Illicit waste trafficking and loopholes in the European and Italian legislation

Introduction[1]

Rapid economic growth and consumerism have dramatically increased waste generation worldwide. Waste production is expected to reach 27 billion tons by 2050, causing manifold concerns primarily focused upon the necessity for effective disposal (Roraima et al. 2017). In the preceding decades, many countries have partially addressed this aforesaid issue by disposing of their waste across national boundaries all over the world, most of the time through improper behaviours, exponentially increasing the phenomenon of illegal waste trafficking (IWT) (Liddick 2010; Klenovšek and Meško 2011; Rucevska, Ieva et al. 2015). Indeed, the global market presents opportunities to distance oneself from the waste problem, and "*restore, retreat and redispose waste anywhere else in the world*" (Liu, Kong, and Santibanez Gonzalez 2017, 1427). Less stringent environmental regulations and less expensive systems of waste disposal in certain countries have encouraged others to displace their waste in those regions with lax legislation and cheaper prices (Klenovšek and Meško 2011; European Environment Agency 2012).

In fact, in some developing countries (e.g., Ghana and China) waste represents an important source of income, because it can be dismantled and sold as raw materials or second-hand goods (Liddick 2010; Bisschop 2012). In these respective countries, governments are ordinarily less active in regulating the market, and underestimate the importance of environmental and health protection. Consequently, actors operating in the waste market can take advantage of the asymmetry of regulations across countries. Invariably, they decide to cut costs and dispose of waste in those places where norms are either less fixed or wholly absent (Vander Beken and Balcaen 2006). This is illustrative of how, as in other business sectors, waste management entrepreneurs are compelled by economic drivers, attempting to maximise earnings and savings (Klenovšek and Meško 2011; Sahramäki et al. 2017).

Waste trade across the world is regulated by international treaties, but the boundaries between licit and illicit activities are often blurred, whilst enforcement is currently wholly inadequate for properly tackling the phenomenon worldwide (Klenovšek and Meško 2011). Consequently, when possible, actors in the waste sector are often incentivised to take advantage of the illegal market since they perceive the risk of being caught as extremely low (Sahramäki et al. 2017).

Previous studies and academic research on IWT have shown how criminal actors in the waste sector are not only members of organised crime groups, but also businessmen operating in the legitimate economy who have decided to turn to the black market (i.e., white-collar criminals) (Germani, Pergolizzi, and Reganati 2015; Sahramäki et al. 2017). In an effort to reduce their costs and generate further profit, they are likely to avoid the duties associated with the correct and environmentally sound treatment of waste. To evade the law, waste is smuggled through false declarations and documentation, concealment, and other illicit methods, as it will be extensively explained in this paper. The realisation of this variety of activities involves the active participation of multiple actors with different roles (Liddick 2010; Bisschop 2012; Baird, Curry, and Cruz 2014; EnviCrimeNet 2015). The end result is the illicit management and shipment of waste, a phenomenon which detrimentally affects the environment, jeopardises human health, and weakens the legitimate economy.

The present study

In recent decades, considerable effort has been dedicated to developing international and national legislation that seeks to strengthen the waste regulatory framework and bolster enforcement capabilities. Nevertheless, scholars have highlighted how the regulation of the waste sector creates unintended opportunities for crime and increases the risk of illegal behaviours (Baird et al., 2014; Vander Beken and Balcaen, 2006; White and Heckenberg, 2011). These unintended problems engendered by extant regulations stem from the definition of

[1] This article is a further elaboration of the results of a study conducted by the authors as part of the project BlockWaste "Blocking the Loopholes for Illicit Waste Trafficking", co-funded by the Internal Security Fund of the European Union.

waste types, as well as rules related to waste management. Complicated precepts can cause confusion with respect to the interpretation of rules, not to mention raising difficulties in their implementation, thus resulting in unconscious or, mostly, conscious non-compliant behaviours by actors (Dorn, van Daele, and Vander Beken 2007).

Strict regulation often corresponds with increased investment and time, because it foresees the necessity of fulfilling certain requirements to be compliant with the rules (e.g. sorting out of different components of waste, hygiene and other special treatments). Consequently, actors are incentivised to either engage in unlawful conduct or avail themselves of illegal services that substitute for legal ones. Unfortunately, the possibility of being involved in IWT is quite feasible. Offenders thus form an impression that the risk of being caught is low, and that the financial losses stemming from the potential punishment are negligible (Bisschop 2012).

Hitherto, the major (and altogether few) studies on waste legislation have conducted general assessments of the risks, and focused on recommendations identifying those comprehensive characteristics that should be observed worldwide to better implement norms (e.g., clearness of the content and coherence between different types of sources) (White and Heckenberg 2011; Baird, Curry, and Cruz 2014). At the European level, extant analyses have concentrated on the whole legislative framework, pointing out general weaknesses that translate into discordant implementation by European Union (EU) Member States (MSs) resulting in weak, uncoordinated and ineffective enforcement actions (Vander Beken and Balcaen 2006).

In contradistinction to the general approach mentioned above, the first objective of the present study is to identify the vulnerabilities and criticalities of specific pieces of regulation by applying an innovative and rigorous step-by-step methodology: the crime proofing of the legislation (CPL). In doing so, this study develops an original top-down approach to analysing both European and national legislation which is particularly suitable for highlighting loopholes in the legislative framework of specific countries. The second objective is to provide suggestions on how to solve the manifold criticalities related to waste management.

