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Abstract

In this study we describe the smuggling activities involving drugs and cigarettes within the Italian multimodal logistic system in the period between 2004 and 2014. Data concerning the smuggling flows intercepted by Italian authorities are used to carry out detailed studies about the evolution of the trafficking of illicit substances. Several dimensions of these episodes, including geographical analyses, are assessed using quantitative methods to investigate how the international trafficking of such categories has evolved over the last decade. Numerical data shows how the illicit substances and the methods to smuggle them have evolved over time in the Italian logistic network. Detailed data about the geographical areas of origin and the destination of these flows are also provided.
These results can be used to implement and develop more robust and effective methods to contrast illegal substances trafficking and/or to evaluate the effectiveness of the measures to curb smuggling activities that are adopted by Italian custom offices and institutions.

Keywords

Smuggling, Trafficking, Multimodal transportation, Illegal substances, Drug smuggling, Cigarette smuggling

1. Introduction

According to the European Commission (2003), the direct costs of breaches in transport security accrue to several billions of euros per year in the European Union (EU). Moreover, crime is not restrained by national boundaries, nor focused on a single transport mode. Criminals might attempt to introduce drug, weapons or explosives by a legitimate shipment on route, or may even transport illegal products disguised as a legitimate shipment.

International illegal trafficking of drugs and cigarettes has attracted the attention of press and media in the last decades. However, researchers and scientists have neglected this field given that monitoring patterns

and trends is practically and methodologically challenging. In addition, due to the illegal nature of these traffics, the subject itself is “murky and dangerous” (Schiray, 2001).

A study conducted by the Canadian Police in 2008 assessed that thecontraband of tobacco and cigarettes contributes to an underground economy that is worth hundreds of millions of dollars a year. Even if tobacco and cigarettes smuggling is generally perceived by the general public as victimless crimes, these illegal traffics represent a significant source of income for organized crime. Moreover such illicit profits are often reinvested to support other criminal activities (Police, Royal Canadian Mounted, 2008).

According to a recent report, published by the European Monitoring Centre for Drugs and Drug Addiction, drug use is one of the major causes of avoidable mortality among young people in EU (EMCDDA, 2015). Most studies show mortality rates among young people in Europe between 1% and 2% per year, with a yearly amount of deaths in EU between 10,000 and 20,000 (mainly opioid users). In addition, about 1.6 million people received treatment for illicit drug use in EU during 2013.

In the context of worldwide drug trafficking, Europe represents an important market, supported by both domestic production and drugs smuggled from other regions. Latin America, West Asia and North Africa are important source areas for drugs entering into Europe. EU also represents an important crossroad for drugs directed to other continents and a producing region for cannabis (mostly for local consumption) and synthetic drugs (mostly exported to other areas). The European drug markets is continuously changing and rapidly evolving as a result of a series of factors such as: globalization, Internet, new trafficking routes, innovations in drug production and trafficking methods.

A better comprehension of the illegal flows can help to understand how criminal groups are organized. This would have significant implications to develop effective strategies and action plans aimed at contrasting crime. It should be noticed that measures aimed at preventing and fighting the supply of drugs are not easy to be implemented since they might involve collaboration of many stakeholders (e.g. governments, ONGs, public and private institutions) from different countries.

In this paper, the evolution of the drug trafficking episodes as well as the contraband of tobacco and cigarettes are analyzed. The proposed study is based on the occurrences in which these substances have been intercepted in the Italian intermodal and multimodal hubs in the last decade. The evolution of the prevalent transportation mode used by traffickers over the last 10 years as well as geographical aspects (location of the Italian logistic facilities, origin/destination of the illicit traffic, etc.) are analyzed.

The paper is organized as follows. In Section 2 a short overview of the recent studies about the worldwide and European drug trafficking is proposed. Section 3 covers a deep multidimensional analysis of the illegal trafficking. Its evolution and the main logistics nodes affected by the smuggling episodes are studied. Section 4 proposes a geographical analysis of the international flows of smuggled goods in Italy. Finally, Section 5 concludes the paper and presents some recommendations and suggestions for future research.

2. Literature review on the relevance of drug trafficking and contraband

Due to the illicit nature of drug trafficking and contraband, assessing the evolution of such phenomena represents a challenging task. The scarcity of data is the main limiting factor which has probably resulted in a lack of quantitative works in the scientific literature. More detailed studies could significantly foster the

cooperation among national agencies and customs services to prevent, detect and investigate smuggling episodes.

The smuggling of tobacco and drugs represents one of the main sources of profit for criminal organizations all over the world. Tobacco smuggling causes heavy losses to the budgets of EU States mainly due to the loss of custom duties and taxes. In addition, smuggled tobacco poses great risks to consumers. Similarly to the drug market, it is difficult to estimate the dimension of the illicit tobacco market, mainly because contraband and counterfeiting are clandestine and very dynamic activities characterized by sudden changes in the main actors involved. Over the 2012–2014 period, the investigative activities of OLAF (European Anti-Fraud Office) and the joint customs operations of the European member states contributed to seize more than 800 million cigarettes in EU (OLAF, the European Anti-Fraud Office, 2015).

The increase of cigarette prices as a consequence of both strict tax policies to discourage smoking and to limit the profits of the manufacturing firms has led to an escalation of distribution of contraband tobacco products over the last years (Joossens and Raw, 2012). Consequently, the involvement of organized crime in illegal tobacco activities has substantially risen. Moreover, since the profits of tobacco smuggling are most often invested in more lucrative illicit activities such as drug and gun trafficking, the linkages between crime organizations devoted to drug and cigarette contraband should not be neglected. According to a recent threat assessment in Canada, more than one hundred organized crime groups of varying levels of sophistication appear to be involved in the illicit tobacco trade. The majority of them (70%) are also involved in drug trafficking (mainly marihuana and cocaine) and/or weapons trafficking (Police, Royal Canadian Mounted, 2008). The use of threat and violence to maintain their market positions and to ensure illicit profits do not only characterize crime groups which are focused on drug trade but also those related to cigarettes smuggling. Moreover, smugglers adopt flexible networks in order to conceal and change flow patterns minimizing thus the risk of being detected by eluding the controls of police officials.

