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a cluster analysis approach = Stavovi javnosti o sivom tržištu
duhanskih proizvoda u zemljama zapadnog Balkana

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Public opinion on tobacco gray market in the Western Balkans: A cluster analysis approach

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Public opinion on tobacco gray market in the Western Balkans:
A cluster analysis approach

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Contents

	Abstract	5
1	Introduction	7
2	Balkan illegal tobacco trade – background	8
3	Literature review	11
4	Data and methodology	14
5	Results and discussion	16
6	Conclusions	22
	References	23

Public opinion on tobacco gray market in the Western Balkans: A cluster analysis approach

Abstract:

Attitudinal studies about gray market of tobacco products are in particular scarce for countries along the Balkan route that has been known as smuggling corridor for centuries. This empirical study fills the gap by using a large survey dataset of 21,000 citizens in seven Western Balkan countries: Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, Kosovo. The analyses of public opinion on tobacco gray market in the Western Balkans distinguishes smokers and non-smokers, includes a set of individual socio-demographic attributes (gender, age, level of education, occupation, income), and an indicator of the importance of the tobacco sector for the national economy. Citizens are grouped into four distinct clusters based on their attitudes towards tobacco gray market. The typology of citizens in the region reveals that public opinion differs primarily depending on whether an individual is a smoker or not. The most repressive attitudes and opinion that curbing gray tobacco market will reduce smoking come from non-smokers and from citizens of countries that have no comparative advantages in tobacco trade. The results showed the level of public awareness on the negative aspects of tobacco gray market. Finally, the analysis pointed out whether stricter sanctions were rated as appropriate actions to curb the gray market of tobacco, cigarettes and other tobacco products.

Keywords: attitudes, tobacco trade, gray market, Western Balkans

JEL classification: K42, L66

Stavovi javnosti o sivom tržištu duhanskih proizvoda u zemljama zapadnog Balkana: klaster analiza

Sažetak:

Istraživanja stavova o sivom tržištu duhana i duhanskih proizvoda razmjerno su rijetka, a posebice ih manjka za zemlje na balkanskoj krijumčarskoj ruti. Ovo istraživanje doprinosi empirijskoj literaturi u tom području jer koristi anketne podatke 21.000 građana u sedam zemlja zapadnog Balkana: Sloveniji, Hrvatskoj, Bosni i Hercegovini, Srbiji, Crnoj Gori, Sjevernoj Makedoniji i Kosovu. Analiza stavova javnosti o sivom tržištu duhana i duhanskih proizvoda na zapadnom Balkanu razlikuje pušače od nepušača i uključuje niz socio-demografskih obilježja ispitanika (spol, dob, obrazovanje, zanimanje i radni status, prihode) te je pokazatelj važnosti duhanskog sektora za nacionalno gospodarstvo. Građani su grupirani u četiri klastera ovisno o njihovim stavovima prema sivom tržištu duhana i duhanskih proizvoda. Tipologija građana regije pokazuje da se stavovi javnosti prvenstveno razlikuju ovisno je li ispitanik pušač ili ne. Stavovi o nužnosti oštrijih sankcija i suzbijanju sivog tržišta čime će se smanjiti raširenost pušenja izraženi su kod nepušača i građana zemalja koje nemaju komparativne prednosti u trgovini duhanom i duhanskim proizvodima. Rezultati su pokazali da postoji određena razina osviještenosti o negativnim aspektima sivog tržišta duhana i duhanskih proizvoda. Naposljetku, analiza je pokazala ocjenjuje li javnost strože sankcije primjerenim mjerama suzbijanja sivog tržišta duhana, cigareta i drugih duhanskih proizvoda.

Ključne riječi: stavovi, trgovina duhanom i duhanskim proizvodima, sivo tržište, zapadni Balkan

JEL klasifikacija: K42, L66

1 Introduction¹

Illicit tobacco trade is a global problem. It is estimated that one out of nine cigarettes worldwide (11.6 percent) is illicit and this share is a bit higher in low-income countries (Joossens and Raw, 2012). Discrepancies in tobacco product prices, due to the different taxation policies, are the “initial stimulus” for smuggling, but criminal networks, corruption or existing conflict zones without border control are fertile ground for illicit tobacco trade, and the Balkans stand here as historical smuggling route. The Western Balkans region, which is situated at the south part of the EU and its periphery, permanently struggles with illicit tobacco trade. The size of the gray market varies among countries, from about 3 percent in Slovenia to 28 percent in Montenegro (Recher, 2019).

Reports on attitudes of Europeans toward tobacco reveal changing trends in an increasing consumption of the young, and a visible gap in tobacco consumption between northern and southern European countries. The highest smoking prevalence in the EU is observed in three Balkan states (Greece, Bulgaria, and Croatia) and France (European Commission, 2017). Estimates on the scale of the illicit cigarette market in the EU, Norway and Switzerland amount to 9 percent of the total consumption (KPMG, 2016). The same study reports on the social acceptability of cigarette smuggling, and on the loss of state revenues as the biggest problem perceived by consumers related to illicit cigarette trade. Cross-border illegal trade is driven by price differences and the report briefly explains that unemployment and other socio-economic reasons might as well stand behind the illegal market developments. The Eurobarometer survey estimates that the penetration of black market of cigarettes is on average 19 percent in 28 EU member states (European Commission, 2016). The main reason for buying at the gray market is price. The outstanding issue connected with tobacco gray market for Europeans are again tax revenue losses, and only 14 percent of respondents think it is a source of revenue for organized crime. Among the majority of European citizens who are in favor of enforced tobacco control policies, women and older citizens prevail.