In the past, authors introduced the CPL as an efficient crime risk assessment mechanism capable of safeguarding legislation against different types of unlawful conducts (Savona 2007). The core idea underlying this approach is that legislation may inadvertently produce opportunities for crime. Reducing such opportunities would thus help to reduce crime and its consequences. CPL have previously been conducted on the regulation of tobacco (Calderoni, Savona, and Solmi 2012; Caneppele, Savona, and Aziani 2013; Caneppele 2017), pharmaceuticals (Vander Beken and Balcaen 2006), insurance and corporate security (Dorn and Levi 2006), off-shore banking (Curtol et al. 2006), and firearms trafficking (Mancuso and Savona 2017). This methodology is thus considered to be particularly suited to the study of unintended effects created by specific waste regulation. In comparison to previous studies on the vulnerabilities of extant waste legislation, there are three key strengths stemming from the application of CPL. First, it proffers a precise and replicable approach that is less predicated upon the subjective interpretations of the criticalities connected to the regulations. Second, it is capable of accurately identifying loopholes in legislative texts and, in turn, connecting them to concrete risk indicators that can be traced within the dynamics of the waste market. Third, the detailed analysis of each provision within the relevant legislation teased out the interconnections between the administrative framework and the criminal framework, whereby loopholes in the first field have an amplificatory effect upon the impingements within the other field.

The innovative top-down approach proposed in this study is based on the combined analysis of both European and Italian legislation. This enabled an assessment of the validity of the legislation itself, as well as affording insights into the coherence, or otherwise, between national and supranational levels. Indeed, this approach permitted to track the level of impact of loopholes generated within the supranational level down to the local set of rules. Indeed, the European legislation dictates the general guidelines on the broad topic of waste, leaving the national competent authorities a certain degree of flexibilities when it comes to implementing the EU directives. At the same time, however, every MS must implement both the regulation and the directive in a harmonious, coordinated and efficient way.

Amongst the EU MSs, Italy has been selected as an especially interesting case for analysis, reason being its peculiar history with regards to waste crimes. In Italy, waste management has been a national issue from the 1990s and, indeed, still represents a significant problem (Massari and Monzini 2004; Cerulli Irelli and di San Luca 2011a, 2011b). The legislative efforts have been both considerable and varied over the years, and thus it would be useful to examine these manifold regulations and propose improvements for the future.

As aforesaid, the crime proofing methodology requires a highly specific object of analysis. Hence, the present study focused on the Waste Framework Directive[2] and its amending proposal[3], and the European Waste Shipment Regulation[4] as examples of supranational level legislation, and the Italian Environmental Code[5] as a national level example.

An in-depth analysis of the legislation, provision-by-provision, will enable the identification of vulnerabilities and develop extant understanding pertaining to how regulatory frameworks either unintentionally present opportunities for crime or displace licit waste management into illicit forms. Pinpointing these legislative loopholes will aid the fulfilment of the second objective of this paper, which aims to both provide suggestions about how to solve these criticalities and improve current regulation of waste management, in an effort to design effective policy interventions in the future.

In conclusion, the most innovative contributions of the present work to extant knowledge centre on the meticulous analysis of specific pieces of legislation, rather than, say, conducting an overall assessment of an entire legislative framework, the application of a rigorous step-by-step methodology hitherto not applied to waste legislation in the EU and the Italian context, in addition to the implementation of a top-down approach that considers the supranational and national levels of legislation as being intrinsically interrelated. The results are mostly in accordance with previous research on this topic, even though the study affords new insights with respect to the analysis of the Italian regulatory framework and the interconnections between EU and national legislation.

The European Union and Italian waste management and shipment legislation

From the 1970s onwards, the EU has taken the lead in countering the problems deriving from the mismanagement of waste and its illicit shipment (Ezroj 2009; Pak 2008; Mastrodonato 2010; Klenovšek and Meško 2011; Staab 2013). However, it was only in 2002 with the Sixth Environmental Action Programme that waste management was included among the "key environmental priorities" at EU level and subsequently, in 2007, the Treaty of Lisbon formally included the issue of the environment in all European policies (Ezroj 2009; Mastrodonato 2010).

Based on these factors, not to mention the transnational nature of waste trade, the most relevant interventions at EU level have been selected as objects of study for the field of interest. This is the case of the Waste Framework Directive together with its amending proposal and the European Waste Shipment Regulation.

The Waste Framework Directive sets out the institutional set up and identifies the key terms and factors of waste generation and management, while the European Waste Shipment Regulation outlines the common legal framework for transboundary waste management among the EU MSs and third countries, transposing the obligations arising from the Basel Convention (Nash 2009; Cassotta 2012; Hedemann-Robinson 2012, 2015).[6] With the evolution of the EU institutional framework, the environment now comes under the principle of

[2] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, published on the OJ L 312, 22.11.2008, p. 3–30.
[3] Proposal for a Directive of the European Parliament and of the Council amending Directive 2008/98/EC on waste (Text with EEA relevance) {SWD (2015) 259 final} {SWD (2015) 260 final} Brussels, 2.12.2015 COM(2015) 595 final 2015/0275 (COD).
[4] Regulation (EU) No 660/2014 of the European Parliament and of the Council of 15 May 2014 amending Regulation (EC) No 1013/2006 on shipments of waste, published in the OJ L 189, 27.6.2014, p. 135–142.
[5] Italian legislative decree No 152/2006 (as amended from time-to-time), published in the Italian Gazette No 88 of 14 April 2006 – Ordinary Supplement No 96.
[6] The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22 March 1989 by the Conference of Plenipotentiaries in Basel, Switzerland.

shared competence, based upon which MSs have to implement EU legislation within their national legislation under and in conjunction with the intervention of the EU.

Based on the aforesaid principle, the first Italian law to exhaustively implement European waste legislation was the D. p. r. No 915/1982: its provisions classified waste under three distinct categories (namely, urban, special, toxic/hazardous), outlined the principles upon which the legislation was based, and focused on the concept of "disposal" (Iacoviello 2007; De Leonardis 2011; Vagliasindi, Lucifora, and Bianco 2015). Moreover, the D.p.r. No 915/1982 introduced the so-called Formulary of Waste Identification[7], a document which aimed to identify the main features of waste (such as quantity, type, producer, destination, etc.), in order to trace its route (Iacoviello 2007; Mastrodonato 2012).

Until the 1990s, Italian waste legislative framework was characterised by a massive production of specific, sectorial regulations, both at the national and local level, which culminated in a fragmented, unclear and ambiguous legal set up about this topic (Paone 2008; Cerulli Irelli and di San Luca 2011a). By virtue of the Legislative Decree No 22/1997, the so-called "Decreto Ronchi", the Italian Parliament transposed into national legislation several EU directives on waste, and designed a systematic regulatory framework on the matter (Della Scala 2009; Cerulli Irelli and di San Luca 2011a).

