; Nagy & Mezei, 2016). In addition, cybercrime facilitates more traditional forms of criminal activities, such as extortion and the distribution of imagery of sexual abuse of children (MONEYVAL, 2012). Cybercrime revenues have also been used to finance the operational costs of terrorist groups and their terrorist activities (McGuire, 2018; MONEYVAL, 2012). Moreover, digital applications have facilitated money-laundering by terrorist groups.

2.8.6. Future trends and dynamics

Table 2.69: Cybercrime – Future trends

Future trends and dynamics	Future trends may include more offerings, more diverse products and services, increased specialisation and more integrated/comprehensive packages of Cybercrime-as-a-Service.

Impact on market and criminal finances	The cybercrime supply chain and attribution might become even more complex and the threshold of criminal activities online would be lowered, as fewer skills are needed to participate in the market.

Eight studies identified in the literature review included information on the future trends and dynamics of cybercrime. Together with the foregoing account of the cybercrime market, these studies showed that it is a fast-moving environment that is becoming increasingly **accessible to a larger audience**, as well as being more attractive and trustworthy. People lacking the technical skills to carry out cyber-attacks now have access to cybercrime tools and services through CaaS. Simultaneously, cybercrime has become a more viable career and cybercriminals are driven deeper underground. In spite of takedowns of a number of prominent online illegal markets – such as the Silk Road and Alpha bay – cybercriminal trade has demonstrated its resilience and remained on a relatively stable level (Van Wegberg et al., 2018). Indeed, Décary-Hétu and Giommoni (2017) found that police crackdowns on crypto markets were ineffective in enforcing drug laws online and lowering the volume of dark web sales, as the supply and consumption were only temporarily impacted, before continuing elsewhere.

Growing internet penetration around the world increases the number of users globally and, therefore, the number of potential victims of cybercrime. More often than not, these new users have limited technical skills, making them vulnerable to cybercrime. As societies are likely to become ever more digitalised, cyber-enabled crime could rise further in the future. On top of increased connectivity and more prevalent exploitable vulnerabilities, cybercriminals can leverage technological advances to perpetrate their crimes. Levels of anonymity, complexity of operations and speed may all increase in the future. Progress in automation may also reduce the necessary manpower to undertake a certain criminal activity. If (international) criminal justice responses cannot keep up with the increasingly difficult prosecution of cybercriminals, cybercrime may become more attractive to able hackers. McGuire concluded that 'both the legitimate and illegitimate economies come together within an increasingly cyber-criminogenic world; one where the tools and cultures of information crime become blurred and interchangeable with the tools and cultures of an information society, and vice versa' (McGuire, 2018).

In the past, cybercriminals have proven their ability to quickly **adapt to changing conditions and incorporate innovative approaches** to their criminal activities to perpetrate attacks and hide their operations from law enforcement (Levi et al., 2015; Positive Technologies, 2018). Several emerging technologies may steer cybercrime in a certain direction in the future. For example, artificial intelligence and machine learning are likely to increase the speed of attacks, whilst simultaneously making them more tailored. Autonomous devices and systems may be used, for example to carry out disguised attacks independently with limited external control. Developments in computing and data storage technologies could facilitate an increase in data theft. The growing volume of data collected by Internet of Things devices could also introduce new vulnerabilities, which could be exploited on a larger scale in the future. Another example of an emerging technology is blockchain (and distributed ledger technologies), which cybercriminals could try to manipulate or employ in their operations as a tool of storing disruptive or inappropriate content. Lastly, privacy-enhancing technologies may offer further opportunities of hiding identities and operating even more anonymously.

In addition, cybercriminals increasingly work together to maximise profits. Further specialisation could deepen the trend towards a more complex cybercrime supply chain. This could take the shape of a 'cybercriminal service composition as a service' – a one-stop-shop service combining the services of various hackers and illicit marketplaces (Huang et al., 2018). Such **specialisation, commercialisation and collaboration** would also further complicate determining the criminals' identities and, ultimately, would lower the barriers to the access to cybercrimes even further to increase demand and revenues. McGuire also speaks of a 'post-crime world of criminality' where 'varieties of criminality that involve less crime, or that take on a secondary form and benefit indirectly, become more attractive in terms of revenue generation' (McGuire, 2018).

Other trends relating to CaaS and card fraud are:

- A shift is expected from advertising CaaS services on crypto markets to using specialist sites and forums on the open web (Ugur, 2019). Transactions are then conducted on encrypted communication channels, such as Telegram.

- Price levels for most cybercrime services have remained at a relatively stable level over the past couple of years, in spite of the wide price ranges and lack of clarity about what determines the price of a service or product (Gray, 2019).
- There is likely to be progression towards more sophisticated markets and a wider range of tools and services on offer (McAfee, 2018).
- A move from offering bespoke malware towards ready-made solutions, which is a more lucrative approach (Positive Technologies, 2018). Additionally, ransomware has seen a rise in popularity in recent years (McAfee, 2018).
- Cloud security company Armor found that sales of credentials to remove desktop protocol servers (offered for around €20) have risen in popularity since 2018, and are expected to rise further in the future (Armor, 2019). The internet-facing servers running the RDP server can be used as an initial entry point into the computer network of the targeted organisation to, for example, infect it with ransomware.
- Another emerging trend identified by Armor was a growth in selling cash (at a cost of 10–12 cents per dollar), eliminating the need for stolen bank credentials and money mules, which has become one of the most popular services in the cybercrime market (Armor, 2019). Sales of articles of incorporation and sole proprietorship papers were also expected to rise in the future.
- Global card fraud losses have doubled in the past decade. However, this is not true in absolute numbers, as it mirrors a sharp rise in card transactions (Anderson et al., 2019).
- The ECB projected a potential shift towards attacks by cybercriminals against mobile payments as one of the main expected threats to future security of card payments (ECB, 2018). Other noted potential threats were lack of resources and/or skilled personnel in handling fraud detection and prevention, their adaptability to emerging threats, limited functionality of fraud tools and inflexible regulatory regimes limiting preventative actions of organisations under attack.
- Payment card fraud, often conducted by fraudsters operating on an international level, is expected by payment-services company Nets to increasingly target cardless payments and businesses. More specifically, Nets believed OCGs tend to target weak point sectors, processing infrastructure and environments (Nets, 2019).

2.8.7. Recommendations

Below we discuss some general comments on areas for future development in order to improve future efforts in measuring the cybercrime market. Many previous studies concluded that a comprehensive estimate of the revenue from cybercrime is not feasible, and would perhaps be counter-productive to attempt. Previous efforts to develop comprehensive estimates of global cybercrime have been considered misleading[199]. Having said this, others who have explored these issues have highlighted good practice and potential considerations for future research into the revenues and costs generated by cybercrime:

- **Adopt systematic research methodologies and approaches**. The Home Office Science Advisory Council (2018), for example, recommended applying a systematic research design – such as their cybercrime framework – locating the biggest gaps in this framework, and directing research questions toward filling those gaps in order to produce reliable and defensible estimates.
- **Clearly define and scope the market segment to be estimated**. Previous studies have attempted to generate estimates across many different types of cybercrime to arrive at a global estimate for cybercrime in general. This approach may be unproductive, as it is likely that different types of cybercrime may require different methodological approaches, as well as different data sources[200]. In order to produce defensible estimates, it may be more successful to engage in tailored approaches designed to estimate one particular type of cybercrime, rather than catch-all approaches.
- **Use the best available data and ensure buy-in from data holders**. When reliable and extensive datasets do not exist or are inaccessible, it is essential to invest in trying

[199] Interview with cybercrime academic expert, 12 February 2020 (#12).
[200] Interview with EU-level official, 28 February 2020 (#11).

to access the best data possible. It may be the case that data useful to the estimation of cybercrime markets exists, but is unknown or inaccessible to researchers – for example data captured through law enforcement actions or takedowns. It is therefore necessary for researchers to work closely with other stakeholders to develop an understanding of the availability of data – particularly real-world data from real-world cases – and how this could feasibly be used in research. Valuable data for the estimation of cybercrime markets may also reside in private sector companies such as banks, financial institutions or cyber insurance providers.

- **Leverage good practice from estimating other illicit markets**. Researchers engaged in estimating cybercrime markets should not be oblivious to methodological approaches used to estimate other illicit markets and measure levels of OCG involvement. While cybercrime presents certain unique contextual constraints and challenges, there may nevertheless be valuable lessons learned or good practice that could improve how cybercrime market estimates could be produced in the future.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.70: Recommendations – Cybercrime market

Key finding	Recommendation	Actor
Estimates of the revenues from cybercrime do not exist. However, CNP fraud is included in the ECB's reporting of card payment fraud (both online and offline).	Focus future research efforts on specific cybercrime sub-markets using tailored methodological approaches. Partnerships with industry may be strengthened in order to access data for deriving estimates, as well as police and judicial authorities for accessing case information.	Member States, particularly police and judicial authorities Industry

2.9. Organised property crime

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Key findings:

- Cargo thefts and ATM physical attacks are the only organised property crimes for which reliable revenue estimates can be provided, although they remain niche crimes in the EU when compared to other forms of organised property crime.
- According to the estimates produced in this study, the annual revenues derived from the cargo theft market in the EU range between €0.1 billion and €7 billion for 2019. ATM physical attacks account for another €22 million in annual revenues.
- The data availability does not allow for the generation of an estimate of revenues for other organised property crime types – such as burglaries, robberies and motor vehicle theft (MVT). However, upper bound estimates of losses incurred by households and businesses are as high as €2.5 billion from MVT, €3.4 billion from domestic burglary, and €0.5 billion from robbery market.
- Comparison of revenue estimates for both cargo theft and ATM physical attacks show a decreasing trend over the period 2015 to 2019.
- Organised property crimes are frequently carried out by mobile OCGs, which systematically commit a significant number of property crimes over large areas across Europe, and often originate from Eastern European countries.
- Each organised property crime sub-market has unique actor characteristics, which include differing levels of organised crime involvement and skill level. Organised crime involvement is highest in MVTs, cargo thefts and ATM physical attacks.
- A growing trend faced by law enforcement in combating organised property crime is the increasing use of technology to facilitate and abet in criminal activities.

This Annex provides a comprehensive overview of organised property crime in the EU, building upon the summary provided in **Section 2.9** of the main report.

Property crimes – or the theft or destruction of property (Europol, 2020f) – range from widespread crimes such as burglary, MVT and robbery to more niche crimes such as cargo theft and trafficking in cultural goods (Angelini et al., 2015). Due to the relative frequency of some of these crimes, they are often investigated as isolated events carried out by single actors or small disparate groups (Angelini et al., 2015). However, there has been a growing presence of OCGs and increasingly, mobile organised criminal groups (MOCGs) (Van Daele & Vander Beken, 2010) behind petty property crimes, which historically have been understood and investigated as unrelated events, rather than as organised property crimes attached to a broader criminal network (Europol, 2017).

This study focuses on five of the most common and profitable types of organised property crime in which OCGs are involved: domestic burglary, MVT, robbery, cargo theft, and trafficking in cultural goods (see Glossary in main report for definitions of each) (Fell et al., 2019; Levi et al., 2013; Mills et al., 2013). In addition, all five areas are examined due to their significant financial costs and increasing occurrences in the EU, and due to the nature and pattern of crimes that can indicate active and clear involvement from OCGs (Fell et al., 2019; TAPA, 2018).

Cargo thefts and ATM physical attacks are the only organised property crime for which market revenues can be provided, given the general lack of prior methodologies and datasets for most of the organised property crime. The results are provided below.

2.9.1. Previous revenue estimates of the EU organised property crime market

The desk research did not identify any prior estimates for the market revenue from all types of organised property crime in the EU. Only five studies were identified with EU-wide estimates on specific categories of organised property crimes, including MVT, cargo theft and physical ATM attacks. These studies, however, provide estimates for the value of losses incurred by the individuals, households or businesses due to those categories of crime. In general, estimated losses are not equal to the actual revenues generated by OCGs, as not all of the covered incidents are carried out by OCGs, and not all of the losses are directly transferable to revenues. The only exceptions discussed in detail below are cargo theft and ATM physical attacks, where losses could be used as an adequate proxy for revenues.

In addition, costs – which are often reported in the literature – are a very different measure to losses as they also cover the cost of damaged property, the funds invested in insurance, societal costs (e.g. for the criminal justice system), and even 'physical and emotional costs', among many others (Heeks et al., 2018). Clearly only the 'direct costs' (i.e. the value of stolen property, but not that of damaged property) can be considered as contributing, although are not equal to the revenue of perpetrators.

Since no sources were identified that estimate the revenues from organised property crimes, sources of direct losses are discussed below as potential proxy estimates for the generated revenues.

Burglary: Estimates for burglary rely on either law enforcement data or crime victimisation surveys, most of which do not differentiate between organised and conventional crime. A UK Home Office study authored by Heeks et al. found that 695,000 domestic burglaries, both from OCGs and individual perpetrators, resulted in £973 million in damage or stolen property in England and Wales alone in 2015–2016 (Heeks et al., 2018). The average value of property stolen in the UK for 2015 is estimated at €1,235 per incident.

Boerman et al. (2017) estimated that losses resulting from burglary of residential premises amount to approximately €175 million for 2015 in the Netherlands. The average loss per burglary incident was approximately €2,700. It was estimated that organised burglars (OCG and MOCG) are responsible for approximately €35 million of the total losses (20%). Finally, the study comments that not all cases are reported to the police and that according to data from victimisation surveys, the actual number of burglaries of business premises, for example, would be almost 30% higher than the recorded incidents. While the sources of information are clearly official databases and victimisation surveys conducted in the Netherlands, no detailed methodology for producing the loss estimates was provided.

A Home Office estimate by Mills et al. (2013) places the scale of distraction burglaries in the UK at £35 million for 2010–2011. The authors note that distraction burglaries are a complex type of crime that is typically attributed to OCGs. While they assume 100% of the incidences are OCG related, they admit this may be an overestimate due to some cases being caused by individuals. However, the estimated scale of distraction burglaries is based solely on losses (value of stolen property), with the average value of property stolen estimated to be £2,040 (Mills et al., 2013)[201]. There are several similar single-country studies (e.g. Poland – see Czabański, 2009) and they all use the same approach to estimating losses based on number of incidents multiplied by the average value of the stolen property (typically obtained through surveys or experts' assessments).

Robbery should be regarded as an umbrella term for multiple types of crimes against persons ('personal robbery') or businesses ('commercial robbery'). The focus regarding OCGs is naturally on the commercial robberies, believed to be with higher OCG involvement. However, available statistics for the number of incidents on the EU or Member State levels do not distinguish between personal and commercial robbery.

Physical ATM attacks are a particular type of organised property crime including both burglaries and robberies, where OCGs are assumed to be the main perpetrator. The European Association for Secure Transactions (EAST), using data on reported incidents compiled by its national members in 20 Member States[202], reported that in 2018 there were €36 million in losses (cash stolen) from 4,549 physical ATM attacks – up from €31 million in 2017 (EAST, 2020). Europol similarly reports that financial losses in 2017 were over €30 million for Europe from physical ATM attacks, but provides no background on how this figure was arrived at (EUCPN, 2017). The latest data reported by EAST indicates the losses from physical ATM attacks for 2019 to be €22 million (EAST, 2020). The values represent the sum of all losses reported to EAST, but since the organisation relies on self-reported data from financial institutions and independent ATM deployers, it makes no representation as to their accuracy or completeness. Since the reported losses are in cash, no discount factor is needed to convert them to revenues of OCGs that perpetrated these crimes (EAST, 2020).

MVT: Levi et al. (2013) found that in 2011 unrecovered organised MVTs amounted to a **loss** of €4.25 billion. The average value of a stolen car in the UK for 2015 was estimated by Heeks et al. (2018) to be €4,340. However Fell et al. (2019) estimated the average value of an **unrecovered** stolen vehicle to be £9,308 (€10,648), and argued that the unrecovered stolen vehicles are more easily attributed to OCGs and therefore their value accounts better for losses related to OCGs. Both estimates draw on the 2015–2016 'Crime Survey for England and Wales'.

All identified studies that produce a monetary estimate of loss relied on the number of incidents (registered or estimated through victimisation surveys) to arrive at the total amount of losses. This was obtained by multiplying the number of incidents by the average value of the stolen vehicle (with value usually based either on victim reports or on insurance data). Very few authors try to estimate the OCG level of involvement (e.g. Fell et al. (2019) assume OCG involvement in average MVT is 61%, but 100% for 'car key' burglaries).

Cargo theft: Estimates for cargo theft have relied upon law enforcement data (Mills et al., 2013) and the Transported Asset Protection Association (TAPA) Incident Information Service (IIS), which produces estimates for Europe, the Middle East and Africa (EMEA). The Transported Asset Protection Authority (TAPA) EMEA Incident Information Service (IIS) is a database of reported transport-related theft incidents (TAPA, 2020b), which compiles industry data on these occurrences and provides a valuation of road freight and cargo theft at the EMEA level, including modus operandi of offenders (Ekwall & Lantz, 2012). The TAPA EMEA IIS shows that in the months of October and November 2019 there were around $5.5 million worth of goods reported stolen as a result of cargo theft in 12 EU Member States (TAPA, 2019). TAPA estimates that in the first nine months of 2019 over €80 million of goods was stolen across EMEA (King, 2019). Additionally, throughout the EMEA recorded cargo thefts in the IIS indicate financial losses in 2018 totalling €153.8 million (TAPA EMEA, 2019). Home Office data for the UK alone (2015–2016) shows that cargo theft amounted to £51 million (€59.7 million) lost in 1,189 incidents (Fell et al., 2019). According to a Europol report, the losses in EU 27 (the report was published prior to Croatian

[201] See p. 26, footnote 32 for the exact source.
[202] AT, CY, CZ, DK, FI, FR, DE, EL, IE, IT, LI, NL, PT, RO, SK, ES, SE, CH, UK.

ascension to the EU) from cargo thefts registered in the TAPA IIS database alone amounted to €424.4 million in 2007 (Europol, 2009; Savona & Riccardi, 2015).

While the estimates above are based on the number of cases reported to the TAPA EMEA ISS or registered by law enforcement authorities, Van den Engel and Prummel (2007) used a probabilistic model that aimed to include unreported cases of cargo theft to produce a total estimate of the losses. The model was based on the number of loaded trips (using data from Eurostat), the probability of a cargo theft taking place (authors' estimations) and the average cost of the stolen cargo (three cost groups based on the TAPA database). Using this approach, Van Den Engel & Prummel estimated that cargo theft in the EU accounts for €8.2 billion in losses for 2007 (Bulgaria, Greece, Malta, Romania were excluded due to lack of data) (Van den Engel & Prummel, 2007).

FreightWatch International & Supply Chain Intelligence Center (FWI SCIC, 2016) used Van Den Engel & Prummel's approach to update the estimate of the cargo theft cost in 2016, with a model based on more recent and detailed estimates (FWI SCIC, 2016). Most notably, they applied a proprietary risk analysis to each of the countries in the estimate using a large variety of quantitative and qualitative sources that were not available for the 2007 study. Their estimate for the total cost of stolen goods in 27 EU countries (except Malta) in 2013 was €11.6 billion – 41% higher than the 2007 estimate.

The applied approach was not described in detail. Engel & Prummel assume, based on their analysis, that the probability for an incident to occur during a 'short trip' was 1 in 5,000 and for a 'long trip', 2 in 5,000. FreightWatch used the same numbers but 'revised' them 'where necessary' by conducting their own analysis, which 'utilized a large variety of quantitative and qualitative sources'. No further information was given about the methodology used. Similarly, the average loss per incident in the case of Engel & Prummel was based on TAPA IIS database categories, but no detailed algorithm was provided. FreightWatch on the other hand applied their own 'conservative' estimate of €91,000 loss per incident for 2013, which differs considerably from the average loss of incidents registered in the TAPA ISS database, which was €235,000 in 2013. No further information is provided by FreightWatch on how the €91,000 estimate was produced.

The UK Home Office (Fell et al., 2019) estimated that in 2015–2016 the value of road freight crime in the UK was £51 million (€60 million). The study argues that all road freight crime is organised (Fell et al., 2019).

Trafficking of cultural goods: The desk research did not identify any estimates for the market value of trafficking in cultural goods in the EU. One recent estimate from 2011 was identified for the value of this market on global level. Haken estimated that annual value of the market amounts annually to between $3.4 billion (USD) to $6.3 billion (USD) worldwide (Haken, 2011). The estimate was produced by taking the average of the low estimates and the average of the high estimates reported in prior sources (some of them dating back as far as 1999).

2.9.2. Quality of prior revenue estimates

The prior studies described above were subject to a quality appraisal, and the following limitations were identified with regards to their methodologies:

- **Replicability and lack of data**. All of the identified methodologies for burglaries and robberies rely on input data from crime victimisation surveys. However, recent crime victimisation surveys are available only for a few Member States. Criminal statistics on registered crime do not account for the unreported crime and do not provide disaggregated data for the different sub-types of organised property crime.
- **Losses, not revenues**. One of the main limitations in estimating the value of the organised property crimes market stems from lack of data on actual revenues generated through organised property crimes. All existing methodologies provide estimates only for the **losses** resulting from various categories of property crimes. **None of the studies indicates to what extent these losses actually correspond to the revenues of the perpetrators**, except for cargo thefts and ATM attacks.
- **Share of OCG-perpetrated crimes**. Very few studies parse out what share of the crimes can actually be attributed to OCGs. It is impossible to define where organised property crime ends and conventional criminality begins for several of the property crime types, and this presents problems that can lead to both the undercounting and

over-counting of organised property crime incidents (Crime&Tech, 2017). Given the high volume of some of these crimes (e.g. burglaries), this additionally exacerbates the problem of overcounting. For example, in all identified cargo theft estimates, 100% of the incidents are *assumed* by the authors to be carried out by OCGs due to the level of organisation, knowledge or sophistication required to carry out said cargo theft. This assumption was also confirmed by two of the interviewed experts[203].

- **Different definitions of crimes** are applied across different Member State laws and national databases – for example, crime statistics from France do not differentiate between robbery and thefts without use of violence (Aebi, 2014). This can cause either under- or over-reporting, as some countries will have an inflated number of incidences based on looser definitions, and vice versa.
- **Undercounting** may stem from authorities being unaware of, or not properly recording, OCG cargo thefts. Furthermore, non-reporting from victims of theft who may fear reputational damages can result in additional undercounting (Van den Engel & Prummel, 2007).
- **Overcounting** may stem from crimes which were not carried out by OCGs but are then classified as organised property crime. For example, within the Van den Engel & Prummel dataset, crimes were classified as organised property crime if 'the circumstances of the crime suggest that the theft was well-planned and that the robbers know exactly what the target goods of the theft were' (Van den Engel & Prummel, 2007). This approach introduces both biases and assumptions into the data selection process that can then mar results (Van den Engel & Prummel, 2007).
- **Discrepancies in the methodological approaches** of the few prior attempts to produce quantitative estimates – for example some of the approaches for estimation of cargo thefts summarize reported cases of cargo theft, whereas others attempt to estimate the whole hidden cost through statistical/probabilistic methods. The former approach is typical for some Home Office reports (although others account for the crimes which are not reported to the police through victimisation surveys), and most notably for EU-level reports aggregating data from the TAPA EMEA IIS database (e.g. the Europol report from 2009). The latter is developed by Van den Engel and Prummel (2007).
- **Certain aspects of identified methodologies are unclear** – most notably some of the coefficients applied in the cargo theft methodologies are reportedly based on interviews with stakeholders and desk research but were not described in sufficient detail, and hence cannot be replicated.
- **Unreliable methodologies** – for example, Haken's approach for producing a market value for trafficking in cultural goods was to simply collect various prior estimates from distinct time periods and produce average values out of them, without accounting for their underlying methodologies (Haken, 2011).

[203] Interview with cargo theft expert, 27 February 2020 (#8); Interview with law enforcement expert, 12 March 2020 (#19).

Table 2.71: Prior studies estimating the revenue of organised property crimes in the EU

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (revenue)
Domestic burglary							
1	Heeks et al. (2018)	2015–2016	All domestic burglaries – organised and non-organised	Data from police recorded crime and Crime Survey for England and Wales	England and Wales	No	£973 million (€1.05 billion) lost in damaged or stolen property
2	Mills et al. (2013)	2010–2011	Domestic burglary – organised distraction burglaries	Data from police recorded crime and Crime Survey for England and Wales	United Kingdom	No	£35 million (€37.6 million) in economic cost
MVT							
3	Levi et al. (2013)	2011	Organised unrecovered vehicle theft	Eurostat	EU	No	€4.25 billion in losses
4	Heeks et al. (2018)	2015–2016	All MVT	Data from police recorded crime and Crime Survey for England and Wales	England and Wales	No	£281.5 million (€312.25 million) lost in damaged or stolen vehicles
Robbery							
5	EAST (2020)	2018	Robbery – ATM physical attacks	Not specified	Europe	No	€36 million in losses
Road freight and cargo theft							
6	Europol (2009)	2007	Road freight and cargo theft	TAPA IIS Database	EU 27 (Croatia not in EU)	Yes	€424.4 million of reported losses
7	FWI SCIC (2016)	2013	Road freight and cargo theft	European Commission road transport statistics for 2013	EU 27 (exclude Malta due to lack of data)	No	€11.6 billion lost from stolen goods
8	Fell et al. (2019)	2016	Road freight and cargo theft	National Vehicle Crime Intelligence Service (NaVCIS) Freight database	United Kingdom	No	£51 million (€60 million) combined value of vehicles and loads stolen
9	Van den Engel and Prummel (2007)	2004	Road freight and cargo theft	Data from 2003–2007, TAPA EMEA IIS database, stakeholder	EU 27 (Croatia not in EU, excluded BG, EL, MT, RO due to lack of data)	No	€8.256 billion lost from stolen goods

	Citation	Year(s) of estimate	Sub-market	Data source(s)	Countries included in estimate	Disaggregated at Member State level?	Estimate produced (revenue)
				questionnaire, NEA-cost calculation models			
Cultural goods trafficking							
10	Select Committee on Culture, Media, and Sport (2000)	Unclear	Cultural goods trafficking – classical antiquities	Not specified	Europe and Mediterranean	No	Between £200 million and £300 million (€235.39 million and €353 million) a year
11	Haken (2011)	Unclear	Cultural goods trafficking – antiquities	Not specified	Worldwide	No	Between $300 million and $6 billion (€273.6 million and €5.47 billion) per year

Note: All revenue estimates presented in this table reflect the original years for which they were produced. They have not been adjusted for inflation, as we have done for the final estimates used in the current study.

2.9.3. Methodology for estimating revenues in this study

A replicable and reliable methodology for estimating market revenues was identified only for cargo thefts, and not for the rest of organised property crimes. For the rest of the crimes no estimate for market revenues were produced for one or more of the following reasons: they are not homogeneous markets (e.g. OCG involvement varies between particular types of robbery, burglary and MVT); incidence rates are not disaggregated for specific types of crime (e.g. type of burglary); losses cannot be estimated adequately; and loss estimates cannot be directly converted into revenues. The identified value of overall loss due to ATM attacks represents the sum of overall reported losses across the EU for 2019, and hence does not require further estimation.

The methodological approach we adopted for estimating the market value of cargo thefts in this study is a probabilistic incidence-based approach suggested by Van den Engel and Prummel (2007). The approach draws on number of reported incidents, number of actual incidents per 5,000 trips, and average loss. The summary of the approach for measuring the market value of cargo theft crime in the EU is outlined in the table below.

Table 2.72: Summary of approach for estimating revenue from cargo thefts

Summary of approach	Reliable estimates are produced only for the **cargo-theft sub-market**. Incidence-based approach was used: number of incidents is multiplied by the average loss per incident.
Rationale	The approach fulfils the criteria for reliability and robustness and can be replicated, since all the required input data is available.
Output	The approach estimates total loss (value of stolen property), which is assumed to be an adequate proxy for the OCGs' revenues for the covered sub-market.
Scope and coverage	**Geographical scope**: EU-level and Member State level. **Year(s) of estimate**: 2013–2018 for the whole EU; 2018 for Member States, updated to 2019 values. **Sub-markets**: only cargo theft sub-market is covered.
Data sources	Eurostat, number of loaded cargo trips for estimating the number of incidents. Transported Asset Protection Association (TAPA) Incident Information Service (ISS) database for average loss per incident estimates. Transported Asset Protection Association (TAPA) Incident Information Service (ISS) average losses per incident are: €235,000 for 2013; €205,624 for 2014; €101,256 for 2015; €68,359 for 2016; €62,178 for 2017; and €53,625 for 2018.
Key steps	The methodological approach outlined for estimating the market value of cargo theft in this study involves the following steps: 1. Based on the desk research, it was concluded that the cargo theft market is a relatively **homogenous** one. 2. Number of registered **incidents** is available from the Transported Asset Protection Association (TAPA) Incident Information Service (ISS) database, and actual cases could be estimated applying Engel & Prummel's probabilistic approach: number of loaded cargo trips is extracted from Eurostat and divided into long (>300km) and short (<300km). Probability of an incident to occur is applied: 0.0001 for short trips and 0.0002 for long ones. 3. Average **loss** per incident is available from the Transported Asset Protection Association (TAPA) Incident Information Service (ISS) database. 4. In this particular case it can be assumed that the **revenue** is somewhat equal to the value of the stolen property (the loss), as some experts suggest that the stolen goods are sold for their full price on eBay and similar online outlets[204]. 5. Applying the formula:

[204] Interview with cargo theft expert, 27 February 2020 (#8).