There are studies on socio-economic predictors of smoking prevalence and attitudinal studies of smoking prevalence and tobacco control (e.g. Bempong, 2017; Adkison et al., 2015), but there is no research on socio-economic characteristics describing attitudes towards tobacco gray market. Attitudes are crucial for both anti-smoking campaigns and for fighting illegal tobacco trade. If de-normalization of smoking brings lower smoking prevalence (Burton et al., 2015), it is reasonable to assume that building negative opinion on tobacco gray market would help curbing illegal tobacco trade.

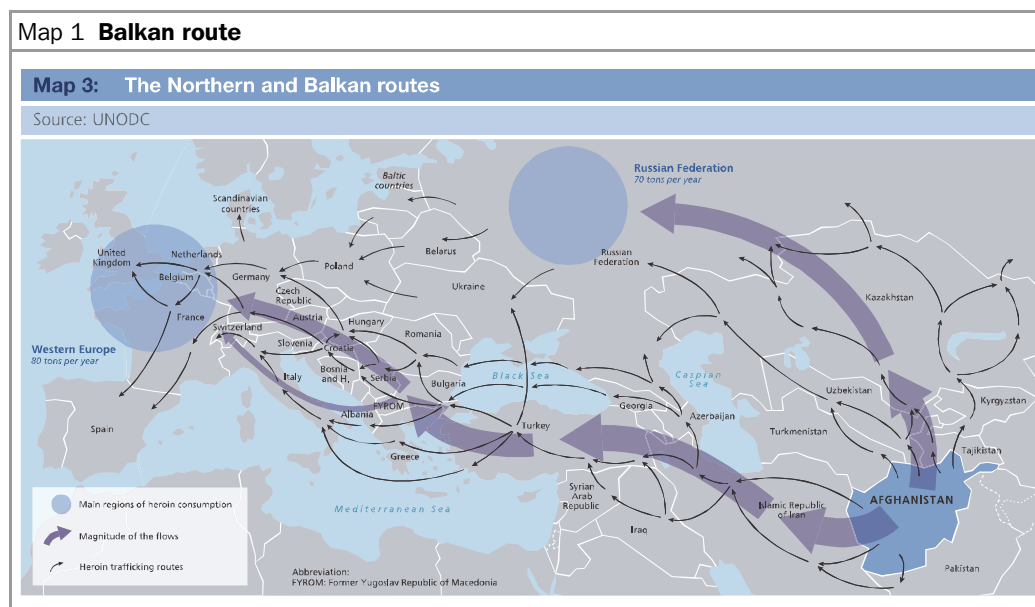
¹ This paper is part of the research project “Illegal Trade of Tobacco Products: Smuggling as Experienced along the Balkan Route – BalkanSmugg”, funded by PMI IMPACT – a global grant initiative by Philip Morris International (“PMI”) to support projects dedicated to fighting illegal trade and related crimes. In conducting their research, the authors maintained full independence from PMI. Views and opinions expressed in this document are those of the authors and do not necessarily reflect the views of PMI.

The objective of this research is to capture the opinion of citizens in the Western Balkan countries, distinguishing the smoking from the non-smoking population. Additional research question is if citizens can be clustered into distinct clusters based on their attitudes towards tobacco gray market. If so, are there differences in these clusters based on demographics and/or comparative advantages in tobacco trade of their respective countries? The results will shed light on the public awareness of the negative aspects of tobacco gray market. Finally, the analysis will point out whether stricter sanctions are rated as appropriate actions to curb the gray market of tobacco, cigarettes and other tobacco products.

In order to better understand the research topic, the context of Balkan illegal tobacco trade is first explained, followed by the relevant literature review on similar tobacco consumption and trade studies on individual socio-demographic characteristics and attitudes. Data and methodology are explained in detail in section four, while the results are discussed in section five. The last section concludes with findings, offering policy recommendations and outlining future research.

2 Balkan illegal tobacco trade – background

The Balkan route has long been infamous as a passage along which illegal goods and immigrants are smuggled into Western Europe. It has mainly been known for drug trafficking, most notably heroin produced in Afghanistan for the West European market. The original route passes from Afghanistan through Pakistan or Iran, Turkey, Bulgaria, North Macedonia or Serbia, Bosnia and Herzegovina, Croatia, Slovenia, and into Italy and Western Europe (Map 1).



Source: UNODC, 2010.

Organized crime has long plagued the Balkan region, having gained a foothold during communism and the 1990s conflicts. Facilitated by corruption, the Balkan route has turned the region into a transit zone for illegal transactions of goods or traffickers of drugs, illegal migrants and other persons involved in crime, evasion of taxes and customs duties, deceptions and frauds, smuggling of high rated goods like tobacco and cigarettes, and money laundry (Foster, 2012). Contraband trade, including illicit trade with cigarettes and tobacco have a long history since the Ottoman and Austro-Hungarian empires which had established tobacco trade monopolies, and this in turn boosted smuggling of cigarettes (Hojić, 2004).