A study by UNODC (2014) has shown that, globally, between 3.5% and 7% of the world population aged 15–64 has used an illicit drug (cannabis, opioid, cocaine or amphetamine) at least once in 2011. A recent European drug report (EMCDDA, 2015) has estimated that almost a quarter of the adult population in the EU has tried drugs at some point in their lives. In Europe over a hundred new psychoactive substances were detected in 2014. The rapid emergence of new drugs and the diversity of available products has posed several challenges to the EU policymakers. At the national level, a range of measures have been used to control the spread of these new substances. Despite the heterogeneities in the definition of the offences and in the penalties applied in each EU country, responses tend to focus on supply side of the market rather than on the possession and use of these substances.

The most commonly used drug in EU is cannabis followed by cocaine, amphetamines and MDMA (EMCDDA, 2015). Looking at the drug supply, the long-established Balkan route remains an important corridor for the transit of heroin from Afghan to the lucrative markets in Western and Central Europe. However, the Balkan route is facing a decline due to a more effective law enforcement and to a shrinking drug market in Western and Central Europe. The so-called “southern route” is expanding, with heroin reaching Europe, via the Middle East and Africa, as well as directly from Pakistan. Western and Central Europe still represent the second largest market for cocaine produced in South America, while the European market of cannabis is facing significant changes. More specifically, cannabis herb produced locally or regionally are now gaining ground over cannabis resin, largely sourced from Morocco.

As it was mentioned, the clandestine nature of the drug market makes the analysis of its dynamics a challenging task. Analyzing the routes of the illegal drug smuggling can strengthen the fight against crime organizations and improve the effectiveness of the detection systems currently in use. Based on a better knowledge of the illegal flows, improved security measures can be adopted (Schilk et al., 2007). Through a better cooperation between Customs border authorities and firms it would be possible to increase security and to guarantee, at the same time, seamless freight flows avoiding congestions, delays, external and internal costs, as well as conflicts between public bodies, operators and customers.

A better knowledge of the dynamics of the drug smuggling could also improve the understanding of the structure (e.g. hierarchy, rules, communication, adaptability, specialization, coordination, procedures) of the criminal organizations behind these flows and their networks. Several efforts have been made in the past years to discover common characteristics of international organizations devoted to drug trafficking.

According to Benson and Decker (2010), groups involved in illegal lucrative activities such as tobacco, drug and/or human smuggling are characterized by high levels of organization and coordination. These criminal groups are most often rationally structured in order to increase their efficiency, to minimize the risk of being discovered, and to limit the seizures and punishments. The achievement of these goals most likely limits the creation of large, structured and monopolistic crime organizations or their persistence over time.

It is generally acknowledged that the features of the illicit tobacco and drug market determine the main characteristics of the criminal actors dealing with these illegal activities (see e.g. Paoli, 2004). Therefore, trafficking groups are in continuous evolution to adapt themselves to the fast-changing nature of the drug/tobacco market and to the improved controls of police authorities. Crime organizations involved in drug trafficking, generally adopt flexible and dynamic partnerships. The formal hierarchical structure is replaced by more flexible, pragmatic and opportunity-oriented mechanisms. Moreover, geographical distance does not appear to limit the criminal connections of drug offenders.

A better understanding of how criminal groups are structured and interact with each other would have significant implications on how to develop and apply theories and policies against crime. One of the first attempts to link the features of crime organizations to drug flows is due to Reiss (1988). In his work, a basic distinction of crime organizations among gangs, groups, and networks is proposed as a useful starting point in understanding the nature of such organizations and their impact on crime activities.

According to a study by Schiray (2001), the geographical analysis of drug trafficking represents a critical factor to assess its consequences on economies and societies. By analyzing the economic and social aspects of the drug trade, it emerges that policies against drug trafficking remain ineffective if they are not complemented by a wider system of policies which include, among others, local development, financial and economic activities, tax systems.

Shelley (2012) emphasized that anti-trafficking measures such as intelligence, task forces and coordinated operations could be used against organizations involved in drug, cigarettes and other illegal substances trafficking. Moreover, since certain markets have recently become saturated with many criminal and terrorist organizations entering into the drug trade, crime organizations are diversifying their illicit activities to other categories such as human trafficking. Beside the flexibility and adaptability of such organizations, one of the main causes which make criminal activities difficult to be eradicated is the

corruption of public officers and institutions as emphasized by a report of the United Nations Office on Drugs and Crime (UNODC, 2010).

In order to deploy enhanced measures again drugs and tobacco smuggling, it would be important to combine the results of the studies on crime organizations with innovative tools and methodologies for network analysis. In the last decades, powerful methodologies and models based on network analysis, have been increasingly used to study criminal networks devoted to drug smuggling. Some scholars (see Coles, 2001 among others) have argued that network analysis is employed very rarely to fight organized crime. This methodology is based on three main indicators to measure the importance of a crime organization. Local centrality is used to measure the number of contacts that a node (i.e. a single criminal or organization) has with other nodes. Global centrality measures the position occupied by a given individual within the entire network, while betweenness quantifies the number of links which pass through a certain individual or organization (Johansson and Borell, 1999). By applying such methodologies, the smuggling offenders active in Stockholm were studied by Heber (2009). It turned out that, in line with other studies, criminals are part of a very large crime network, with time limited links between the individuals and focusing only on limited types of smuggled substances.

The organization of two Italian drug trafficking mafia groups were studied by Calderoni (2012). The analysis has shown that the formal hierarchy, which is typical of mafia organizations, does not play a relevant role in the organization of drug trafficking. Indeed, the literature has frequently described drug markets as examples of "disorganized crime" where small, flexible and mutable networks with a limited number of individuals are most effective compared to traditional and rigid crime organizations (Eck and Gersh, 2000; Bouchard and Ouellet, 2011). In order to fight crime organizations involved in drug trafficking, Calderoni (2012) underlined the importance of methodologies based on social network analysis, which nevertheless need to be completed and integrated by using additional methods to detect hidden organizational features.