After Directive 2006/12 took effect, replacing Directive 75/442, a new Italian waste law was promulgated to comply with the EU legal framework: the Italian Legislative Decree No 152/2006, also known as "Environmental Code"[8] (Mastrodonato 2010; Paone 2008; Pernice and Mininni 2008; Cerulli Irelli and di San Luca 2011a). Its Fourth Part,[9] regulating, among other issues, waste management and the waste cycle, abrogated and entirely replaced the Decreto Ronchi (Della Scala 2009; Cerulli Irelli and di San Luca 2011a).

At this juncture, the protection of the environment (and, therefore, the rules with respect of licit waste management) foresees a range of misdemeanours, all of which fall outside of the Italian Criminal Code (Vagliasindi, Lucifora, and Bianco 2015). The main regulatory text on waste management is represented by the Italian Environmental Code, namely from article 177 up to and including article 238, amended from time to time in order to follow and regulate new cases (Della Scala 2009; Mastrodonato 2010; De Leonardis 2011; Pirlone 2015).

Italian waste legislation as enshrined in the Environmental Code is comprised of two main parts (De Santis 2008). The first part is a general one, dedicated to administrative rules (from article 177 up to and including article 216), and outlining the main features governing waste cycle management. The second part is a special one, dedicated to specific waste types, such as packaging (from articles 217 up to and including 226), tyres, end-of-life vehicles and others (from article 227 up to and including article 238), setting out the common rules pertaining to producers and final users' obligations, as well as establishing the duties of the public administration with respect to the differentiated collection of waste.

The enforcement and sanctions system associated with breaches of waste legislation is outlined by Title VI of the Fourth Part of the Environmental Code.[10] The sanctions outlined in these provisions concern both the administrative and criminal fields of legislation and run from article 254 up to and including article 263.

Article 256 punishes waste activities carried out without either the preventive control of the public administration or the required authorisation, registrations and/ or communication prescribed in articles 208 through to 212, and 214, 215, 216 (Germani, Pergolizzi, and Reganati 2015).

Two other important provisions, especially from the perspective of the transnational crimes commission, are article 259, named "Illicit trafficking of waste", and article 260, titled "Organised activities for the illicit trafficking of waste". Article 259, which is a misdemeanour, refers to illicit waste trafficking" as outlined by Regulation No 259/93 (later replaced by Regulation (EC) No 1013/2006): those individuals who are found to

[7] Formulario Identificativo del Rifiuto.
[8] Testo Unico Ambientale.
[9] Parte IV: Norme in materia di gestione dei rifiuti e di bonifica dei siti inquinati.
[10] Sistema sanzionatorio e disposizioni transitorie e finali.

be guilty are forced to pay a fine and sentenced to imprisonment of a maximum duration of two years.[11] Article 260, which is a felony, punishes the illicit management of waste committed by a number of people who are part of a criminal organisation. The provision describes those activities which are part of the crime commission: to cede, to receive, to transport, to export, to import and/or to manage huge quantity of waste (De Santis 2008).

In 2015, Italian legislation introduced four environmental felonies connected to IWT into the Italian Criminal Code, according to the Law 68/2015. The new offences are pollution, environmental disaster, obstruction of controls, as well as the illegal transport and abandonment of radioactive materials (Legambiente 2015). This legislation marks an important step towards protecting the environment, because it allows for the adequate punishment of environmental offences (also connected to waste), which are now of criminal relevance and no longer considered merely as administrative violations.

Empirical strategy

The CPL is a scientific approach developed in 2006 (Calderoni, Savona, and Solmi 2012; Calderoni et al. 2006; Savona 2017, 2006). The core idea underpinning the CPL is that every type of regulation has the potential to produce unintended criminal opportunities, and, in fact, the latent criminogenic effects of the legislation can even go so far as to undermine the main objectives of the law itself (Calderoni, Savona, and Solmi 2012; Curtol et al. 2006; Curtol, Pesarin, and Vander Beken 2006; Savona 2017). Accordingly, the screening of legislation can significantly contribute towards minimising the potential risks and their attendant consequences, both in terms of costs and victims (Savona 2017).[12] More specifically, the CPL focuses on the connection between the legislative index and the vulnerabilities of the market as potential sources of criminal opportunities.

The CPL mechanism consists of two phases: an assessment of the risks and criminal implications that a policy option may inadvertently produce (the so-called "crime risk assessment"); and the subsequent actions required to close loopholes in legislation, thus "proofing" it against crime (the so-called "crime risk management") (Calderoni, Savona, and Solmi 2012; Calderoni et al. 2006; Savona 2017, 2006). The analysis here presented focuses on the crime risk assessment phase. The crime risk management phase is out of the scope of the study. Indeed, it should be conducted with the full involvement of national and EU legislators.[13] The crime risk assessment is divided into three steps: Initial Screening (IS), Preliminary Crime Risk Assessment (PCRA), and Extended Crime Risk Assessment (ECRA).

Step 1: The IS checks if any policy options fall under one of the seven general risk indicators identified by the original CPL framework (Savona 2017, 2006) and presented in Table 1. It is conducted through a rigorous analysis of the contents of the texts of each regulation. If any of the legislative measures are deemed to fall under one of the risk indicators, then the assessment proceeds to Step 2.

Table 1 about here

Step 2: The PCRA evaluates the coherence of the legislation and the level of vulnerability of the waste market to crime. This phase represents a key innovation if compared to other studies on waste legislation, that usually are limited to the analysis of the regulatory framework on a theoretical level. Step 2 of the CPL instead is an evaluation of the i) formal aspects of the relevant waste regulation and an assessment of the ii) vulnerability of the waste market to crime based on the *attractiveness* to crime and the *accessibility* of the waste sector to criminals. The evaluation of formal aspects is conducted assigning a level of crime risk (low, medium, high) to each policy option based on the type and number of risk indicators associated with each policy option. If any of the policy options is assessed to have a medium/high level of risk, then Step 3, the final one, will take place. The assessment of the vulnerabilities in the market is based on information collected in existing literature, including grey literature. This assessment has been integrated with interviews carried out with

[11] The value of the fine can vary from Euro 1,550.00 to Euro 26,000.00.