The trade in cigarettes at the gray market flourished during the time of conflict – being a common method of funding the war in the Balkan countries – and continues to maintain a large presence in the region. War-induced economic sanctions imposed on Serbia and Montenegro and an embargo stimulated smuggling (Andreas, 2004). This form of smuggling is often done through crime groups or with the consent of a legal manufacturer (Hojić, 2004). Griffiths (2004) wrote about tobacco smuggling in Bosnia and Herzegovina after the Dayton Peace Agreement was signed in 1995 and how smuggling channels to the European Union originated in Montenegro. Close ties of local politicians with smuggling groups dating from the times of the war and other organized crime actors made illegal smuggling in the Balkan region flourish at the end of the last century (Hajdinjak, 2002). Organized crime networks in the Western Balkans are focused on drug smuggling, money laundering, smuggling of stolen vehicles, human trafficking and cigarette smuggling (Stojarová, 2007).

UNODC (2011) points out that during transition from communism to democracy ties were created between criminal underworld and the social elite. Dating from the time of communism, black market smuggling was tolerated to supply consumer demands not met by traditional economy. Accordingly, corrupt border officials were also important in the unhindered operation of the black market. In countries such as the former Yugoslavia, Bulgaria, and Romania, it was often the case that smuggling routes and black market operations were encouraged by the ruling government, and controlled by criminal organizations (Kaplan, 2009). As a result, with the fall of communism and the emergence of privatization, many former policemen with criminal ties were in a privileged position to create a local monopoly of the black market, while still maintaining their political associations. The forms and corridors of illegal trade in the Balkan region might have changed in the last decade or two, however, corruption is considered the major social problem in all countries in the region (Transparency International, 2016; UNODC, 2011). As countries in the Western Balkan region are either members of the European Union or at the EU periphery, border control (Kos, 2013) and suppressing illegal activities have intensified in the last decade.

Exact figures on illicit tobacco trade are not known. Upsetting estimates on the scale of illegal tobacco trade are about 600 billion cigarettes illegally manufactured or smuggled worldwide per year which equals one out of every ten packs. The same statistics hold true for the EU28 countries where illicit trade of counterfeit and contraband cigarettes (C&C) accounts for 9.8 percent of total cigarette consumption (KPMG, 2016). The same source estimates that about 8 percent of total cigarette consumption in Slovenia are C&C, mostly coming from Bosnia and Herzegovina (B&H). B&H and Serbia are two of the main suppliers of C&C for Croatia, another EU country included in the SUN Project (KPMG, 2016) where C&C account for 4.3 percent of cigarette consumption and have drastically declined due to the increased consumption of cut tobacco. Croatia, as a maritime country, is also an entering port for illicit whites. The World Health Organization says that one in three cigarettes in B&H is illegal. Comparable statistics for other countries on the Western Balkan route are not available; however, the media report daily on the seizure of smuggled tobacco in the region. Official customs statistics² confirm the anecdotal evidence that the gray market of tobacco products is an important channel of supplying cigarettes and other tobacco products in the Balkan region.

Calderoni et al. (2016) focused on the Eastern Balkan hub for illicit cigarettes. They highlighted that Bulgaria is the most relevant country in the hub because it has significant inflows and outflows of illicit tobacco products. The surrounding countries (Greece, North Macedonia, Romania, Serbia and Turkey) are included because they enable and facilitate these flows. Most countries in the Eastern Balkan hub recorded high levels of illicit trade in tobacco products (ITTP) in 2014 (Calderoni et al, 2016; KPMG, 2015; Euromonitor International, 2015). Bulgaria ranked fifth out of 28 EU countries for ITTP penetration in 2014 (18.5 percent of the total consumption) (KPMG, 2015). Greece and Turkey are above Bulgaria, with 20.6 percent and 19.0 percent of ITTP share, respectively. Romania and Bosnia and Herzegovina follow Bulgaria at 15.6 percent and 14.2 percent, correspondingly. Serbia and North Macedonia have the lowest illicit trade of tobacco products penetration of the hub, with 11.7 percent and 5.2 percent, respectively. Between 2007 and 2014, the ITTP in the Eastern Balkan hub increased in almost all countries. This rise may be mainly related to price and tax increases (e.g., Bulgaria, Turkey, Romania and Greece) or to the increase in illicit production within a country (e.g., Serbia) (Euromonitor International, 2015). The only country that registered a decrease in the ITTP in that period is North Macedonia. The main reason behind North Macedonia's improvement was the government strategy to fight illicit trade and counterfeit tobacco distribution (Euromonitor International, 2015). Systematic empirical research on illicit tobacco trade for Western Balkan countries has not been conducted. However, apart from several studies for individual countries which mostly deal with tobacco production (Varga et al., 2012;

² See for example the official statistics of the Croatian customs authorities, <https://carina.gov.hr/UserDocsImages//6364//Godi%C5%A1nje%20izvje%C5%A1%C4%87e%20o%20radu%202018.pdf>

Beljo et al, 2016), tobacco trade was explored as a part of trading of agricultural products between countries from the Balkan region (Peshevski et al., 2013).

To combat the illegal trade at the gray tobacco market, general perceptions and attitudes towards illicit activities matter. Negative public opinion on the gray market could be used by governments and policy makers in enforcing stricter regulations and sanctions for illicit tobacco trade. If citizens are not aware of the negative effects of tobacco gray market or even feel somewhat empathetic about dealers, it would be much more difficult to fight illegal tobacco trade. We assume that the tradition of tobacco leaf growing and production of unmanufactured tobacco, as well as production of manufactured tobacco products in the region, make the general public aware of the role that the tobacco sector plays in their national economies.