While the exiting studies in the literature mainly address drug consumption and the evolution of the drug market, this paper aims at highlighting some trends and features of the illegal tobacco and drug trafficking in Europe with a main focus on Italy. The results may constitute a useful starting point to understand the way in which crime groups are currently organizing the international tobacco and drug flows. Consequently, more effective measures and policies may be developed and enforced to fight crime and intercept the flow of these illegal substances.

This paper does not directly deal with the features of the crime organizations and groups related to illegal tobacco and drug trafficking. However, since the characteristics of the drug trafficking network normally match the structure of the crime organizations behind the illegal smuggling, a thorough knowledge of the most common drug routes used by international smugglers would definitely foster the analysis of features, strengths and weaknesses associated to crime groups. As a result, the methods, the policies and the legal framework to be implemented to fight crime could be more effective and efficient. In addition, customized security measures and new technologies (e.g. non-intrusive container inspection, electronic seals) could be designed and implemented, based on the evolution of the drug trafficking, to find a right balance between security and seamless freight and passenger transport.

3. Major smuggling episodes in the Italian multimodal logisticnetwork

3.1. Methodology

In this section we describe the methodology used to analyze the illegal trafficking episodes which have taken place in Italy from 2004 to 2014. The data set has been collected through the official website of the Italian custom office which registers all the illegal smuggling and trafficking related episodes that occur on a monthly basis.[1] For each episode a report is stored in the national database providing information about the location, the transportation mode, the intermodal infrastructure involved and the type of event. Moreover, in most cases, an economic estimation of the goods that have constituted smuggling or trafficking is provided. These data represent only a part of all smuggling activities referring exclusively to the amount/value of illegal substances confiscated by Custom authorities, which might represent only one part of the overall phenomenon. Nevertheless, considering this dataset as a fraction of all smuggling episodes, we can reasonably treat it as a good proxy of the evolution of tobacco and drug smuggling activities over 10 years.

For the majority of these illegal trafficking episodes some relevant information (e.g. the origin/destination of the shipment, the economic value and the volumes of the freight involved) are also provided by the Italian custom offices. In the cases where economic values or volumes were not explicitly mentioned in the report associated to a specific episode, these information have been indirectly derived from the dataset itself, on the basis of the average market price of the corresponding good in that specific year. First, for all types of smuggled goods and for every year, the associated average value per kg has been determined, based on all episodes referring to that specific substance, which has been seized in the corresponding year and for which both economic values and volumes are clearly quantified. Then, these rates have been used to calculate the monetary value and/or the weight to be attached to the seized substances whether weight and/or values were not explicitly mentioned.

A multi-level approach has then been adopted to study both the evolution and the geographical aspects of such smuggling phenomena.

3.2. Evolution of drug trafficking and contraband

As shown in Fig. 1, the number of smuggling episodes involving cigarettes are the prevalent type of occurrences in the freight transport, while the illegal trafficking of drugs accounts for the majority of episodes when passenger transport is considered. It is worth remarking once more, that the analysis carried out in this paper has been based on the confiscated volumes and thus just a fraction of the total amount of illegal smuggled substances passing thought the Italian multimodal transportation network is considered. When the freight volumes are taken into account, it emerges that cigarettes cover about 96% of the total smuggled goods (drugs represents only 2% of the total volumes). On the contrary, in the case of passenger transport, the shares of cigarettes and drugs is 62% and 32% respectively of the total volumes.

Focusing on drugs and cigarettes, which represent the categories of goods that are most smuggled, Figs. 2 and 3 show the evolution of their illegal trafficking over the last decade.

The volumes of cigarettes reached a peak in 2010 and then they significantly decreased. The volumes of

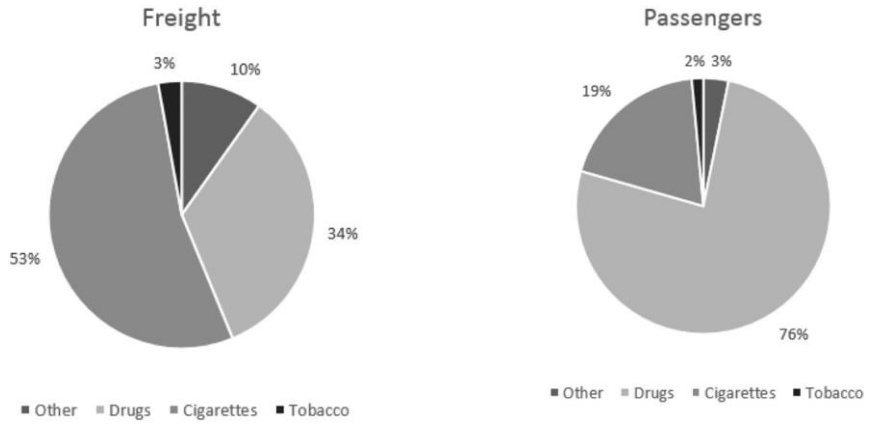

Fig. 1. Distribution of the number of episodes per type of transportation.

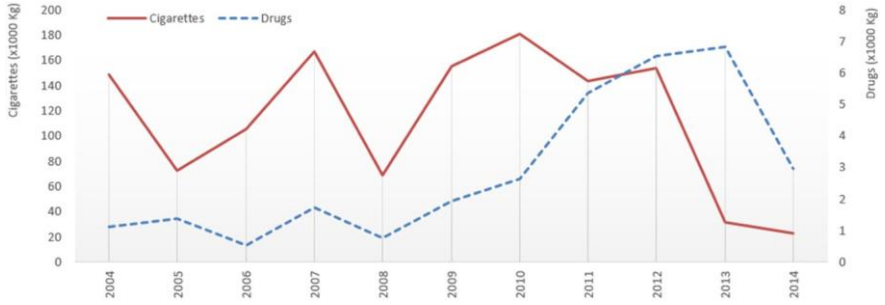

Fig. 2. Volumes of drugs and cigarettes smuggled from 2004 to 2014.

drugs consistently increased since 2006 with an average yearly growth of about 70% and then dropped in 2014. One reason may be the global crisis that has determined a significant decrease of the overall freight transport figures. In general, looking at the volumes of smuggled drugs and cigarettes their trends is quite similar. In the following figure the evolution of the smuggled goods in terms of value is shown.