[12] An expanded explanation of the CPL method can be found here: "A study on crime proofing – Evaluation of crime risk implications of the European Commission's proposals covering a range of policy areas" (Transcrime, 2006).

[13] The cooperation between the academia and the institutions usually requires specific agreements that could not be achieved for this study. For this reason, the crime risk management is out of the scope of this analysis, although it may be the object of future research.

practitioners and experts within the field at both European and national levels. Specifically, the interviews sought to understand if there were certain vulnerabilities that did not emerge in extant literature, but that were nevertheless of critical relevance from the perspective of the experts' experience. In this sense, the primary source of information was extant literature, while the interviews served as a secondary source of information in those instances in which important criticalities were not covered by the primary source. For the purposes of the study, eight experts on illicit waste trafficking were interviewed between November 2016 and March 2017. They belong to different fields of expertise and have multifaceted and varied backgrounds; academia, judicial system and public institutions (Table 2). The on-field experience of the experts helped to integrate and confirm the outcomes of the theoretical methodology. Interviews were mostly carried out by remote questioning and with the support of a list of questions calibrated to each interviewee's profile, in order to best utilise their respective expertise and insights.

Table 2 about here

Step 3: The ECRA consists of an in-depth evaluation of the likely impact of the legislation on the four crime components, namely: the amount of crime, the number of expected actors/perpetrators, the estimated number of victims, and the forecasted costs and damages. Step 3 is conducted qualitatively analysing all available information and data gathered through the previous steps of the CPL exercise to access the likely impact of the options on the levels of the IWT expressed through the crime components.

Application of the empirical strategy

The present study applies the empirical strategy of the crime proofing to the European Waste Framework Directive and its amending proposal, the European Waste Shipment Regulation, and the Italian Environmental Code in order to identify the main criminal opportunities arising from specific policy measures.[14]

This paragraph presents the application of the empirical strategy to the European Waste Framework Directive and its amending proposal in order to present the scheme followed for the analysis. Table 6 and Table 7 in the Appendix summarize the results of the application of the CPL analysis to the other regulations for which we followed the same analytical approach.[15]

Step 1 – Initial Screening (IS)

The Waste Framework Directive and its amending proposal introduced new rules regarding the waste management and the institutional set up, that can be grouped in five policy options.[16] Every policy option was interpreted in the light of the risk indicators identified in Table 1 and associated with one or more of these indicators.

Table 3 shows that, except for the first policy option (i.e. new definitions), all other options have been associated with two or more risk indicators that could jeopardise the implementation of the Waste Framework Directive and its amending proposal. The IS results support the importance of proceeding with the Step 2 of the assessment, the PCRA.

Table 3 about here

Step 2 – Preliminary Crime Risk Assessment (PCRA)

[14] The CPL is the result of an analysis firstly conducted by one researcher (law expert) and secondly checked by the other members of the research group (criminology experts), who verified the content of the analysis and the rigorous application of the CPL in order to minimize subjectivity in the identification of the vulnerabilities. Moreover, since the study is part of a wider project that involved other universities, the preliminary results of our analysis were also validated by other research teams.

[15] Additional information on the empirical strategy and its application can be found in the report "*Crime Proofing analysis of the waste regulation. A specific focus on the European Union, Finland, Italy, and the Netherlands*" (https://drive.google.com/file/d/0B_z0dJCe4UmYYWlUNjcxTlRJUkhxUENvOXlDVWN5TWFhQWxz/view)

[16] A policy option can be considered as a measure of intervention outlined by the legislation. Policy options are regulatory provisions whose aim is to tackle a phenomenon and that have economic, social and environmental impacts. For a detailed explanation, see also https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox_en

Formal aspects. The complexity of the waste regulation (at international/EU/national/regional/local level) contributes to the creation of opportunities for criminals who take advantage of unclear interpretations and legislative overlaps (EnviCrimeNet 2015; Hayman and Brack 2002). The IS of the Proposal amending the Waste Framework Directive precisely highlighted this risk. On the one side, the proposal adds new definitions and new obligations in the view of creating a clearer legal framework and, therefore, seems to reduce the overall complexity. On the other side, the introduction of incentives for the application of the waste hierarchy (option 2), the introduction of an extended producer responsibility scheme (option 3), of additional exemptions to the registration obligations (option 4), and of an electronic registry as record keeping device (option 5) makes the general interpretation of the overall functioning not easy to understand and implement.

At this point, the PCRA qualitatively assesses the level of crime risk which is associated with each of these policy options. The assessment is based on the number of risk indicators identified for each policy option and the intensity of the potential crimes associated with each activity. For example, a policy option which falls under two risk indicators is considered at medium risk, whereas a policy option falling within four risk indicators is deemed to be at high risk (Table 4). As well as the potential impact of forgery of documents is qualitatively associated with a lower risk to the society compared to the risk level applied to corruption, for example (Table 4).

Table 4 about here

Vulnerability – Attractiveness. The attractiveness of the waste market to criminals can be explained through two factors: its profitability, which stems from the combination of a high demand for waste management services and a lack of sufficient and even supply of services, and its low risk of detection by Law Enforcement Authorities (LEAs), caused by the lack of systematic inspection plans (Klenovšek and Meško 2011; EnviCrimeNet 2015)**,** at least until the implementation of the new regulatory framework resulting from the European Waste Shipment Regulation, which introduced systematic inspection plans.[17] Furthermore, regulations putting burdens on waste disposal contribute to the rise of waste disposal costs (Bernard 2011). Criminals enter as unfair competitors in this market by offering waste management services, such as transportations, storage, and disposal, at lower prices compared to the ones applied in the legal market (Klenovšek A., Meško G. 2011). In fact, illegal disposal and illegal transportation of waste are both less expensive for the waste holder and easier to carry out than the legal ones, due to the complexity of the regulatory framework and its administrative costs (Bernard 2011; Hayman and Brack 2002).