Assessing citizens' opinions on tobacco gray market and related socio-demographic characteristics of individuals seems to be a missing link to better understand the patterns of present practices at the gray tobacco market in the Western Balkans.

3 Literature review

Academic literature on tobacco consumption and attitudes, that is relevant for this research, has been developed in two main streams. Apart from empirical studies focusing on socio-demographic determinants of smoking incidence, there are studies of attitudes towards smoking, prohibiting smoking and examining opinions on other smoking-related issues (Bempong, 2017; Adkison et al., 2015). These studies employ socio-demographic characteristics of individuals by using comparable data from several countries, national data or data for a sub-set of the population, e.g. adolescents. Studies usually combine sets of variables as briefly illustrated in the following review.

Socio-economic status affects smoking behavior of adolescents, whereas negative attitudes regarding smoking are transferred from older to younger generations (Madarasová Gecková et al., 2005). Older people are in favor of more severe sanctions and of prohibiting smoking, while younger generations are not so strict. The negative attitudes are more present among the non-smoking population (Taylor et al., 2006). These opinions were studied in Georgia investigating people's attitudes regarding indoor smoking (Bakhturidze et al., 2013). Opinion on restrictions depends on income, at least in the case of younger population: Awotedu et al. (2006) showed that students with no income are more in favor of smoking restrictions.

One of the first researches on the European population of smokers focuses on smoking behavior and attitudes toward quitting smoking (Boyle et al., 2000). A recent study of

socio-economic differences and smoking prevalence in European countries showed that the level of education is negatively associated with smoking prevalence, and confirmed that education stands as the determinant of smoking prevalence in all socio-economic groups (Bempong, 2017). Findings of an older study on education being a strong predictor of smoking incidence in the European Union are the same (Huisman, Kunst, Mackenbach, 2005). That study also found that both education and income inequalities stand as stronger determinants of smoking prevalence among men. Tenn, Herman and Wendling (2010) claim there is a higher probability that one additional year of education will deter young people from starting to smoke, but education is not so effective when considering the older population. More comparative country studies have been conducted on the importance of education and income in smoking behavior. Bobak et al. (2000) found that smoking is more widespread among poor socio-economic groups, regardless of the income level of a particular country. This is in line with the findings on lower smoking cessation rate among lower-lever income groups of smokers (Hiscock, Dobble, Bauld, 2015).

Literature on illegal tobacco trade is also abundant. Studies mostly estimate the costs of this criminal activity and there is a lack of research based on the empirical evidence gathering experiences and opinions. It is interesting to mention here Griffiths (2004) who identified cigarette smuggling in Europe and at the European periphery as a serious problem and listed the set of consequences in terms of lost budget revenues and indirect losses for public funding. The data he used are from the late 1990s, when awareness of the scope of damage caused by cigarette smuggling in Europe, as a major illicit industry, was probably low.

The research on addictive habits and attitudes towards smoking prevails in the literature on tobacco. To a lesser extent, there are studies on individual opinions of smokers and non-smokers. However, the academic literature exploring attitudes towards gray tobacco market is very scarce. Wiltshire et al. (2001) in their study found that deprived smokers in Edinburgh prefer contraband cigarettes because of their price. Although some of them expressed fear of buying illegal cigarettes, cigarette and tobacco smuggling are viewed positively by the majority of low income smokers as a way of dealing with high taxation and increasing prices of tobacco and cigarettes. Another survey-based research on attitudes toward contraband tobacco confirmed that tax-induced price increase of tobacco products results in the shifting to gray market (Adkison et al., 2015). Buyers supplying themselves at the tobacco gray market have more favorable attitudes toward contraband products when compared to smokers buying at the regular market and imagine fewer risks related to illicit products. There is a consensus on stable consumer preferences toward counterfeit cigarettes, mainly driven by affordable prices (Moodie et al., 2014).

Such studies are rare for the Western Balkans, except for public opinion in Serbia that showed moral acceptability of illegal practices, including smuggling and black market (Andreas, 2004). According to our best knowledge, this is the first research on clustering

citizens depending on their attitudes towards the gray market. Recher (2019) employed descriptive statistics on the similar data and showed that, as expected, smokers are more tolerant, while older people are less tolerant towards gray tobacco market. He further concludes that differences in attitudes among citizens of Western Balkan countries are rather small. His research proceeds with regression analysis of determinants of illegal market, so the public attitudes remain not fully explored. This attitudinal study fills the gap with an in-depth analysis of population groups sharing the same opinion on the gray tobacco market. Since anti-smoking campaigns should start with education and should focus on the most vulnerable people (Hiscock et al., 2012), the results of this research should help reveal the common characteristics of each group and design target policy measures to curb the illicit trade. Yürekli and Sayginsoy (2010) suggest that improved enforcement of anti-smuggling laws must accompany the tobacco tax increase. Otherwise, global cigarette smuggling will increase. Whether they consider stricter sanctions or, as Lund, Halkjelsvik and Storvoll (2016) advocate, soft interventions in order to raise awareness and change attitudes, depends on findings of the analysis that follows. Joossens and Raw (2000) opt for tobacco export and transit control and for European Commission action plan to combat cigarette and alcohol smuggling along the eastern border of the EU (Joossens et al., 2014).