When analyzing the average value for each unit of volume that has been discovered (Fig. 4), it can be observed that the evolution associated to cigarettes (around 218 €/kg in 2014 nearly 34% more than in 2004) has constantly grown by an average of 3% year by year.

With regard to drugs a decrease of 78% compared to 2004 (an average of 11% on a yearly basis) can be observed. Since the volumes of smuggled drugs is subject to a constant growth, the decrease in the average value per kg can be ascribed to a large increase of the shares of drugs with a lower value per kg such as marijuana.

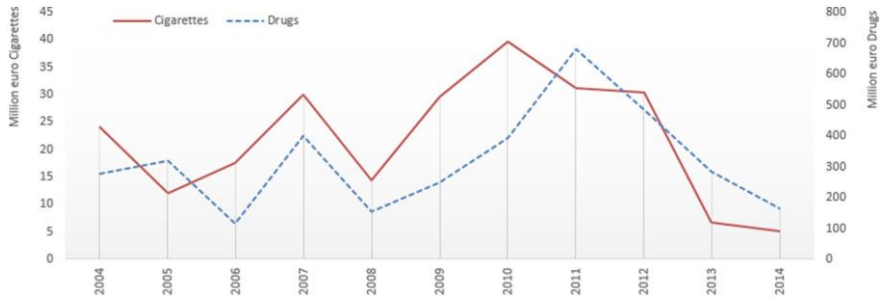

Fig. 3. Evolution of smuggled drugs and cigarettes in value.

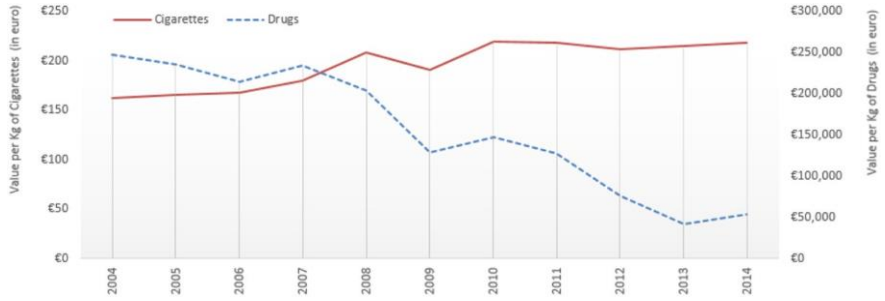

Fig. 4. Evolution of the average value per weight of drugs and cigarettes in the last decade.

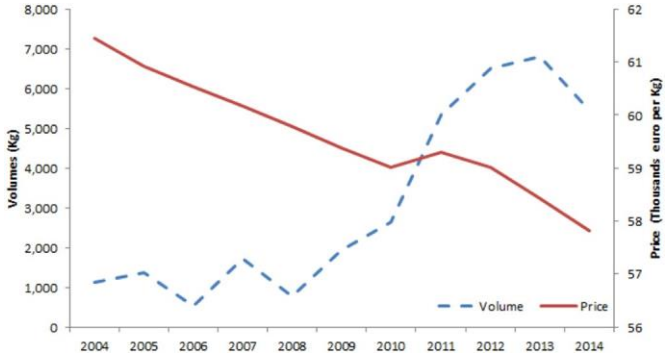

Fig. 5. Volume of drugs versus average prices.

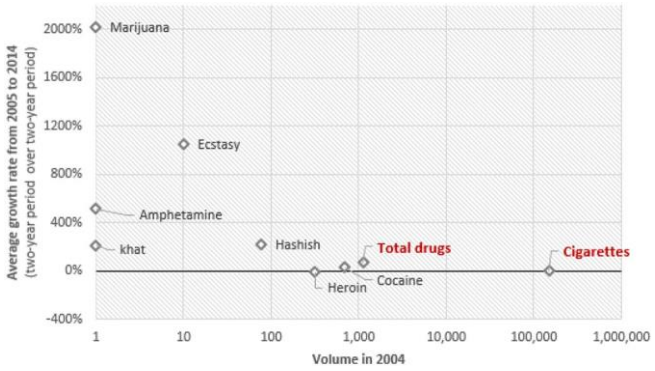

Fig. 6. Average growth of drugs and cigarettes between 2005 and 2014 vs logs of volumes in 2004.

In our sample, the illegal trafficking of cigarettes and tobacco does not appear to be strictly correlated to the increase of price. The volumes of drug substances represent an increasing trend over the sampled period despite the average price has been decreasing. In fact, a negative correlation (−0.77) between volumes and average drug prices can be observed. The diffusion of cheaper drug substances, which has been observed in the last years, probably characterized by a global economic crisis, lowered the average price of drugs, making them accessible to a larger number of users (see Fig. 5). It is worth mentioning the negative correlation between the smuggled quantities and the price of cocaine. In particular, cocaine is facing an increasing smuggling trend despite a reduction of the average price per kilogram. A similar negative correlation between price and volume is registered for heroine. However, in this case, it can be observed a significant decrease in the illegal trafficking of this substance in spite of increasing average prices year over year, between 2004 and 2014. With regard to marijuana a positive correlation (0.88) between volumes and prices can be highlighted.

Table 1 intercepted traffic of illegal substances in kilograms.

Substance	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Marijuana	0	20	5	11	0	842	1	2546	4208	4363	3734	15,731
Cocaine	694	1196	205	1180	589	979	2526	2587	2087	1154	1372	14,571
khat	0	100	2	144	76	0	0	81	89	1056	170	1717
Heroin	318	43	321	377	93	91	110	67	93	131	39	1682
Hashish	77	5	0	1	2	7	9	55	23	95	119	394
Psychotropic	27	0	0	0	0	0	0	0	0	0	0	27
Ecstasy	10	0	0	1	0	0	0	0	2	8	0	21
Ketamine	0	0	1	0	0	15	0	0	0	0	0	16
Amphetamine	0	0	0	0	0	2	0	0	12	0	0	14
Others drugs	0	0	0	0	0	0	2	6	2	0	9	19
Total drugs	1126	1364	535	1714	761	1935	2648	5342	6516	6807	5444	34,193
Cigarettes	148,546	72,739	105,351	166,776	68,655	155,277	180,667	143,074	153,925	31,347	46,143	1,272,500