Vulnerability – Accessibility. Overall, the waste market presents a relevant level of accessibility for criminals. The combination of the degree of exploitability of the market and quality of checks and inspections undergone by LEAs are among the common sources of vulnerabilities that facilitate the accessibility. Precisely, the fragmentation of the disposal process in several stages, the implementation of different waste management plans at MS's level and the high volume of waste flows undermine the supervision, enforcement and detection actions to counter the IWT. The in-depth analysis of the policy options summarized in Table 3 highlighted medium/high levels of crime risk, so it is advisable that a closer examination of the possible crime implications of the selected policy options is carried out to establish exactly which impacts they may have.

Step 3 – Extended Crime Risk Assessment (ECRA)

The extended analysis of the criminal context is the objective of this third step. For each policy option the amount of crime, the number of expected actors/perpetrators, the estimated number of victims, and the forecasted costs and damages has been envisaged. Moreover, the potential impact of each policy option on the relevant market has been considered in terms of crime risk assessment.

Table 5 about here

[17] Article 3 and Article 4 of the European Waste Shipment Regulation.

Loopholes in the EU and Italian waste management and shipment legislation

The in-depth analysis of the EU waste legislation as implemented within the Italian framework indicated the existence of potential loopholes. The loopholes have been identified looking at the regulation itself with the IS - where each policy option has been assessed against the risk to fall under one of the seven risk indicators -, but also assessing, in the innovative approach of this paper, how the regulation influences the waste market and the day-by-day waste management – resulting from the application of the two further steps, namely the PCRA and the ECRA. The loopholes identified can be aggregated into three different macro-categories: (i) the legal framework, (ii) the supply chain (the regulatory framework and law enforcement capacity), and (iii) the justice response system.

Applying a top-down approach to the analysis of waste legislation and employing the CPL method confirmed the results of previous studies pertaining to loopholes in the regulatory framework. Endorsing certain outcomes of previous studies through the use of multiple and different methodologies serves to increase the robustness and reliability of scientific results. At the same time, the approach proposed produces innovative findings which are presented in the following sections. These new insights predominantly pertain to the Italian context and the relationship between the EU and national legislations.

The legal framework

The first source of loopholes can be traced to the unclear legal framework, both at the EU and Italian level, and, in fact, the deficiencies of the supranational regulatory set up automatically undermine the clarity of the latter. It is important to note that the problem stems from the ambiguity of the language pertaining to definitions and implementation, as well as (and consequently) in the overall framework, which creates the potential for inconsistency and incoherence.

With regards to the EU level, ambiguous definitions of the essential terms included in the Waste Framework Directive have led to inconsistencies among EU MSs' respective implementation of the legislation on waste, especially when transposing the EU regulation into national rules. With respect to this issue, it is important to highlight that the complexity of the waste framework helps to create opportunities for criminals to take advantage of these unclear interpretations and legislative overlaps (Hayman and Brack 2002; Klenovšek and Meško 2011; EnviCrimeNet 2015; Interview no. 1 2016; Interview no. 2 2016; Interview no. 3 2016).

In terms of the Italian environmental legal framework, the first point to stress, as innovative outcome of this analysis, is that the generation of loopholes stem from the simultaneous presence of two regulatory fields: the administrative one, which governs the (licit) management of waste operations and authorisation procedures, and the criminal one, which intervenes when provisions are not fulfilled and certain crimes are committed. Based on this, the first feature of the legal set up generating loopholes pertains to the non-systematic collection of rules. The relevant provisions of waste management are found in different national and regional acts, the latter ones implementing national legislation (the Criminal Code, the Environmental Code, specific legislative decrees, etc.) and, consequently, there has been a huge proliferation and stratification of norms in this field, which invariably have not been well coordinated (Paone 2008; Vagliasindi, Lucifora, and Bianco 2015). Moreover, the decision to qualify the vast majority of violations of environmental provisions as misdemeanours (administrative violations) rather than felonies represents one of the major causes for the ineffectiveness of environmental (waste) legislation, as well as raising two further issues: on the one hand, the criminal conduct becomes relevant when committed either intentionally or negligently; on the other hand, it charges modest sanctions (if applicable) (Vagliasindi, Lucifora, and Bianco 2015).

The supply chain

The regulatory framework

When analysing the waste market, it has been noted that its first vulnerability arises at the level of the administrative set up, that is, all the rules that have to be respected and fulfilled when entering the sector. At

this moment, there are two primary factors that cause an uneven playing field: the un-proportioned and uncoordinated numbers of competent authorities involved at different stages of the process, and the sheer complexity of the system dedicated to releasing licenses and permits to economic actors, the latter having resulted to be a peculiarity of the Italian case.

EU legislation proclaims the waste hierarchy to be the cornerstone of European waste policies and legislation, and, indeed, this principle plays an integral role in the choices economic actors make when entering the relevant market (European Commission, Directorate-General Environment, and Director-General 2012). To boost the numbers of correct applications, the amending proposal of the Waste Framework Directive makes it mandatory for MSs to provide incentives to economic actors to help fulfil this principle. Hence, criminals may forge the requisite documents in order to obtain economic advantages, and/or may engage in collusive/corruptive behaviours with competent authorities.

As for the Italian administrative waste framework, the length and difficulty of current legislation pertaining to the authorisation, registration and licenses' issuance procedure constitutes one of the key reasons behind the insufficient number of waste treatment and disposal plants in Italy, compared to the real demand of the market (Germani, Pergolizzi, and Reganati 2015). This situation has caused waste crises, such as the emergency that occurred in Naples in recent years, where waste was abandoned on the streets and in the fields, provoking serious pollution and health safety concerns (Commissione parlamentare inchiesta rifiuti 2016a, 2016b).