We assume that individual opinion is normally formed under the influence of socio-demographic personal attributes, and further include the nation-specific element in the analyses. Given the tradition of tobacco trade and production in the Balkan region, we assume that public opinion on the gray tobacco market would differ among economies with more significant tobacco industry. Namely, if a country is a net exporter of either unmanufactured or manufactured tobacco products, and has comparative advantage in tobacco trade, one could assume that the public would perceive the role of tobacco industry for the economy as more important.³ This in turn might shape individual attitudes towards tobacco gray market in either direction. General public awareness of the negative consequences of tobacco gray market is expected to be higher in countries where more people make their lives in tobacco industry and trade, and in the countries with considerable budget revenues coming from the tobacco sector. On the other hand, in the tobacco exporting countries, both official and unofficial tobacco trade might be developed and this might ease the negative public opinion on tobacco gray market.

Citizens' public opinion analyses in the Western Balkans, distinguishing attitudes of smokers from non-smokers, includes, therefore, a set of individual socio-demographic attributes (gender, age, level of education, income), and indicator of tobacco trade. Data and employed methodology are described in the next section.

³ For comparative advantages in the Western Balkan countries regarding mutual trade, see for example Buturac (2013).

4 Data and methodology

Based on literature review and scope of the research, we have developed a questionnaire covering attitudes, habits and experiences of citizens towards gray market and illegal trade with tobacco products. The questionnaire also provides information on socio-demographic attributes of respondents. Prior to the survey, the questionnaire was translated into local languages and pilot tested for structure and comprehensibility.

Table 1 Summary statistics on sampled citizens, n=21,013	
Sample characteristics	%
Gender	
Men	49.1
Women	50.9
Age	
18-24	10.1
25-34	17.2
35-44	18.2
45-54	17.7
55-64	16.8
65+	20.0
Education	
Elementary school or less	8.3
High school	59.5
College, university or higher	32.2
Occupation	
Business-owner	3.8
Manager	1.8
Professional	8.3
Clerk	10.2
Worker	25.7
Retired	25.7
Student	7.0
Unemployed	16.2
Other	1.3
Household income	
Below average	33.6
Average	32.8
Above average	16.8
Refuse to answer	16.8
Smoker	
Yes	35.9
No	64.1
Country	
Bosnia and Herzegovina	14.3
Croatia	14.3
Kosovo	14.3
Montenegro	14.3
North Macedonia	14.3
Serbia	14.3
Slovenia	14.3

Source: Survey and authors' calculations.

The data originate from the large survey we conducted in seven countries of the Western Balkan region. The data were collected in spring 2018 by computer-assisted telephone interviewing (CATI) of 3000 net respondents in Croatia, Slovenia, Serbia, Montenegro, Bosnia and Herzegovina, North Macedonia, and Kosovo. The sample in each country is proportionally stratified according to smoking prevalence within each country. Sample profile is presented in Table 1.

The instrument for this research consisted of 22 Likert-scaled items that covered attitudes about various aspects of tobacco illicit trade. Attitudes were measured on a five-point scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The demographic variables included gender, age, education, occupation, household income, country of origin and whether respondents declared themselves as smokers or not. All items were developed by the research team (Table 2).

Table 2 Items used in the research	
Item codes	Items
I1	Smokers profit from buying tobacco products from the gray market.
I2	There is nothing wrong with purchasing gray market tobacco products.
I3	Gray market of tobacco products causes considerable damage to society.
I4	Gray market of tobacco products causes an increase in other forms of crime.
I5	All smokers cannot afford legal tobacco products.
I6	Smokers sometimes buy gray market tobacco products.
I7	Gray market tobacco products are of lower quality than legal tobacco products.
I8	Purchase of gray market tobacco products is a criminal offense.
I9	Buyers of gray market tobacco products are exposed to possible arrest.
I10	Gray market of tobacco products causes substantial damage to the state budget.
I11	Purchase of gray market tobacco products causes the loss of jobs (in my country).
I12	Gray market tobacco products are more harmful to health than legal ones.
I13	Suppressing the gray market of cigarettes would reduce the number of smokers.
I14	Gray market of tobacco products is an opportunity for resellers to earn a living.
I15	Selling cigarettes on the gray market is not being sanctioned enough.
I16	Cigarette and tobacco smuggling is part of organized crime.
I17	The gray market of tobacco products is one of the major problems in my country.
I18	Tobacco products on the gray market are mostly of domestic origin.
I19	If there was no gray market of tobacco products, people would be smoking less.
I20	In my country, tobacco should be grown as an important crop.
I21	The rise in the prices of legal tobacco products increases the gray market.
I22	The majority of smuggled cigarettes and tobacco comes from areas near the border.