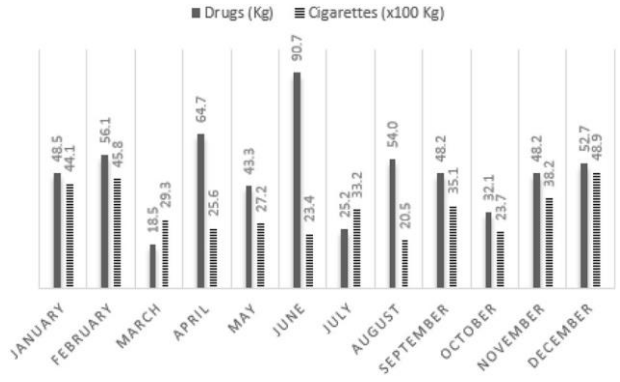

Fig. 7. Distribution of the average smuggled volumes over the year.

A dispersion diagram, reported in Fig. 6, shows for each substance the average growth rate between 2005 and 2014 in relationship with the seized volumes in 2004, which are reported in the horizontal axis of the diagram. For each seized substance, the growth rate between 2005 and 2014 has been measured by averaging all progression rates in consecutive periods of two years (i.e. averaging all values starting from the growth rate between the years 2007–2008 and 2005–2006 until the evolution rate between the time intervals 2013–2014 and 2011–2012). By analyzing Fig. 6 it is possible to note that the illegal trafficking of drugs and cigarettes through the Italian transportation network is shifting from the traditional smuggled goods such as cigarettes, cocaine and heroin to new and cheaper drugs which are growing at a significant pace. As it can be observed from the dispersion diagram, cigarettes, cocaine and heroin, which have been the main smuggled drugs for a long time, are facing a negative trend, while other substances such as ecstasy, amphetamine and marijuana are growing at a significant pace.

However, it should be highlighted that volumes of these relatively new synthetic drugs (i.e. ecstasy, amphetamine) in absolute terms are still lower than the traditional drug categories (see Table 1 for further details).

In Fig. 7, the seasonality of the illegal smuggling activities is analyzed. It can be observed that the peak of the illegal activities, when considering the average volumes of cigarettes, is constituted by the period between December and February. The opposite holds for drugs for which the highest average volumes are on average registered in June.

In Table 2, the main differences between the transport modes that traffickers normally adopt to transport illegal substances are highlighted. It should be mentioned that Italy constitutes a natural hub in relation to worldwide freight flows directed to (or originating from) Europe. The southern Italian ports (e.g. Gioia Tauro, Taranto), are located along the Suez-Gibraltar axis, and are specialized in transshipment, while the northern Italian ports (e.g. Genoa, Trieste) operate as gateways to the largest European markets and the main industrial districts.

Table 2
Modal split by number of episodes.

Transportation Mode	Freight		Passenger	
	Drugs	Cigarettes	Drugs	Cigarettes
Air	18.71%	0.82%	65.85%	42.36%
Sea	79.35%	97.13%	21.08%	54.17%
Rail	0.00%	0.00%	1.74%	0.00%
Road	1.94%	2.05%	11.32%	3.47%
Total Episodes	155	257	574	155

Table 3 number o
involved logistic i

Logistic node/arc	Freight		Passenger	
	Drugs	Cigarettes	Drugs	Cigarettes
Airport	4.80%	0.06%	82.13%	24.90%
Intermodal Hub	0.00%	0.00%	0.00%	0.00%
Port	95.13%	99.79%	16.55%	72.73%
Rail station	0.00%	0.00%	0.16%	0.00%
Road Customs	0.06%	0.15%	1.16%	2.37%

These aspects are reflected in the smuggling episodes given that cigarettes, looking at volume in absolute terms, are mainly carried by sea mode for both freight and passenger transport. Conversely, drugs are in general smuggled by sea when considering freight transport, but mainly by air for passenger transportation. As discussed in Talarico and Zamparini (2016), the majority of all freight are generally moved from harbors to subsequent destinations through surface transport, in case of domestic destinations, via sea in case of international destinations and, in minor part, by rail to reach neighboring countries (mainly Austria, Switzerland and France) through the Alps. For the sake of simplicity, in the remainder of the paper, if not expressly mentioned, the focus will be mainly on freight transport.

In Table 3 the distribution of the episodes by logistic node is reported. As it can be observed, ports are the most vulnerable logistic node where the highest number of episodes for both cigarettes and drugs are detected, while airports are the most preferred gateway of international drug traffickers or drug "mules" (which often use their body as a "container"), when considering passenger transport.

This result is in line with the values assessed by the United Nations Conference on Trade and Development which estimates that over 80% of the overall world trade through the world is done by sea (Taylor and Smith, 2007). Moreover, as also underlined by van de Voort and
O'Brien (2003), approximately 90% of all cargo is shipped in containers.[2]

Since the Italian shipping system is a complex and critical infrastructure for the drug and cigarettes trafficking, it poses several challenges from a security point of view. Despite its vulnerability, according to a

research study on freight by Dal Savio and Dari (2012), only 5% of all containers imported via sea to Italy were subject to document checks in 2010 (the EU average in the same period is 14%), while physical inspections were performed on average in 9.4% of cases (6.5% in EU). Concerning the exports on average in the 27 EU countries physical checks are carried out in 2.8% of cases, while in Italy this value is equal to 2.1% (Agenzia delle Dogane, 2011).

It is worth noticing that these percentages might vary depending on the port terminal, the type of flow (import, export, transshipment) and the origin/destination of the containers. With regard to freight, some interesting statistics per harbor are provided in a report by Dal Savio and Dari (2012). Visual checks on imports might vary from port to port (e.g. 5% of the total flows are checked in Livorno, 13% in Venice and 20% in Naples). These values are much lower when considering the export flows: 7% of these flows is designated to undergo documental checks, while 1% is subject to physical inspections in La Spezia. The amount of the scanned checks might be even lower depending on the logistic facility.