	$Total\ value = number\ of\ incidents_i * Average\ revenue\ per\ one\ incident_i$ Where: i stands for Member States. The total market value is computed as the sum of the total revenue estimates for all Member States.
Limitations and caveats of this approach	As with any probabilistic approach, the current one has certain limitations stemming mainly from the assumptions that: - TAPA ISS average loss is representative for all incidents; - the ratio of 1 in 5,000 short trips and 2 in 5,000 long trips is adequate to produce a reliable estimate of the actual number of incidents; - the losses (or value of stolen property) could be turned into revenues without a significant discount.

MVT, domestic burglary and robbery

Tentative loss-based estimates were produced for **MVT**, **domestic burglary** and **robbery** crimes. These estimates are based on Eurostat data for the number of incidents and survey data for the average loss per incident. The results should be used with caution and only as gross guestimates of the value of losses incurred by households and businesses from these three types of organised property crimes. There are various methodological caveats inherent to these estimates, some of which were discussed in the previous section. These loss-estimates cannot be considered an adequate proxy for their corresponding market value, mainly because there is no data for these three markets on how losses relate to revenues of OCGs, since there is an unknown discount factor. In addition to that, there is no reliable quantitative estimate for OCG participation in these markets.

The methodological approach we adopted for estimating the value of losses from burglary, robbery and MVT in this study is an incidence-based approach suggested by Heeks et al. (2018). The approach draws on number of reported incidents and average loss. The summary of the approach for measuring the losses from the three types of organised property crime in the EU is outlined in the table below.

Table 2.73: Summary of approach for estimating losses from MVT, domestic burglary and robbery

Summary of approach	Guestimates are produced for the **MVT**, **domestic burglary** and **robbery** sub-markets. Incidence-based approach was used: number of incidents is multiplied by the *average* loss per incident.
Rationale	The approach does not fulfill the criteria for reliability and robustness. It can be replicated, but losses **cannot** be considered an adequate proxy for revenues for these sub-markets, and OCG involvement cannot be estimated, which means that the calculated numbers include a large portion of conventional crimes that cannot be attributed to OCGs. These estimates are produced as very gross approximations of the upper bounds of losses due to these three types of organised property crime.
Output	The approach estimates total loss (value of stolen property).
Scope and coverage	**Geographical scope**: EU-level and Member State level. **Year(s) of estimate**: 2017. **Sub-markets**: MVT, domestic burglary and robbery.
Data sources	Eurostat, number incidents for the corresponding crimes. Available estimates in the literature for the average loss per crime: €3,651 average loss per MVT[205], €2,700 average loss per burglary (Boerman et al., 2017), and €1,167 average loss per robbery (Heeks et al., 2018).
Key steps	The methodological approach follows the formula below: $Total\ loss = number\ of\ incidents_i * Average\ loss\ per\ one\ incident_i$ Where: i stands for particular Member States. The total loss for EU is computed as the sum of the total loss estimates for all Member States.

[205] Europol, SIS-alerts art. 38(1) and 38(2) in 2018.

Limitations and caveats of this approach	These estimates are produced only as very gross approximations of the upper bound of losses due to the three types of organised property crime. Reliable estimates for the market revenues from these sub-markets cannot be produced.

2.9.4. Revenue estimates of cargo theft and ATM attacks in the EU

The table below presents the estimates of cargo theft and ATM physical attacks in 2019 at the EU-level and for each of the EU Member States (without Malta).

Table 2.74: Revenue estimate of cargo theft and ATM physical attacks

EU Member State	Annual revenue, adjusted for inflation, 2019 (€ million)			
	Cargo theft*			ATM physical attacks
	Mid	Low	High	Low
28 EU Member States	**3,347.85**	**144.39**	**6,551.32**	**22**
27 EU Member States without UK	**2,970.26**	**49.87**	**5,890.70**	
Austria		-	168.96	
Belgium		1.37	64.00	
Bulgaria		-	58.20	
Croatia		-	34.04	
Cyprus		-	13.20	
Czech Republic		0.45	267.10	
Denmark		0.14	57.76	
Estonia		-	9.06	
Finland		-	85.76	
France		2.57	685.84	
Germany		6.84	1,517.43	
Greece		-	150.83	
Hungary		0.36	93.62	
Ireland		0.76	71.71	
Italy		5.87	356.40	
Latvia		0.66	25.29	
Lithuania		-	41.80	
Luxembourg		-	19.07	
Malta		-	-	
Netherlands		18.52	307.18	
Poland		-	663.46	
Portugal		0.25	68.65	
Romania		8.72	110.27	
Slovakia		0.83	139.51	
Slovenia		-	39.51	
Spain		1.24	641.06	
Sweden		1.29	200.97	
United Kingdom		94.52	660.63	

Notes: Estimates were produced for 2013–2018 (mean) and updated to 2019 values using Eurostat's HICP (Eurostat, 2020b). * No high estimate could be produced for Malta, as there are no data about the number of loaded trips in Malta in Eurostat. There are no reported cases of cargo-theft loss for Malta in the TAPA IIS database, therefore the low estimate is 0.

Cargo theft

With regard to cargo theft, the results show that the market can be as large as €6.5 billion despite the much smaller sum of the losses (€144 million) based on reported incidents, which is used above as a low bound.

The source for the lower bound estimate was the TAPA IIS database, which is the best source of information on this market (TAPA, 2020a). The TAPA IIS report for 2018 covers all EMEA countries. The total reported losses (based on the 2,869 cases of reported loss values) was €153.85 million. Of these, €136.36 million were reported in Member States as presented in the table; €16.57 million were the losses from incidents in third countries (Russia, Saudi Arabia and South Africa). €0.91 million of losses could not be attributed to any particular country from the information provided in the report, and included smaller cases. Croatia, Cyprus, Estonia, Lithuania, Luxembourg and Malta reported no cases of cargo theft to the TAPA IIS database in 2018. Austria, Bulgaria, Finland, Greece, Poland and Slovenia reported 20 cases in total, with losses not discussed in the TAPA IIS report.

Larger losses are estimated for Germany, France, Poland, Spain and the UK. However, since the estimates use the same average loss per incident for all Member States, differences in the market value stem from differences in the number of incidents. These, in turn, use the same probability coefficients for all Member States and therefore the differences between the states reflect purely the number of loaded trips as reported by Eurostat. Since the probability of cargo theft occurring might vary between Member States, the current estimates of the levels of Member States should be interpreted with caution. Still, since the crimes are perpetrated by highly mobile groups, it is possible that the incidence rates coincide with the main trade routes (as the results above suggest). This is supported by cases registered in the TAPA IIS base during 2019 (the year after the above estimates), when Germany, for example, had the highest number of recorded incidents (one-third of the incidents registered by TAPA IIS in 2019) (TAPA, 2020a).

While TAPA IIS is the best and only source of structured information on cargo theft, it should be noted that the reliability of the database has improved greatly during the last few years: the number of cases in the database reporting loss value was only 341 in 2015, but increased more than three times to 1,136 in 2016, and continued to increase to 1,690 in 2017 and 2,869 in 2018. The latest TAPA report based average loss estimates on 3,344 cases that reported the value of the stolen property in 2019. This is a very large sample for this type of crime, and even if the sample is not representative, the loss estimates for the last few years could be considered quite reliable. Previous estimates, however, could be subject to reporting bias (e.g. higher loss value cases are more likely to be reported to the database, and to mention the value of the stolen property, than lower loss cases).

ATM theft

The current study has not produced an estimate for ATM attacks, but we identified a reliable market value reported by EAST in the literature review. EAST systematically collects and publishes data on the number and value of reported ATM physical attacks in the EU on an annual basis. According to their most recent report for 2019, the overall value of losses from reported ATM physical attacks is €22 million in 2019 (EAST, 2020).

Box 8: Estimates of the costs of organised property crime in the EU

Tentative loss-based estimates for MVT, domestic burglary and robbery can be calculated, but should be used with great caution due to multiple methodological limitations of the estimates. Loss-based estimates are not the same as revenues, and therefore cannot be directly compared to other organised crime markets for which revenue estimates have been produced.

- MVT losses (different from revenues) are estimated to be as high as €2.5 billion (an upper bound estimate).
- Domestic burglary losses (different from revenues) are estimated to be as high as €3 billion (an upper bound estimate).
- Robbery market losses (different from revenues) are estimated to be as high as €462 million (an upper bound estimate).

EU Member State	Losses from organised property crimes (€ million)		
	MVT	Domestic burglary*	Robbery
	High	High	High
28 EU Member States	2,526.27	3,389.86	461.91
27 EU Member States without UK	2,093.81	2,674.05	369.47
Austria	29.23	31.87	3.05
Belgium	54.19	179.21	22.12
Bulgaria	8.65	11.97	1.82
Croatia	3.12	12.24	1.01
Cyprus	3.51	2.49	0.14
Czech Republic	77.97	19.53	1.85
Denmark	0.80	109.06	2.38
Estonia	1.24	2.61	0.23
Finland	22.27	12.88	1.91
France	589.75	651.24	116.79
Germany	197.59	314.66	45.34
Greece	124.24	59.52	4.98
Hungary	11.59	54.79	0.98
Ireland	17.90	-	2.55
Italy	532.23	528.72	36.37
Latvia	3.95	3.86	0.70
Lithuania	3.65	6.99	1.27
Luxembourg	6.22	5.73	0.53
Malta	1.21	2.30	0.24
Netherlands	92.93	134.44	9.32
Poland	45.46	57.02	9.47
Portugal	37.44	33.21	13.87
Romania	10.69	39.09	3.69
Slovakia	5.56	4.44	0.55
Slovenia	1.97	7.84	0.28
Spain	120.11	283.77	77.94
Sweden	90.34	104.58	10.09
United Kingdom	432.46	715.81	92.44

* Domestic burglary estimates do not include Ireland.

2.9.5. Criminal actors and modus operandi

Table 2.75: Organised property crime – Market actors

Level of OCG involvement	Domestic burglary – High involvement. Robbery – Varies between medium and high involvement, based on the type of robbery. ATM physical attacks – Almost all attacks perpetrated by OCGs. MVT – Almost all thefts of newer cars are carried out by OCGs.

	Road freight and cargo theft – Nearly all cargo thefts are carried out by OCGs. Trafficking in cultural goods – High involvement across all levels of trafficking cultural goods.
Size and composition of OCGs	On average around 3 to 5 males per operation but can be as many as 30 individuals. Perpetrators mostly from East and Southeast Europe.
Modus operandi of OCGs	Highly adaptable groups that can move from one target area to another, and one crime market to another. Utilise criminal networks and legitimate offline and online channels to sell stolen goods and remain undetected by law enforcement.
Poly-criminality of OCGs	High levels of poly-criminality, especially within Organised Property Crimes sub-markets, e.g. MVT OCGs carrying out cargo thefts, robberies, or occasionally burglaries.
Other key actors	Legitimate business owners.

We identified 65 studies in the literature review that included information on the key actors in organised property crime in the EU. These studies showed that **many actors carrying out organised property crimes are MOCGs** originating from Eastern European countries who systematically commit a significant number of property crimes over large areas across Europe (Van Daele & Vander Beken, 2010). Van Daele further argues that these groups should be defined as mobile or itinerant since they travel from their origin countries to Western Europe to carry out crimes (Van Daele & Vander Beken, 2010). In an interview with a law enforcement representative[206] they noted that EU enlargement and subsequent increase in free movement has provided new opportunities for criminals, resulting in an extremely profitable market from organised property crimes in the European Union alone (Europol, 2017).

The United Nations Office on Drugs and Crime (UNODC) notes that 'low-profile, agile' MOCGs are capable of carrying out crimes without any recognition of their involvement in a wider organisation (UNODC, 2010). This is in part because these criminal groups are highly mobile and commit a number of crimes in a region over a short duration before moving on (Europol, 2020f). In addition, a theft in one city does not seem connected to a theft in another, which makes organised property crime a lucrative and low-profile revenue source (Ronchi, 2018). OCGs operating in organised property crime can range from highly hierarchical formal groups to informal loose networks of criminals who occasionally carry out crimes together (Le, 2012). Even if arrested criminals are most likely to be charged only with the direct crime they commit – due to ignorance of a wider conspiracy at play or from the inability to prove organised property crime are anything more than mundane criminal acts (Fijnaut & Paoli, 2004). As a result, this insulates those higher up the criminal hierarchy from law enforcement, and protects criminals from harsher punishments attached to being part of SOC, further highlighting the low-risk, high-reward structure of organised property crime (Savona & Riccardi, 2015).

A 2018 report by Transcrime found evidence that Albanian, Romanian and Georgian members of MOCGs commit organised property crime in France, Italy, Spain and the UK (Savona & Riccardi, 2018). A 2017 report noted that MOCGs from Bosnia and Herzegovina are some of the most commonly reported **nationalities** for organised property crime in the EU, and are involved in various organised property crimes including domestic burglary and robbery (European Parliament, 2017a). It also mentioned nationals of Serbia carrying out organised property crime in Belgium, France, Germany and Italy; Moldovan MOCGs in Austria, France, Germany, Latvia and Poland; and Georgian MOCGs in France, Greece, Germany, Italy and Spain. Interviews with experts echoed these findings, noting that many MOCGs travel from countries such as Belarus, Poland, Romania and Russia to carry out cargo theft operations in Western Europe[207]. Further interviews noted Latin America and North Africa as common origins for MOCGs[208].

The **type of goods** targeted by OCGs carrying out property crimes depend on both the crime and the organisation's skill level. Expert interviews noted that highly structured organisations have the skills to carry out more lucrative, but riskier property crimes, such as stealing a specific

[206] Interview with Spanish national-level expert, 22 April 2020 (#72).
[207] Interviews with cargo theft expert, 27 February 2020 (#39); Interview with law enforcement representative, 12 March 2020 (#50).
[208] Interviews with law enforcement representative, 22 April 2020 (#72); Interview with expert from a non-profit organisation, 27 April 2020 (#74).

container from a warehouse or pieces of art from a museum[209]. In contrast, loosely structured groups are often involved in more opportunistic property crimes – such as domestic burglaries – where they can steal jewellery, electronics and other items containing gold which can easily be sold at pawnbrokers or 'Cash for Gold' shops (Wollinger et al., 2018, p. 17).

Because of the differences in each organised property crime sub-market, each market has some unique characteristics, which include varying levels of OCG involvement and differing actor profiles. **Burglaries** in the past were carried out by locals, but one law enforcement expert estimated that between 60% and 80% of burglaries are now carried out by MOCGs from Eastern Europe[210]. Wollinger et al. found that these MOCGs comprised of otherwise unemployed men often working in small groups on multiple burglaries over time, ranging between the ages of 30 and 50, and considered to be professionals with years of experience (Bezlov et al., 2011; Wollinger et al., 2018, p. 17).

Conversely, due in part to individuals aging out of crime, or at least moving away from violent crimes, the average **robber** is between 20 and 30 years old (Cornelius et al., 2017; HM Government, 2018). Additionally, the young age can be attributed to the fact that as individuals age they become both physically weaker and less intimidating, and as a result may shift towards being an advisor or financial backer, rather than an active participant (Fijnaut & Paoli, 2004). Others move away from robbery because of the risk of being caught and the associated penalties being too high, which – according to one law enforcement representative[211] – has contributed to the decline in robberies. Most robberies are carried out by a small group but attacks, such as some physical ATM attacks, can have as many as 10 perpetrators who act as lookouts, looters and 'muscle' (ATM Industry Association, 2014; Europol & EUCPN, 2019).

Those carrying out **physical ATM attacks** closely resemble the overall profile of most OCGs in organised property crime, and especially those MOCGs involved in both burglary and robbery[212]. This includes having experienced criminals who utilise their skills and expertise to quickly break into ATMs and carry out attacks over time and across regions (Europol & EUCPN, 2019). Whereas more inexperienced, opportunistic criminals may struggle or fail in disarming ATM security mechanisms and subsequently revert to traditional property crimes (Europol & EUCPN, 2019).

For **MVT**, anti-theft protections – such as electronic tracking systems or passive immobilisers – have resulted in a market that is challenging for the common criminal who lacks the tools or skills to steal cars efficiently or effectively (Savona & Riccardi, 2015). As such, this has resulted in a market that is dominated by OCGs (Siegel, 2014) who have access to tools that can break or bypass security measures – according to one interview with law enforcement[213]. In addition, selling a stolen vehicle requires a substantial amount of 'legwork' and a network of individuals to drive the car to a new country, alter documents and find potential buyers (Van Daele & Vander Beken, 2010).

The vast majority of **cargo thefts** are carried out by OCGs, though with differing levels of organisation[214]. Some highly skilled heists, as mentioned in an interview with law enforcement, include the theft of a particular pallet of valuable pharmaceutical products that was stored inside a warehouse containing hundreds of pallets[215]. The level of specificity required to carry out this very focussed theft is evident that this was more than an opportune crime, and involved information as to where the exact pallet was located. Other cargo theft that requires very little organisation from actors relies on lax security or 'curtain slashing' – cutting the tarp that protects truck cargo – accounts for around 50% of all cargo thefts, according to Europol (Boerman et al., 2017; Europol, 2009). Additionally, truck stops or rest areas with little to no security make it easy for less-skilled OCGs to steal cargo as the driver sleeps or when trucks are left unattended at industrial parks (Sudy et al., 2013).

Actors who **traffic cultural goods** operate within a legal, finite and niche market requiring specific skills and a level of knowledge to locate, loot and later transport illicit cultural goods to sell internationally (Campbell, 2013). As a result it can be an extremely profitable market, and

[209] Interviews with cargo theft experts and cultural goods trafficking experts, 26 February 2020 (#38) and 27 February 2020 (#39).
[210] Interview with law enforcement representative, 8 April 2020 (#61).
[211] Interview with law enforcement representative, 8 April 2020 (#61).
[212] Interview with expert from non-profit organisation, 27 April 2020 (#74).
[213] Interview with law enforcement representative, 8 April 2020 (#61).
[214] Interview with cargo theft expert, 27 February 2020 (#39).
[215] Interview with cargo theft expert, 27 February 2020 (#39).

because punishment is lenient and rarely ends in prison sentences there is little incentive for criminals to stop trafficking in a lucrative market that is less risky than either the illicit drug or illicit firearms market (Chonaill et al., 2011). As such, cultural goods trafficking is increasingly being carried out by OCGs – although Campbell notes that the extent to which they operate in trafficking is difficult to measure, due in part to the fragmented and complex nature of the art market (Campbell, 2013). This has resulted in a market whose value and profits to OCGs are impossible to trace. Existing estimates are from 2000 or before and are both not specific to the EU and, more importantly, lack information on the methodological approach followed to arrive at their estimates.

The involvement of OCGs depends largely on which type of crime is committed and how the goods are trafficked. This can further depend on where and how goods are sold, since there are numerous routes for cultural goods to enter the market (UNESCO, 2018). The United Nations Educational, Scientific and Cultural Organisation (UNESCO) noted that less valuable or non-descript works may be sold relatively easily to pawn shops or brokers, but other goods require greater levels of knowledge or contacts to appraise or to gain access to the buyers' market (UNODC, 2018e). According to UNESCO other forms of trafficking require even greater levels of connections, to government officials who will assist in forging export or import documents, or corrupt law enforcement agents willing to turn a blind eye to the trafficking (UNESCO, 2018). This level of trafficking requires organisation and networks that can be relied on to discreetly sell or traffic goods, indicating, according to Renold (2018), that OCGs play a greater role in this form of trafficking.

For cultural goods that are trafficked OCGs can play a role in every step of the process – from coercing locals to excavate or hand over cultural goods, to being the middleman who locates a buyer, or selling the product directly to a buyer (Chechi, 2019). Regardless of the role OCGs play in the trafficking of cultural goods there are, in general, three ways the trafficked items are acquired: theft, illicit excavation, and producing fakes (UNESCO, 2018). Theft often involves professional criminals breaking into museums, places of worship and private collections to acquire goods (Garrett, 2019). One expert on cultural-goods trafficking stated that illegal excavations are often carried out by locals who may or may not be aware of the legality of their actions, and are often abetted by local law enforcement[216].

Modus operandi

Burglaries most commonly occur when criminals simply break into homes when the owners are away, often after surveilling or 'casing' the property and surrounding areas (Van Daele & Vander Beken, 2010). Houses are chosen based on their accessibility and potential payoff, with burglars preferring houses that have fences or landscaping that provides concealment from potential witnesses (Kruize & Sorensen, 2018). In Ireland, for example, criminals have moved to rural regions, utilising motorways and technology to carry out crimes more efficiently and with less risk (Agnew, 2020). Europol found that this includes using social media to track when individuals are away from their homes and using online navigation tools to scout neighbourhoods (Europol, 2017, p. 47).

The target for **robberies** has become more random, with traditional targets such as banks no longer being targeted by any 'smart criminal' – as noted by one interview with a representative from law enforcement[217] – due to having better security and less cash. Additionally, Van Duyne et al. found that criminals move away from robbery by investing illicit profits in other less risky criminal ventures, such as drug trafficking, or opening legitimate or semi-legitimate businesses (Van Duyne et al., 2016). In many cases organised robberies consist of long-term professional, specialised criminals who come together to form short-term groups that carry out a handful of robberies before going their own way (Rosta'mi et al., 2018).

Europol & the EU Crime Prevention Network (EUCPN) note that gas and explosive attacks are the most common **physical ATM attacks**, followed by in-situ attacks and rip-out/ram-raid attacks (Europol & EUCPN, 2019, p. 4). Gas attacks can be carried out using easily sourced hydro-carbon gas mixes found in welding and cutting equipment, and can be detonated with igniters found in consumer gas products (ATM Industry Association, 2014). Explosive attacks are carried out using material such as dynamite, gelignite, C4 and even grenades (Europol & EUCPN, 2019). To carry out such attacks the criminals gain access to the ATM by breaking or bending the shutter after a cash transaction, or by cutting or drilling into the ATM (ATM Industry Association, 2014, p. 11).

[216] Interview with an expert from an international organisation, 26 February 2020 (#38).
[217] Interview with law enforcement representative, 12 March 2020 (#50).

This allows them to then place the explosive material or gas into the machine for detonation to gain access to the cash holder (Srinivasan et al., 2019). Conversely, rip-out and ram-raid attacks require much less planning and knowledge, with individuals often stealing a vehicle and either ripping the ATM out of its location or using the vehicle as a ram to gain access to the ATM before taking the ATM to another location where it can be broken into (Check Point, 2019). Similarly, in-situ attacks require little to no expertise in ATM security mechanisms and rely on brute force, using tools to cut or break into the ATM (Europol & EUCPN, 2019).

Unique to **MVT** is the variety of reasons why criminals may steal a car (Europol, 2017). Some vehicles are stolen as a means to commit other crimes, with high-performance cars being stolen and used as getaway cars in other organised property crimes, or vans and trucks used in ram attacks on ATMs (Savona & Riccardi, 2015). In other thefts the car is stolen for its resale value or to use[218]. One law enforcement representative noted that MOCGs target both high-end luxury vehicles and less valuable but more common models[219]. Additionally, cars are frequently stolen for their parts, which are increasingly being sold online to both EU and international customers[220], with one law enforcement interviewee noting China as an increasingly popular destination for 'chopped' parts[221].

As noted by Burges (2012), **methods of cargo theft differ based on the criminals involved**. Some of these operations involve pre-planned measures to carry out thefts and protect the criminals from being identified, including using stolen cars or fake license plates, GPS and mobile phone jammers, and communication through walkie-talkies (Boerman et al., 2017, p. 210). Other cargo thefts identified by Boerman et al. (2017) and in interviews involve the would-be thieves pretending to be contracted cargo carriers in online freight exchange systems who pick up the cargo under the guise of being a legitimate business, the ruse only exposed when the goods never reach their destination (Boerman et al., 2017). Cargo thieves occasionally receive assistance from workers within the supply chain who provide route plans, information on security or PIN codes and forged documents, although this is rare (Boerman et al., 2017; Europol, 2009).

Cultural goods can originate from all over the world and often make their way to or through Europe. As the biggest art market in terms of sales, recorded cross-border trade of artworks and art exported – in addition to being the second-largest importer of art – Europe is frequently at the centre of the trafficking problem (Renold, 2018). Oosterman mentions that increased law enforcement focus on the trafficking of cultural goods has resulted in tightened security measures around heritage sites to prevent looting in many European countries (Oosterman, 2019). However, in South Eastern Europe looting remains a vexing problem, with illegal goods frequently found for sale on the European market (UNESCO, 2018). Other cultural goods entering Europe come from art-rich countries that lack adequate control mechanisms for protecting artefacts and historical sites. Whether this is due to regional instability in countries such as Syria and Libya, or due to a lack of resources to effectively protect cultural goods, the goods rarely stay in their country of origin (Europol, 2017). Instead they are usually moved through transit countries that provide pathways to a wider market, to reach the more profitable European or American markets, where they are sold to wealthy collectors or dealers in private or public sales (UNESCO, 2018).

According to Gruber (2019), individuals and OCGs involved in cultural-goods trafficking often rely on the ignorance of buyers to obfuscate an item's provenance, in addition to creating fake export documents, import licenses or certificates of authenticity to mask the illegal origin of cultural goods. This has created ambiguity on the legality of pieces, creating difficulties for buyers to verify that pieces are legal (Shea, 2018). As a result, this can cause buyers to dismiss suspicions that a piece is illicit and choose to simply assume their purchases are both legal and ethical (Gruber, 2019). This makes cultural-goods trafficking particularly attractive for money-laundering – in which criminals pass pieces through legitimate auction houses using fraudulent sales to make money 'clean' (Polner, 2019). As a result, Mackenzie notes that this can make differentiating between sales of legal goods and illegal goods difficult – as buyers are often unaware or indifferent to how a piece was acquired (Mackenzie, 2019). This level of secrecy, inherent in much of the art world, has created difficulties for curbing the illegal sale of cultural goods, and makes it impossible to know the provenance of an item (Day, 2014). This is exacerbated by the fact that once goods are stolen their trajectory in the market is obscured and their destinations are often unknown (Gill, 2019).

[218] Interview with law enforcement representative, 22 April 2020 (#72).
[219] Interview with law enforcement representative, 12 March 2020 (#50).
[220] Interview with law enforcement representative, 22 April 2020 (#72).
[221] Interview with law enforcement representative, 8 April 2020 (#61).

2.9.6. Future trends and dynamics

Table 2.76: Organised property crime – Future trends

Future trends and dynamics	Increased use of technology, including Information and Communications Technology (ICT), to sell stolen goods and elude law enforcement detection. Increased organisation in carrying out organised property crimes. Rising profitability from trafficking cultural goods, as art and antiquities remain in high demand.
Impact on market and criminal finances	Continued fusion of legitimate and illegitimate businesses to obscure criminal gains from organised property crime. Growing use of internet to circumvent authorities and sell goods anonymously.

We identified 30 studies in the literature review that included information on the future trends and dynamics in organised property crime in the EU. These studies showed differing outcomes based on the organised property crime market. Overall trends in **domestic burglary and robberies** indicate either a rise or no change in the number of occurrences in the last decade across the EU (Europol, 2017). For domestic burglary this is in due part to the fact that while home security has improved and law enforcement becomes more accustomed to how to stop or deter burglars, it still remains a lucrative market (De Stercke et al., 2014). Increasing rates of robberies can also be partially attributed to improvements in police recording, despite security measures taken to curb robberies (Home Office, 2018). Similarly, **MVT** rates have stabilised across much of Europe, however the number of recovered cars has decreased, which Europol credits to professional thieves who know how to elude detection (Europol, 2020f).

Much like the other organised property crimes discussed, trends indicate that the market for **trafficking of cultural goods** remains strong and will continue to grow. The antiquities market is a profitable and relatively safe, recession-proof market in which supply and demand will continue to increase in the future (Shea, 2018). One barrier is that even though most nations are signatories to the 1954 Hague Convention and the 1979 UNESCO Convention – or at least have laws that protect cultural heritage sights – these national laws often differ or are incongruent to the international laws related to cultural goods trafficking. A Commission study touched on these differences in legal systems from the source country, along with how definitions of cultural goods vary and different techniques and methods are used to protect and control these goods through domestic laws (Armbrüster et al., 2011). It also noted that a lack of experts on the subject has damaged some EU Member States' ability to properly identify and curb the problem – especially as OCGs find more sophisticated ways to forge legal documentation of antiquities.

One growing trend faced by law enforcement in combating organised property crimes is **the increasingly sophisticated methods** used by the OCGs who carry out these crimes[222]. Some OCGs buy tools, which can have legal uses, that disable car alarms and GPS, or allow keyless entry to cars[223]. Some OCGs have used other techniques that use jamming or spoofing technologies to facilitate cargo thefts, as mentioned in one interview with a cargo theft expert[224]. Additionally, both social media and GPS have allowed thieves across all organised property crimes to monitor the comings and goings of targets and plan routes without ever coming into contact with victims (Profiling, 2015). These technologies have allowed OCGs to carry out crimes more effectively and efficiently, while simultaneously lowering their criminal profile to police as they are able to mask criminal intentions and evade capture[225]. Another trend is the continued and increased reliance on the use of online platforms to sell loot anonymously and remain undetected by law enforcement (Wollinger et al., 2018). This is universal across organised property crime markets, as the internet is often the easiest and safest way to sell stolen goods, with sellers able to sell goods both within the EU and internationally (Aniello & Caneppele, 2017).