Exploratory factor analysis was performed to examine the underlying structure among the variables. Items that did not load heavily on any factor and items that had significant cross-loadings were removed from further analysis. Confirmatory factor analysis was performed to further examine the underlying structure among the remaining items. Cronbach’s alpha coefficients were calculated to assess the reliability of identified factors. K-means cluster analysis was used to develop typology of citizens based on their attitudes towards various

aspects of illicit tobacco trade. Chi-square test was used to analyze differences among identified segments. Revealed comparative advantages (RCA) indicator was calculated for each country to determine their comparative advantages in tobacco trade. The RCA indicator is useful for the purpose of comparing comparative advantages for individual product groups. The RCA indicator is calculated by the formula:

$$RCA = \ln \left[\frac{X_i}{M_i} \right] \times \left(\frac{\sum_{i=1}^n X_i}{\sum_{i=1}^n M_i} \right) \times 100$$

X is defined as the value of exports, while M is the value of imports. Index i is the product group classified according to Harmonized Tariff System. A positive value indicates that the country has comparative advantages in the corresponding product group. Conversely, a negative sign for the RCA indicator implies that there are no comparative advantages.

5 Results and discussion

Exploratory factor analysis with varimax rotation of factors and principal component analysis as the method of factor extraction was performed on initial 22 items. The Kaiser-Guttman rule was used to determine the number of factors to extract. Eight items, which did not load heavily on any factor or which had significant cross-loadings, were removed from further analysis. The remaining 14 items were again analyzed with exploratory factor analysis, and they were loaded on three factors (Table 3). The three-factor solution explained 50.7 percent of the variance.

	Factor 1	Factor 2	Factor 3
I1		0.59	
I3	0.72		
I4	0.68		
I5		0.70	
I6		0.68	
I8	0.71		
I9	0.57		
I10	0.69		
I11	0.58		
I13			0.88
I15	0.64		
I16	0.66		
I19			0.88
I21		0.66	
Explained variance (%)	28.1	12.0	10.6

Factors were named according to the dominant variables in the factor, as follows: Factor 1: Negative opinion on tobacco gray market; Factor 2: Understanding motives for buying on tobacco gray market; Factor 3: Curbing gray tobacco market reduces smoking.

Confirmatory factor analysis was conducted on 14 remaining items to further examine the underlying factor structure and test three-factor solution from exploratory factor analysis (Table 4). The goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI) and comparative fit index (CFI) were 0.97, 0.95 and 0.93 respectively. The normed fit index (NFI) and non-normed fit index (NNFI) were 0.93 and 0.91 respectively. All factor loadings were significant at $p < 0.01$ level. The results of confirmatory factor analysis indicate a reasonable level of fit of the three-factor model (Hu and Bentler, 1999). Cronbach's alpha coefficients indicate acceptable level of reliability for all three scales (Table 4).

Table 4 Confirmatory factor analysis results and Cronbach's alpha coefficients	
	Factor loadings
Factor 1: Negative opinion on tobacco gray market ($\alpha = 0.82$)	
I3	0.73*
I4	0.67*
I8	0.67*
I9	0.52*
I10	0.66*
I11	0.59*
I15	0.59*
I16	0.57*
Factor 2: Understanding motives for buying on tobacco gray market ($\alpha = 0.59$)	
I1	0.40*
I5	0.60*
I6	0.51*
I21	0.59*
Factor 3: Curbing gray tobacco market reduces smoking ($\alpha = 0.76$)	
I13	0.98*
I19	0.95*

Note: * Factor loadings significant at $p < 0.01$ level.

K-means cluster analysis was conducted to develop typology of citizens based on their attitudes towards various aspects of illicit tobacco trade. Mean values were calculated for each factor and these mean values were taken as an input in the K-means cluster analysis. The K-means cluster analysis indicated four homogeneous segments of citizens (Table 5).

On average, citizens recognize negative aspects of gray market represented by factor 1. However, they exhibit the highest value of factor 2 denoting how much they understand the motives of smokers for buying at the gray market. The lowest value is calculated for factor 3 representing opinion that suppressing the gray market reduces smoking (Table 5).

Factors	Total sample 100% (n=21,013)	Cluster 1: Undecided 23% (n=4,859)	Cluster 2: Aware 22% (n=4,637)	Cluster 3: Link 29% (n=5,979)	Cluster 4: No link 26% (n=5,538)	ANOVA
Factor 1 Negative opinion on tobacco gray market	3.55	3.02	3.75	3.84	3.52	F=1801.8; p=0.00
Factor 2 Understanding motives for buying on tobacco gray market	3.62	2.87	3.85	3.93	3.77	F=3993.6; p=0.00
Factor 3 Curbing gray tobacco market reduces smoking	2.96	2.82	3.06	4.28	1.57	F=34342.5; p=0.00

Note: Items were measured on a scale ranging from 1 (strongly disagree) to 5 (strongly agree).