Focusing on passenger transport by sea, depending on the harbor and the security plan in place (based on the level of terrorism threat), the type of controls can vary from identity check, luggage inspection, vehicle check, on board inspections, monitoring of the transiting areas and docks. These checks might also involve the use of metal detectors for passengers and X-ray scans for luggage. The Italian ministry of transport has recommended to check 25% of all passengers in normal periods and 50% in case of more severe alert levels (Ministero delle Infrastrutture e dei Trasporti, 2012).

With reference to drug smuggling, Fig. 8 shows a significant positive trend for maritime transportation (by containers or by accompanied transport), while the air transport system seems to face a major decline probably due to improved and more effective preventive measures (i.e. body scanner and X-ray scan), implemented after the 9/11 and subsequent terrorist incidents, aimed at detecting weapons and illegal substances passing through the airport. The security checks performed on every single unit of cargo and/or passenger appear to work as an effective deterrent. On the other hand, as it was mentioned before, since only limited security checks are usually performed in the Italian harbors, the chances to transport illegal substances by sea without being detected is higher. For example, the Italian Custom authority evaluates that the amount of drug which is currently seized in Gioia Tauro harbor represents only 10% of the total cocaine smuggled via this node, with a number of scanned inspections in 2014 of about 0.2% of the total amount of containers transiting thought this logistic facility (about 3 millions of container a year). Therefore, a higher amount of resources devoted to increase the level of security check, may most likely determine an increase of the detected illicit substances.

However, one should bear in mind that the link between security checks and smuggling detection is not so straightforward. As it was also mentioned by the vice president of the Italian shippers, the outcome of the anti-smuggling activities cannot be measured only by the number of containers undergoing physical and/or scan inspections, but rather on the overall set of anti-smuggling activities and on the investigative analyses in place that may also include risk analyses performed by the Customs Authority (The Medi Telegraph, 2016).

4. Geographical analysis of smuggled goods in Italy

The definition of regions and sub-regions proposed by the United Nations has been adopted in the remainder of the study to perform a geographical analysis of the illegal tobacco and drugs trafficking. As

shown in Fig. 9, Southern Europe represents the origin of the majority (51.07%) of drug volumes reaching or passing by Italy, with Albania and Greece representing the crossroad of these illegal routes. These two European countries detain a share of the overall Southern European drugs trafficking volumes of 53% and 37% respectively.

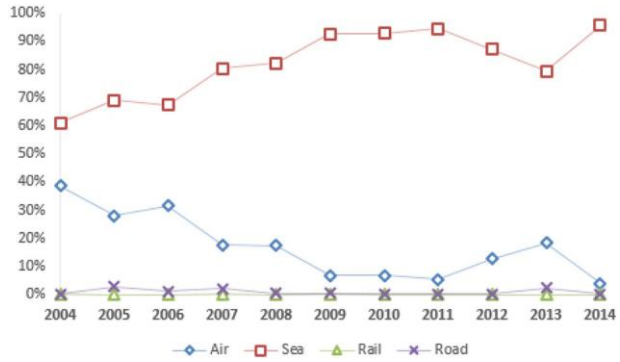

Fig. 8. Evolution of the modal split for drugs transportation by volumes.

Fig. 9. Origin of drugs in volumes per macro areas.

In Fig. 10, the percentage volumes of the drug trafficking activities having an origin from a European country is shown. With regard to the intra country drug trafficking, Italy accounts for about 1% of the total Southern European volumes.

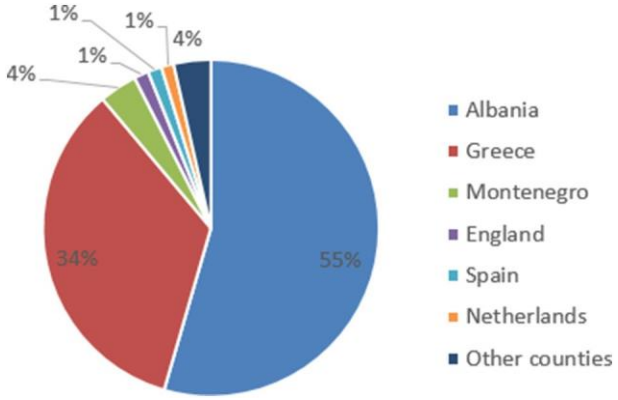

Fig. 10. Major European countries where the illegal trafficking of drugs is originated.

When the illegal trafficking of cigarettes is taken into account, it should be noticed that about 45% of the total volumes originate from Southern Europe, 25% from Eastern Asia and 15% from Western Asia as shown in Fig. 11.

Focusing on the major European countries, Greece represents the main gateway for the illegal trafficking of cigarettes as displayed in Fig. 12.

It is possible to further consider the Italian multimodal infrastructure by analyzing the logistic nodes that are mainly interested by the illegal smuggling of drugs and cigarettes. Focusing on the number of episodes in which drug substances have been discovered by the Italian customs, the highest drug volumes have been detected in the logistics nodes located in Apulia and Calabria regions (Southern Italy) which respectively hold 33% and 17% of the total volumes and in the Marche region (Central Italy) that has a share of 12% of the total volumes.

Fig. 11. Origin of the trafficking of cigarettes per

volumes. As shown in Fig. 13, the majority of the drug volumes are transported by sea either by means of containers as in the Gioia Tauro port in Calabria (that is one of the most important transshipment harbors in the Mediterranean sea) or by trucks leveraging the intermododality in the ports of Ancona (Marche region), Bari and Brindisi (both located in Apulia region).

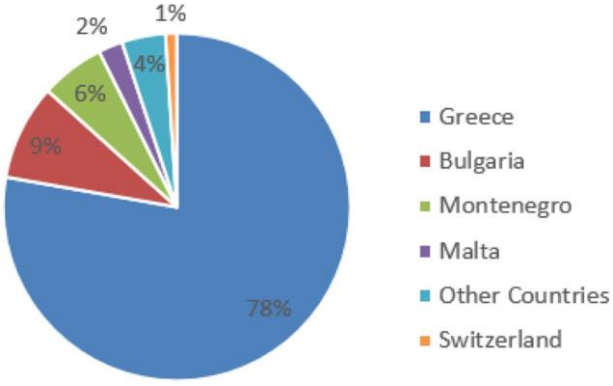

Fig. 12. Major European countries where the illegal trafficking of cigarettes is originated.