Moreover, the ambiguous procedures for the establishment of sites dedicated to the waste recovery and disposal, and the aforesaid insufficient number of facilities cause an uneven distribution of the plants at the regional level in Italy. The result is a significant distance between processing and final disposal sites and waste production, not to mention a concentration of licit plants in the Northern part of Italy (Commissione parlamentare inchiesta rifiuti 2016b, 2016a; Vagliasindi, Lucifora, and Bianco 2015). Resultantly, the South of Italy is characterised by, and suffers from, the widespread presence of criminal management activities, most of which are conducted under the shadow of, but not only by, organised criminal groups (Ruggiero and South 2010; Germani, Pergolizzi, and Reganati 2015; Commissione parlamentare inchiesta rifiuti 2016a, 2016b).

Italian waste regulation is lacking in terms of coordinated policies (Interview no. 7 2016). Local municipalities have the power to establish the rules regarding urban waste management, while hazardous waste follows the dynamics of the free market. Documents to identify products are often counterfeited, classifying hazardous waste as non-hazardous (Interview no. 4 2016; Interview no. 5 2016; Interview no. 6 2016; Interview no. 7 2016; Interview no. 8 2016). However, this is also a common administrative violation affecting the system at supranational level (Klenovšek and Meško 2011). Further up the ladder, criminals may engage in other non-compliant behaviours, such as corrupting public officials in charge of the procedures connected to the release of authorisations, registrations and licenses. The level of corruption against public official is of such amount to be considered a threat to crime vulnerability (Vagliasindi, Lucifora, and Bianco 2015; Germani, Pergolizzi, and Reganati 2015). In addition, the Environmental Code requires companies to meet certain conditions to receive grants and subsidies. This might constitute an incentive to carry out correct waste management, but it also potentially stimulates illicit behaviours (Interview no. 7 2016). Indeed, criminals might adopt non-compliant behaviours, such as forgery of documents and corrupting competent authorities, to obtain an economic advantage.

The law enforcement capacity

The waste identification and traceability systems are essential tools to combat illicit trafficking, the efficiency of which reaches high peaks when implemented by specific trained LEAs dedicated to counter the crime.

Hazardous waste and its proper management still constitutes a key challenge for the EU legal framework, which is compounded by the fact that reliable and systematic data have hitherto not been wholly recorded (European Commission and Council 2015). The amending proposal of the Waste Framework Directive aims to enhance record keeping and tracing systems by setting up electronic registries for hazardous waste in MSs, whilst leaving open the option of whether to extend this new device of data gathering to other waste streams.

However, this degree of flexibility in the categories of data subject to a spontaneously collection by EU MSs may impinge on the level of comparability of such information and therefore affect the overall results of a (non-standardized) reporting procedure (Klenovšek and Meško 2011). The introduction of new obligations and fees, on one side, is likely to stimulate non-compliant behaviours, while, on the other side, it requires law enforcement authorities to undergo specific training and acquire specialist knowledge to detect frauds and other forms of misconduct.

Certain types of waste are subject to the procedures of prior written notification and consent that must be submitted to and received from the competent authority of dispatch, which is empowered to release the relevant documents (notification document and movement document). If requested by the competent authority of dispatch, the notifier must submit additional documents. Waste operators may seek opportunities to avoid administrative costs and forge required documents; moreover, criminals may try to corrupt competent authorities to obtain their consent.

All shipments of waste, for which a notification is prescribed, are subject to a required financial guarantee (or equivalent insurance) to cover different types of costs (such as transport, recovery, disposal, and storage). The form, wording and extent of coverage of the financial guarantee are all subject to the approval of the competent authority of dispatch, and in the case of import into the EU territory, the competent authority of destination is empowered to review the aforesaid features. Criminals may forge the relevant documents (Sahramäki et al. 2017) and/or try to corrupt the competent authorities to obtain the approval of the guarantee (Cesi, D'Amato, and Zoli 2017).

If there is a similarity in the physical and chemical characteristics, then the waste is shipped to the same consignee and the same facility, and if the route of the shipment is the same, the notifier may submit a general notification to cover several shipments. The implementation of this simplified procedure is subject to discretionary approval by the competent authority. Criminals may attempt to elude the aforementioned procedure by forging documents and/or corrupting competent authorities.

Illegal shipments of waste often stem from uncontrolled collection, sorting and storage. Adequate planning of shipment inspections is an effective tool to counter illicit waste trafficking. Systematic inspections, if not uniformly enforced across the EU, are likely to engender elusive behaviours and diversion towards laxer national systems, along with corruption of and collusion with competent authorities (Interview no. 1 2016; Interview no. 3 2016).

With regards to the Italian framework, urban waste management comes under the competence of public local municipalities, which ordinarily adopt different strategies for treatment and disposal; therefore, it is often difficult to implement an effective system of control (Cassinelli and Del Duro 2007; Germani, Pergolizzi, and Reganati 2015; Vagliasindi, Lucifora, and Bianco 2015). Traceability represents, at least for the time being, a critical shortcoming in the Italian context (as well as for most of the EU MSs): in the majority of cases, it is based on self-certification (mainly through the formulary to identify waste), and thus documents can easily be forged and counterfeited (De Santis 2008; Commissione parlamentare inchiesta rifiuti 2014, 2016a; Sahramäki et al. 2017). As showed in the analysis above, this specific loophole derives from the one already present at the EU level.

Unruly methods of waste classification, differing from country to country at the international level, is also a major source of loopholes (Klenovšek and Meško 2011). During some inspections carried out by Italian LEAs at ports on the coast, containers were found full of items classified as "second-handed goods" instead of "waste". This practice is down to the fact that, especially in some developing countries, prices of used products are cheaper than prices of new products (Commissione parlamentare inchiesta rifiuti 2016a; Germani, Pergolizzi, and Reganati 2015).