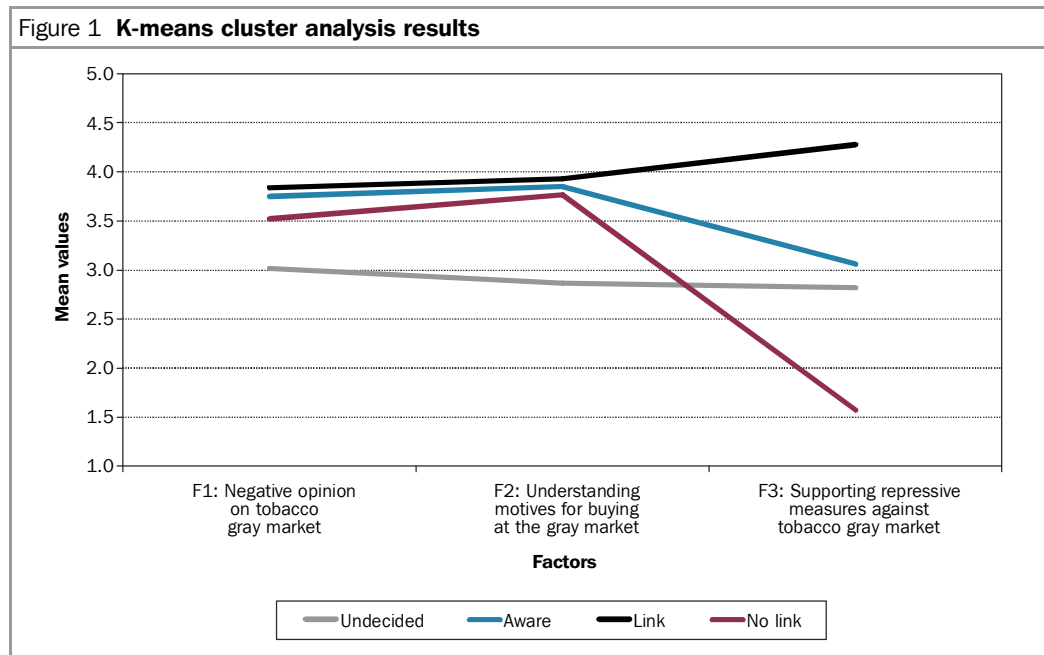
On average, citizens in the region recognize that gray market of tobacco products causes damage to society, losses of jobs and in budget revenues. Furthermore, citizens are aware that the gray market is related to other forms of crime and therefore subject to sanctions, both for dealers and buyers. However, citizens in the observed countries have only slightly negative opinion about the gray tobacco market (mean = 3.55).

More respondents understand the reasons for smokers buying on the gray market, referring to tobacco products' affordability and more favorable prices, enabling smokers to benefit from buying the tobacco on the gray market (mean =3.62).

Finally, and in line with the not so judging public opinion on tobacco gray market, the majority of respondents do not think that curbing gray tobacco market reduces smoking (mean = 2.96). However, there are differences among clusters and that is the specific point of interest of this research. Four groups of citizens with different values have been identified with K-means cluster analysis. The results of factor analysis and K-means cluster analysis are jointly presented in Figure 1.

Cluster 1 (Figure 1, gray line) is characterized with similar and relatively low values for all three analyzed factors (mean equals to 3 or less). For both factor 1 (negative opinion on gray market) and factor 2 (understanding motives for buying on tobacco gray market) citizens from cluster 1 exhibit the lowest values. The average mean values of factors below 3 indicate slight disagreement with the statements on the negative aspects of the gray tobacco market. They are quite indifferent towards enforcement of more illicit tobacco control and stricter sanctions. Individuals in this cluster somewhat ignore the existence of gray tobacco market and do not perceive reasons for smokers to buy tobacco products at the gray market. Cluster members have no firm opinion on whether curbing gray tobacco market would deter people from smoking. According to their consistent values for all three factors,

and since their values are very close to the middle point of the five-point scale, this cluster is labelled as “Undecided”.



Cluster 2 (Figure 1, blue line) is characterized with high values for factor 1 (negative opinion on gray market) and factor 2 (understanding motives for buying on tobacco gray market), with the middle point for factor 3 (curbing gray tobacco market reduces smoking). Citizens in this cluster are well aware of the negative aspects of gray market, but at the same time they perceive certain positive aspects for consumers who buy their tobacco products on the gray market. Also, they do not share the opinion that an absence of limiting the gray tobacco market would have positive effects on the reduction of smoking. The prevalent distinguishing attribute of cluster members is awareness, so Cluster 2 is labelled as “Aware”.

Cluster 3 (Figure 1, black line) is similar to Cluster 2 regarding values for factor 1 and factor 2. Citizens grouped in this cluster see the detrimental effects of the tobacco gray market, but at the same time understand that some smokers use this illegal channel of supply with cigarettes and other tobacco products. Distinct to Cluster 2, citizens in this cluster exhibit very positive attitudes for curbing gray tobacco market, because of its effects on lower smoking prevalence. Since cluster members perceive that there is a link between curbing gray tobacco market and smoking prevalence, Cluster 3 is labelled as “Link”.

Cluster 4 (Figure 1, red line) has relatively low value for factor 1, relatively high value for factor 2 and the lowest value of all four clusters for factor 3. It means that citizens in this cluster perceive negative aspects of gray market to a lesser extent when compared to Cluster

2 and Cluster 3, while at the same time they are aware of positive aspects that gray market has for consumers. Moreover, citizens in this cluster do not believe that curbing gray market will reduce smoking. This cluster is labelled as “No link”.

The typology of citizens according to their attitudes towards gray tobacco market showed that there are four segments of population, yet this tells us nothing about which individual characteristics stand behind clusters.

Chi-square tests were conducted in order to explore the differences in demographics among identified clusters (Table 6). In this phase the comparative advantages in tobacco trade of respondents' countries were included in the analysis, and RCA indicator calculated for each country. If RCA was negative, it was considered that the country does not have a comparative advantage in tobacco trade (Bosnia and Herzegovina RCA = -1.62; Kosovo RCA = -1.65; North Macedonia RCA = -0.41; Montenegro RCA = -0.49). If RCA was positive, it was considered that the country has a comparative advantage in tobacco trade (Croatia RCA = 2.36; Serbia RCA = 3.03; Slovenia RCA = 1.55).