[222] Interview with cargo theft expert, 27 February 2020 (#39).
[223] Interview with law enforcement representative, 8 April 2020 (#61).
[224] Interview with cargo theft expert, 27 February 2020 (#39).
[225] Interview with law enforcement representative, 8 April 2020 (#61).

2.9.7. Recommendations

The current study suggests two possible ways in which data collection and estimations of the organised property crime market could be improved, although both would be costly and difficult to implement:

- First, Eurostat currently reports numbers of incidents for robbery, MVT, domestic burglary and commercial burglary. If incidence rates for the sub-types of these crimes were also collected/reported, this would allow for **estimates of organised property crimes for specific sub-markets** – such as distraction burglary, plant theft, theft of cash and valuables in transit. Given the differences in legislation between Member States, however, this is rather unlikely to be feasible, since even current more general crime types – like robbery and MVT – are not considered completely reliable for comparisons between Member States (van Dijk et al., 2014).
- Second, **conducting large-sample harmonised cross-country victimisation surveys** among populations – and especially businesses – could be a much better source of data (albeit a costly one) for estimating OCG markets. Such surveys would allow the collection of detailed information about losses and improve rates of reporting to the police for different organised property crime types, along with other relevant details through which revenue estimates could be produced for more organised property crime sub-markets.

The key findings from this study and the related recommendations are summarised in the table below.

Table 2.77: Recommendations – Organised property crime market

Key finding	Recommendation	Actor
Criminal statistics on registered property crime collected by Eurostat do not provide disaggregated data on incidents for the different sub-types of organised property crime (e.g. plant theft, theft of cash and valuables in transit), which would allow better differentiation of crimes with high OCG involvement from high-volume crime. All identified methodologies account for the unreported crime and rely on input data from crime victimisation surveys. Such surveys are available only for a few Member States. A lack of data on the ratio between monetary value of stolen property and revenue of criminals makes it impossible to estimate revenues of organised property crime.	Collect incidence rates for specific types of organised property crime, especially the ones known for high involvement of OC. Conduct large-sample harmonised cross-country victimisation surveys among populations – and especially businesses – in all EU Member States on a regular basis. Such surveys should collect detailed information about losses per incident and rates of reporting to the police for different organised property crime types. Member States should systematically report information on revenues generated through property crimes – which is currently collected by police or judicial authorities in the course of some of their investigations – to the European Commission.	Eurostat Member States European Commission

3. Serious and organised crime investment and infiltration in the legal economy

3.1. Additional information on investments by OCGs in the legal economy

Shann Hulme, RAND Europe

Key findings:

- The predominant sectors of known investments by OCGs in the legal economy are property/real estate, transportation and construction. However, there is a lack of robust data to quantify such investments and it is likely that current understandings are not representative of the phenomenon.
- Cash couriers are used by OCGs for transferring proceeds generated from cash-based markets, such as illicit drugs, THB and illicit tobacco.
- Electronic funds may be transferred by OCGs through money muling or 'smurfing'.
- Cryptocurrency exchange services and mixing or tumbler services are used for transferring cryptocurrencies and funds earned through cybercrimes.

This annex provides additional background from the literature review on investments by OCGs in the legal economy, and supports the analysis presented in **Section 3.1** of the main report.

Specifically, this annex focuses on the drivers of OCG investments.

3.1.1. Drivers of investments by OCGs in the legal economy

The literature review identified 14 studies conducted since 2015[226] that offered information on investments made by OCGs in the EU legal economy. These studies mainly relied upon country-level case studies and information on assets that have been frozen or confiscated from OCGs by EU Member State authorities. There is a disproportionate focus in prior research on investments by OCGs operating in Italy and the Netherlands. As a result, current knowledge is biased towards the activities of traditional hierarchical OCGs operating in markets such as drug trafficking and THB; while less is known about investments made by OCGs operating in other EU Member States or markets.

An analysis of the 14 studies included in the literature review identified a number of driving factors influencing OCGs to invest in the legal economy. These include:

- **profit maximisation and the multiplication of revenues** – such as by investing in high-growth markets like renewable energy and real estate.
- **the facilitation and concealment of ongoing illicit activities** – such as purchasing real estate to accommodate illicit goods, such as drugs or victims of sexual exploitation;
- **the laundering of illicit proceeds** – such as through investment in cash-intensive businesses like bars and restaurants;
- the perpetration of fraud;
- the exertion of control over territories or sectors; and
- to strategically influence local politics, public administration and the business community, thus reducing potential risks and threats to the OCGs or their illicit businesses.

Research has shown that while profit is to some extent a driver of investment by OCGs in the legal economy, this may not be the most important factor. For instance, Riccardi (2014) found

[226] The year 2015 was chosen as the cut-off for the search because the purpose was to build upon the work already undertaken by Transcrime, which published on this area in 2015 (Riccardi et al., 2014; Savona et al., 2015).

that the business sectors with the highest levels of investment and infiltration by OCGs (i.e. bars and restaurants, construction, transportation) were not necessarily the most profitable. These sectors and the assets available within them may be exploited by OCGs to facilitate their criminal activity rather than for economic gain. This has been supported by several other studies (Dugato et al., 2015; Ferwerda & Kleemans, 2019; Savona & Riccardi, 2015). For instance, Dugato et al. found that Italian OCGs tend to invest in familiar sectors where they can draw upon prior networks and contacts, and exert control over territories or sectors that offer some operational benefit to their criminal activities. OCGs invest in assets and sectors where they can utilize previous experience and knowledge to reduce risks and threats, and are less likely to invest in sectors with high barriers to entry, high requirements for technical skills and low cash intensity (Antonopoulos & Hall, 2016; Ferwerda & Kleemans, 2019; Kruisbergen et al., 2015).

3.2. Additional information on the freezing and confiscation of assets from OCGs

Laura Lica-Banu, EY

Key findings:

- Considerable gaps remain in the collection and availability of statistical data on assets that are frozen or confiscated in the EU. Data collection is not centralised, is still largely undertaken manually and there is no systematic collection of information about seized assets linked to SOC.
- Considering the ongoing limited availability of data, it is not possible to reliably ascertain the overall number and value of assets frozen or confiscated at the EU-level.
- Attention should be paid to improving systems for data collection, to enable a more robust understanding of the extent of asset recovery in the EU.

This annex provides additional information and data relating to asset freezing and confiscation in the EU, and supports the analysis presented in **Section 3.2** of the main report.

Specifically, this annex provides detail on the legal requirements for statistical data collection in the EU on asset freezing and confiscation, and presents the extracted data from the Financial Action Task Force (FAFT) reports on the value of freezing and confiscation orders in money-laundering cases between 2014 and 2018.

3.2.1. Legal requirements for statistical data collection in the EU on asset seizure and recovery

At the European level, Directive 2014/42/EU on freezing and confiscation of instrumentalities and proceeds of crime in the EU aims to ease the freezing, confiscation and recovery process – including that of assets used or in possession of OCGs at the EU-level. Relevant *acquis Communautaire* provisions also include requirements for the Member States to collect and maintain specific and comprehensive statistical data in criminal matters that should be periodically submitted to the Commission. The spectrum of the legal provisions includes:

- **Directive 2014/42/EU:** sets out the minimum rules with respect to Member States' freezing and confiscation regimes. The provisions refer also to extended confiscation and confiscation from third parties.
- **Regulation (EU) 2018/1805:** refers to the mutual recognition of freezing orders and confiscation orders related to criminal offences covered by Directive 2014/42/EU, as well as freezing orders and confiscation orders related to other criminal offences.
- **Council Decision 2007/845/JHA:** refers to setting up Asset Recovery Offices (AROs) in the EU Member States in the field of tracing and identifying proceeds from, or other property related to, crime. When exchanging information, the requesting ARO shall provide specific information.
- **Council Framework Decision 2006/960/JHA** (known as the 'Swedish Initiative'): provides rules for the cross-border exchange of criminal information and intelligence,

ensuring that procedures for cross-border data exchanges among EU Member States are not stricter than those that apply to similar exchanges at national level. Annex A of the Decision includes the form of information exchange to be used by the competent authorities of the Member States in case of transmission/delay/refusal of information, and Annex B includes the request form for information and intelligence to be used by the requesting Member State authority.

The table below provides a summary of the type of statistical data required by the above-mentioned European acts in connection to freezing and confiscation measures.

Table 3.1: List of statistical data to be maintained by intelligence / law enforcement / judicial authorities of the EU Member States

Directive 2014/42/EU	Regulation (EU) 2018/1805	Council Decision 2007/845/JHA	Council Framework Decision 2006/960/JHA
Number of freezing orders executed. Number of confiscation orders executed. The estimated value of property frozen, at least of property frozen with a view to possible subsequent confiscation at the time of freezing. Estimated value of property recovered at the time of confiscation. Number of requests for freezing orders to be executed in another Member State. Number of requests for confiscation orders to be executed in another Member State. Value or estimated value of the property recovered following execution in another Member State.	*(additionally, to Directive 2014/42/EU)* Number of freezing orders and confiscation orders received by a Member State from other Member States that were recognised and executed, and the recognition and execution of which were refused. Number of cases in which a victim was compensated or granted restitution of the property obtained by the execution of a confiscation order. Average period required for the execution of freezing orders and confiscation orders.	Object of and the reasons for the request and the nature of the proceedings. Property targeted or sought (bank accounts, real estate, cars, yachts and other high value items) and/or natural or legal persons presumed to be involved (e.g. names, addresses, dates and places of birth, date of registration, shareholders, headquarters).	Type of crime or criminal activity being investigated. Nature of offences, according to art. 2 (2) of Council Framework Decision 2002/584/JHA. Purpose of request for information about the main persons under investigation or subject to request for intelligence purposes.

Source: Research team's analysis.

In addition to these obligations, Recommendation 33 of the FATF[227] and Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money-laundering or terrorist financing (under the Anti-Money Laundering Directive 4) require Member States to maintain comprehensive statistics on money-laundering and associated predicate offences.

[227] The Financial Action Task Force (FATF) is the inter-governmental body that sets international standards to ensure a co-ordinated global response to prevent money-laundering, organised crime, corruption and terrorism. FATF monitors countries to ensure they implement the FATF Standards fully and effectively and holds to account countries that do not comply.

Table 3.2: List of statistical data to be maintained in money-laundering cases

FATF Recommendations	Directive (EU) 2015/849
Number of freezing, seizing and confiscation actions and the amounts or values involved, regarding money-laundering, terrorist financing and the 21 designated categories of predicate offences, collected in such a way as to ensure that there is no double-counting with respect to statistics relating to the money-laundering offence and the underlying predicate offence. Breakdown of whether such cases are domestic or relate to a foreign request. Statistics on the general level of criminality in the country. Breakdown of the status and/or ultimate outcome of such actions (e.g. pending, property released, property or value confiscated). Breakdown of the amounts ordered in confiscation proceedings and recovered.	Number of cases investigated. Number of persons prosecuted. Number of persons convicted for money-laundering or terrorist financing offences. Types of predicate offences, where such information is available, and value in Euro of property that has been frozen, seized or confiscated.

3.2.2. Publicly available information on assets frozen and confiscated

In addition to collecting data directly from AROs, we also compiled available statistics from the literature – mainly FATF Mutual Evaluation Reports. This data – presented in Table 3.3 below – was available for the value of assets seized in money-laundering cases for 18 EU Member States.

- It is not possible to compare overall value over time because each year includes data for a different number of Member States.
- For the majority of countries, the value of assets frozen or confiscated fluctuates over time, which may reflect changes in valuation methodology or reporting practices, as well as practices targeting high or low valued assets.
- The extraction of this data may be useful for future data collection efforts.

Table 3.3: Statistical data on value of assets frozen and confiscated in money-laundering cases (€ million)

Member State	2014		2015		2016		2017		2018		Sources of information used
	F	C	F	C	F	C	F	C	F	C	
Austria	-	-	-	-	-	-	-	-	78.02	3.56	FATF, 2016, 2017b, 2018b
Belgium	-	12.52	-	-	-	-	-	-	-	-	FATF, 2015, 2018c
Bulgaria	-	-	-	-	-	-	-	-	149.39	12.53	MONEYVAL, 2013a, 2018f; OCSC, CEPACA and Supreme Court information
Croatia	-	26.74	-	22.28	-	25.64	-	39.53	3.00	1.66	Croatian State Prosecutor's Office for the Suppression of Organized Crime and Corruption, n.d.; MONEYVAL, 2013b, 2019c; State Attorney's Office of the Republic of Croatia, n.d.
Cyprus	-	-	-	-	-	-	-	-	5.00	0.10	MONEYVAL, 2011, 2013c, 2015, 2019b
Czech Republic	297.25	343.45	237.44	45.19	379.39	21.09	142.40	8.41	44.57	-	MONEYVAL, 2018a; Office for Government Representation in Property Affairs (OGRPA), n.d. *Note: aggregated data for the period 2012–mid 2017
Denmark	1.78	1.03	2.22	1.16	0.47	-	-	-	-	-	FATF, 2017a, 2018a, 2019a; SKAT, n.d.
Estonia	-	-	-	-	-	-	-	-	9.88	2.21	MONEYVAL, 2014, 2019c; Republic of Estonia, n.d.
Finland	-	-	0.90	5.60	1.10	4.90	42.00	1.60	36.45	19.33	FATF, 2019c; SEO information
Greece	160.90	-	255.40	-	301.70	-	312.60	-	433.70	-	Customs Authority, n.d.; FATF, 2019b; Hellenic Financial Intelligence Unit (HFIU); Independent Authority for Public Revenue, n.d.
Hungary	8.70	-	0.03	-	-	-	-	-	12.57	-	MONEYVAL, 2016, 2017, 2018b, 2019a HFIU, Police, NTCA, Prosecutor's Office information
Ireland	-	0.26	-	2.07	-	-	-	-	-	2.18	FATF 2017, FATF 2019d, CAB & DPP information
Latvia	-	-	-	-	-	-	-	105.41	-	-	Moneyval 2018c, Moneyval 2019d, SP & SRS FPD information
Lithuania	76.12	-	14.97	-	108.67	0.43	17.17	2.49	3.42	-	Moneyval 2018d, STI & Prosecutors' Office & MoJ information

Member State	2014		2015		2016		2017		2018		Sources of information used
	F	C	F	C	F	C	F	C	F	C	
Malta	0.03	0.00	0.05	0.11	0.09	0.03	0.12	0.01	0.59	0.28	Moneyval 2018e, AGO information
Portugal	18.60	-	185.92	-	54.05	-	-	-	4.99	-	FATF 2017c, DCIAP & Prosecutors' Office & MoJ information
Romania	-	-	-	-	-	-	-	-	468.72	2.44	Moneyval 2014a, Compliance Enhancing Procedures 2018 & 2019, ANABI & MoJ information
Sweden	20.40	6.90	16.40	4.00	-	-	-	-	42.24	3.67	FATF 2017d, FATF 2020
Number of Member States	**8**	**8**	**9**	**8**	**7**	**6**	**5**	**6**	**14**	**10**	
Total	**583.77**	**409.51**	**713.33**	**266.34**	**845.47**	**106.13**	**514.30**	**157.45**	**12,92.55**	**47.97**	

Where data was identified in local currencies, a conversion to EUR was made, taking the EUR/currency official rate for January 2020 as reference.
Notes: F = freezing, C = confiscation, '-' = no statistics available

3.3. Additional information on risk factors for SOC infiltration

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Key findings:

- Risk factors for SOC infiltration of companies and public procurement were examined.
- Regarding infiltration of companies, the analysis of financial and ownership risk indicators does not support the claim of the literature that SOC infiltrated companies have a significantly different financial or ownership profile than their non-infiltrated peers, when considering individual features.
- The analysis revealed that companies infiltrated by SOC have a distinct profile when considering multiple dimensions all at once.
- Extrapolations across the EU identified that corruption, high cash-intensity and weak legal frameworks are positively associated with level of SOC infiltration in the economy.
- Regarding infiltration of public procurement, single bidding, number of contracts awarded by the procuring entity in the year, the share of a supplier in buyer's annual spending, and relative price are all associated with higher probabilities of SOC infiltration.
- The extrapolations to the whole EU revealed a rich and diverse picture that only partially overlaps with existing perceptions of where SOC infiltration is high.
- The analysis demonstrates that it would be both feasible and fruitful to build large-scale SOC risk-assessment tools – based on micro-level databases describing companies and public procurement contracts – that would allow frequent monitoring rather than one-off reports.

In this annex, we elaborate on several elements of **Section 3.3** of the main report. First, supporting materials for the analysis of risk factors for SOC infiltration of companies is described – this includes a full literature review of risk factors identified in the prior literature, detailed methodological approach, results of the analysis, and key findings and recommendations. Second, supporting materials for the analysis of risk factors for SOC infiltration of public procurement is described.

3.3.1. Supporting materials for analysis of risk factors for SOC infiltration of companies

Risk factors identified in the literature

The existing body of literature on infiltration and investments of SOC groups in the legal economy is relatively large, enabling this analysis to start from a range of proposed indicators and empirical tests. A considerable scholarly debate has arisen among various authors who take diverse positions on what level of measurement – micro-, meso- or macro- – and what indicators – qualitative or quantitative, or a combination of both – to employ for the most precise measurement of SOC infiltration in the legal economy.

The reviewed body of literature on indicators and red flags of SOC infiltration presents a wide variety of methodological approaches and potential data sources.

As shown in Table 3.4: Quantitative and qualitative measurement of SOC infiltration in the legal economy

Source	Indicator used	Meso/ Micro / Macro	Country	Year	Sector	Definition, description
Schneider (2010)	Cash intensity	Macro	20 OECD countries	1995–2006	All sectors	On a macro-level, cash intensity in this study had two indicators: i) confiscated money per capita as compared to ii) overall cash per capita in a country. Furthermore, the model controls for a number of prosecuted people in a country.
Cobham, Janský, and Meinzer (2015)	Financial secrecy, ownership links with secrecy countries	Macro	International	The latest FSI was released in 2018	Finance	When the Financial Secrecy Index (FSI) was created, many researchers turned to it as a proxy for tax heavens and opacity in global financial flows. The indicator is based on secrecy provided to non-resident investors and has four different dimensions: knowledge of beneficial ownership, corporate transparency, efficiency of tax and financial regulation, and international standards and cooperation.
Blum, Levi, Naylor, and Williams (1998)	Complexity of business ownership	Macro	N/A (qualitative)	N/A	Finance	Many attempts have been made to identify quantitative measures for the complexity of business ownership, however, it remains more of a qualitative assessment of risks of SOC infiltration on a macro level. Authors point out that the use of legal instruments – such as numbered trusts of various secrecy levels and International Business Corporations – could be red flags in this context.

Source	Indicator used	Meso/ Micro / Macro	Country	Year	Sector	Definition, description
Gurciullo (2014)	High territorial specificity	Meso	Italy	2004–2006	All sectors	Some researchers considered the territorial aspect of the issue and underlined that SOC groups tend to favour areas with overall low competition, low openness to international investments and public-protected sectors that enable SOC groups to monitor pervasively the territory in which they are active.
	High sectoral and company-level centrality measures	Meso/ Micro	Italy	2002	All sectors	The study is based on the network analysis approach and measures the centrality of sectors as well as individual firms. The degree of centrality of a company in a market network can be interpreted as an immediate risk/chance of a node receiving and capturing any signal or event flowing through the network. It was concluded that SOC tends to infiltrate sectors having a high degree of centrality and a monopolist kind of market. On the company level, high centrality is also associated with a higher level of organised crime.
Scherrer & Thirion (2018)	Golden Visas: investment-based citizenship and residency	Macro	EU	Depending on the availability of the data	All sectors	The study examined risks related to 'citizenship for sale' and described a positive relationship between investment-based visas in jurisdictions of high secrecy and a large scale of offshore financial activities.
Savona & Riccardi (2018)	Lower financial debt / Higher proportion	Micro	EU	2000–2016	All sectors	The MORE report presents a comprehensive list of red flags of SOC

Source	Indicator used	Meso/ Micro / Macro	Country	Year	Sector	Definition, description
	shareholders' loans Higher proportion of trade payables / tax payables Lower ratio of liquid assets / Total assets Higher variance of total assets/yearly reported revenues					infiltration and their measurement, however we list here the most innovative ones that were not used by other studies extensively. They are all calculated on the firm-level with a possible aggregation on sector, region and country levels. These metrics are based on reported company financials, in particular balance sheets and income statements. The study presents financial ratios to detect suspicious activities or accounting techniques to hide them.
Ferwerda & Kleemans (2019)	Administrative denials Corporate tax anomalies Quantified complexity of business ownership: - business ownership network distance - risk score of business ownership and shareholders Cash/Total Assets ratio EBITDA margin ratio	Micro	Netherlands	1996–last available as of 2019	All sectors	In this study, researchers propose a list of innovative measures of SOC infiltration in the economy of the Netherlands. They introduced the use of data on administrative denials, which contain all records on revoked and rejected licenses in case of suspicion of criminal involvement. Furthermore, the study employed data on anomalies in tax declarations detected in tax inspections and introduced the quantified measures of complexity of business ownership. Interestingly, they also used a micro-level cash intensity measure and EBITDA margin as one of the most accurate measures of profitability compared across business sectors.

Source	Indicator used	Meso/ Micro / Macro	Country	Year	Sector	Definition, description
De Boyrie, Pak, and Zdanowicz (2005)	High capital flight	Macro	USA	1995–2000	All export and import transactions	This approach measures the residual of a country's net capital official inflow of foreign direct investments, with the deduction of uses of funds such as current account deficit and additions to reserves. If this difference is negative, it is considered as the capital flight is attributed to individual wealth-maximising behaviour, and could be an additional signal of SOC infiltration.
Schneider & Windischbauer (2008)	'Errors and omissions' in the balance of payments	Macro	Austria, Germany	1999–2005	All sectors	'Errors and omissions' in the balance of payments on the macro level, as highlighted by the study, state the discrepancy between capital inflows and outflows and a failure to measure all private short-term capital movements. This might be an indicator of change in SOC activities in a country.
Soudijn (2015)	Presence and betweenness scores of financial facilitators in a network	Micro	International with focus on Netherlands	2005–2011	Illegal drug trafficking	On the basis of social network analysis, the authors evaluate presence and betweenness of different participants in a network of 31 cases of SOC with a particular focus on financial facilitators, and highlight that professional 'money-launderers' come into play only for relatively large illegal drugs businesses. However, the study also points out that police tend to encounter financial facilitators if 'the police were actively looking for them', i.e. if money-laundering was a priority at the earliest planning

Source	Indicator used	Meso/ Micro / Macro	Country	Year	Sector	Definition, description
						stages of an investigation.
Andrews, Brewster & Day (2018)	SOC signals in social media	Micro	Internet based study using Twitter	N/A	Human trafficking	The study aims to capture weak early-stage SOC signals in social media. Researchers employ formal concept analysis in combination with map-based visualisation, data extraction and NLP techniques to extract and classify data to detect, through social media, the presence of corroborated organised crime threats.
Palan (2010); Young (2013)	Banking liabilities and total assets	Macro	International	Latest available as of 2013	Banking	When looking at financial ties between offshore jurisdictions and the West, the author draws attention to the fact that Europe and the UK in particular heavily invest in offshore centres. For example, Overseas Territories and former colonies of the UK accounted for 36% of international banking liabilities in 2008. The Cayman Islands themselves account for 42% of the global $4.4 trillion (USD) of offshore banking liabilities. As of September 2011, total assets in the Caymans were reported at $1.6 trillion (USD).
Savona & Berlusconi (2015)	Set of spatial, sectoral, ownership features	Macro/ Micro	Italy, the Netherlands, Slovenia, Sweden, and United Kingdom	Depending on data availability, mostly 2012–2014	All sectors	Project ARIEL presents a comprehensive approach to assessing risk factors contributing to the emergence and development of SOC. In addition to already discussed indicators, this study introduced new measures: - a territorial aspect of an

Source	Indicator used	Meso/ Micro / Macro	Country	Year	Sector	Definition, description
						issue (since authors argue that territories with a rich history of past infiltration, regions with large urban areas and high levels of infrastructural equipment tend to be more vulnerable to SOC infiltration); - sectoral characteristics (such as low level of competition, technology, and barriers to entry); and - some aspects of ownership structure (namely firms having 'limited company' as a preferred legal form, age, and gender of shareholders and directors, presence of familial relationships between shareholders and directors).
Vander Beken and Defruytier (2004)	Combination of the operating principle of the spectrum of enterprise and the application of a risk-based methodological process	Macro/ Meso/ Micro	N/A	N/A	All sectors	The study revisits the methodological issues of measurement and capturing of SOC and develops a comprehensive methodological framework which is based on two pillars: i) operating principles of enterprises drawn from monitoring and assessment of licit

Source	Indicator used	Meso/ Micro / Macro	Country	Year	Sector	Definition, description
						and illicit markets and ii) a risk-based methodology, which considers organisations and counter strategies of illicit businesses and licit and illicit sector analysis.
Ferrante et al. (2019)	Index of mafia presence	Meso	Italy	1991, 2001, 2011	Constructio n sector	The research develops a new index of mafia presence based on municipal data and finds a robust association between criminal organisations and the degree of concentration in the construction industry in Sicily.

below, a large number of studies are based on single, micro-level indicators – such as, for instance, a firm's cash-intensity, profitability, or balance sheet structure as compared to its peers in an industry – while other studies combine a set of financial metrics with more aggregated information on the sectoral or country-level, providing a more comprehensive picture than each individual red flag.

A comprehensive study was published by Savona & Riccardi (2018) that presents a wide-ranging list of potential red flags of SOC infiltration and their measurement. The researchers focus on firm-level financial metrics that could be easily aggregated by sector, region and country. The study presents financial ratios to detect suspicious activities or accounting techniques to hide them. For instance, ratios focused on liabilities – **lower financial debt / higher proportion of shareholders' loans** – might indicate an infiltrated firm, since it will not require other external funding due to illicit revenue streams or shareholder's support, when compared to peers in the firm's industries and geography.

Moreover, the authors highlight that **infiltrated businesses tend to have less cash on hand and other liquid assets due to a fear of them being confiscated**, thus other types of assets prevail in the balance sheet of such entities. An additional set of indicators regards the variance of total assets and revenues with high values not supported by objective market conditions as red flags.

In line with the approach focused on financial ratios, other researchers widely employed financial statements-analysis to reveal differences between criminal and legal businesses, thus identifying red flags.

Building upon a combination of micro-, meso- and macro- indicators, research on capturing and measuring SOC infiltration has developed a more complex approach that employs network theory to analyse interconnected business ownership networks, networks of financial facilitators and geospatial networks. Such studies use **financial secrecy of ownership links with secrecy countries as well as the overall complexity of business ownership structure for measurement of SOC infiltration**. The complexity of the ownership structure has been discussed in the literature in both qualitative and quantitative measures. Qualitative studies point out that the use of legal instruments – such as numbered trusts of various secrecy levels and International Business Corporations – could be red flags in this context. Nonetheless, this approach was extended by a study in the Netherlands, which introduced quantified measures of complexity of business ownership. These include ownership network distance and risk score of business ownership.

Network science methods further contributed to the research into SOC infiltration by introducing company-level and sectoral network measures. It was underlined that **SOC groups tend to have high territorial specificity as they favour areas with overall low competition and low**

openness to international investments, as well as public-protected sectors that enable SOC groups to pervasively monitor the territory in which they are active. Furthermore, the network analysis approach extends to the measures of the centrality of sectors as well as individual firms. It was concluded that SOC tends to infiltrate sectors that have a high degree of centrality, and a monopolist or oligopolistic market. On the company level, high centrality is also associated with a higher level of SOC.

Developing big data methods also resulted in a new approach to SOC studies that employ social media analysis in combination with formal concept analysis and neuro-linguistic programming (NLP) techniques to detect the presence of corroborated SOC threats. The exhaustive list of indicators of SOC infiltration in the legal economy discussed in the literature is presented in the table below.

A closer look at the literature on risk factors of SOC infiltration, however, reveals several gaps and shortcomings.

Despite a great variety of indicators, **most studies rely on merely theoretical or qualitative measures with no or very limited potential for implementation on a large scale, due to lack of data**. Only a few studies in the field demonstrate a comprehensive analysis of quantitative measures of SOC infiltration. However even these studies typically analyse indicators of SOC infiltration indicator-by-indicator, without considering how they combine. Therefore, this report sets out to build upon and complement the existing body of literature, expand the analysis of SOC infiltration indicators using proven cases and explore combinations of risk factors rather than looking at them in isolation.