The Environmental Code outlines different systems of waste traceability: the so-called "SISTRI" (a computerized system that is compulsory for operators that handle hazardous waste and discretionary for the other ones), and the registry of waste loading/unloading activities (compulsory for those enterprises managing

hazardous waste and not using the SISTRI). There is also a self-certification form, aimed at identifying the main characteristics of the waste. Forging the required documentation is among the most common *modus operandi* for criminals, along with corrupting and colluding with the competent authorities (Interview no. 4 2016; Interview no. 5 2016; Interview no. 6 2016; Interview no. 7 2016; Interview no. 8 2016).

With respect to the analysis of criminal sanctions, the falsification of documents sprouts up under various *modi operandi*, the most common of which is the invoice switch (the so-called "*giro bolla*"). Through this illicit procedure, waste is transferred from the original producer to a storage centre or a temporary deposit site. The latter two are then listed as new producers by way of document falsification, whilst hazardous material turns into non-hazardous material through the issuing of fake certifications (Germani, Pergolizzi, and Reganati 2015). Falsification of documents is also linked to tax fraud commission, which ordinarily also exploits regional differences in environmental taxation (Commissione parlamentare inchiesta rifiuti 2014, 2016a, 2016b; Germani, Pergolizzi, and Reganati 2015).

The increased connections between legal firms and organised criminal groups, or at the very least between legal firms and illegal undertakings, known as "white-collar crime", is also permeating the waste market. In most cases, this involves criminals operating at the transnational level, in particular those subjects who operate in the role of "brokers" (De Santis 2008; Della Scala 2009; Commissione parlamentare inchiesta rifiuti 2014; Vagliasindi, Lucifora, and Bianco 2015; Germani, Pergolizzi, and Reganati 2015). Whilst the majority of Italian enterprises are duly enrolled to the Register of Environmental Managers and are supplied with an identification code (VAT code), this is not to say that they are exempt from criminal infiltration, nor that the owner might actively seek a shadow network to help in reducing the costs of licit waste management (Commissione parlamentare inchiesta rifiuti 2014; Germani, Pergolizzi, and Reganati 2015; Commissione parlamentare inchiesta rifiuti 2016b).

The justice response system

The EU legislation requires MSs to implement proportionate repressive measures; however, the degree of flexibility regarding determining the quantity and quality of sanctions remains at national level competence. Based on the fact that, at least up to the time in which this analysis was conducted, the EU has not yet been transferred competence in the criminal field, the only loophole identifiable at EU level concerns the build-up of different justice response systems among its MSs, which qualify the same illegitimate act as either a misdemeanour or a crime.[18] Consequently, in a situation in which there are different regulatory frameworks, criminals are likely to operate under the jurisdiction of the one that has the least stringent rules and sanctions.

With regards to the enforcement and sanction system, article 259 of the Italian Environmental Code, named "Illicit trafficking of waste" ("*traffico illecito di rifiuti*") has exerted a low-level of deterrence (Commissione parlamentare inchiesta rifiuti 2014). Problems pertaining to investigation methodology and LEAs coordination weaken this provision: based on the fact that LEAs can start the investigative operations only after having received the crime reports (*notitia criminis*, "*notizia di reato*"), the transmission of all the data and information to the competent LEA assumes priorities of outstanding importance. Most of the time, the procedure is overly long, due to limitations and gaps in the traceability system and, as a result, the offences lapse.[19] Therefore, criminals have a low rate of detection (Commissione parlamentare inchiesta rifiuti 2014; Germani, Pergolizzi, and Reganati 2015). However, it is to remark that the lack of coordination and prompt information sharing among LEAs is a sensitive issue impinging on the tackling of illicit waste trafficking (Klenovšek and Meško 2011).

[18] Under the framework of the Treaty on the Functioning of the European Union, the EU has the power to act – at different degree of exclusivity – only when the Treaty recognizes its competence, competence that has been transferred by the EU MSs. Up to now, criminal law is still exclusive competence of the EU MSs.

[19] The offences can be persecuted only through a limited number of years (generally, five or ten). When the time lapse expires without any initiative of persecuting, there is no chance to assess the criminal liability (concept of "prescrizione del reato").

Policy implications

Loopholes in legislation cause substantial shortcomings in enforcement capabilities, and necessitate the development of a greater array of enforcement tools. Amendments to legal and policy frameworks, then, should not only bear in mind legal principles, but also focus on the effects on markets, access to data necessary for setting up a responsive mechanism, and the economic effort required for enforcement operations.

Taking into consideration the three macro-categories of loopholes identified in the analysis of waste regulation at both the EU and Italian level, this study outlines some implications for policy, and proposes recommendations about how best to orient the future initiatives of the competent authorities (Figure 1).

Figure 1 about here

Considering the legal framework, rewording and simplifying the language adopted in waste legislation should be considered firstly at the EU level and, subsequently, at a national level. Previous studies unanimously agreed on this specific aspect (Klenovšek and Meško 2011). The legal situation with respect to waste is complex, and, indeed, the concept of waste itself is unclear at the best of times (Vander Beken and Balcaen 2006). Hence, a more precise categorisation of concepts and classification of criminal conduct to be punished may help both legislators and actors operating with more certainty within the waste sector. To support the legislative process of amendment, one avenue could involve employing specialised legal and risk assessment experts. At Italian level, also as result of an upper level of legal uncertainty, the overlap between different sources can cause legal uncertainty, both for the addressees of the obligations and the appointed officials. As with other goods which require regulation, the provision of clear and systematic rules is paramount.

Considering the regulatory framework, harmonising and rationalising both the competent authorities and the authorisation procedures might help to mitigate the problems related to the difficulties encountered at administrative level when one attempts to enter the market itself (e.g., different competent authorities, complex system of licenses and permits). In particular, the creation of a centralised environmental authority at the EU level, entrusted with monitoring and enforcement powers and giving a common guidance in handling unclear cases could be considered as a key innovation worth introducing, much like the enhancement of information exchange between competent national authorities. Moreover, once a common European environmental authority will be set up, the standardisation of the reporting procedures will have to be improved. As a consequence, one common authority will collect and monitor all the data related to waste trafficking of the 28 EU MSs, having therefore a clear and comprehensive picture of the flows. This would also enable an easier detection of criticalities and inconsistencies in the common system and to close the loopholes. The uncertainty over rules, which readily change with relative ease, and the presence of different competent authorities is a problem also in Italy. Therefore, the set-up of a European centralised environmental authority will help in reducing each country's specific problem. The legislative framework should be simplified as part of a move towards broader cooperation at the EU level and a more open waste market.