When analyzing the illegal trafficking of drugs in terms of value, the harbor of Gioia Tauro represents the most critical gateway with about 38% of the total value of drugs detected in Italy (see Fig. 14). The reason behind this negative result can be partially justified by the use of the sea transport mode, which, as mentioned before, represents the preferred one by smugglers, and by the higher value of the illegal substances that are detected in this port (mainly cocaine). Other important gateways associated to the illegal trafficking of drugs are represented by the Fiumicino – Leonardo Da Vinci airport in Rome and by the harbor of La Spezia in Liguria (Northern Italy).

Since Gioia Tauro handles about one third of the containers arriving in Italy, it is not surprising that a higher number of containers containing illicit substances are seized. It is worth mentioning that inspection operations are more complex in such facility due to the significant influence of crime groups. In fact, several investigations conducted by the Italian police have shown the position of absolute supremacy of the 'ndrangheta in the international traffic of drugs proving how easily this powerful mafia organization can access and control the port of Gioia Tauro for its illicit traffics (Gratteri and Nicaso, 2010). Between June 2012 and July 2013 nearly half of all the cocaine confiscated by the Italian Customs was intercepted in this harbor (ItaliaOggi, 2014).

Some confidential documents of the American Embassy in Italy published by WikiLeaks highlight that to overcome the security checks in place in the harbor of Gioia Tauro it is believed that the drug trade can be done only with the assistance and complicity of corrupt personnel (WikiLeaks, 2009). For this reason, always according to WikiLeaks, after the 9/11, Gioia Tauro harbor has been added in a black list from the US authorities. To deal with increased levels of security threats, several initiatives have been launched such as the Container Security Initiative (CSI) and Megaport increasing the level of security controls and container inspections for all containers moving to US involving both Italian customs officers and US authorities. In 2008 more than 19,000 and 40,000 containers were moved from Naples and Gioia Tauro harbors respectively to US. Thanks to the CSI and Megaport initiatives about 85% of these containers have been jointly inspected (Maurizi, 2014).

Considering the illegal smuggling of cigarettes, the logistic nodes that are most interested are the harbor of Ancona (31% of total volumes), the port of Gioia Tauro (28%) and three harbors located in Apulia Bari (7%), Brindisi (5%) and Taranto (5%). The smuggled cigarettes in the harbors of Gioia Tauro and Taranto are mainly hidden inside containers, while in the harbors of Ancona, Bari and Brindisi the illegal content is normally carried inside trucks which are embarked on ships that connect Italy with Greece and Albania. Due to the standard type of goods, in the case of cigarettes, a similar situation is found when analyzing the values of the illegal trafficking. (See Fig. 15.)

5. Conclusions

The protection of society from crime/terrorism and the fight against illegal trafficking in people, drugs and counterfeit goods are among the main priorities for governments, national and international organizations. This paper has analyzed the Italian logistic multimodal network with respect to the smuggling of illegal substances such as drugs and cigarettes. The evolutions of the transportation modes used by traffickers over the last decade might be used to analyze the effectiveness of the measures adopted by Custom offices to prevent and detect such illegal trafficking.

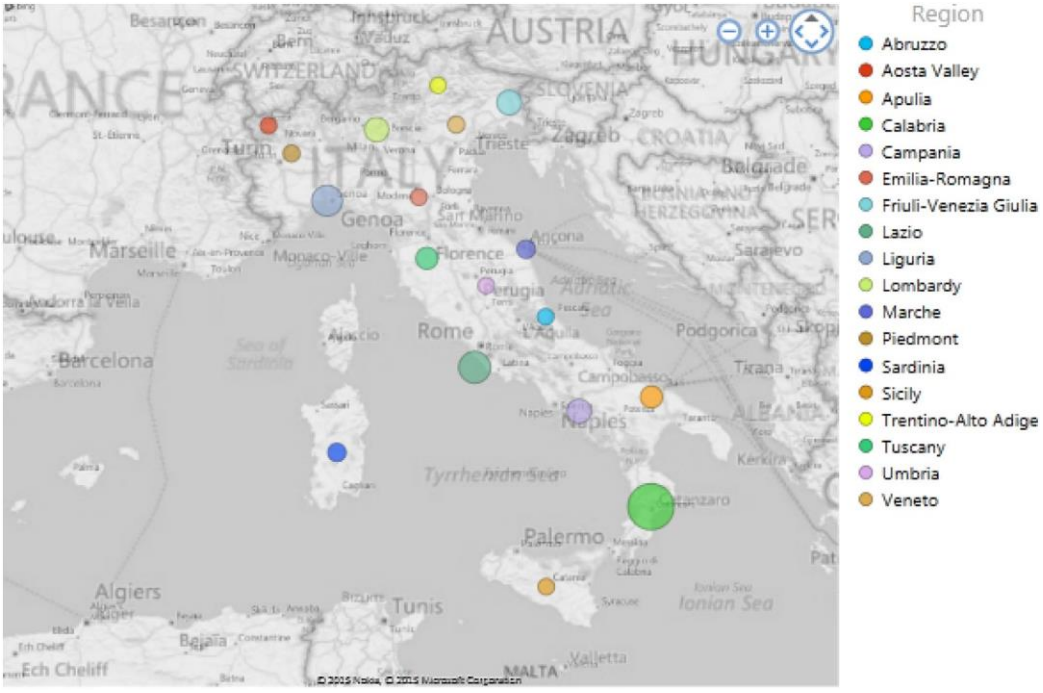

Fig. 13. Distribution of the drug trafficking per volumes among the Italian region.

Fig. 14. Distribution of the drug trafficking per value among the Italian region.