Table 3.4: Quantitative and qualitative measurement of SOC infiltration in the legal economy

Source	Indicator used	Meso/ Micro/ Macro	Country	Year	Sector	Definition, description
Schneider (2010)	Cash intensity	Macro	20 OECD countries	1995–2006	All sectors	On a macro-level, cash intensity in this study had two indicators: i) confiscated money per capita as compared to ii) overall cash per capita in a country. Furthermore, the model controls for a number of prosecuted people in a country.
Cobham, Janský, and Meinzer (2015)	Financial secrecy, ownership links with secrecy countries	Macro	International	The latest FSI was released in 2018	Finance	When the Financial Secrecy Index (FSI) was created, many researchers turned to it as a proxy for tax heavens and opacity in global financial flows. The indicator is based on secrecy provided to non-resident investors and has four different dimensions: knowledge of beneficial ownership, corporate transparency, efficiency of tax and financial regulation, and international standards and cooperation.
Blum, Levi, Naylor, and Williams (1998)	Complexity of business ownership	Macro	N/A (qualitative)	N/A	Finance	Many attempts have been made to identify quantitative measures for the complexity of business ownership, however, it remains more of a qualitative assessment of risks of SOC infiltration on a macro level. Authors point out that the use of legal instruments – such as numbered trusts of various secrecy levels and International Business Corporations – could be red flags in this context.
Gurciullo (2014)	High territorial specificity	Meso	Italy	2004–2006	All sectors	Some researchers considered the territorial aspect of the issue and underlined that SOC groups tend to favour areas with overall low competition, low openness to international investments and public-protected sectors that enable SOC groups to monitor pervasively the territory in which they are active.

Source	Indicator used	Meso/ Micro/ Macro	Country	Year	Sector	Definition, description
	High sectoral and company-level centrality measures	Meso/ Micro	Italy	2002	All sectors	The study is based on the network analysis approach and measures the centrality of sectors as well as individual firms. The degree of centrality of a company in a market network can be interpreted as an immediate risk/chance of a node receiving and capturing any signal or event flowing through the network. It was concluded that SOC tends to infiltrate sectors having a high degree of centrality and a monopolist kind of market. On the company level, high centrality is also associated with a higher level of organised crime.
Scherrer & Thirion (2018)	Golden Visas: investment-based citizenship and residency	Macro	EU	Depending on the availability of the data	All sectors	The study examined risks related to 'citizenship for sale' and described a positive relationship between investment-based visas in jurisdictions of high secrecy and a large scale of offshore financial activities.
Savona & Riccardi (2018)	Lower financial debt / Higher proportion shareholders' loans	Micro	EU	2000–2016	All sectors	The MORE report presents a comprehensive list of red flags of SOC infiltration and their measurement, however we list here the most innovative ones that were not used by other studies extensively. They are all calculated on the firm-level with a possible aggregation on sector, region and country levels. These metrics are based on reported company financials, in particular balance sheets and income statements. The study presents financial ratios to detect suspicious activities or accounting techniques to hide them.
	Higher proportion of trade payables / tax payables					
	Lower ratio of liquid assets / Total assets					
	Higher variance of total assets/yearly reported revenues					
Ferwerda & Kleemans (2019)	Administrative denials	Micro	Netherlands	1996–last available as of 2019	All sectors	In this study, researchers propose a list of innovative measures of SOC infiltration in the economy of the Netherlands. They introduced the use of data on administrative denials, which contain all records on revoked and rejected licenses in case of suspicion of criminal involvement. Furthermore, the study employed data on anomalies in tax declarations detected in
	Corporate tax anomalies					
	Quantified complexity of business ownership:					
	- business ownership network distance					

Source	Indicator used	Meso/ Micro/ Macro	Country	Year	Sector	Definition, description
	- risk score of business ownership and shareholders Cash/Total Assets ratio EBITDA margin ratio					tax inspections and introduced the quantified measures of complexity of business ownership. Interestingly, they also used a micro-level cash intensity measure and EBITDA margin as one of the most accurate measures of profitability compared across business sectors.
De Boyrie, Pak, and Zdanowicz (2005)	High capital flight	Macro	USA	1995–2000	All export and import transactions	This approach measures the residual of a country's net capital official inflow of foreign direct investments, with the deduction of uses of funds such as current account deficit and additions to reserves. If this difference is negative, it is considered as the capital flight is attributed to individual wealth-maximising behaviour, and could be an additional signal of SOC infiltration.
Schneider & Windischbauer (2008)	'Errors and omissions' in the balance of payments	Macro	Austria, Germany	1999–2005	All sectors	'Errors and omissions' in the balance of payments on the macro level, as highlighted by the study, state the discrepancy between capital inflows and outflows and a failure to measure all private short-term capital movements. This might be an indicator of change in SOC activities in a country.
Soudijn (2015)	Presence and betweenness scores of financial facilitators in a network	Micro	International with focus on Netherlands	2005–2011	Illegal drug trafficking	On the basis of social network analysis, the authors evaluate presence and betweenness of different participants in a network of 31 cases of SOC with a particular focus on financial facilitators, and highlight that professional 'money-launderers' come into play only for relatively large illegal drugs businesses. However, the study also points out that police tend to encounter financial facilitators if 'the police were actively looking for them', i.e. if money-laundering was a priority at the earliest planning stages of an investigation.
Andrews, Brewster & Day (2018)	SOC signals in social media	Micro	Internet based study using Twitter	N/A	Human trafficking	The study aims to capture weak early-stage SOC signals in social media. Researchers employ formal concept analysis in combination with map-based visualisation, data extraction and NLP techniques to extract and classify data to detect,

Source	Indicator used	Meso/ Micro/ Macro	Country	Year	Sector	Definition, description
						through social media, the presence of corroborated organised crime threats.
Palan (2010); Young (2013)	Banking liabilities and total assets	Macro	International	Latest available as of 2013	Banking	When looking at financial ties between offshore jurisdictions and the West, the author draws attention to the fact that Europe and the UK in particular heavily invest in offshore centres. For example, Overseas Territories and former colonies of the UK accounted for 36% of international banking liabilities in 2008. The Cayman Islands themselves account for 42% of the global $4.4 trillion (USD) of offshore banking liabilities. As of September 2011, total assets in the Caymans were reported at $1.6 trillion (USD).
Savona & Berlusconi (2015)	Set of spatial, sectoral, ownership features	Macro/ Micro	Italy, the Netherlands, Slovenia, Sweden, and United Kingdom	Depending on data availability, mostly 2012–2014	All sectors	Project ARIEL presents a comprehensive approach to assessing risk factors contributing to the emergence and development of SOC. In addition to already discussed indicators, this study introduced new measures: - a territorial aspect of an issue (since authors argue that territories with a rich history of past infiltration, regions with large urban areas and high levels of infrastructural equipment tend to be more vulnerable to SOC infiltration); - sectoral characteristics (such as low level of competition, technology, and barriers to entry); and - some aspects of ownership structure (namely firms having 'limited company' as a preferred legal form, age, and gender of shareholders and directors, presence of familial relationships between shareholders and directors).
Vander Beken and Defruytier (2004)	Combination of the operating principle of the spectrum of enterprise and the application of a risk-based methodological process	Macro/ Meso/ Micro	N/A	N/A	All sectors	The study revisits the methodological issues of measurement and capturing of SOC and develops a comprehensive methodological framework which is based on two pillars: i) operating principles of enterprises drawn from monitoring and assessment of licit and illicit markets and ii) a risk-based methodology, which considers

Source	Indicator used	Meso/ Micro/ Macro	Country	Year	Sector	Definition, description
						organisations and counter strategies of illicit businesses and licit and illicit sector analysis.
Ferrante et al. (2019)	Index of mafia presence	Meso	Italy	1991, 2001, 2011	Construction sector	The research develops a new index of mafia presence based on municipal data and finds a robust association between criminal organisations and the degree of concentration in the construction industry in Sicily.

Detailed methodological approach

The aim of this analysis is first, to calculate and review individual micro-level risk indicators of SOC infiltration of legal entities. In this task, we calculate risk indicators for available proven cases of SOC and compare the results with the overall distributions of these indicators in the respective markets. This simple review of individual indicators is designed to establish to what degree the proven cases are outliers in their own sector and country. This is a necessary step for testing SOC indicators, because if the proven case appears to be average or near average in a sector along one of the SOC indicator dimensions, it will not be a particularly useful indicator on its own.

Second, we employ hierarchical cluster analysis and a multi-dimensional similarity measure to analyse combinations of risk factors and how widespread they are. In this case, we look at similarity to proven cases across all known indicators at once. The idea behind considering similarity along multiple dimensions all at once is that the reliability of SOC measurement greatly increases if multiple indicators are triangulated against each other. Even if each indicator on its own is a noisy measure of SOC infiltration, taken together they may well offer a precise measurement, as their combinations may be highly unusual. A summary of the steps taken is described in the table below.

Table 3.5: Summary of analytical steps for analysis of risk factors for companies

Steps of analysis	Goals of analytical steps
1(a). Calculate risk indicators for available proven cases of SOC	The individual review of a risk indicator is aimed at establishing to what degree the proven cases are outliers in their own sector and country. This is a necessary step for testing SOC indicators because if the proven case appears to be average or near average in a sector along one of the SOC indicator dimensions, it will not be a particularly useful indicator on its own.
1(b). Establish the distribution of the risk indicators for all firms in the respective markets	
1(c). Compare individual proven cases of SOC to a respective market distribution	
2(a). Perform hierarchical cluster analysis	Hierarchical cluster analysis is designed to compare and group European companies on the basis of their (dis)similarity as defined by a group of features, not a single indicator. The reliability of SOC measurement greatly increases if multiple indicators are triangulated against each other.
2(b). Develop a multi-dimensional similarity measure of businesses in sectors with identified cases of SOC	The idea behind developing a multi-dimensional similarity measure is to have a universal, reliable measure of how any company of interest is similar to proven cases of SOC.
3. Extrapolate the multi-dimensional similarity measure calculation to the whole EU economy	The extrapolation of a comprehensive similarity measure to all European countries based on the available sample of cases of proven SOC tests the external validity of findings and illustrates the distribution of risks of SOC across the EU in the four markets with identified cases of SOC.
4. Examine the relationship between estimated level of SOC and external macro-drivers of SOC	We use the infiltration estimates built in previous steps to assess the macro risk factors discussed by the literature.

The sample includes 81 cases of SOC infiltration coming from 14 EU states, mostly Bulgaria and Italy, and operating in construction, finance, real estate and car manufacturing markets. The company-level information is drawn from the Bureau van Dijk (BvD) database, which contains registry, ownership, and financial information on 796 thousand entities. The table below provides an overview of the cases of SOC infiltration that were used for this analysis.

Table 3.6: Available cases of SOC infiltration of legal entities for the analysis

Country	Industry
Italy	Other professional scientific and technical activities
Bulgaria	Construction of buildings, Civil engineering, Specialised construction activities
Bulgaria	Advertising and market research
Romania	Construction of buildings
Italy	Manufacture of other non-metallic mineral products
Italy	Construction of buildings
Italy	Construction of buildings, Civil engineering, Specialised construction activities
Croatia	Advertising and market research
Italy	Specialised construction activities
Italy	Construction of buildings, Civil engineering, Specialised construction activities
Bulgaria	Financial service activities (except insurance and pension funding) Food and beverage service activities, Gambling and betting activities
Bulgaria	Other professional scientific and technical activities
Romania	Human health activities
Italy	Wholesale trade (except of motor vehicles and motorcycles) Retail trade (except of motor vehicles and motorcycles)

The corresponding table of markets and respective NACE codes is presented below.

Table 3.7: Identified markets

Industry code as per 2-digit NACE	Industry name
23	Manufacture of other non-metallic mineral products
41	Construction of buildings
42	Civil engineering
43	Specialised construction activities
46	Wholesale trade except of motor vehicles and motorcycles
47	Retail trade except of motor vehicles and motorcycles
55	Accommodation
56	Food and beverage service activities
58	Publishing activities

Industry code as per 2-digit NACE	Industry name
64	Financial service activities, except insurance and pension funding
68	Real estate activities
70	Activities of head offices; management consultancy activities
73	Advertising and market research
74	Other professional scientific and technical activities
86	Human health activities
92	Gambling and betting activities
93	Sports activities and amusement and recreation activities

Step 1: Calculation and review of individual financial and ownership risk factors

In this task, we calculate risk indicators for available proven cases of SOC and compare the results with the overall distributions of these indicators in the respective markets. This simple review of individual indicators is designed to show to what degree the proven cases are different from other companies in their own sector and country. If the proven case appears to be average or near average in a sector along one of the SOC indicator dimensions, that measure will not be a particularly useful indicator on its own.

Step 2: Development of a multi-dimensional measure of similarity

We combine individual micro-level indicators into a single multi-dimensional similarity measure to analyse combinations of risk factors and how widespread they are. In this case, we look at the similarity to proven cases across all known indicators at once. The idea behind considering similarity along multiple dimensions all at once is that the reliability of SOC measurement greatly increases if multiple indicators are triangulated against each other. Even if each indicator on its own is a noisy measure of SOC infiltration, taken together they may well offer a precise measurement, as their combinations may be highly unusual.

Supporting materials for cluster analysis

Cluster analysis is a multivariate unsupervised method that aims to classify a sample of observations on the basis of a set of measured variables (here, SOC infiltration risk factors) into a number of different groups, such that similar subjects are placed in the same group. We used a hierarchical agglomerative method, in which observations initially started in their own separate cluster. At the next stage, the most similar clusters in terms of Euclidean distance were then combined, and this is repeated until all observations end up in one cluster. The variables we considered using for clustering were the previously discussed financial measures (network-based degree or degree centrality measures were not used in the final analysis as they failed to sufficiently discriminate among cases) (see table below).

Table 3.8: Descriptive statistics on variables used for clustering

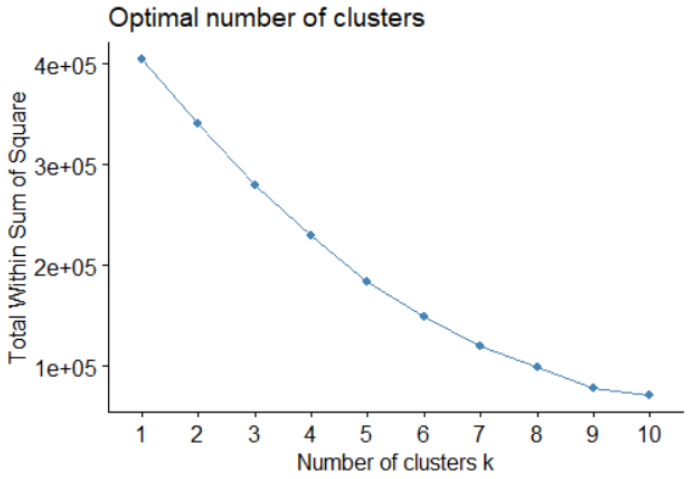
Metric	Share of current assets	Standard deviation of assets	Standard deviation of revenue	EBITDA margin
Minimum	0.007	0.000	0.000	-618.064
1st quartile	0.447	19749.779	16369.318	0.007
Median	0.805	69474.283	57596.401	0.091
Mean	0.678	216884.297	140558.732	-2.292
3rd quartile	0.957	201032.518	185938.765	0.289

Metric	Share of current assets	Standard deviation of assets	Standard deviation of revenue	EBITDA margin
Maximum	1.000	7262826.532	859334.807	13.997

After performing multiple attempts of clustering analysis with different parameters as well as a set of features, we conclude that using only financial indicators with six clusters yields the most salient clustering result (i.e. minimising intra-cluster variance while maximising inter-cluster variance). Simply put, the criterion for the optimal clustering is the creation of such groups of observations (companies in our case), that observations within a group are highly similar, while groups themselves are far apart in terms of chosen variables (financial indicators).

The optimal number of clusters is defined with the help of the so-called 'elbow' method, which aims to define clusters such that the total intra-cluster variation (or total within-cluster sum of square) is minimised. The elbow method suggests that the more clusters we define, the lower total within sum of square we get (see Figure 3.1).

Figure 3.1: Optimal number of clusters as per elbow method



Results of the analysis

Step 1: Calculation and review of individual financial and ownership risk factors

While the literature suggests that businesses infiltrated by SOC should have a significantly different financial profile with respect to key financial metrics, our analysis reveals a different pattern. That is, the set of proven cases does not appear to be significantly different from other firms in their respective markets. Infiltrated companies are also broadly similar to other companies with regard to financial metrics, when examined by business sector.

After reviewing financial measures as indicators of company infiltration, we further proceed with the analysis of network structure indicators. We focus on two network-based measures: the degree of an entity and its centrality measures. The literature suggests that high centrality of a company in an ownership network is associated with a higher level of organised crime, while it also suggests that infiltrated companies have a more extensive ownership network (Gurciullo, 2014). In order to test this hypothesis, we present ownership networks of the businesses featuring in proven cases of infiltration, and look at the distribution of centrality measures of proven cases of SOC infiltrated businesses and other businesses in the respective markets. Infiltrated companies in the available sample have sparse ownership networks and low degree and centrality measures. The degree and centrality of proven cases of SOC are broadly similar to other companies in their respective markets.

Many attempts have been made to identify or develop quantitative measures for the complexity of business ownership and its links with black-listed jurisdictions. The reviewed literature suggests that the use of legal instruments such as numbered trusts of various secrecy levels in various jurisdictions, including tax havens and black-listed jurisdictions, could be red flags in the context of SOC infiltration. Some authors describe a positive relationship between ownership links and

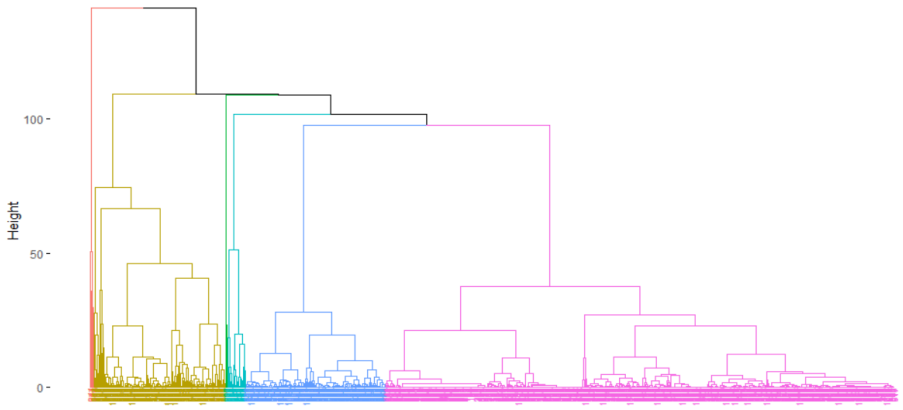
investment-based visas in jurisdictions of high secrecy and a large scale of offshore, potentially SOC infiltrated, financial activities.

No ownership links with black-listed jurisdictions were discovered in the sample of proven cases of SOC. All shareholders and subsidiaries of convicted businesses in our sample were domestic firms. Contrary to the assumption outlined in the literature, the available pool of proven cases of SOC has no links with high-secrecy jurisdictions. Hence, the empirical material on proven cases warrants further analysis of ownership ties to secrecy jurisdictions on a larger sample of companies – all firms in the respective markets.

Step 2: Development of a multi-dimensional measure of similarity

We illustrate the results of the optimal clustering in the cluster dendrogram presented in Figure 3.2, which visualises how the clustering was performed. The cluster dendrogram should be read from the bottom to top representing the order in which observations were grouped in clusters. The bottom of the dendrogram shows all observations arranged in order of quantitative similarity so that most similar firms are placed next to each other. At the next step, individual observations are joined in one cluster. This procedure of joining individual compounds or existing compounds is repeated until the point when all observations are grouped in one cluster. The vertical axis 'Height' refers to a distance measure between observations or formed clusters. It can be interpreted as the number of iterations needed to reach the final stage of clustering. What we clearly see from the presented cluster dendrogram (Figure 3.2) is that based on the selected financial indicators the algorithm defines three relatively big clusters (pink, blue and brown clusters), with the three other clusters grouping a small number of outliers. All companies in the markets with proven cases of SOC can be categorised into three large groups of companies based on the selected financial indicators.

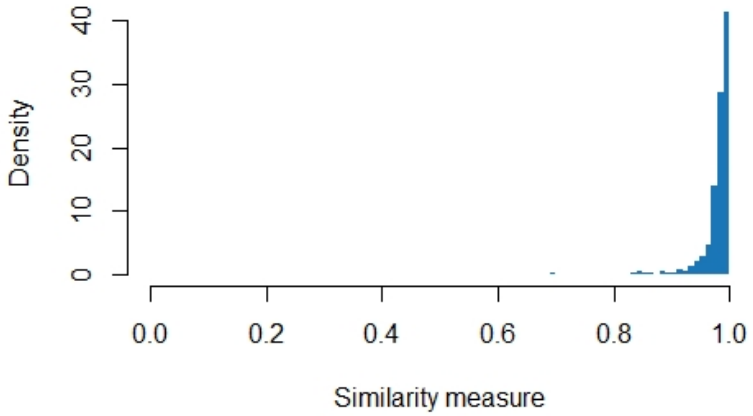
Figure 3.2: Cluster dendrogram



Notes: Number of clusters = 6, all available records until 2015 year-end.
Source: BvD, n = 796 thousand entities.

On the histogram presented below, the distribution of the similarity measure is highly skewed, and most of the companies in markets with identified cases of SOC are grouped on the right-hand side, i.e. they have profiles similar to cases of SOC infiltration.

Figure 3.3: Distribution of similarity measure in markets with identified cases of SOC infiltration



Source: BvD, n = 796 thousand entities.

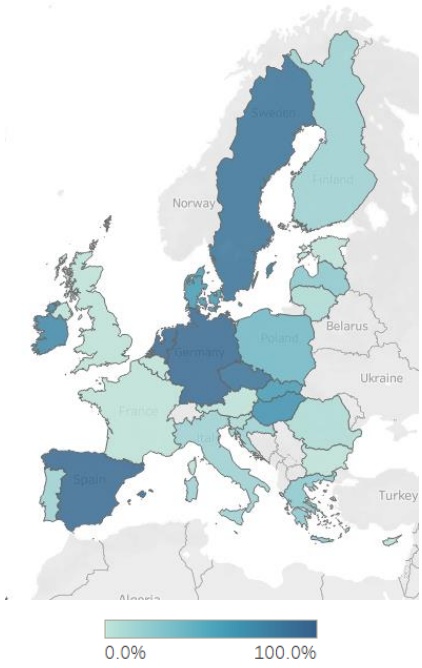
Step 3: Predictions and extrapolations to all EU countries using the best model

The cluster analysis approach and the developed similarity measure allows us to extrapolate the assessment of SOC infiltrated businesses to all EU countries, with a focus on four industries in which we have at least three proven cases of SOC infiltration (wholesale and retail of motor vehicles, construction activities, real estate activities and financial service activities). As an aggregated macro-indicator of SOC infiltration, we developed a new measure – the share of companies with business profiles highly similar to proven cases of SOC. As a threshold for flagging an entity that is highly similar to cases of SOC infiltration, we set the similarity between cases in a particular market. The results of the macro-aggregation are presented on the maps below (the darker colour corresponds to a higher percentage).

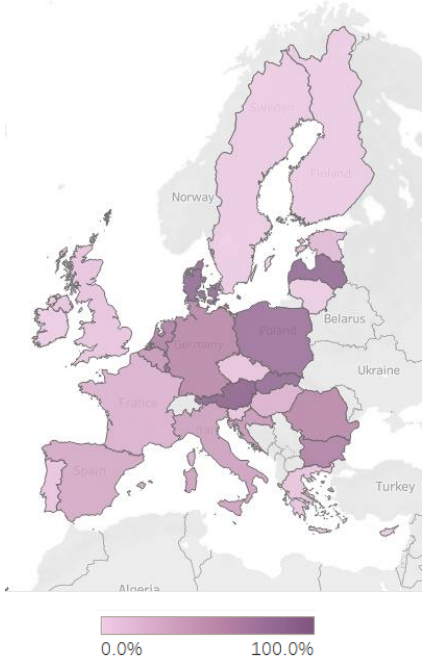
All the four industries have significantly different country rankings, both from each other and from perceptions of country rankings based on macro indicators. The visualisations are presented in Figure 3.4 below.

Figure 3.4: Distribution of share of companies with high similarity measure as compared to identified cases of SOC across Europe

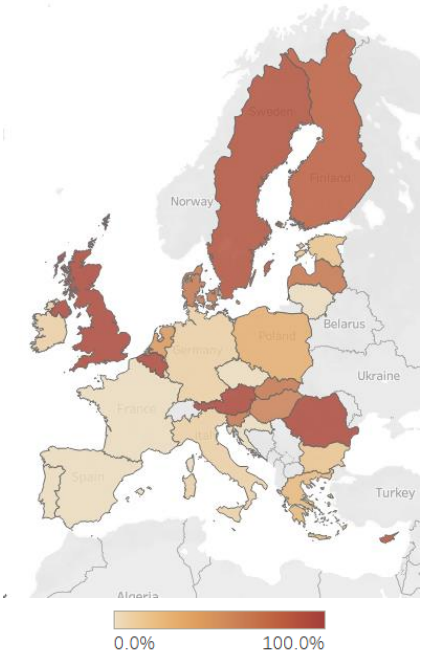
A) Wholesale and retail trade of motor vehicles



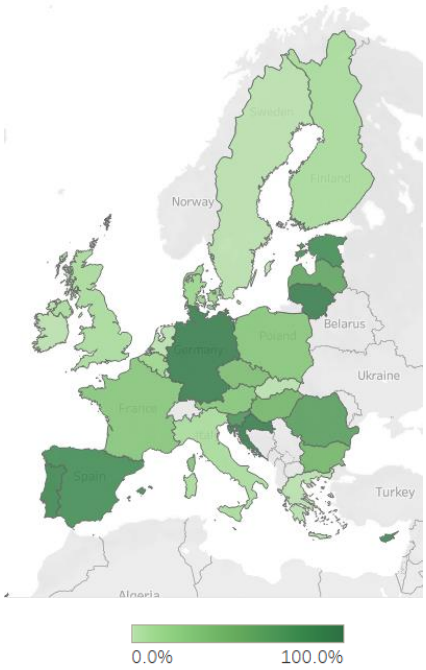
B) Construction



C) Real estate activities



D) Financial service activities



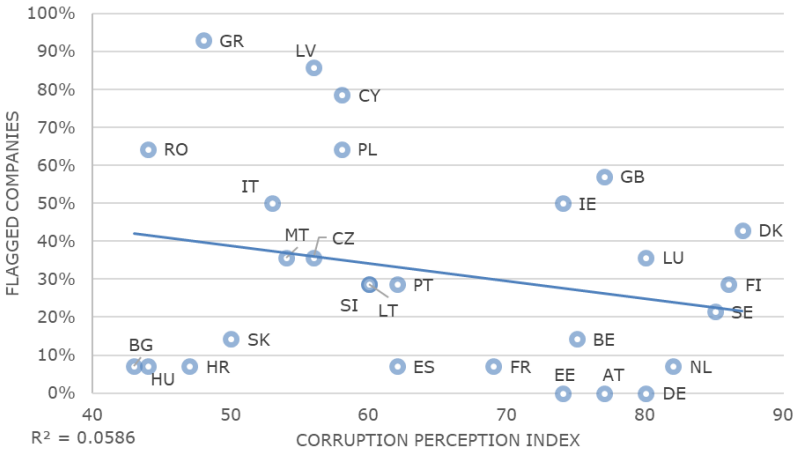
Step 4: Examining the relationship between the estimated level of SOC infiltration across EU countries and macro-indicators

Corruption

According to the literature, the main sentinel crime would be **corruption**, as it indicates that OCGs have lobbied to infiltrate public procurement, avoid control and facilitate the takeover of legal businesses (Savona & Riccardi, 2018). We are able to look for correlations between infiltration risk and corruption by using the Control of Corruption Index (CCI) in the Worldwide Governance Indicators produced by the World Bank. This index is meant to reflect the extent to which public power is captured by private interests. It is built using many different sources into a consistent and comparable annual index ranging from -2.5 (weak control of corruption) to 2.5 (strong control), and an unobserved components model is used to aggregate the different sources of information. For the purpose of our analysis, we rescaled the index from 0 (weak control) to 5 (strong control). It is important to note that this indicator of corruption is mostly based on individual perceptions, and can therefore be different from the actual level of corruption within a country. For instance, it is possible that intensified action against corruption could increase the perception of corruption in a country in the short term. Other popular corruption indicators, such as the Corruption Perception Index measured by Transparency International, suffer from the same limitation.

In the figure below, we observe a negative correlation between the CCI and the percentage of companies flagged as at risk of infiltration in the motor vehicle trade sector.

Figure 3.5: Correlation between Control of Corruption Index and share of companies flagged as likely infiltrated in the motor vehicles trade sector



Cash-intensity

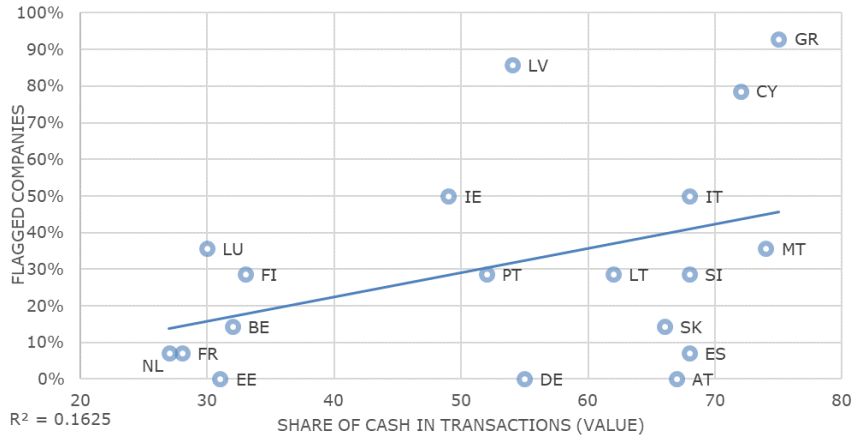
According to the literature, the most prominent vulnerability facilitating OC infiltration is cash-intensity (Savona & Riccardi, 2018). The fact that cash transactions are anonymous and very difficult to track make cash attractive to OCGs, who can use it for drugs transactions and other illicit services. Hence, businesses in countries where most transactions are done by cash are theoretically more at risk of infiltration, as OCGs can use this to hide their involvement. We assessed this hypothesis using an EU-wide survey from the European Central Bank (ECB) in 2017 (Esselink & Hernandez, 2017). Respondents were surveyed on many aspects of their use of cash, including the share of the value of their spending which was made using cash[228]. We define this share as the 'cash-intensity' of a country's economy, and its correlation with our measure of infiltration.