LEA's capacity should be improved**,** providing specific training activities at a national and international level. This will allow to upgrade current prevention and investigation systems, including the onsite inspections on trucks and seaport, to exchange information in a prompt manner and develop best practice among different authorities. The coordination and information exchange between different LEAs within and among EU MSs should be improved, as currently MSs too often limit the investigation of intercepted illicit waste shipments to their own territories. IWT is a common and transnational issue, so the enforcement measures must be (Bisschop 2014). Given that enforcement competences are differently divided between administrative agencies at a national level, cooperation should be promoted, both within countries and in terms of cross-border cooperation (Spapens 2014). In particular, the Italian model in this regard is to be suggested: the set-up of specifically trained enforcement personnel helped in a better identification of waste. Above all, cooperation and direct and continuous exchange of information between the national competent authorities and the supranational enforcement and investigation agencies, such as Interpol and Europol, should be further encouraged. In addition, significant investment should be made in technological systems and equipment to help enforcement

units that specialise in environmental crimes to tackle IWT. In the specific case of Italy, different systems of waste traceability are allowed (e.g., SISTRI, which is a computerized system, and the registry of loading/unloading of waste for those enterprises managing hazardous waste), although the old and traditional paperwork method is still the best preferred and most easily to be counterfeited. The diffusion of SISTRI as the standardised method for registering hazardous waste would improve the possibilities of better controlling its traceability, which, in turn, would enhance enforcement capabilities.

The existence of different justice response systems (based on the qualification of the relevant actions/inactions as misdemeanours or crimes) encourages the shift towards less stringent regulatory frameworks. EU legislation requires MSs to implement proportionate repressive measures, but grants them flexibility over determining the quality (either administrative or criminal) and amount of sanctions. In order to coordinate investigative and prosecutorial activities within the MSs, the sanctions against waste legislation violations should be aligned as much as possible, at the very least across the EU to tighten up less stringent regulatory frameworks. In addition, waste crimes and IWT can often be considered as corporate crimes, inasmuch as they are often committed by businessmen operating within the waste sector. Nevertheless, viewing corporate crime as a type of criminal offence is not shared across the respective criminal codes of the EU countries, therefore creating misalignments. Thus, most of the time, the liability for violation is charged to the corporation and results in an administrative sanction, easily payable off, rather than being charged to the perpetrator as personal criminal offence. This is the case in Italy, for example, which has specific articles of the criminal code dedicated to punishing criminal conspiracies (art. 416) and mafia style conspiracies (art. 416 bis), but no comparable specific articles for corporate crimes.

Conclusion

This study presents an in-depth analysis of EU and Italian waste and shipment regulations, highlighting the common vulnerabilities and those specific of the national framework. The analysis remarked that the latter ones are sometimes the inevitable result of loopholes already existing at supranational framework and proposed possible solutions for crime prevention at different level.

The study applies the CPL as a privileged methodology through which analyse the gaps and problems within current regulation. There has been a relative dearth of studies which have hitherto applied CPL, and, indeed, trying to embed its results in practice have often drawn scepticism from both policy makers and LEAs. However, the application of the analysis has great potential, specifically because it can be a useful tool for critically assessing legislation before coming into force at drafting stage and/or attempting to improve it, though a direct link in the analysis to the peculiarities of the specific market in terms of its attractiveness and accessibility to criminals. As aforesaid, it is vitally important to proof legislation against the risk of unintentionally encouraging illicit activities, by implementing a clearer system aimed at avoiding ambiguity and coordinating countering strategies at a transnational level. Specifically, effective measures are required to both improve the identification and traceability of waste, and to provide LEAs with the tailored-made training and technological resources through which to perform their inspection activities. Given the transnational nature of IWT, international cooperation and a prompt exchange of information becomes integral to the fight against this crime type. This means, on the one hand, effective information and standardised data sharing among countries, and, on the other hand, the possibility of creating solid formal and informal networks among agencies operating in the sectors (e.g., law enforcement agencies, prosecution offices, customs, environmental protection agencies), with the recommendation to set up a centralised European authority to monitor and coordinate overall.

Some of the results and policy implications highlighted by this study represent innovative proposals (e.g., using SISTRI or any other computerized techniques as standardised methods), whereas other findings and suggestions confirm what previous literature has already identified. However, the fact that the application of an alternative methodology, such as the CPL, produced similar conclusions to extant literature serves to underscore the necessity for greater interventions and effort on the behalf of institutional actors. The overall

vulnerabilities of waste legislation are largely confirmed by our CPL analysis, which provides a highly specific analysis of three pieces of regulation (i.e. Waste Framework Directive and its amending proposal, European Waste Shipment Regulation and the Italian Environmental Code) and buttresses our observations of the criticalities inherent within specific provisions of the assessed legislation and the dynamics of the market.

Moreover, the analysis shows in detail how the weaknesses of supranational legislation translate into national ones. The Italian context represents an interesting and hitherto unexplored example and, as such, further analysis should take into consideration the loopholes in legislation of other EU countries, both for the purposes of comparison and so as to synchronise potential solutions. Given that national regulations derive from EU legislation in this particular field, it could be that legislative vulnerabilities are similar in different countries. Consequently, this could stimulate a coordinated effort to solve these common issues and design efficient solutions. In addition, a more in-depth investigation could examine the feasibility of the proposed measures with respect to monetary costs and usable resources. A cost-benefit analysis of the implementation of public policies could aid legislative attempts to set priorities and evaluate the feasibility of the proposed solutions. In this sense, it would be expedient to realise the second phase of the CPL, by conducting crime risk management in close collaboration with legislators and policy makers. Crime risk management is an excellent starting point for developing practical solutions to the vulnerabilities of extant legislation and evaluating the feasibility of the proposed recommendations.

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