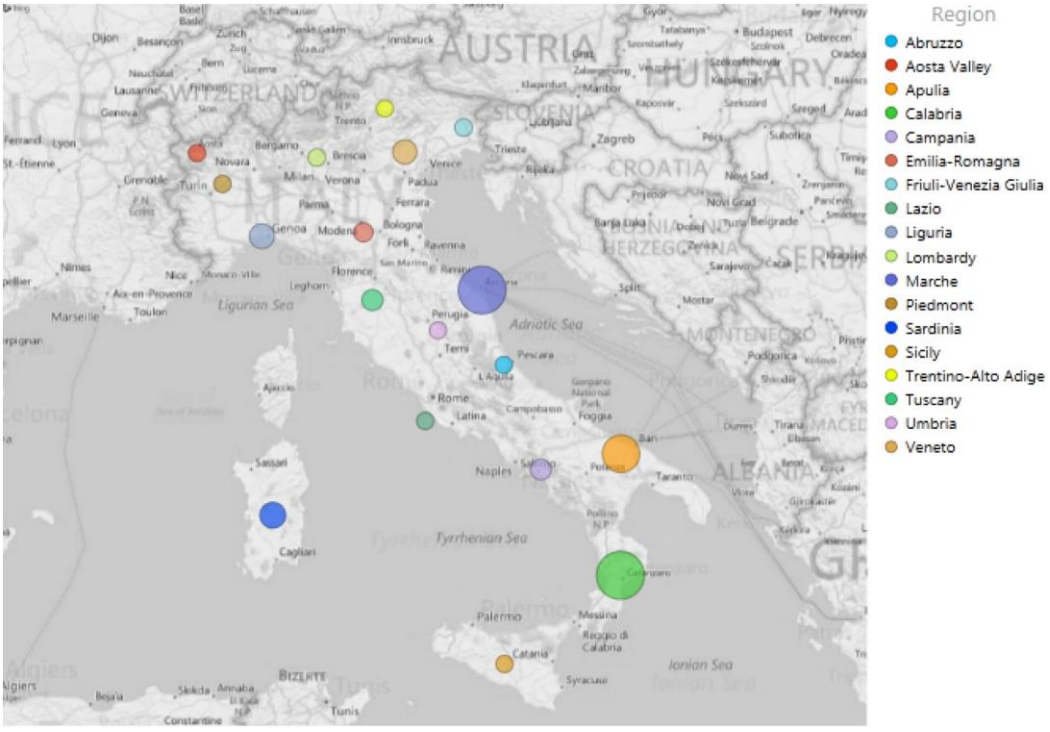

Fig. 15. Distribution of the trafficking of cigarettes per value among the Italian region.

A thorough geographical analysis, based on the volumes of cigarettes/drug which have been confiscated by the Italian authorities, showed that the flows of such illegal trafficking are mainly originating from Southern Europe (mostly from Greece and Albania with regard to both cigarettes and drugs), South America (with respect to drugs) and Easter Asia or Western Asia (when considering cigarettes). For this reason, the majority of episodes of illegal smuggling are reported by the harbors located to the southern Italy intercepting the international flows thought the

Adriatic Sea or entering the Mediterranean

Sea passing by either the Strait of Gibraltar or the Suez Canal.

Due to the geography of Italy, with a coastline of about 7600 km, harbors represent the main gateway for freight transport. Therefore, these logistic nodes are the critical entry points of illegal substances which deserve more security efforts to increase the effectiveness and the efficacy of the procedures adopted to process and control the inbound and outbound flows increasing at the same time the overall competitiveness of the Italian logistic network.

Focusing on freight moving via containers trough the Italian harbors, the inspection activities are currently performed following a layers approach with four types of checks. Based on Customs documents, freight is directed to different control channels in relation to the risk profiles that may be associated to one or more elements of the declaration (e.g. origin, country of origin, goods, packaging, tax treatment):1) red channel - documentary and physical inspection of good; 2) orange channel - documentary check and verification by using (X-rays) scanners of vehicles and containers; 3) yellow channel - documentary check of the declaration and the accompanying documentation; 4) green channel - automated control (Ministero delle Infrastrutture e dei Trasporti, 2012).

Risk profiles are constantly updated by performing a risk analysis which considers both objective factors (type of goods, origin/destination of the shipment, tax treatment) and subjective elements concerning for instance the history of the economic operator, resulting from the Anti-Fraud Database (which contains all the administrative and criminal violations found by the Offices of Customs) or reported by OLAF, government authorities, police forces, and so on. All this information need to be constantly updated via a

continuous activity of intelligence by assessing new trends and changes in the illicit traffic flows. Another added value might come from sharing information in real time and ensuring, at the same time, high security standards.

Integrated IT systems might significantly enhance the risk analysis process by gathering data and information coming from most recent flow analysis and numerous national, European and international databases. A cyclical process of evaluation/correction of the risk profiles in relation to the findings of previous audit activities can definitely improve the detection system. Therefore by means of a self-learning process it is possible to increase the effectiveness and the selectivity of security controls, progressively reducing the quantity and the time needed for the inspection activities with significant costs savings.

Moreover, as also mentioned in Section 2 a better understanding of the geographical flows as well as the application of methods based on network analysis, Data Mining and Artificial Intelligence might produce substantial results in detecting the structure of the crime organizations involved in illicit drug/cigarette traffics. Technological innovations represent thus a strategic factor to fight against international smugglers which require an intensification of the level of data/information on inbound/outbound flows stored in a digital form.

It is also important to highlight that the enhanced airport security due to terrorism threats seems to have drastically reduced the illegal substances that are smuggled using this transport mode. This might also have led to a redistribution of the illegal flows via other, less strictly controlled channels (e.g. sea). Since the maritime logistic nodes in the Southern Italy represent a gateway to the rest of the country where freight is moved by other transport modes (especially trucks), effective control operations performed at the harbors and/or a multi-layers control structure such as an integrated freight tracking system, could lead to an improved efficiency in detecting illegal substances.

Moreover, it is important to notice that for some illegal drugs (cocaine and heroin) there appears to be a negative correlation between price and quantity smuggled (detected) while for others (i.e. marijuana) the correlation is positive. This is most probably due to illegal market incentives.

Lastly, the analysis of the trends and networks/transport modes used by international traffickers to illegally smuggle drugs and cigarettes may be an interesting starting point to implement policies to counter these phenomena. A tighter collaboration with the Custom offices of the origin/destination countries could also significantly improve the efficiency and the effectiveness of the methods and techniques used to detect illegal goods by the Custom office in Italy and to fight criminal organizations.

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