Once again, we observe an expected correlation between cash intensity and likelihood of infiltration in the trade of motor vehicles and construction sectors (no significant relationships were observed for the other sectors). The visualisations of correlations between cash-intensity and share of flagged companies in certain sectors are presented below. There are some clear outliers among those countries where cash usage is high. For instance, zero percent of Austrian companies in 'Wholesale and retail trade of motor vehicles' are flagged as being at risk of infiltration, even though nearly 70% of all transactions are made using cash in the country. In contrast, all countries exhibiting low cash usage have a low share of flagged companies.

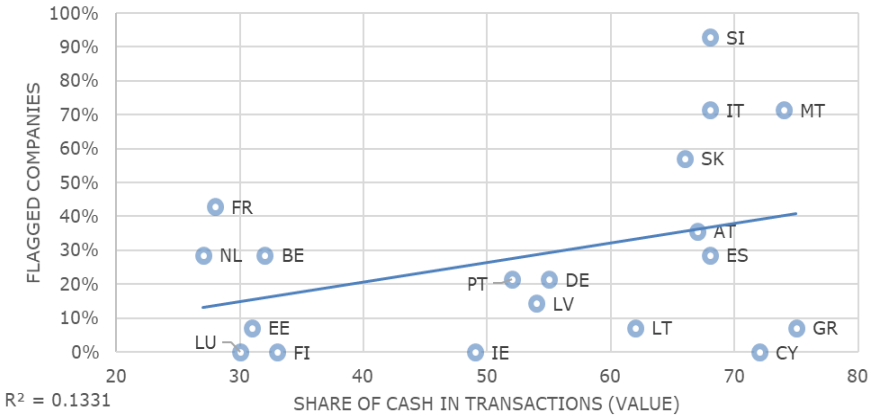
[228] Some EU countries were included in this survey. Data is missing for Bulgaria, Czech Republic, Denmark, UK, Croatia, Hungary, Poland, Romania and Sweden.

Figure 3.6: Correlation between countries' cash intensity and share of companies flagged as likely to be infiltrated

A) Wholesale and retail trade of motor vehicles



B) Construction

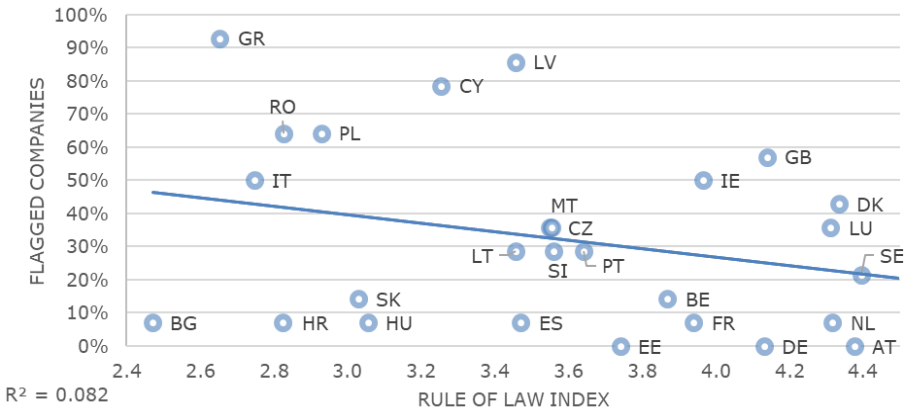


Quality of the rule of law

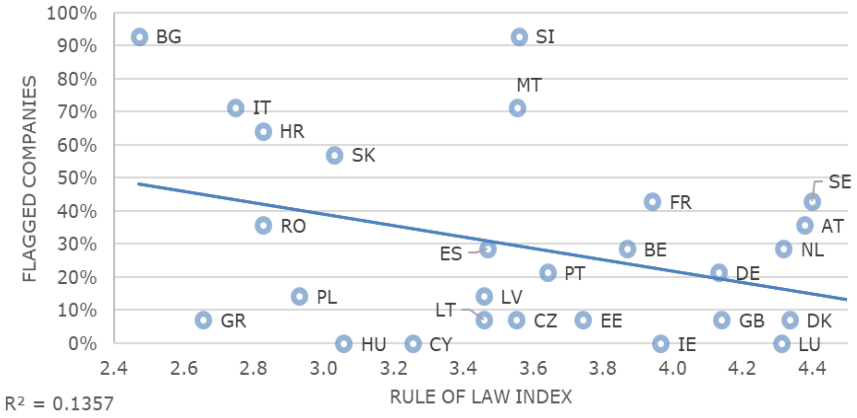
Previous research has suggested that a major risk factor for infiltration is **opacity of business ownership** and the **level of financial secrecy** (Savona & Riccardi, 2018). Legislation that allows opaque or complex ownership systems is ideal for criminals wishing to invest in legitimate assets while keeping their identities concealed. A jurisdiction with a lenient legal framework regarding financial and ownership transparency can therefore be considered as being at risk – and observing recurrent occurrences of unnecessarily complex business ownership structures in a country should raise suspicion regarding OCG infiltration (Savona & Berlusconi, 2015). At the macro-level, one source of data that we can use as a proxy for the quality of legal frameworks across EU Member States is the Rule of Law Index from the Worldwide Governance Indicators produced by the World Bank (World Bank, 2019). Rule of law is defined by the 'perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence' (World Bank, 2019). It is an index ranging from -2.5 (worst governance) to 2.5 (perfect governance). For the purpose of our analysis, we rescaled it from 0 (worst) to 5 (perfect). The visualisations of correlations between rule of law and share of flagged companies in the two usual sectors are presented below. As expected, higher ability to enforce the rule of law seems to crowd out infiltration, as OCGs are less able to conceal their illicit activities in legitimate businesses.

Figure 3.7: Correlation between countries' rule of law index and share of companies flagged as likely to be infiltrated

A) Wholesale and retail trade of motor vehicles



B) Construction



3.3.2. Supporting materials for analysis of risk factors for SOC infiltration of public procurement

Risk factors identified in the prior literature

While there is no dedicated literature discussing SOC infiltration indicators in public procurement, a large body of evidence looks at corruption risk indicators in public procurement around the world. Drawing on these studies enables us to at least derive a set of potentially relevant indicators, which then we can test in the empirical analysis below.

In the last decade or so, a small but innovative academic and policy literature has emerged in public procurement, on the one hand establishing the validity of individual corruption proxies; on the other, providing a rich repository of potential corruption indicators based on practitioners' and experts' views. These studies look into tendering corruption risks, political connections and company risk profiles in various contexts, such as elections and high-level politics or welfare services and redistributive politics.

First, in terms of tendering risks, a widely cited example is Olken (2007), who uses independent engineers to review road projects and calculates the amount and value of missing inputs to indicate corruption during contract implementation. Another approach to assess the amount of missing procurement outputs in infrastructure is proposed by Golden & Picci (2005), who examine the difference between the stock of infrastructure and cumulative public spending on it, using two independent data sources. Other authors use indicators characterising the

bidding process on the micro-level: the use of exceptional procedure types (Auriol et al., 2016), negotiated procedures (Chong et al., 2016), explicit scoring rules (Hyytinen et al., 2018) or single bidder auctions (Klašnja, 2016). In addition to such quantitative measurement exercises, a wealth of qualitative studies has documented the nature and logic of diverse corrupt practices in public procurement. These studies cover many countries – both from OECD and non-OECD groups – from a more journalistic, government-centred or legalistic approach (David-Barrett et al.,2018; OECD, 2007; Transparency International, 2006; World Bank, 2009). Detailed qualitative accounts of corruption strategies and techniques in public procurement provide a robust basis for identifying the most widespread corruption situations in large-scale datasets, using analytical techniques in the quantitative literature quoted above.

Second, the empirical literature looks at personal political connections as well as political influence established through political-party donations. Academic papers consider short- as well as long-term direct benefits accruing to connected companies (1–4 years) (Goldman et al., 2013; Luechinger & Moser, 2014), while others consider ties either to specific individuals or parties as a whole (Straub 2014). Most studies look at individual countries with only partially comparable research questions, data and analytical tools. For example, in Brazil, companies' campaign contributions translate into additional contracts won worth 14 times more than the contributions (Boas et al., 2014); the same figure in the US is only 2.5 times (Bromberg, 2014). Moreover, in the US the largest predictor of company procurement volume from before to after the 1994 change in the controlling majority of the House and the Senate was party connections/affiliations (Goldman et al., 2013). Even in Denmark, which is viewed as one of the least corrupt countries of the world (Transparency International, 2020), direct family ties between companies and politicians increase company profitability, especially in sectors dependent on public demand, i.e. public procurement (Amore & Bennedsen, 2013). At a different end of the reputational spectrum, one study looks into within-country variation and tries to link quality of institutions to the association between procurement income and political connections in Russia. It uses a unique database of all bank transfers leaked from the national bank to identify bogus transfers between companies clustering before elections (Mironov & Zhuravskaya, 2016).

Third, many studies look at how corruption alters companies' financial performance, which leads to signs of corrupt corporate behaviour (in addition to the previously discussed tendering risks and political connections). Using diverse analytical techniques, company turnover is often found to increase due to corruption (see e.g. Cheung et al., 2006; Cingano & Pinotti, 2012; Dávid-Barrett & Fazekas, 2016). Overall turnover increase typically comes from public procurement contracts, which often also translates into changes in the share of public procurement income in total turnover. Evidence from developed economies shows that return on assets, profitability and productivity increase significantly through winning public contracts due to connections (Amore & Bennedsen, 2013; Cingano & Pinotti, 2012; Williams et al., 2016), although other studies focusing on less developed economies find conflicting evidence. While some conclude that companies involved in corruption are the less efficient and less profitable ones (Cheung et al., 2006; Di Bono et al., 2015; Mironov & Zhuravskaya, 2016), others find the exact opposite or at least a mixed picture (Blagojevic & Damijan, 2012). Further authors find a strong relationship between government turnover and company success in high corruption economies, but not in clean countries (Dávid-Barrett & Fazekas, 2016). Finally, company-registry characteristics – such as tax haven registration or very young company age at the time of winning public procurement – contracts have been found to be associated with a range of other red flags in quantitative studies as well as case studies (Fazekas & Kocsis, 2015; Fazekas & Tóth, 2017).

Detailed methodological approach

The goal of this analysis is to predict mafia infiltration of municipal public procurement contracts (coded as binary variable: 1=SOC infiltration; 0=SOC non-infiltration) based on procurement-contract level and regional variables. The set of predictors was restricted in order to allow for EU-wide extrapolation, using Tenders Electronic Daily (TED) data as compiled by DIGIWHIST (i.e. all variables only available in the Italian public procurement dataset, but not in TED were removed from the analysis). While the micro-level validity of the analysis is very high, the results were further validated both on Italian and EU-wide data. First, we used Transcrime's Italian region-level mafia index (Calderoni, 2014) to validate our procurement-specific SOC score for the whole of Italy (note, not just for the municipalities infiltrated). Second, we correlated the procurement specific SOC score on NUTS regions across the whole of the EU with macro-indices of SOC infiltration and corruption such as TI CPI.

A set of alternative predictive models were estimated, and the best method selected based on prediction accuracy. The predictive models included both traditional regression analysis and machine learning, and in particular we compared three groups of models: logistic regression, Random Forest, and Gradient Boosting Machines. Sets of models were built to predict the binary outcome variable on the contract level: 1=SOC infiltration of the contract/supplier; 0=SOC non-infiltration of the contract/supplier. SOC infiltration was assumed if the contract was awarded in a municipality that was dissolved up to 3 years after the award of the contract, and SOC non-infiltration was assumed if the contract was awarded in a dissolved municipality 3 years after the dissolution. Models were compared based on the percentage of correctly classified contracts on the test dataset, with 70% of the sample used for training the models and 30% used for testing accuracy. In addition, we provided a test for external validity using the Transcrime Mafia Index (Calderoni, 2014). First, we report logistic regression results then Random Forest and Boosting estimations. A summary of the steps taken are described in the table below.

Table 3.9: Summary of analytical methods for analysis of risk factors in public procurement

Steps of analysis	Goals of analytical steps
1(a). Estimate the probabilities of SOC infiltration using Random Forest Classifier.	Random Forest Classifier, as a more advanced method, was applied to improve the model accuracy, using the same set of predictors. It also allowed us to explore the most important variables for the prediction and inspect partial dependence plots for them.
1(b). Estimate the probabilities of SOC infiltration using Gradient Boosting Machines (GBM) Classifier.	The GBM Classifier, another tree-based model, was developed to compare the results and accuracy among different models with the same predictors and select best performing approach.
1(c). Estimate the probabilities of SOC infiltration using logistic regression.	The first step was to estimate SOC infiltration probabilities for the sample of dissolved municipalities, using procurement-related indicators together with available social and geographical variables.
2. Select the best model and features predicting SOC infiltration.	Based on the prediction accuracy, we select the best model that will be used in further steps.
3. Test the results against external measurements of SOC infiltration.	To test the external validity of estimated models, we test the results for the infiltration score using Transcrime's Italian region-level mafia index (Calderoni, 2014). This was for the whole of Italy and not just for the municipalities infiltrated.
4. Extrapolate the SOC infiltration score to the full sample of Italian municipalities and to the whole of Europe.	The final step was to use the best performing model to predict probabilities of SOC infiltration for the full sample of the Italian municipalities, and then to all regions in Europe. The extrapolation for Europe was made using TED public procurement database. The extrapolation allowed us to map the predicted risks of SOC infiltration for the European regions.

The full list of indicators used in the analysis can be found in the table below.

Table 3.10: Overview of variables used in the analysis

Variable Name	Variable Description
Procurement-related indicators	
Log contract value	Logarithm of the awarded value.
Number of bids	Number of bids submitted, trimmed at 20.
CPV division	First two digits of the main CPV code of the tender (XX000000-Y).

Variable Name	Variable Description
Selection criterion	Whether the main criterion for winner selection is the lowest price or MEAT.
Contract delivery is local	Whether the location of contract implementation is the same as the buyer's location (y=1), or not (y=0).
Consortium	Whether tender winner is a member of consortium (y=1) or not (y=0).
Supply type	Whether procurement type is services, works or supplies.
Framework agreement	Whether a procurement procedure is a framework agreement (y=1) or not (y=0).
Administrative error	Share of missing key values (information about winner, buyer, contract value, number of bids) in the tender.
Share of supplier in buyer's annual spending	Share of total contract value of a winner in a year divided by total contract value awarded by the procuring entity in a year.
Number of contracts awarded by the procuring entity in the year	Number of contracts awarded by the procuring entity in the year.
Month of contract award publication	Month of contract award publication.
Quarter of contract award publication	Quarter of contract award publication.
Week in a month of contract award publication	Week in a month of contract award publication.
Day in a week of contract award publication	Day in a week of contract award publication.
Relative price	Estimated price of the tender divided by the awarded contract value. Coded as a binary variable with y=1 if relative price is more than 1, and y=0 for other cases.
Regional indicators	
Log population	Logarithm of the population of the NUTS3 region of municipality.
Area, thousand sq.km.	Area of the NUTS3 region of municipality in sq.km.
Coast region (y=1)	Whether the municipality is located in the coastal region (y=1) or not (y=0).
Mountain region (y=1)	Whether the municipality is located in the mountain region (y=1) or not (y=0).

The summary statistics for dissolved municipalities are presented in the table below.

Table 3.11: Summary statistics for dissolved municipalities

	Number of contracts	Mean	St. Dev.	Min.	Median	Max.	Missing rate
Number of contracts by procuring entity	2,368	17.84	17.78	1	10	65	0%
Share of supplier in buyer's annual spending	2,368	0.47	0.36	0.00	0.39	1.00	11%
Relative price	2,368	0.88	0.10	0.38	0.92	1.54	48%
CPV division	2,368	43.3	13	1	39	70	0%
Regional population, thousand people	2,368	748.6	708.6	163.4	559.8	3,176.2	2%
Log contract value	2,368	12.67	0.87	0.00	12.60	20.98	46%
Number of bids	2,368	12.58	26.44	0	3	292	45%
Procedure type	2,368	11.5	2.7	1	11	21	0%
Tender selection method	2,368	15.37	8.15	25	9	26	51%
Supply type	2,368	23.2	0.65	22	23	24	0%
Consortium	2,368	0.04	0.19	0	0	1	0%
Local contract delivery	2,368	6.16	3.93	0	9	1	0%
Framework agreement	2,368	0.04	0.18	0	0	1	0%
Administrative error (number of key missing fields)	2,368	0.48	0.33	0.00	0.75	1	0%
Area, thousand sq.km.	2,368	2.95	1.28	1.15	3.21	6.83	2%
Coast region	2,368	0.96	0.19	0	1	1	0%
Mountain region	2,368	0.72	0.44	0	1	1	0%
Weekday of contract award publication	2,368	4.06	1.50	1	4	7	0%
Week in a month of contract award publication	2,368	3.16	1.36	1	3	6	0%

	Number of contracts	Mean	St. Dev.	Min.	Median	Max.	Missing rate
Quarter of contract award publication	2,368	2.60	1.10	1	3	4	0%

Results of the analysis

Step 1: Estimate probabilities of SOC infiltration for Italian municipalities using different methods

Supporting materials for Logistic Regression and Random Forest

As a benchmark, traditional regression analysis is applied. In this step we fit a set of binary logistic regression varying the set of predictors included. The final model combines the significant contract- and regional-level predictors, as well as red flags from the three sets of variables (see Table 3.12 below).

Of the contract-level predictors, higher contract values are associated with lower average probability of SOC infiltration. By contrast, one can observe positive coefficients for the most missing information variables – that is the higher the rate of missing information, the higher the likelihood of SOC infiltration. To estimate whether missing information in tender announcements is associated with higher average probability of mafia presence, we firstly use separate binary coded variables for each missing field, and then opt to the composite indicator (administrative error).

We use four contract-level risk indicators in the model – number of bids (captures single bidding), number of contracts awarded by the procuring entity in the year, share of supplier in buyer's annual spending, and relative price. In line with expectations, contracts that were awarded by large procuring entities and received more bids, on average, have lower probabilities of SOC infiltration outcome. By contrast, larger values of the share of supplier in buyer's annual spending increases the average probability of SOC infiltration. The effects of the region-level characteristics are large and statistically significant. Larger population, and proximity to coast and mountain areas increases the probability of SOC infiltration. The most complete logistic regression model we estimated achieved an already high degree of accuracy – the model predicted SOC infiltration correctly for 71% of observations in the test dataset.

Table 3.12: Results of Logistic Regression for the SOC infiltration prediction

	Dependent variable: SOC infiltration		
	(1)	(2)	(3)
Log contract value	-0.349*** (0.119)	-0.341*** (0.118)	-0.346*** (0.118)
Number of bids (trimmed at 20)	-0.038** (0.017)		-0.038** (0.017)
Single bidding		0.166 (0.285)	
Number of bids is missing		0.923* (0.551)	
Contract delivery is local	-0.228 (0.334)	-0.201 (0.339)	-0.237 (0.334)

	Dependent variable: SOC infiltration		
	(1)	(2)	(3)
Place of contract delivery is missing	-1.030**	-0.977**	-1.030**
	(0.485)	(0.482)	(0.471)
Consortium (y=1)	-0.620	-0.620	-0.580
	(0.511)	(0.517)	(0.506)
Supple type is works	1.477***	1.354***	1.473***
	(0.491)	(0.488)	(0.490)
Supply type is services	0.400	0.373	0.379
	(0.380)	(0.379)	(0.379)
Selection criterion is the lowest price	0.437	0.302	0.453
	(0.315)	(0.310)	(0.313)
Selection criterion is missing	0.094	-0.030	0.157
	(0.497)	(0.474)	(0.435)
Framework agreement (y=1)	0.367	0.353	0.343
	(0.610)	(0.605)	(0.606)
Information about winner is missing	0.359		
	(0.252)		
Contract value is missing	1.177**		
	(0.532)		
Administrative error (missing key values)		1.320*	2.045***
		(0.706)	(0.680)
Month of contract award publication	-0.073		
	(0.079)		
Quarter of contract award publication	0.253		
	(0.242)		
Week in a month of contract award publication	0.103**	0.105**	0.106**
	(0.049)	(0.049)	(0.049)
Day in a week of contract award publication	0.136***	0.137***	0.140***
	(0.043)	(0.043)	(0.043)
Share of supplier in buyer's annual spending	1.435***	1.438***	1.388***
	(0.202)	(0.201)	(0.195)
Number of contracts by procuring entity	-0.044***	-0.045***	-0.044***
	(0.005)	(0.005)	(0.005)

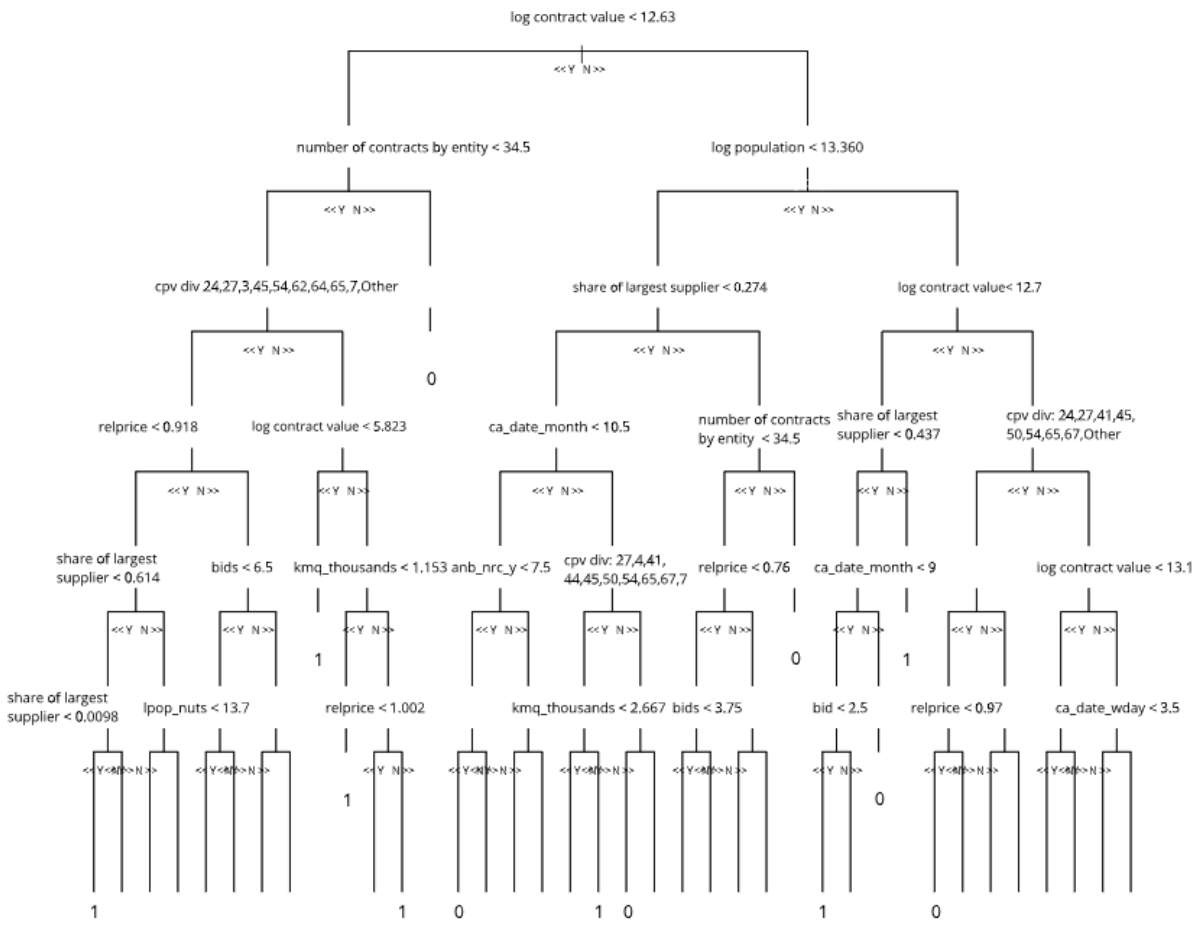
	Dependent variable: SOC infiltration		
	(1)	(2)	(3)
Relative price (coded as binary variable with y=1 if relative price > 1)	0.767 (0.883)	0.800 (0.892)	0.704 (0.878)
Log population	0.926*** (0.133)	0.912*** (0.133)	0.928*** (0.133)
Area, thousand sq.km.	0.067 (0.062)	0.060 (0.061)	0.069 (0.062)
Coast region (y=1)	2.441*** (0.391)	2.406*** (0.390)	2.430*** (0.392)
Mountain region (y=1)	0.408** (0.211)	0.405* (0.211)	0.413** (0.211)
Constant	-44.097 (2,938.143)	-44.382 (2,937.684)	-44.140 (2,937.700)
CPV division	Yes	Yes	Yes
Procedure Type	Yes	Yes	Yes
Observations	1,657	1,657	1,657
Log Likelihood	-776.541	-778.086	-776.354
Prediction Accuracy on the Test Set	70%	71%	70%
	*p<0.1; **p<0.05; ***p<0.01		

Note: The model is fitted on the train set to predict the probability of SOC infiltration. The table reports the measure of model performance – accuracy of predictions for the test set. Administrative error is calculated as the share of key missing values. For models (2) and (3) the administrative error was calculated excluding covariates containing a special level representing missing values (e.g. 'Selection criterion is missing').

In order to arrive at a precise estimate of SOC public procurement infiltration we estimated a series of tree-based machine learning algorithms (James et al., 2015). The advantage of these methods over traditional regression is that they are much more flexible, and are able to incorporate a series of interactions and non-linear relationships. Their disadvantage is that it is harder to interpret each predictor, nevertheless we provide examples and pointers as to the impact of each variable on SOC infiltration risk.

In order to demonstrate the logic of the Random Forest algorithm we present a sample decision tree in Figure 3.8, which represents a section of one of hundreds of trees constituting the Random Forest model. For the sake of clarity, it is not shown at the full size, but only the first seven levels.

Figure 3.8: Sample decision tree from the model of SOC infiltration classification



More advanced, ensemble-based methods are then applied, which in essence combines the predictive power of a large number of decision trees: Gradient Boosting Machines and Random Forests, using the same set of predictors as for the logistic regression.

Step 2 and Step 3: Selection of the best model and features predicting SOC and Validation using Transcrime's mafia index

The Logistic regression achieved 71% prediction accuracy, as shown in the table below. Boosting achieved 88% prediction accuracy for SOC infiltration in the test set, while the Random Forest model achieved 89% of accuracy, so performing slightly better.

In addition to prediction accuracy of the sample of proven cases, we also look at the correlation of predicted SOC infiltration scores with the established proxy, the Transcrime Mafia Index on the level of provinces in Italy. The correlation coefficient between the estimated SOC infiltration probability based on the prediction of the Random Forest model and Boosting model equals 0.3 and 0.2 respectively, considering the sample of contracts awarded by municipalities.

Table 3.13: Models' accuracy and correlation coefficient of predicted probabilities of SOC infiltration and Transcrime Mafia Index

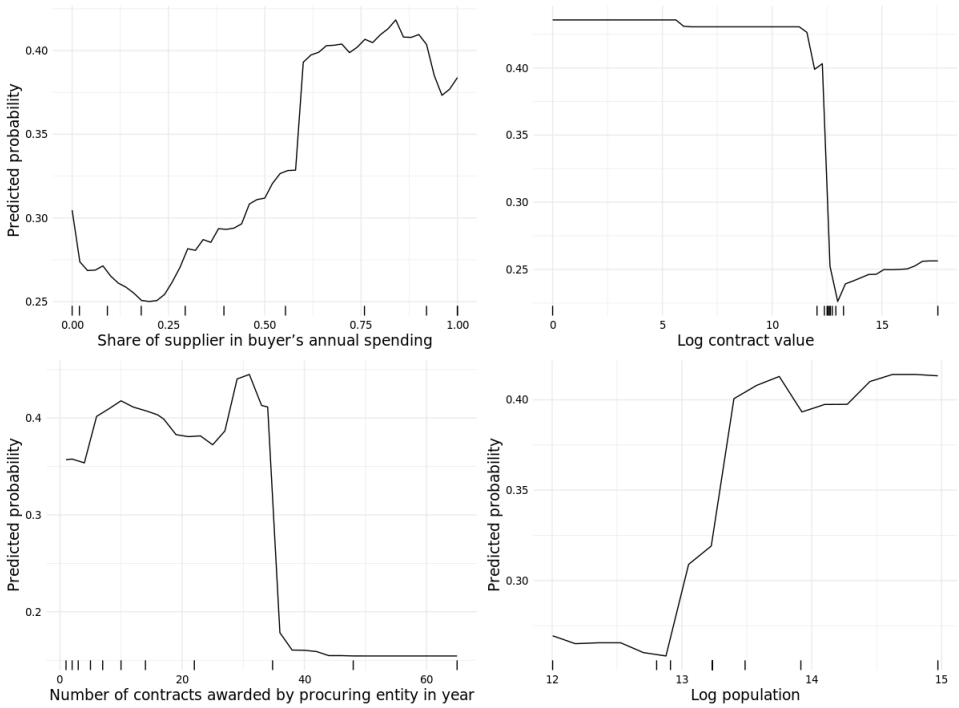
	Logistic Regression	Random Forest	Boosting
Correlation on prediction for all Italian contracts	0.26	0.18	0.22
Correlation on prediction for all Italian municipal contracts	0.49	0.3	0.24
Prediction Accuracy on Test Set	71%	89%	88%

Taken together, we conclude that based on prediction accuracy and correlation with the Transcrime Mafia Index, the Random Forest model is the most reliable for identifying OC infiltration of municipal procurement contracts.

Subsequently, we will use this best model for producing further estimates and demonstrating the explanatory power of the analysis.

In order to better visualize the impacts of individual predictors on the probability of SOC infiltration of municipal procurement, a few high impact predictors are shown using partial dependence plots. In the figure below, the horizontal axis represents values of each variable, while the vertical axis depicts average predicted probability of SOC infiltration across all trees, holding all other variables constant. For instance, for values greater than 0.60 of share of the supplier in buyer's annual spending, the model predicts that SOC infiltration is highly likely, and close to 50% probability. Similarly, the SOC infiltration is highly likely when the number of bids is 1. The upward trend is also observed for the population variable.

Figure 3.9: Partial dependence plots for the five most important predictors in the selected Random Forest model



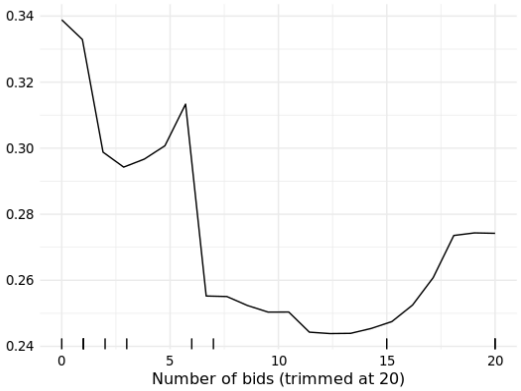
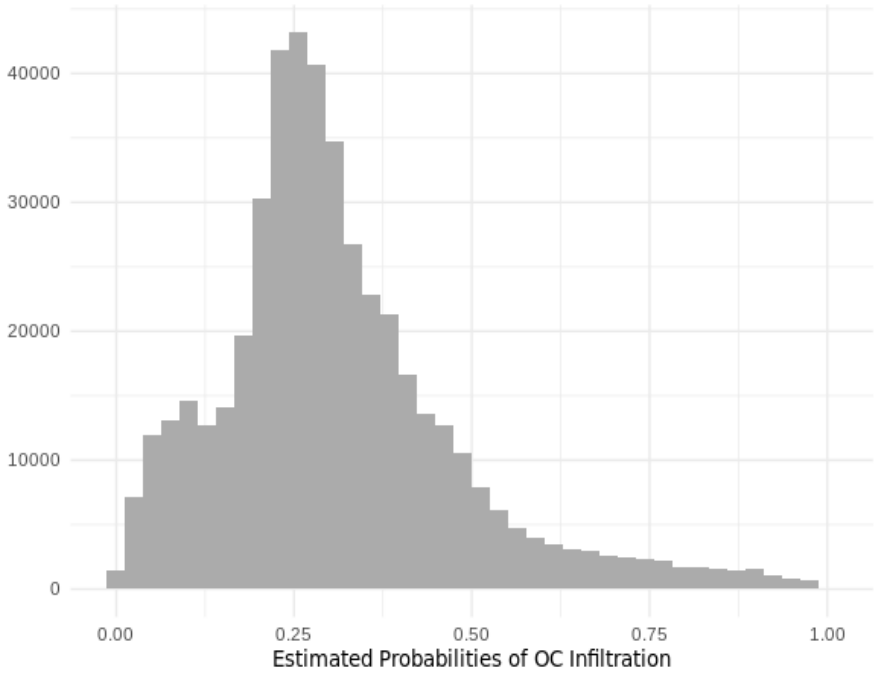


Figure 3.10 below shows the predicted SOC infiltration probabilities for the whole Italian public procurement dataset. Crucially from the perspective of using this indicator for further analysis, most contracts have a low estimated SOC infiltration probability, while a substantial minority of contracts have a predicted probability above 50%.

Figure 3.10: Predicted probabilities of SOC infiltration at the contract level produced by the selected Random Forest model for the Italian procurement data



Note: Histogram represents the distribution of estimated probabilities of the classification of each contract in the Italian dataset as the case of SOC infiltration. Parameter of the number of randomly chosen candidate predictors for each tree node = 14.

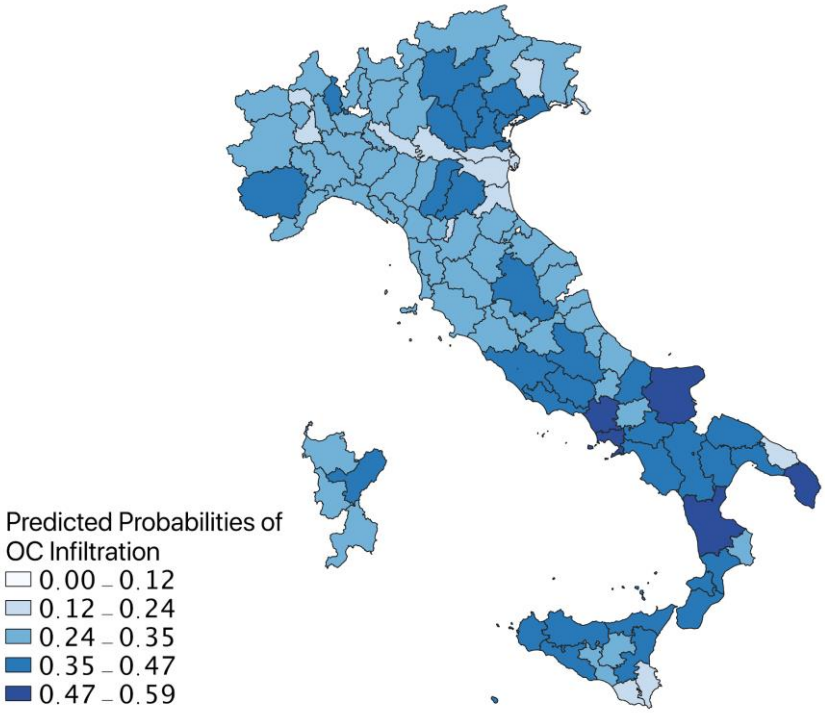
Step 4: Extrapolation of the SOC infiltration score to the full sample of Italian municipalities and to whole Europe

The Random Forest model, as the best model, was used to estimate the probabilities of the SOC infiltration of public procurement across the whole of Italy and for the rest of the EU. Each country or region received an aggregate score based on the average predicted probability of SOC infiltration for all its municipal contracts. Crucially from the perspective of using this indicator for further analysis, most contracts have a low estimated probability of SOC infiltration, while a substantial minority of contracts have a predicted probability above 50%. The distribution of predicted SOC infiltration probabilities for the whole Italian public procurement dataset is presented below.

The geographical distribution of the predicted SOC infiltration probabilities for Italian regions is shown in the figure below.

Our analysis indicates higher predictions for Southern regions and coastal regions of Italy.

Figure 3.11: Mean value of predicted SOC infiltration probabilities for Italian regions based on contracts awarded by municipalities



3.4. Additional information on the exploitation of the underground economy by OCGs

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Key findings:

- There is no agreed definition of the underground economy. Some definitions include both legal and illegal activities, while others strictly exclude illegal activities. This creates problems in measuring and comparing estimates of the size and extent of the underground economy.
- The relative size of the underground economy is, according to estimates by Medina and Schneider (2019), larger in Eastern and Southern Europe than in Western and Northern Europe.
- The literature on the exploitation of the underground economy by OCGs remains limited.
- OCGs are in a particularly good position to exploit underground economic practices in sectors that are closely connected to many economic activities, and have a relatively centralised position in existing economic networks.
- The underground economy and SOC intersect and thrive on each other in cases of THB for labour exploitation.

In this annex, we elaborate on several elements of **Section 3.4** of the main report. First, we expand on efforts to estimate the size of the underground economy. Two main categories of methods are discussed: direct and indirect methods, as well as their limitations. Then we discuss in greater detail estimates by Medina & Schneider (2019), whose work we used in this study to present the relative size of the underground economy in the EU and its member states. This is followed by a detailed overview of approaches that have been used for measuring the underground economy and drivers and indicators noted in existing literature on the topic. Given the prominence of Friedrich Schneider's work in this field, we also provide an overview of the debate and criticisms surrounding this body of work.

3.4.1. Details of efforts to estimate the size of the underground economy

Direct and indirect methods have been used to measure the underground economy in the EU

The desktop research identified that many studies have been carried out in the past 20 years to measure the size of the underground economy. Several methods have been used, falling into two main categories:

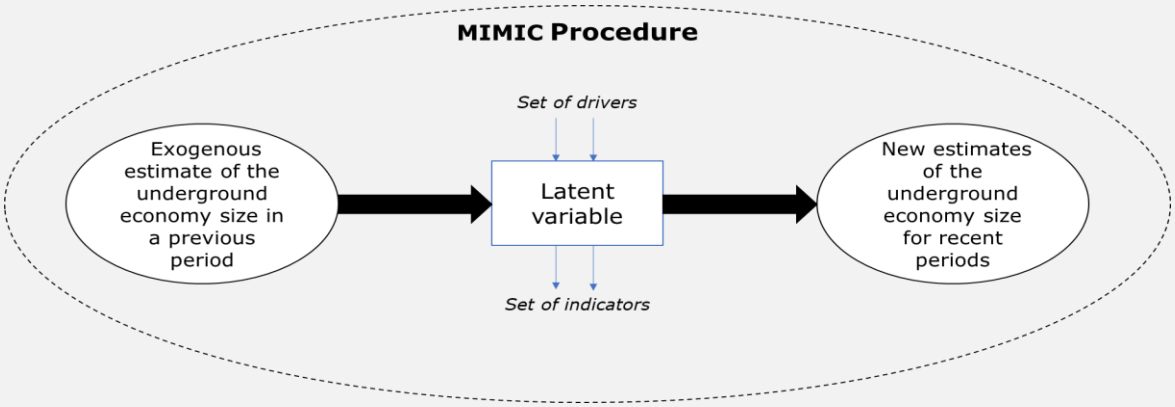
- Direct methods relying on primary data collected from participants in the underground economy, experts or the general population (e.g. via interviews, surveys, etc.)
- Indirect methods using indicators of the underground economy based on discrepancies between observed economic variables or trends (e.g. between reported personal income and personal consumption). The most common methods are presented later in this annex.

At the EU-level, the most prominent example of **direct method** usage is a survey on undeclared work implemented by Eurobarometer. The latest instance of the survey occurred in 2019, when 27,565 respondents across the 28 Member States were asked about their personal experiences and perception associated with undeclared work in their respective countries (Eurobarometer, 2019). One main advantage of this survey is that it permits the study of both the supply and demand of the underground economy, by asking participants about the different ways they engage with it.

Recent studies more often use **indirect methods**, most often the Currency Demand Approach (CDA) and Multiple Indicators Multiple Causes (MIMIC) modelling. The former consists of estimating a cash-demand equation, and interpreting any excess of demand as an increase in the size of the underground economy. MIMIC modelling aims to build a latent variable describing the annual variations in the size of the underground economy using a variety of drivers and indicators – which is then benchmarked using an exogenous measure of the underground economy (MIMIC procedure is described in the box below). These two methods have been improved in different studies to try to address their respective weaknesses (Ardizzi et al., 2014; Hassan & Schneider, 2016; Herwartz et al., 2015; Pickhardt & Sardà, 2015). In particular, CDA is often used for the external benchmarking step of the MIMIC model (Dybka et al., 2017).

Box 9: MIMIC procedure

MIMIC modelling is a theory-grounded approach exploiting the expected relationships between a set of observed drivers and indicators to build a latent variable. This latent variable is an index of the trend of the size of the underground economy describing only the annual size variations. Therefore, this index needs to be calibrated (through benchmarking) using an external measure of the underground economy for any year in the past (Hassan & Schneider, 2016). This process is described in the schema below.



Indirect methods rely on the drivers and indicators of the underground economy to estimate its size.

- **Drivers** are factors that favour the emergence and the growth of the underground economy, by giving incentives to individuals to conceal their activities.
- **Indicators** are factors that can be used to indirectly observe the underground economy, as they are expected to be highly correlated with it.

The distinction between driver and indicator can sometimes be thin, therefore some variables can often be used either as drivers or as indicators of the underground economy. The list of variables provided later in this annex are the most recurrent in the literature.

These drivers and indicators are extensively used in the models to produce estimates of the size of the underground economy in the different countries. They are instrumental in the computation of the latent variable used in the MIMIC models, which are used to produce most of the recent estimates. For that reason, exploring empirical correlations between the measures of those drivers and the estimates of the size of the underground economy in the different countries would be erroneous. Indeed, a correlation between a driver (such as tax burden) and the estimated size of the underground economy would be the reflection of the importance of this variable in the estimation procedure, rather than the proof of a connection between the driver and the underground economy. This was confirmed in an interview with an academic expert[229].

A very influential source of applications of an indirect methodology is Schneider, who has regularly published updated estimates of the size of the underground economy worldwide, principally using MIMIC modelling techniques (Medina & Schneider, 2018; Schneider & Buehn, 2018; Schneider & Enste, 2000). In the past 20 years, Schneider has co-authored many studies using MIMIC modelling to update the estimated size of the underground economy in a large pool of countries on a very regular basis. These estimates have been highly popular and influential in the academic and policy literature, as well as in the popular press.

Both direct and indirect methodologies are susceptible to biases and have important limitations that should be considered. These are discussed below.

Prior estimates of the underground economy have limitations that warrant cautious interpretation.

[229] Interview with academic expert, 13 March 2020 (#19).

Underreporting is an important limitation of **direct methodologies**, such as the Eurobarometer survey, as respondents might be reluctant to declare illicit activities. Hence, direct methods findings should always be considered as lower bounds.

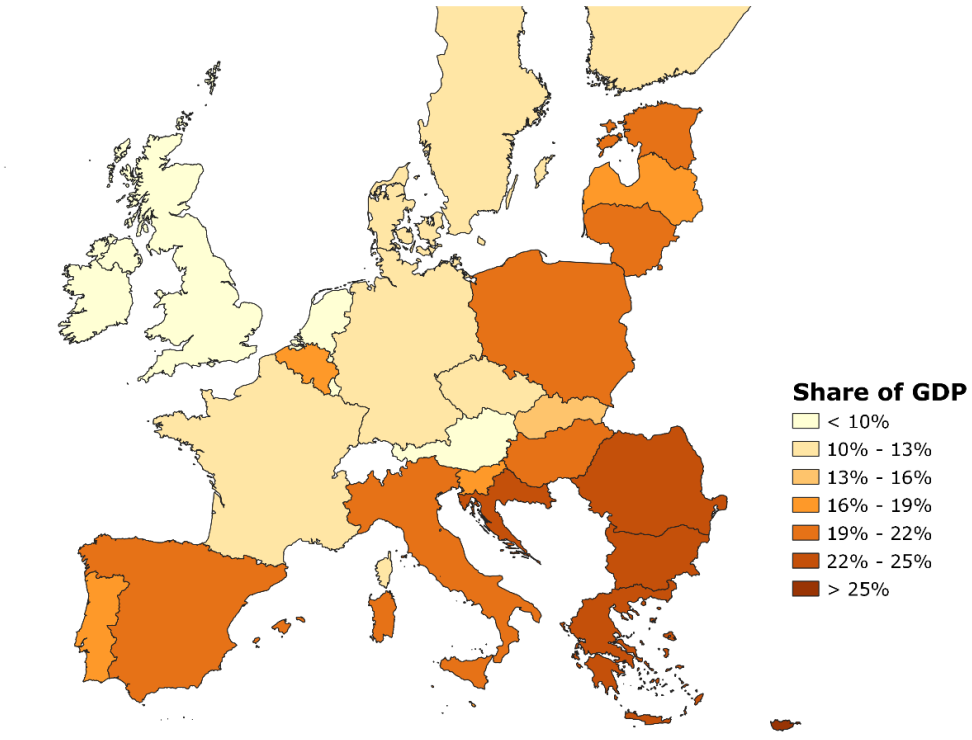
The main limitation of the MIMIC method – the **indirect methodology** employed by Schneider – relates to the benchmarking procedure, which consists of using an independent estimate of the size of the underground economy in a country for a given year as a base value. The MIMIC procedure only produces a latent variable, which allows study of the fluctuations of this size. Therefore, the final estimates for the most recent years produced via the MIMIC method are highly dependent on external estimates used in the benchmarking procedure, and the reliability and validity of these estimates are often difficult to assess (Feige, 2016). For this reason, among others, Schneider's work has been strongly questioned early on by Breusch (2005), and more recently by Feige (2016). Additional criticisms of Schneider's methodology are discussed later in this annex.

Existing estimates provide insight into the relative size of the underground economy in the EU

- Bearing in mind the limitations discussed above, this section presents current estimates from direct and indirect methodology on the size of the underground economy in the EU.
- According to the 2019 Eurobarometer survey, 11% of respondents indicated that they had consumed undeclared goods or services, and 3% reported having engaged in underground activities themselves. These proportions varied significantly across Member States.
- On the demand side, the share of the population declaring having consumed undeclared goods or services ranges from 5% (Poland) to 30% (Malta).
- On the supply side, only 1% of participants from the UK, Cyprus, Malta and Poland declared having participated in undeclared paid activities, but 10% in the Netherlands (Eurobarometer, 2019).

The map in the figure below shows the different levels of underground economy in the EU in 2017, as described in the latest iteration of Schneider's work (Medina & Schneider, 2019).

Figure 3.12: Relative size of the underground economy across EU Member States



Source: Research team's elaboration of Medina & Schneider (2019)

Key observations about the relative size of the underground economy that can be drawn from this map include:

- The relative size of the underground economy is, according to these findings, larger in Eastern and Southern Europe than it is in Western and Northern Europe.
- Member States from Southeast Europe are the most affected, with underground economies being nearly as large as a quarter of the size of the formal Gross Domestic Product (GDP) in Croatia, Bulgaria, Romania and Greece.
- The Member State with the largest underground economy relative to its legitimate economy in 2017 was Cyprus, where it represented 25.2% of the country's legitimate GDP.
- To a lesser extent, the whole Eastern region of the EU exhibits relatively large underground economies. In Hungary, Poland and the Baltics, the underground economy is equivalent to approximately 20% of the formal GDP. The same also applies in most Mediterranean countries (Italy, Spain and Slovenia).
- In relative terms, Western Europe and Scandinavia seem less subject to the phenomena. For most Member States in this region, the size of the underground economy represents less than 13% of the formal GDP, the lowest relative size being in Austria (7.1% of the GDP). The only notable exception is Belgium, where the underground economy represents 16.5% of the legitimate GDP.
- Large discrepancies are observed between the findings of the direct method (2019 Eurobarometer survey) and those of the MIMIC model. For instance, Malta, Cyprus and Poland are among the countries reporting the least participation in underground economic activity, while the relative sizes of their underground economies are among the largest in Europe (according to Schneider). Underreporting probably plays a significant role in this difference, as people can understandably be reluctant to declare underground activity, and this propensity to underreport might differ across countries.

Table 3.14: Approaches that have been used for measuring the underground economy

Method name	Description	Strengths	Weaknesses	References
DIRECT APPROACHES				
Surveys	Asking a representative sample of the population about their behaviours to identify and measure shadow economy activities.	Produces clear estimates, easy to interpret.	People are likely to underreport fraudulent activities. Costly to implement. Difficult to design an unbiased questionnaire. Poor comparability across different countries.	Schneider & Buehn (2017) Medina & Schneider (2018) Schneider & Enste (2000)
Tax auditing	Using fiscal auditing programmes' findings in terms of undeclared taxable income as a proxy to calculate the size of the shadow economy	Theoretically attractive.	The sample of audited companies is biased because it is not random. The estimates depend on the ability of the authorities to detect fraud.	Schneider & Buehn (2017) Schneider (2012)
INDIRECT APPROACHES				

Method name	Description	Strengths	Weaknesses	References
Discrepancies between national expenditures and income statistics	As income and expenditure measures of the GNP should always be equal – the gap between the two could theoretically be interpreted as resulting from the shadow economy.	Easy to calculate.	Discrepancies are likely to be the result of national accounting errors; this method therefore lacks reliability.	Schneider & Buehn (2017) Medina & Schneider (2018) Schneider (2012)
Discrepancies between official and actual labour	The discrepancy between official and actual labour force could be interpreted as a proxy for shadow economy as the excess labour force would be the one employed in off-the-book activities. As actual labour force cannot be observed, past studies assumed the labour force participation constant, and to interpret any decrease in the official participation rate as an increase in shadow activities.	Simple, easy to calculate.	Assumption of constant labour participation rate is very strong. Variations of participation rate might be explained by other factors than underground activities.	Schneider & Buehn (2017) Medina & Schneider (2018) Schneider (2012)
Transactions approach	Using the assumption of constant relationship between the volume of transactions and the official GDP stated by the Fisher quantity equation – and assuming the equality of the total value of transactions to total nominal GNP – one can derive the size of 'underground GNP' by subtracting the official nominal GDP to the total value of transactions in the same year.	Grounded in economic theory. Theoretically attractive.	Need to arbitrarily choose a base year and assume that it was not affected by underground economy to derive size estimates. Difficult to gather complete and reliable data on transactions, in particular cash transactions.	Schneider & Buehn (2017) Schneider (2012)
Currency demand approach (CDA)	Assuming that shadow transactions are always made using cash, the idea is to develop an equation for currency demand over time and to interpret any excess of demand as an increase in the size of shadow economy.	Consistently replicable across countries.	All shadow transactions might not be made in cash. Studies suggest different reasons for increases in cash demand. This method often assumes same velocity of money in both legal and shadow economy, which cannot be tested. Again, need to arbitrarily choose a base year and assume that it was not affected by underground economy to derive size estimates.	Schneider & Buehn (2017) Pickhardt & Sarda (2015) Ardizzi et al. (2014) Medina & Schneider (2018) Schneider (2012)

Method name	Description	Strengths	Weaknesses	References
The electricity consumption method	Taking electric power consumption as an observable indicator of economic activity, the idea is to interpret differentials between electricity consumption growth and GDP growth as increases of the size of the shadow economy.	Simple and appealing method. Accessible data.	The direct link between electricity consumption and economic activity is questionable. This link is likely to be different across countries and over time.	Schneider & Buehn (2017) Schneider & Enste (2000) Schneider (2012)
The model approach (Multiple indicators, multiple causes estimation, or MIMIC)	The idea is to build a latent 'shadow economy' variable by using a structural equation model including known drivers of the shadow economy. Then, the latent variable is used to predict a set of shadow economy indicators in a measurement model. If the latent variable proves to be an efficient predictor of the shadow economy indicators, it can then be used to predict evolution in the size of the shadow economy.	Wider approach than competing methods since it can use several causal factors and indicators. Flexible in its application, can be adjusted to available data.	More confirmatory than explanatory model. Only produces relative estimates (latent variable), therefore need to use a benchmark observation produced by another method.	Schneider & Buehn (2017) Hassan & Schneider (2016) Medina & Schneider (2018) Schneider (2012)

Table 3.15: Drivers and indicators of the underground economy

Variable	Theory	Data	References
DRIVERS			
The economic burden of tax and social security contributions	The higher the cost induced by tax and social security contributions, the more likely individuals are to seek escaping them by going underground, and hence maximize their incomes. In addition, low tax morale is also understood as a driver of the shadow economy. Indeed, previous studies have argued that taxpayers are more likely to evade their duty if they perceive that their tax money is unfairly used and distributed.	Countries' national data on tax and social contribution levels	Hassan & Schneider (2016) Herwartz, Schneider & Tafenau (2010) Feld & Schneider (2010) OECD (2017)
Regulations	Higher levels of regulation in the legitimate economy are likely to increase the likelihood of some activities to go off-the-books. For instance, labour market regulations in terms of minimum wages, maximum working hours or workers' safety standards can be perceived as too pressuring on the labour costs, and hence provide further economic incentives to hide activities.	Economic and business freedom indexes	Enste (2015) Medina & Schneider (2018)
Institutional quality	The ability for an administration to apply the tax codes and regulations in an effective and transparent way can be a more decisive decisional factor to operate in the underground economy than the actual burden of taxes and regulations. Furthermore, presence of corruption in an administration will reduce the ability to enforce the different regulations, and hence facilitate the concealment of activities and reduce the benefits of being formal. As formal businesses often benefit from good-quality public services, the inability to efficiently deliver good public services also increases the attractiveness of the underground economy. This is a vicious circle, as the increase in the size of the shadow economy automatically reduces the tax revenues of the public sector, which hinders its ability to efficiently deliver public goods, which in turn favours the development of the shadow economy. If public-sector weaknesses can therefore increase the development of the informal economy, it sounds reasonable that a good deterrence strategy can inversely slow it down. However, data to prove such an assertion is difficult to collect, and there is weak evidence that effective deterrence is helping to reduce the size of the shadow economy.	Rule of Law index Regulatory Quality index Government Effectiveness index Control of Corruption index	Schneider & Buehn (2018) Williams & Schneider (2016) Herwartz, Schneider & Tafenau (2015) Hassan & Schneider (2016) Feld & Schneider (2010) OECD (2017)

Variable	Theory	Data	References
State of legitimate economy	High unemployment and self-employment rates might incentivize individuals to move to the shadow economy to generate incomes. Some sectors are also more likely to have a part of their activity hidden from the authorities. This is for example the case of the agricultural sector, for which relative size can be considered as both a driver or an indicator of the size of the shadow economy.	Countries' national data on unemployment/self-employment	Williams & Schneider (2016) Feld & Schneider (2010) Hassan & Schneider (2016)
INDICATORS			
Size of the formal economy	There is a proven negative correlation between the size of the shadow economy and the size of the formal economy, all else being equal. The reason behind this is quite straightforward – the shadow economy growth is detrimental to legitimate economy growth.	Countries' national data on GDP	Hassan & Schneider (2016)
Cash in circulation	Individuals involved in shadow activities are more likely to make their transactions in cash than with other payment methods that are more easily traceable, and thus more likely to attract the attention of the authorities. Therefore, an excessive demand for cash (compared to legitimate reasons for people to hold cash) in a country might suggest that it is used in the underground economy.	Ratio of cash in circulation (M1/M2)	Hassan & Schneider (2016) Medina & Schneider (2018)
Labour participation rate	The underground economy is crowding out workforce from the legitimate economy. Hence, the larger the underground economy is, the lower the official labour participation rate should be (all else being equal).	Countries' national data on labour participation rate	Hassan & Schneider (2016) Medina & Schneider (2018)

Controversy surrounding Schneider's work

Problem of definition and scope

As defined in Schneider's work, the underground economy (or 'shadow economy') is a component of the unobserved economy, alongside the illicit economy and the informal economy. However, Feige (2016) noticed that Schneider's estimates of the size of the underground economy are significantly larger than estimates of the size of the unobserved economy for the same countries and years for which he collected data from national statistical agencies. This is of course counterintuitive, as by definition the underground economy cannot be larger than the unobserved economy. Schneider's estimates are therefore unexpectedly high. In 2002 a publication on the measurement of the non-observed economy by the Organisation for Economic Co-operation and Development (OECD) had already noted that macro models, such as the MIMIC employed by Schneider, have the tendency to 'produce spectacularly high measures, which attract much attention from politicians and newspapers' (OCED, 2002).

High sensitivity of the model

MIMIC models require researchers to assign a unit coefficient to one of the indicator variables, for normalisation. It means that one of the indicator variables is arbitrarily set to have a one to one, or one to negative one, correlation with the latent variable, which will in turn be used to calculate the size of the underground economy. Common choices of variable for the normalising indicator are currency holdings, GDP per capita or real GDP. The problem is that the choice of the sign of the coefficient assigned to the normalising indicator is made arbitrarily and has a direct impact on the conclusions of the model. For instance, Breusch (2005) indicated that in a study from Dell'Anno & Schneider (2003), the arbitrary choice of assigning a negative coefficient to real GDP was the only reason for the study's conclusions that tax burden, government size and self-employment positively affect the size of the underground economy. Had the coefficient of the normalising indicator been set to one, the results would have been different. Feige (2016) pointed out that all Schneider's MIMIC models find consistent correlations between indicator variables and the underground economy, which are not always in line with the theory. According to him, this suggests that the results are biased to fit into the authors' prior beliefs.

Lack of documentation on the benchmarking procedure

The MIMIC models employed in Schneider's papers 'only' produce a latent variable, which is an index meant to describe the evolution of the underground economy year on year. The actual size of the underground economy is calculated during the benchmarking procedure, which is done by taking the estimate from a prior exogenous study and adjusting it to another year using the values of the latent variable in both years. A major point of criticism from Feige (2016) on Schneider's studies is their lack of documentation regarding the sources used for the benchmarking procedure. If it is indicated that these studies use currency demand models, too few details would be shared regarding their data sources or specifications, making it impossible for other researchers to assess the quality of these estimates or to replicate them.

Professor Schneider answered to these critics in a response paper (Schneider, 2016). On the question of scope, he in turn questioned the source of the unobserved economy estimates presented by Feige, which were obtained through private conversations with national statistical agencies, and hence non-verifiable. He also denied the assertion that the choice of the coefficients signs for the normalising indicators is arbitrary, arguing that it is based on economic theory. Finally, he strongly rejected the accusation regarding the lack of documentation of his studies. He affirmed that all necessary information, data and code had been provided to all researchers willing to undertake the replication of his results, including to Feige himself.

In conclusion, the reliability of the estimates presented above is subject to debate among academic experts. Yet, they are the only existing estimates coming from a unique consistent source. They are also widely used in economics, public policy and crime literature. Hence, it is reasonable to use them as indicators of the different sizes of undergrounds economies across EU Member States. However, we need to remain cautious and critical when it comes to interpreting these results, as they are not unanimously accepted among the experts in the field. Professor Schneider himself recognizes that the estimates have a margin of error of 15% (Schneider, 2016).

3.4.2. Illustrating the use of the underground economy by SOC in the labour sector

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In order to better understand the links between SOC and underground economy structures and the modus operandi of OCG exploitation of such structures, we undertook a case study analysis focusing on the use of undeclared work by OCGs involved in THB for labour exploitation in Bulgaria and Romania. We focused on THB because there is known to be heavy organised crime involvement and a known intersection with the labour sector, and we focused on Bulgaria and Romania because they are among the top five EU countries for registered victims of trafficking (European Commission, 2018c).

As previously noted, there is a relative paucity of evidence on the interaction between OCGs and the underground economy, and the two phenomena are often dealt with separately. This case study thus aims to address this gap in knowledge by illustrating how **OCGs exploit the underground economy** in the case of THB for labour exploitation.

The case study will review how OCGs adopt different undeclared work practices and fraudulent schemes throughout the different phases of labour trafficking, in order to avoid government detection and achieve cost reduction and profit increase at the expense of the human rights of victims.

The analysis is based on literature review as well as analysis of 11 different proven cases of trafficking for labour exploitation conducted by OCGs from Bulgaria and Romania, identified via searches in judicial databases, media reports and through stakeholder interviews. Furthermore, the case study draws on 14 interviews with national stakeholders from Bulgaria, Romania, Germany, Austria, Spain, Sweden and Belgium (including law enforcement officers, labour inspectors, social security inspectors, trades union and Non-Governmental Organisation representatives). Bulgaria and Romania were selected as they are both primary countries of origin of trafficking victims in the EU. In addition, while trafficking for labour exploitation remains underreported, both countries have experienced a significant increase in the prosecuted cases of THB for labour exploitation in the past 5 years. Bulgaria and Romania have some of the highest shares of undeclared economy in the EU (European Commission, 2017b).

The extent of THB in Bulgaria and Romania

Bulgaria – along with Romania, Hungary, the Netherlands and Poland – is one of the top five EU countries of citizenship of registered victims of trafficking (European Commission, 2018c). Each year, between 400 and 500 victims are registered in criminal statistics by the Bulgarian Prosecutor's Office (НКБТХ, 2017, 2018, 2019). This number is cumulative and refers to all victims identified in criminal proceedings in the respective year.

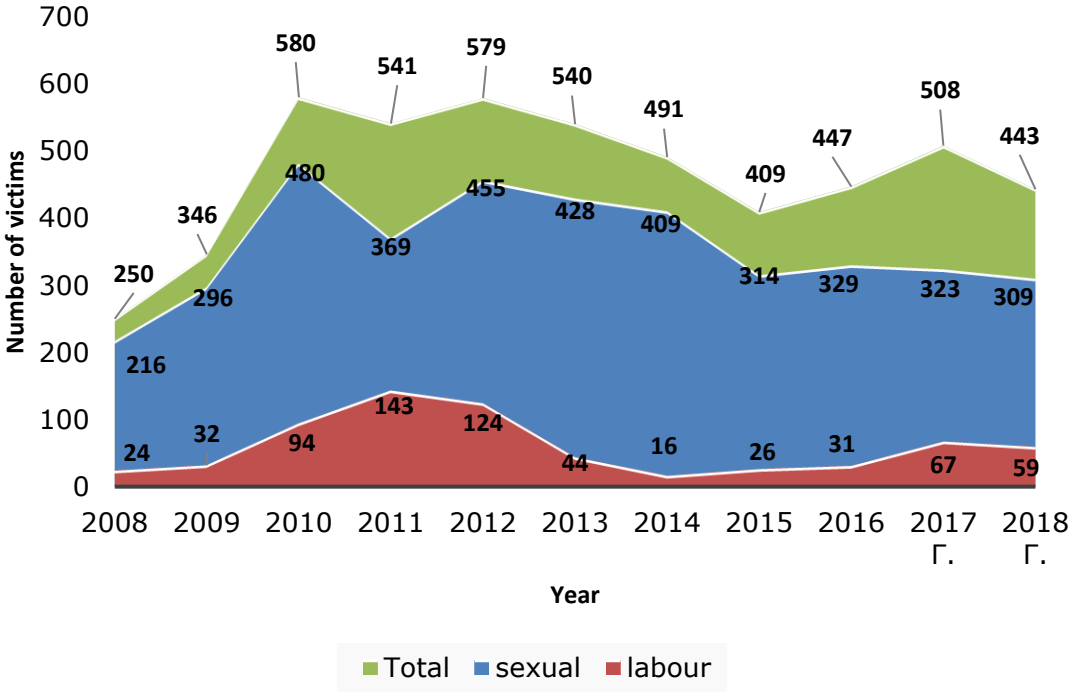
In Bulgaria, about 13% of the registered victims in the last two years (2017–2018) were trafficked for labour exploitation, while trafficking for sexual exploitation remains the prevalent form with 65%–70% of registered victims. Other forms of exploitation include trafficking for the purpose of sale of unborn babies and trafficking for begging. Data from the Bulgarian National Commission for Combatting Trafficking in Human Beings (NCCTHB) show a slight increase in registered THB for labour exploitation cases from 2014 onwards. This is due to the increased attention to this type of crime both on EU-level and Member State-level (Europol, 2016; НКБТХ, 2019)[230].

Romania is also a key source country for victims trafficked within the EU. The THB market in Romania appears to have been shrinking in the last 10 years, according to statistics published by the Romanian National Agency against Trafficking in Persons (ANITP). The number of victims of labour exploitation come at second place after the victims of sexual exploitation – at 17% and 20% in 2017 and 2018 respectively. The total number of victims of all forms of exploitation (including sexual exploitation, labour exploitation begging and other forms) has also been in

[230] Interview national stakeholder, 16 March 2020.

decline, to 497 victims in 2018 (see the figure below)[231]. Regarding the countries of exploitation, official statistics of ANITP show that internal trafficking most prevalent, with most of the Romanian victims being trafficked in their own country (Romania Insider, 2019).

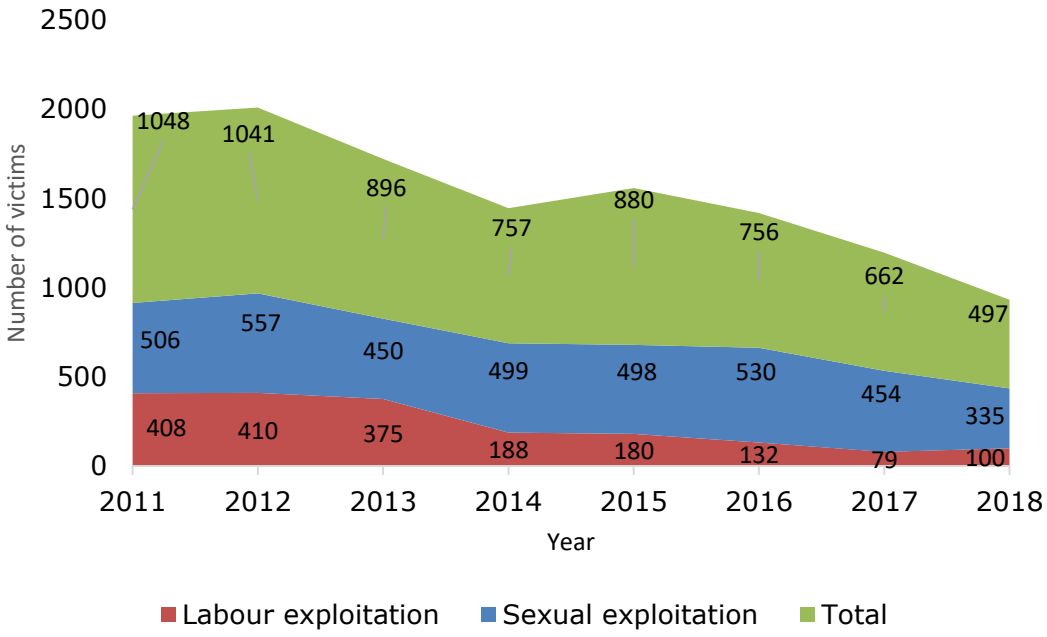
Figure 3.13: Victims of trafficking in Bulgaria by type of exploitation



Source: Bulgarian National Commission for Combatting Trafficking in Human Beings annual reports.

Figure 3.14: Victims of trafficking in Romania by type of exploitation

[231] Government's Reply to GRETA's 3rd Questionnaire, published 10 January 2020.



Sources: ANITP annual reports.

Characteristics of victims of THB for labour exploitation in Bulgaria and Romania

Most of the **victims** of trafficking for labour exploitation in **Bulgaria** are adult males – around two-thirds of all registered victims. Victims typically originate from economically disadvantaged regions, such as northwestern Bulgaria, and have low socio-economic status. The victims are typically in an economically active age and have low educational qualification levels. Country reports, case studies and additional interviews reveal that men from marginalised communities are frequently targeted for labour exploitation in the agricultural and construction sectors (GRETA, 2019).

The profile of the victims for labour exploitation in Romania is similar to the profile of victims from Bulgaria. Most of the victims for labour exploitation in the period 2015–2018 were male (83%), adult (90%), from rural areas (63%) and with poor education (60% up to secondary school)[232].

Most common destination countries and sectors for victims of THB for labour exploitation in Bulgaria and Romania.

The most common destination countries of **Bulgarian** victims of trafficking for labour exploitation are Germany, France, Italy, Belgium, the Netherlands, the UK and Greece, though national statistics do not allow for more precise disaggregation by country (НКБТХ, 2017, 2018). The most common economic sectors where exploitation takes place include agriculture, hospitality, construction, and domestic and social care (НКБТХ, 2017, 2019). In addition, schemes of sham employment in au-pair services were identified as potential trafficking for labour exploitation (European Commission, n.d.). More recently, experts point to industries – such as recycling, meat-processing, beauty salons and the transport sector – that are susceptible to trafficking and labour exploitation of Bulgarian nationals[233].

For Romania, victims for labour exploitation are mostly exploited in Romania (27%), the United Kingdom (18%), Germany and Italy (12% each). All the victims in the ANITP 2015–2018 database

[232] Years 2015–2018 were considered because for these years the data are in open format.
[233] Interview national stakeholder BG, 16 March 2020 (#52);

for labour exploitation were Romanian. As regards the sectors of labour exploitation, the main areas are agriculture, construction, hospitality and day-care for children and elderly.

The exploitation of underground markets and the grey areas between the licit and illicit economy in the context of THB for labour exploitation

Drawing on analysis of 11 proven cases of THB for labour exploitation of Bulgarian and Romanian nationals in other EU countries of destination, the research team identified the main actors involved and modus operandi of OCGs and **the use of undeclared work practices – i.e. exploitation of the underground economy**.

The analysis of cases identified shows a high level of *infiltration of OCGs in the legal economy* using **legal companies** both for the purpose of recruitment and exploitation of victims. The labour exploitation is intertwined with various forms of tax and social contributions evasion or fraud, and traffickers make use of schemes for bogus self-employment or posting of workers abroad, or other grey economic practices and violations of labour and other administrative regulations.

Recruitment

THB cases from Bulgaria and Romania reveal that **recruitment** of victims typically takes place through false promises about employment, good working conditions and high remuneration. This is done both through official job ads and recruitment agencies, but also through informal networks.

Online advertising is used by traffickers through job advertisements on job-search and free ad-posting websites, as well as through social networks, with the aim to attract and recruit potential victims. **Word of mouth** is another (complementary) recruitment strategy as recruiters often come from the same community as victims. The advantage is the trust between community members, who may in some cases be relatives to the victims of the crime. In many cases, male workers are recruited in groups and are encouraged to convince friends and relatives to join the group (Europol, 2016).

Previous research has shown that in the field of migrant labour, the intermediaries facilitating the link between supply and demand of migrant labour can be both OCGs as well as disguised legitimate businesses with close ties to the formal and informal economy in destination countries (Andrees, 2008). Recruitment mechanisms in cross-border labour exchanges include legal, semi-legal/informal, or illegal means.

The analysis of proven cases from Bulgaria and Romania reveals a clear trend that traffickers **use legitimate companies in the process of recruitment** and to conceal the profits of exploitation. The reviewed cases, as well as stakeholder interviews, indicate that **intermediaries** acting as recruitment agencies play an important role in trafficking for labour exploitation. While in Bulgaria there is a licensing regime for legitimate recruiters, the labour inspectorates lack the capacity to proactively check all emerging intermediaries, but rather undertake inspections based on reported irregularities (FRANET, 2014). The Bulgarian General Labour Inspectorate reports on the substantially increased inspections of firms that recruit and post workers abroad[234]. In Romania, legislative changes took place in 2018 forbidding recruitment agencies to charge fees from job seekers.

Analysed proven cases revealed that pre-screening of victims through skype calls and on-site interviews is a technique used to lower the risk of the traffickers, by making sure that those seeking work are potential migrants. Traffickers may rent additional facilities in hotels or administrative buildings to be used as fronts of their business in order to gain the trust of potential victims and to deceive authorities.

Contracts, pay and benefits

[234] Interview national stakeholder BG, 16 March 2020 (#52).

A trend illustrated by both Bulgarian and Romanian cases is that traffickers tend to **offer a contract to the exploited workers**, although work without any formal contract still occurs where payments are done in cash, if at all (НКБТХ, 2019). However, labour contracts are offered in a language that the workers cannot understand and may be completely bogus. Another practice is to include clauses that could be difficult to grasp by workers with low levels of experience and education. In a case analysed from Romania, the initial contract was subsequently replaced by irregular work practices.

Prevalent undeclared work practices that go hand in hand with labour exploitation include payments below the national minimum wage, imposing longer working hours and substandard or even dangerous working conditions (while severely underreporting the hours worked), bogus contracts (where the true nature and conditions of the work arrangement is not disclosed), and withholding all or a large part of the promised due to various fees, charges and deductions. In some destination countries, traffickers take advantage of the regulatory environment and the low risk of detection, for example where labour contracts are not subject to mandatory reporting and registration to the authorities[235].

In the case of Bulgarian nationals exploited abroad, two **prevalent schemes of undeclared work and related administrative abuses** were illustrated by the cases analysed and verified by interviews and desktop research. One of the main schemes includes the **abuse of posted work regulations**, where workers are sent abroad without signing the necessary formal documents (a so-called 'A1 form') that would ensure the employer pays insurance costs. This occurs alongside other administrative offences that are made to cut costs, including lack of any form of insurance, **evasion of taxes and social contribution** in the sending state, and non-compliance with minimum wage or other labour regulations in the receiving state (Rusev & Kojouharov, 2019)[236]. In the usual scheme the posted worker is stated to be insured at the minimum wage in the receiving country, while in reality he/she receives lower actual remuneration as different 'fees' – such as transportation to the receiving country, accommodation, etc. – are subtracted illegally from the posted worker's pay. Subsequently the full amount of taxes due is not paid in the sending state. The undeclared work practices often associated with labour exploitation through posted work may also include fictitious posting (workers are not actually posted, but hired locally), exceeding the allowed posting period, underdeclaring wages or hours worked, and payment below the minimum wage, among others (Mineva & Stefanov, 2018). Such schemes often involve registering numerous shell companies without any assets, which quickly disappear to avoid liability and detection by authorities. In some cases, traffickers have several legally employed workers, around which more people are trafficked and work illegally (being forced to sign bogus contracts or working completely undeclared) (Ollus & Jokinen, 2019)[237]. They may also work as temporary agency workers.

Alternatively, perpetrators use the method of **bogus self-employment** to cut costs and reverse the burden of social contributions onto the workers. Bogus self-employment schemes include deceiving, manipulating or forcing victims to register as self-employed persons in the destination country, while they work under the subordination of an employer. This type of scheme is used in low-qualified positions. The employer in practice **reverses the burden for payment of taxes and social contributions to the workers** and thus cuts labour costs. Another scheme employed is to coerce victims to **register as shareholders of a limited liability company** (Federal Public Service Social Security, 2011). In some cases, victims become bogus company shareholders – i.e. victims are made to sign papers that to acquire 5% of a company, but are not aware what they have signed[238]. There are many variations of bogus remuneration schemes that traffickers may use to evade taxes and social security contributions.

Transport and logistics

In many cases, transport is organised by the recruiters in the country of origin through a logistical partner. The recruiters point to a departure place and time, which takes the workers across the

[235] Interview national stakeholder DE, 10 March 2020 (#47).
[236] Interview national stakeholder AT, 10 March 2020 (#46).
[237] Interview national stakeholder BG, 10 March 2020 (#45).
[238] Interview national stakeholder BE, 16 February 2020 (#37).

border to the destination country[239]. The transport is **commonly provided by unlicensed operators**, who are often part of the trafficking ring. While the provision of transport is usually a part of the overall logistical 'package' offered by the traffickers, Bulgarian anti-trafficking practitioners observe that in some cases, the workers organise transport themselves[240]. The identified Romanian cases reveal that workers can also travel via regular bus companies, although the traffickers make reservations for their travel. In such scenarios, the workers are met by traffickers upon arrival in the countries of destination. The advantage of self-arranged travel is that it is more difficult to detect a trafficking link by authorities.

A notable aspect of the modus operandi of the cases analysed is the participation of actors from the countries of destination, who oversee the logistics at the place of exploitation. This includes accommodation, food and management of relations with the subcontracting companies from the countries of destination.

The role of intermediaries, supply chains and legal entities in the exploitation of victims

Previous research shows that the use of intermediaries and **long labour supply chains**, including cascade subcontracting, are some of the main features in cases of labour exploitation where traffickers also exploit the informal sector (Davies & Ollus, 2019). The role of supply chains (both of products and of labour) is argued to be key to identifying the intersections between the formal and informal economy within forced labour and labour trafficking (Allain et al., 2013).

All cases analysed reveal the use of **intermediary companies or 'subcontractors'** between the end employer and the exploited victim. At a minimum, two companies are registered by traffickers – one in the country of origin to recruit and post victims abroad, and one in the country of destination to arrange logistics and to enter a contractual relationship with the ultimate employer, who may or may not be oblivious of the subsequent exploitation of workers. These are registered either as job intermediary / recruitment agencies, or as trade companies in other business sectors whose activity is later used to conceal the illicit cash flows (Allain et al., 2013).

Bulgarian cases reveal that sub-contracting was present across different sectors, including agriculture, cleaning services and maintenance. Seasonality of labour needs usually calls for the use of several intermediaries in longer supply chains (Allain et al., 2013).

In the case of farming/agriculture, the susceptibility to exploitation in the supply chain is also driven by the time-sensitive nature of the industry, and the drive to lower costs by various actors in the product supply chain (Allain et al., 2013). As in one of the identified cases within this study, pressure to employ labour for seasonal work and to cut costs of production can lead to employment of more informal intermediaries in the supply chain, usually on a temporary basis. This is especially so during harvesting season, so harvesting operations are known as high risk to forced labour (Allain et al., 2013). The interviews revealed the employment of low qualified, in many cases illiterate Bulgarian workers, in the harvesting of oranges (Spain), olives (Greece), berries (Sweden), strawberries (Italy), radishes (Austria) and grapes (France)[241]. While in most of these cases, labour trafficking charges were not pressed due to lack of clear evidence of coercion or other elements of THB, all of them illustrated clear violations of labour laws and involvement in the undeclared economy.

Analysis of cases reveals that supply chain intermediaries are registered in the country of destination and control the working hours and conditions of victims.

Cascade sub-contracting in supply chains is a common instrument for covering various labour-law violations and evasion of due taxes and social contributions. In order to lower risks of inspections or criminal investigations, often these sub-contractors are letterbox companies or

[239] Interview national stakeholder AT, 10 March 2020 (#46).
[240] Interview national stakeholder BG, 10 March 2020 (#45).
[241] Interview national stakeholder BG, 25 February 2020 (#34); Interview national stakeholder BG, 10 March 2020 (#46).

companies without any employees or assets[242]. Even if detected, these shell entities are easily dumped and disposed of (Federal Public Service Social Security, 2011).

In all cascade sub-contracting observed, the control is exerted by a subcontracted/intermediary company. Victims do not come in contact with the large company and employer at the beginning of the supply chain. In most cases there are formal and legitimate contracts between the ultimate employer and the first intermediary company. The exploitation, thus, happens at the second or third level of subcontracting[243]. This is also where the undeclared work practices or administrative violations – such as tax and social security evasion – take place. The 'intermediary' can be either an actual intermediary agency responsible for staff recruitment directly, or can use one or more subcontractors to create a longer supply chain, where the last company in the chain pays out low salaries while the other companies in the chain receive a larger share of the profit, without being liable for misuses (Ollus & Jokinen, 2019).

Revenues, financial flows and money-laundering

The cases analysed and stakeholder interviews confirm that the general avenues for **profit generation** from trafficking for labour exploitation include:

- Revenues generated from arrangement of the recruitment and transport of the victims, which could be paid by the latter in the form of advance fees.
- Generation of profits from labour exploitation from cutting costs by using cheap labour, below the minimum wages in the country (including through undeclared work and non-payment of health insurance and social securities).
- Withholding cash from victims through imposing various fines.

Previous research covering both Romania and Bulgaria reveals that as with other forms of trafficking, **financial flows** related to labour trafficking operations are predominantly in cash. Cross-sectoral differences exist, as some sectors are more cash-intensive (e.g. agriculture, car-washing) and in others bank transfers are the norm – such as food-processing and construction (CSD, 2015).

While cases from Bulgaria and Romania illustrate very low amounts of money paid to victims of labour exploitation, it is not always clear whether payments were made in cash or via bank transfers. However, a pattern is discerned in the cases of cascade subcontracting.

Cases from Bulgaria illustrate that, in most instances, the contracting authority at the start of the supply chain pays via bank transfer to the intermediary for the services provided. The intermediary subsequently opens bank accounts for the workers involved. Payments to the victimised workers may also be carried out via bank transfers. In these cases, traffickers usually control the bank-cards of the victims, and immediately withdraw money in cash so that the victims receive a fraction of their earnings.

Other mechanisms used by Bulgarian and Romanian perpetrators to transfer the profits of exploitation to the country of destination include the purchase of luxury goods, such as watches or cars. In some cases, money is physically transported via mules who carry below €10,000 and thus do not need to report the amounts upon entry in the country of origin. The use of wire transfers is also noted by Bulgarian anti-trafficking practitioners, where the amount wired is below the minimum threshold[244].

Some of the **money-laundering** mechanisms illustrated by the cases include the purchase of properties in both countries of origin and destination, donations made between members of the organised criminal group, or (though this is not laundering in the sense of legitimisation of proceeds of crime) the reinvestment of proceeds in other criminal activities, such as drug

[242] Interview national stakeholder BE, 16 February 2020 (#37).
[243] Interview national stakeholder BE, 16 February 2020 (#37).
[244] Interview national stakeholder BG, 10 March 2020 (#46).

trafficking or trafficking for sexual exploitation. In Bulgaria, legal companies registered in the countries of destination are used to conceal the profits of the crime[245].

Trafficking cases are often connected to additional crimes, for instance: victims are forced to sign documents through which loans are drawn, and document fraud, tax fraud or other economic crimes are also often present[246].

Many stakeholders interviewed stressed that it is very difficult to prove THB and labour exploitation simultaneously, both in the countries of origin and in some destination countries. This often leads to charges being brought for fraud, tax evasion or labour law violations, but not for THB, as elements of coercion are hard to prove, such as seizure of identity documents, restriction to freedom of movement (people are forbidden to leave the place where they work/live), threats of violence, etc[247]. Measures to control victims such as imposition of debts or economic dependency are difficult to withstand (e.g. in Bulgarian court). Even when victims are forced to sign employment contracts, mediation contracts or rental contracts with highly unfavourable terms, such actions are often treated as fraud but do not qualify as trafficking under national legislation.

This case study has shown an example of the exploitation of the underground economy by organised criminal groups, with the purpose of lowering costs of production in different sectors. OCGs use various forms of tax and social contributions evasion or fraud, bogus self-employment schemes and other grey economic practices in order to lower costs of production at the expense of exploitation of victims of trafficking for labour exploitation. Yet, OCGs increasingly use legitimate companies in the course of recruitment, transport and exploitation of victims, thereby blurring the line between the formal and informal economy and posing further challenges to the detection and investigation of the crime.

3.5. Additional information on the exploitation of NPMs by OCGs

Key findings:

- The use of new and non-banking payment methods (NPMs) for money-laundering purposes is observed in practically all Member States, and there are indications that it is growing, although with different intensity across countries and criminal markets.
- Cryptocurrencies are regularly used in both cyber-enabled and cyber-dependent crimes, in illicit trade via dark-net markets, and in money-laundering linked to these types of crime.
- Prepaid cards are rarely used by OCGs compared to cash and other methods.
- Digital or mobile wallets are moderately used in certain cybercrimes, such as phishing and child sexual exploitation material, however they are rarely used in IPR infringements and money-laundering compared to traditional payment methods.
- Other innovative and mobile payment services are rarely used, compared to cash and bank transfers.
- Money transfer services are regularly used – particularly for THB, smuggling of migrants, cybercrime and money-laundering – but less often than cash.
- Hawala and similar informal transfer systems are regularly used for migrant smuggling, and rarely for other types of crimes except where OCGs are of particular nationalities (i.e. Nigerian, Chinese, Afghani).
- Overall, OCGs still rely more on cash than on new and non-bank payment methods.

[245] Interview national stakeholder BG, 16 March 2020 (#52).
[246] Interview national stakeholder BG, 10 March 2020 (#46).
[247] Interview national stakeholders BG (#40, #45, #46, #52) and DE (#47).

This annex presents the full case studies conducted as part of the analysis of the exploitation of new and non-banking payment methods (NPMs) by OCGs, as presented in **Section 3.5** of the main report.

The first case study examined the use of NPMs in the context of cybercrime, and the second focused on NPMs in the context of THB.

3.5.1. Case study 1: NPMs in the context of cybercrime

Maria Karayotova, Centre for the Study of Democracy

According to law enforcement reports, NPMs and cryptocurrencies facilitate various cybercrime activities (Europol, 2018c). They facilitate the obtainment of money from victims, the settlement of payments within the cybercriminal network and the laundering of the proceeds. In order to explore how NPMs are used in the context of cybercrime, the case study focuses on two types of cyber-dependent crime – ransomware and data-compromise via phishing. The case study details in what way and how often NPMs are used for each of those two cybercrimes, as well as what the underlying factors are that determine the choice and use of NPMs by perpetrators.

Over the last year the impact and intensity of ransomware attacks has increased (Amy-Vogt, 2019; Europol, 2018c; Verizon, 2019). Similarly, the prevalence of data-compromise via phishing has been high – one report suggests that 64% of businesses experienced a phishing attack in 2018 (Check Point Research, 2019). Our focus on ransomware will also provide an opportunity to examine the way cryptocurrencies facilitate cybercrime, since ransoms are usually requested in virtual currencies (Paquet-Clouston et al., 2019). Phishing, on the other hand, might involve different methods for the settlement of payments and the laundering of revenues, including digital payment systems. The case study focuses on ransomware and phishing regardless of the level of OCG involvement.

Prevalence of the use of cryptocurrencies in ransomware attacks

A study noted that the use of cryptocurrencies and onion routing have contributed to an increase in efficiency of ransomware, since the first occurrences of the encryption attack technique (Paquet-Clouston et al., 2019). Ransomware attackers use cryptocurrencies as a preferred payment method, since the blockchain system and decentralised nature of cryptocurrencies provide a level of anonymity, and are typically not subject to banking regulation or oversight. The use of cryptocurrencies for the settlement of unmediated payments – in combination with strong cryptographic techniques and communication tools that confer a high degree of anonymity – has provided ransomware attackers with a high level of impunity.

A typical ransomware infection would involve four events: (1) infection via an infection vector, such as an email with a malicious attachment; (2) encryption; (3) extortion; and (4) decryption. The extortion event consists of a ransom note displaying on the device's screen (Conti et al., 2018). The note includes a threat message, a ransom amount given in fiat currency and/or cryptocurrency, a timer that indicates the time left before the deadline and a payment address, which is either a virtual currency address or a website address (Conti et al., 2018).

In the case of ransomware, cybercriminals profit from the value the victims assign to their encrypted data, and their willingness to regain access to them (Everett, 2016; Hampton & Baig, 2015). Studies note that this business model provides more favourable monetising opportunities than forms of cybercrime that profit from the misuse of stolen data (Paquet-Clouston et al., 2019). The main reasons for this are the lack of intermediaries in the perpetration of the crime, and its scalability (Paquet-Clouston et al., 2019). Over recent years, a ransomware-as-a-service business model has also emerged, with cybercriminals offering their operation via web platforms in exchange for a share of the ransom gains, or a fixed fee (Lord, 2018). Up to 2018, most ransomware attacks demanded payments in bitcoins, despite the emergence of other types of cryptocurrencies[248]. Europol noted that although the market share of bitcoin had dropped to 35% by the beginning of 2017, this was not reflected in cybercrime investigations within the EU – and

[248] Interview with international organisation representative, 22 April 2020 (#73).

bitcoin has remained the most encountered cryptocurrency (Europol, 2018c). Therefore, the ransom note usually includes instructions on how and where to buy bitcoins. However, some ransomware demands provide alternative cryptocurrency payment options, such as MoneyPak (in the case of Crypto Locker) and Litecoin (in the case of Crypto Wall) (Litecoin, n.d.; MoneyPak, n.d.). There is a risk of a shift towards cryptocurrencies with built-in privacy settings, such as Monero and Zcash (Europol, 2018c)[249]. A common strategy of cybercriminals would be to request the ransom in bitcoins and then convert the amount to a privacy-oriented currency to conceal their trails (see WannaCry case, Box 10 below). **The main reason why cybercriminals might prefer to request ransoms in bitcoins is that this type of cryptocurrency still has the biggest liquidity, and it is easier to hide high volumes of funds inside the network**[250]. In addition, bitcoin is still the most publicly known cryptocurrency, and it might be easier for victims to obtain it in order to pay the ransom.

Box 10: The case of WannaCry

WannaCry is a ransomware computer-worm that targets the family of Microsoft Windows operating systems. It started to spread in May 2017 and infected more than 200,000 computers in over 150 countries (Bistarelli et al., 2018). Infected institutions included hospitals in the UK and European telecommunication companies. The ransom note demanded between $300 (USD) and $600 (USD) from victims, depending on how early the payment was made (Bistarelli et al., 2018). Estimates of the WannaCry impact suggested that only 0.06% of the victims paid the requested amount and less than $120,000 (USD) was paid to three bitcoin wallets (Kshetri & Voas, 2017). At the time of the attack, a cybersecurity company suggested that a fault in the WannaCry encryption software might make it impossible to decrypt the victim's files after the ransom was paid (Economist, 2017). Three months after the spread of the ransomware, the perpetrators managed to conceal the financial trail and cash-out the received amounts. Experts tracking the bitcoin funds discovered they were converted to Monero via a cryptocurrency exchanger (Franceschi-Bicchierai, 2017). Once the bitcoins had been exchanged to Monero, the experts were not able to check the balance of the addresses or to see when they were used to move the funds. The applied method was the same as in an earlier version of the ransomware and the experts believed that the malware authors were the same (Franceschi-Bicchierai, 2017).

Share of victims paying the ransom

Cybersecurity companies' reports suggest that a significant number of businesses are willing to pay the ransom. However, results of studies tracing bitcoin transactions related to ransomware suggest that the share of victims paying the ransom and the overall profits might not be as high as suggested by security industry reports (see WannaCry case, Box 8 above) (Conti et al., 2018; Paquet-Clouston et al., 2019). A study suggested that a low pay-out ratio might be caused by the complexity of complying with the cybercriminals' demands (Kshetri & Voas, 2017). Cryptocurrencies are new to many of the victims and it takes some effort and time to make and verify an account on cryptocurrency exchangers. Furthermore, there are no guarantees that the decryption key will be provided and data restored (see WannaCry case, Box 8 above). To minimise the effects of these two factors, cybercriminals might operate a call centre offering technical support to the victims, navigating them through the pay-out and data-restoration processes (Economist, 2017).

Over the last two years there has been a decrease in the overall number of ransomware infections on endpoints, but an increase in the number and scale of enterprise infections (Europol, 2020a; Symantec, 2019). Fewer attacks on individuals have occurred, but more targeted attacks towards private- and public-sectors entities (Europol, 2020a)[251]. In such cases the ransom demands could be substantial. According to an interviewee from Europol, there is a possibility that major ransomware attacks with substantial ransom demands have not been reported to law-enforcement authorities due to enterprises' reputational concerns[252]. Their cyber-insurance companies take the necessary actions to buy the cryptocurrency and recover the private keys and

[249] Interview with international organisation representative, 22 April 2020 (#73).
[250] Interview with law enforcement representatives, 12 March 2020 (#48).
[251] Interview with Europol representatives, 12 March 2020 (#48).
[252] Interview with Europol representatives, 12 March 2020 (#48).

decrypting tools. A cyber-security survey[253] suggested that 33% of UK companies have bought bitcoins in order to be prepared to pay the ransom (Mizrahi, 2016).

Use of cryptocurrencies for laundering ransomware proceeds

As ransomware payments are predominantly made in bitcoins, the perpetrators use money-laundering tools in the bitcoin ecosystem or a combination of these tools to launder the proceeds and 'cash-out'[254]. The cybercriminals often use bitcoin mixing or swapping services or non-compliant cryptocurrency exchangers to convert the bitcoins into another type of virtual currency (see WannaCry case, Box 8 above) (Liao et al., 2016)[255]. A substantial number of bitcoin mixing and exchange services, or an overall cryptocurrency money-laundering service, are also offered on dark net websites (Van Wegberg et al., 2018). The opportunities to convert bitcoins into more **privacy-focused cryptocurrencies** could make the use of bitcoin mixers less frequent (Europol, 2018c). Despite the opportunities provided by money-laundering tools in the bitcoin ecosystem, there have been some cases in which money mule networks have also been used.

Empirical studies examining bitcoin transactions linked to ransomware have also established links with dark net marketplaces. For example, bitcoin addresses associated with the Crypto Locker ransomware were linked to The Sheep Marketplace, a dark net marketplace and successor of the Silk Road that specialised in the trade of narcotics[256]. In this case, after the Crypto Locker bitcoin addresses made some exchanges via BTC-e, the bitcoins were transferred to two money-laundering addresses used in the Sheep Marketplace scam (Liao et al., 2016). While the exact association between the two criminal activities is not clear, the transactions' connections suggest that part of the ransomware proceeds were linked to other criminal activities.

An interview with law enforcement officers suggested that the use of a combination of money-laundering tools in the cryptocurrency ecosystem could also be more cost efficient than traditional cash-out schemes[257]. While costs for the money mules and their coordinator could reach 40% of the revenues, the layering and cash-out through several cryptocurrency tools could cost only 6%[258]. Furthermore, the overall cash-out process takes less time, as cryptocurrency mixing and exchange could be carried out in just a couple of hours and without any logistical constraints[259].

Prevalence of the use of NPMs in phishing attacks

Digital payment systems and forms of electronic cash are used as a target in the perpetration of phishing attacks and to launder the proceeds from the commission of cybercrimes (McGuire, 2018). Digital payment providers are a preferred target of phishing attacks as these companies usually communicate with their customers via emails and telephone messages, which creates an opportunity to effectively deceive their general users (Downs et al., 2007). While most phishing attacks aim to access credentials to the digital payment service, some are devised to also access other personal information, such as mailing address information or e-mail credentials (Thakkar, 2019). In cases where more personal information is acquired, more complex fraud schemes could be devised with the stolen data. Phishing is also often used as a vector to access parts of a network and steal confidential data, run administrative commands or deploy malware.

Once the credentials are stolen, the cybercriminal could either use the digital payment accounts themselves to withdraw available balances and/or buy goods and services or sell the credentials

[253] An online survey with 250 IT and security specialists in UK companies with 250+ employees, which took place between 19 May and 24 May 2016.
[254] Interview with Europol representatives, 12 March 2020 (#48); Interview with international organisation representative, 25 February 2020 (#73).
[255] Interview with Europol representatives, 12 March 2020 (#48); Interview with international organisation representative, 25 February 2020 (#73).
[256] The owners of the Sheep Marketplace shut down the site following claims of the administrators that one of the dealers hacked the market and stole 5,400 bitcoins. However, the users of the platform accused the owners of an exit scam, blocking bitcoin withdrawals from the site and holding 96,000 bitcoins (over $100 million (USD)) belonging to its users.
[257] Interview with Europol representatives, 12 March 2020 (#48).
[258] Interview with Europol representatives, 12 March 2020 (#48).
[259] Interview with Europol representatives, 12 March 2020 (#48).

on the online underground markets (Trend Micro, 2011). PayPal accounts obtained through phishing are one of the common commodities on the dark net (McGuire, 2018). Such packages of accounts obtained on the dark net could be used in PayPal micro-laundering schemes. The low prices of such stolen credentials have also led authors to suggest that making use of the stolen data is either very difficult or fails frequently (Florêncio & Herley, 2010; Franklin, 2007).

Factors determining the choice of NPMs in a phishing attack

The selection of a payment service as a target of a phishing campaign depends to a great extent on the **payment culture in the victims' country of origin**[260]. If a particular payment service is popular and profitable among the general population in a Member State, there is a higher probability of a phishing campaign being organised[261]. This might be one of the reasons why some digital payment and financial technology (FinTech) services, which are more popular outside the European Union, have not yet become a target of a phishing campaigns in any Member State. Instead, over the last years some Member States have reported cases of spear phishing[262] impersonating tax authorities[263]. The specific target of the phishing campaign might also depend on the **origin, growth and technical expertise of the criminal network**. In the Netherlands, there have been several cases of home-grown phishing criminal groups that emerged and developed along offline social ties (Leukfeldt et al., 2017). These groups would often prefer to target clients of local traditional banking institutions. In some cases, they used low-level bank employees to acquire personal details about victims, make changes to the victims' accounts and increase withdrawal and credit limits (Leukfeldt, 2014).

The origin and growth of a criminal group, their experience of different payment services and the type of phishing attack could also determine their preference towards a particular method for settling payments among the members of the phishing group prior to or after the attack[264]. There are OCGs using cryptocurrencies to pay each other[265], however most cybercriminal networks still preferred to settle payments with their collaborators and within the group using cash[266]. Even though some phishing groups tried buying cryptocurrencies, they eventually returned to traditional money-mule cash-out schemes[267]. One of the reasons why cryptocurrencies might not be a preferred method for settling payments within phishing groups is the increased level of regulation of the cryptocurrency exchangers, who have introduced identity verification procedures and reporting of suspicious transactions[268]. When payments within the group are made across jurisdictions they might use a money remittance service, such as MoneyGram, or alternative person-to-person money transfer services[269]. For example, a Romanian cybercrime network made use of the possibility provided by some gas companies to send money from one gas station to another[270]. While there are additional costs associated with the use of these services, cybercriminals find them attractive as they allow immediate withdrawal of the money[271].

Use of NPMs for laundering of phishing proceeds

The literature review and the interviews with experts suggested that **NPMs are hardly used for laundering of the profits generated by phishing attacks. Instead, money mules are the preferred means for draining compromised financial accounts** (Florêncio & Herley, 2010). The traditional money-laundering networks in the country of origin of the perpetrators are often exploited by phishing networks[272]. For example, a Germany-based cybercriminal network used

[260] Interview with an academia representative, 25 February 2020 (#35).
[261] Interview with Europol representatives, 12 March 2020 (#48).
[262] Spear phishing is typically used in targeted attack campaigns to gain access to an individual's account or impersonate a specific individual, such as a high-ranking official or person involved in confidential operations within the company (see Swinhoe, 2019).
[263] Interview with an academia representative, 25 February 2020, (#35); Europol (2019).
[264] Interview with academia representative, 25 February 2020 (#35).
[265] Interview with academia representative, 25 February 2020 (#35).
[266] Interview with international organisation representative, 22 April 2020 (#73); Interview with academia representative, 25 February 2020 (#35).
[267] Interview with academia representative, 25 February 2020 (#35).
[268] Interview with academia representative, 25 February 2020 (#35); Europol (2019) Op. cit.
[269] Interview with international organisation representative, 22 April 2020 (#73).
[270] Interview with international organisation representative, 22 April 2020 (#73).
[271] Interview with international organisation representative, 22 April 2020 (#73).
[272] Interview with academia representative, 25 February 2020 (#35).

the services of members of an outlawed motorcycle club to manage money mules (Leukfeldt et al., 2017). In another case, a Latvian phishing network applied a very traditional money-laundering scheme by bringing money mules to the Netherlands, making them open bank accounts and cash-out the money, before returning them to their country of origin[273]. As with other types of crime, the risks of tracing the money mules to the perpetrators is minimised by the use of facilitators who recruit and coordinate the money-mule network[274]. In addition, cybercriminals often used additional layers of security (e.g. installing a proxy server, VPN or encryption of the traffic network) in their communication with facilitators[275].

However, in some cases the phishing attack aims to obtain account credentials for use in micro-laundering schemes. **Micro-laundering** involves moving a large amount of money in small amounts **through thousands of electronic transactions**, hence evading anti-money-laundering transaction limits (Richet, 2013). McGuire (2018) evidenced that in 20% of the cybercrime cases sampled, the main money-laundering tool was PayPal and other digital payment systems. Cybercrime profits are diverted through multiple PayPal accounts to distribute the profits, very often in combination with fraudulently opened bank accounts and Western Union transfers (Richet, 2013).

Information on how revenues from phishing activities are spent is limited. However, the review of cases of phishing networks operating in the Netherlands suggested that most of the profits are spent on **lifestyle items, such as cars, jewellery and holidays**[276]. Despite some major cases where the authorities seized 30 cars, it appears that some members of phishing networks do not manage to significantly increase their living standard[277].

3.5.2. Case study 2: NPMs and THB

Kamelia Dimitrova, Centre for the Study of Democracy

This case study explores the intersection between the market of THB for sexual exploitation and non-banking payment methods in two OCGs present in Europe: Nigerian and Southeast European (Bulgarian and Romanian) traffickers. According to Aronowitz, criminal enterprises involved in THB are not a uniform business, but operate in diverse cultural and political contexts and differ in their modus operandi, including recruitment, transport and control of victims, as well as in *investment of profits* generated from THB (Aronowitz, 2009).

The two OCGs were selected based on their large-scale presence on the EU criminal market of THB for sexual exploitation, and also due to the diversity of the money-transfer methods used by traffickers. The case study will detail the extent of use of non-banking payment methods – such as money remittance services and hawala – in the context of THB for sexual exploitation, as well as the underlying factors that drive their use.

Southeast European and Nigerian OCGs are important actors in the THB for sexual exploitation market in the EU. According to Europol, a great majority of OCGs involved in THB in the EU are comprised of nationals from Southeast Europe (Bulgaria and Romania) and Nigeria (Europol, 2016). To understand the management of financial flows and use of NPMs of OCGs originating from Nigeria and Southeast Europe, a consideration of the organisation of the criminal groups is needed.

Previous research by CSD (2019) reveals that, at the time of accession to the EU, Bulgaria was experiencing decentralisation and increased flexibility of the OCGs controlling THB for sexual exploitation. THB networks tend to be loose networks that are organised along family, kinship or ethnicity (CSD, 2015). Domestic THB in Bulgaria could be organised by single traffickers, while OCGs typically consist of between three and six members. Groups organised on a family or clan

[273] Interview with academia representative, 25 February 2020 (#35).
[274] Interview with international organisation representative, 22 April 2020 (#73); Interview with academia representative, 25 February 2020 (#35).
[275] Interview with international organisation representative, 22 April 2020 (#73).
[276] Interview with an academia representative, 25 February 2020 (#35).
[277] Interview with an academia representative, 25 February 2020 (#35).

principle could consist of 20–30 members. OCGs are very dynamic and easily restructured upon detection from law enforcement (CSD, 2019). According to Europol, Romanian and Bulgarian OCGs share many characteristics in common: they have hierarchical structures and they operate with small, mobile groups of victims controlled by a few members (Europol, 2016).

According to Europol, Nigerian OCGs are known to be highly organised, large-scale networks (Europol, 2016)[278]. They are often family- or kinship-based, with members coming from the same community and cultural background. Europol also reports that Nigerian groups handle all phases of the THB process independently and are best able to hide their activities via legal businesses (Europol, 2016). Nigerian confraternities operate all over the world, funding the brotherhood[279] in Nigeria through both licit and illicit activities, in some cases through organised crime and, in particular, THB (Europol, 2019c).

The Nigerian OCGs rely on social capital and social connections – victims are often recruited in their own home, sometimes by a relative or family friend (UNODC, 2010). The victims' family is asked to pay money for their transportation and living costs. Previous studies assess that the fee demanded by traffickers can range between $35,000 (USD) and $70,000 (USD) (Campana, 2016). An interviewed law enforcement expert from Sweden referred to an amount reaching €70,000 for transfer to Sweden, a country considered to be a highly profitable destination[280]. These fees subsequently need to be returned to the country of origin of the victim.

THB for sexual exploitation is an overwhelmingly cash-based criminal market. Reports by Europol, Association of Law Enforcement Forensic Accountants (ALEFA) and Financial Action Task Force (FATF) – alongside recent country studies in Bulgaria, Italy, Romania and Spain conducted by CSD – did not establish any evidence of the **extensive use of NPMs** by traffickers in the process of settlement of payments during the operations connected with the exploitation of victims (ALEFA, 2019; Europol, 2015; FATF-APG, 2018; Shentov et al., 2019). Interviews with national investigative authorities, as well as EU-level stakeholders, also did not lead to findings of extensive use of NPMs in sex-trafficking operations. Thus, OCGs predominantly rely on traditional payment methods in their operations of the criminal market of THB for sexual exploitation.

The settlements of payments – between clients and victims, between victims and traffickers or between perpetrators within the THB network – are almost entirely cash based. An in-depth study of the financial aspects of THB in nine EU Member States, including Bulgaria and Romania, shows that this is especially valid in the case of THB for sexual exploitation (Shentov et al., 2019). This mechanism holds true both for Southeast European and Nigerian criminal networks. The analysis below provides an insight into the operations of OCGs in an attempt to explain the prevalence of cash operations and the possibility of using NPMs in the settlement of payments.

Cash is typically paid upfront by the end-client to the victim, who promptly gives the money to an intermediary or delivers an accumulated sum to her exploiters on a periodic basis. Money-flows from the victim to the traffickers typically occur directly between procurers and victims, or between trusted associates and victims (Shentov et al., 2019).

Differences can be observed regarding the more sophisticated and expensive ends of the sexual exploitation market. A study on financial flows from THB in Belgium reveals that clients from Western Europe may wire money (debit or credit) as if to pay for a legitimate service, i.e. massage (CSD, 2015; Raets & Janssens, 2019). In these cases, the victim is often located in another Member State in Southeast Europe (including Bulgaria and Romania), and the wired money is in effect a pre-payment for transportation and sex services to be rendered by the victim upon arrival (CSD, 2015; Raets & Janssens, 2019).

[278] Interview with national stakeholder SE, 10 March 2020 (#43).
[279] Nigerian brotherhoods were initially formed in Nigeria's principal universities around the mission of fighting against European colonial powers. Their purpose, however, was subsequently diverted towards organisation of criminal activities (Shentov et al., 2019).
[280] Interview with national stakeholder SE, 10 March 2020 (#43).

Although the internet has gained importance in terms of advertising of victims from Southeast Europe, according to an investigative expert from Sweden, cash is still the prevalent payment for services, even in when victims are advertised on the internet[281].

Underlying factors for lack of extensive use of NPMs by OCGs

The lack of use of NPMs by Southeast European OCGs in their operations of THB for sexual exploitation is to some extent explained by a country report on Romanian financial flows, which suggests that the convicted traffickers typically lack the necessary knowledge and sophistication, and thus resort to traditional cash flow operations (Shentov et al., 2019). Brenig et al. (2015) also argue that despite the advantages of crypto-currencies and cyber-mediated laundering, human traffickers are inclined to use more traditional methods, such as cash. A report by CSD covering financing of THB OCGs attributes the lack of popularity of virtual currencies in human trafficking circles to unfamiliarity or a general lack of expertise. Financial management is a high-expertise 'high-stakes phase' of the trafficking cycle, and this could be the reason why traffickers prefer to use more familiar methods (Shentov et al., 2019).

According to Europol the free movement of goods and people within the Schengen area is a facilitating factor for undeclared transports of large amounts of cash within the EU, from countries of exploitation to countries of origin. As cash flow operations are difficult to trace, they remain a preferred method of traffickers for transferring money (Europol, 2015).

A study on financial flows from THB in Italy reveals that as Nigerian victims are predominantly exploited in street prostitution, cash is used in transactions between victims and customers, and between victims and the money collectors. In this case, the money collector is the 'madam', a former victim herself, who oversees revenues and expenditures. The madam is responsible for delivering the proceeds to her partner and for paying other individuals who support the prostitution activity (Shentov et al., 2019).

Use of NPMs for return of proceeds and money-laundering

ALEFA reports that **proceeds from transnational THB operations are typically sent back to the perpetrators' country of origin** (which is often also the victims' country of origin), either as cash or high-value goods (ALEFA, 2019). For the OCGs originating from Southeast Europe and Nigeria, literature review and stakeholder interviews delineate three main methods for the return of funds from THB to the countries of origin: smuggling of cash or value goods, wire transfers through money remittance services, or via the hawala system.

According to FAFT, **money remittance services are conveniently used by traffickers because of the predominance of cash handling/transactions** in the process of settlement of payments (FATF, 2011). According to ALEFA and stakeholder interviews, the most commonly used money remittance services by OCGs involved in THB are Western Union, MoneyGram and RIA (ALEFA, 2019)[282]. Western Union and MoneyGram are the money remittance services typically used by Southeast European OCGs involved in THB for sexual exploitation.

As previously described, **the proceeds from THB for sexual exploitation are typically gathered in cash.** Southeast European OCGs stockpile the amounts and break them down into small sums, to be transferred to the countries of origin. When money remittance services are used, traffickers use 'smurfing techniques' to wire the money[283]. This practice refers to the breaking up significant amounts of cash into smaller amounts that are typically transmitted by several persons. The money transferred is thus below the threshold requiring an in-depth identification of the customer. Using multiple senders and/or receivers, large sums of cash can be transferred to the countries of origin of perpetrators without raising suspicion (Europol, 2015).

In the case of Bulgarian OCGs, Petrunov (2011) reports that **members of the OCG rarely use wire transfers.** Rather, the victims send the money to their relatives, or to relatives of the

[281] Interview with national stakeholder SE, 10 March 2020 (#43).
[282] Interview with national stakeholder SE, 10 March 2020 (#43); Interview with EU stakeholder, 10 March 2020 (#44).
[283] Interview with EU stakeholder, 10 March 2020 (#44).

traffickers. Often the receivers use false IDs, and the transfers are below €2,500 (the amount that would require a transaction report) (Petrunov, 2011). In addition, the CSD study reveals that Western Union is used by victims who may transfer small amounts of money to their families (Shentov et al., 2019). This is presumably because it is the largest and most globally distributed firm, rather than because of any special weakness in controls, since there is seldom anything in such transfers to enable the firm to deduce that the transferee is a THB victim.

Bulgarian law enforcement has also detected the **sale of personal identities for the use of wire and bank transfers by traffickers.** Typically, the persons selling their personal identities are from impoverished groups and have low levels of literacy, and are not aware of the THB operation[284]. Money remittance services located in the EU are required to identify their customers, but any form of photographic identification is sufficient to transfer amounts below a specified threshold, so traffickers use this method to avoid detection by law enforcement.

Romanian OCGs also typically use Western Union or MoneyGram systems for wire transfer. Victims are also known to use these systems to wire money to their exploiter, who might have employed 'lover boy' grooming methods[285] to recruit them into trafficking. In one case of THB for sexual exploitation, four women victims of THB from Romania were able to send back €86,000 using wire transfers (Shentov et al., 2019).

The money transfers made by Southeast European OCGs fall below the red flag indicators outlined by FATF as money-laundering techniques in THB and migrant smuggling, namely:

- small amounts sent with high frequency to unconnected persons;
- small amounts sent to different recipients;
- frequent money transfer to 'risky' countries; and
- multiple customers making international funds transfers to the same overseas beneficiary (FATF, 2011).

Due to heightened attention by law enforcement on money transfer operations, and the cooperation of key money-transfer service providers, previous research and interviews conducted for this study reveals that **Bulgarian and Romanian traffickers are making less use of money-transfer services for the return of proceeds, in lieu of the more intensive use of cash smuggling** (Raets & Janssens, 2019; Shentov et al., 2019)[286].

Another method used by traffickers to return the proceeds of criminal activities to the countries of origin is through i**nformal value transfer systems, also known as hawala**[287]. According to Europol, Nigerian OCGs use hawala systems to return the proceeds of THB to the country of origin (Europol, 2019c). A large part of the money transferred via the hawala systems is for the repayment of debts incurred by the families of the THB victim. According to a recent case study on THB for sexual exploitation of Nigerian women in Oslo, the hawala customers were required to pay a transaction fee of 10% (FATF, 2011).

The informal transfer system utilised by the Nigerian networks in Italy, also known as 'euro-to-euro', involves parallel money transfer through grocery stores and other retailers. The system is based on services and guarantees 'ad persona' – that is, it is linked to the credibility of the intermediary within a widespread network of intermediaries located mainly in Nigeria, and with money collected in Italy. According to a CSD study, the fee for transferring money through this informal system is 1–2% of the amount (Shentov et al., 2019).

While recent reports warn of the *regular* use of the hawala system by Nigerian OCGs involved in THB for sexual exploitation in particularly, there is no actual assessment on the share of use of

[284] Interview national stakeholder BG, 13 March 2020 (#51).
[285] The 'lover boy' method of recruitment usually revolves around victims being manipulated to become emotionally attached to their exploiters. See Trafficking in human beings brief for additional details.
[286] Interview with national stakeholder BG, 13 March 2020 (#51).
[287] For detailed definition, please refer to Glossary (see main report).

the system as opposed to alternative channels of return of proceeds, such as the use of money transfers or cash smuggling.

While Southeast European and Nigerian OCGs use money remittances as well as hawala systems to transfer the proceeds of THB for sexual exploitation to the origin countries, **our research did not find evidence of the attempted use of bitcoins or cryptocurrencies** in the THB operations. This seems to be the general rule with regards to THB networks. ALEFA concludes that 'there is limited evidence of modern digital financial payments (e.g. bitcoin) being used (in THB cases), but the consensus is that, like for most other criminality, this will become more prevalent in the future' (ALEFA, 2019). The need for development of law enforcement capacity in this area was underscored during interviews with national experts[288].

Europol also warns of an increased use of pre-paid credit cards for money-laundering purposes in cases of THB (Europol, 2015), although the interviews conducted for this study with law enforcement experts in Bulgaria revealed that there have been no registered instances of the abuse of pre-paid cards[289]. However, this does not preclude the use of pre-paid cards by other OCGs.

Smuggling of cash remains prevalent compared to NPMs

The desk research and the conducted interviews clearly showed that even though different NPMs are commonly used by both Southeast European and Nigerian OCGs, **smuggling of cash or luxury goods remains the prevalent method to return proceeds to the country of origin** (Shentov et al., 2019)[290]. This assessment is confirmed by all interviewed stakeholders, as well as by previous research. It constitutes a non-banking remittance method, and as such poses challenges for detection by law enforcement.

According to previous research and current interviews with law enforcement, common techniques used by Bulgarian traffickers are to use victims as couriers by organising regular trips of the exploited women back to Bulgaria, or by rotating victims (Petrunov, 2011). Similar tactics are used by Romanian OCGs (Shentov et al., 2019). The victims usually carry sums that amount to up to €10,000, so they do not have to report the source of the money. Similarly, bus/van drivers conducting regular trips to countries of exploitation are used as cash couriers. For a small fee, they often agree to bring cash to Bulgaria[291]. In addition, previous research has identified another technique used by traffickers: the hiring of persons whose jobs require international travel to act as cash couriers. The couriers could be drivers, line stewards or flight attendants (Petrunov, 2011).

Nigerian networks use cash couriers to smuggle cash through airports. Terenghi & Nicola (2018) point out that the price paid for such service is 6% of the smuggled amount. Alternatively, victims – or sometimes even traffickers – might carry cash with them on planes and buses, or the cash can be shipped in containers (Shentov et al., 2019). Nigerian OCGs in Italy also use 'trolley men' who transfer cash in suitcases back to Nigeria (Shentov et al., 2019).

[288] Interview with national stakeholder BG, 13 March 2020 (#51).
[289] Interview with national stakeholder BG, 13 March 2020 (#51).
[290] Interview with national stakeholder BE, 26 February 2020 (#37); Interview with EU stakeholder, 10 March 2020 (#44); Interview with national stakeholder BG, 13 March 2020 (#51).
[291] Interview with national stakeholder BG, 13 March 2020 (#51).

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