Table 6 Chi-square test results				
	Cluster 1 Undecided	Cluster 2 Aware	Cluster 3 Link	Cluster 4 No link
Smokers	Pearson Chi-Square: 167.73, df=3, p=0.000 (in %)			
Yes	38.6	33.7	30.4	41.1
No	61.4	66.3	69.6	58.9
Gender	Pearson Chi-Square: 4.55, df=3, p=0.208 (in %)			
Men	50.0	48.1	48.6	49.7
Women	50.0	51.9	51.4	50.3
Age	Pearson Chi-Square: 70.35, df=6, p=0.000 (in %)			
18-34	30.7	26.8	26.8	25.3
35-54	36.0	34.6	34.6	38.4
55+	33.3	38.6	38.6	36.2
Education	Pearson Chi-Square: 107.58, df=6, p=0.000 (in %)			
Elementary school or less	7.7	8.9	9.1	7.4
High school	62.9	56.9	61.7	56.3
College, university or higher	29.4	34.3	29.2	36.4
Monthly income	Pearson Chi-Square: 202.62, df=9, p=0.000 (in %)			
Above average	12.6	17.0	19.2	17.9
Average	37.7	32.8	32.2	29.0
Below average	36.2	32.2	31.3	35.2
Refuse to answer	13.5	18.1	17.3	18.0
Country has comparative advantages in tobacco trade	Pearson Chi-Square: 1311.57, df=3, p=0.000 (in %)			
Yes	27.4	47.9	35.8	60.0
No	72.6	52.1	64.2	40.0

Cluster 1 (“Undecided”) is composed of more citizens from the youngest age group (18-34), when compared to other clusters, equally men and women. Moreover, citizens from

this cluster more frequently have secondary education and belong to below average and average household income groups. Having in mind that smokers prevail in this cluster and that citizens come from countries that do not have comparative advantages in tobacco trade, the indecisive attitudes of cluster members are well understood. Young people probably care less and might remain uninformed, so if tobacco does not make an important part of the national economy, it is hard to have a firm opinion on policy measures and impacts of tobacco gray market.

Citizens from Cluster 2 (“Aware”) are more frequently from the oldest age group (55+) and over two thirds of cluster members are smokers. Highly educated respondents make a significant part of this cluster (one third) and this might explain the high level of awareness about the tobacco gray market.

When compared to other clusters, Cluster 3 (“Link”) is composed of more non-smokers, and citizens from all age groups, although the oldest age group (55+) slightly prevails. Cluster members have secondary education, and earn above average household income. Furthermore, there are more citizens from countries that do not have comparative advantages in tobacco trade in this cluster than in clusters “Aware” and “No link”. Calling for more order and stricter control is an attitudinal attribute of older citizens, and, as expected, the non-smoker part of the population feels no empathy for smokers trying to make profit of the gray tobacco market. This might be especially true for wealthier respondents who do not understand the need to buy at the gray market because of price affordability. It is interesting to note that this segment of citizens believes that availability and affordability of the tobacco products at the gray market are positively related to smoking prevalence, so that, in turn, curbing gray market would divert smokers from this bad habit.

Cluster 4 (“No link”) is composed of more smokers, citizens from the middle-aged group (35-54) and citizens with some form of tertiary education. Moreover, citizens from countries with comparative advantages in tobacco trade – Croatia, Serbia and Slovenia – are more often members of this cluster. The prevailing opinion of this group that “the gray tobacco market will exist until prices on the legal and the gray market are equalized, and smokers will naturally benefit from this market situation, so do not punish them for taking this advantage” is, as expected, the attitude of the smoker-prevailing cluster. More educated citizens, as opposed to previous findings in the literature on the negative relation between educational level and smoking prevalence, do not see the gray tobacco market so detrimental for society and economy, and would not opt for sanctions or simply do not believe in repressive measures. They might as well be more aware of addictive nature of smoking and price inelasticity of tobacco products, and, therefore, do not see that suppressing gray tobacco market would result in lower smoking incidence.

Finally, the groups of citizens mostly differ in smoking habits. It is interesting to note that gender differences were not observed in any of the clusters.

6 Conclusions

This study investigated differences in individual attitudes towards the gray tobacco market in a set of Western Balkan countries. The typology of citizens in the region revealed that public opinion differs primarily depending on whether an individual is a smoker or not. Three clusters share similar attitudes on negative socio-economic effects of gray tobacco market, but differ significantly in advocating stricter measures in curbing the gray market. Groups of citizens differ a lot in their belief on whether suppressing gray tobacco market would lead to less smoking, and consequently on whether they would opt for more repressive policies against illegal trade. Most pro-repressive attitudes come from non-smokers and citizens of countries that have no comparative advantages in tobacco trade: Bosnia and Herzegovina, Kosovo, North Macedonia and Montenegro. This might be seen as the opportunity for policy makers to strictly enforce punishment and criminalization of illicit tobacco trade, even for small quantities being smuggled or illegally produced or sold. Raising awareness on the negative effects of tobacco gray market and illegal tobacco trade in general would be the appropriate approach for smokers. The biggest challenge is the group of citizens with no definite opinion. They should be targeted by raising awareness campaigns, media promotion of successful measures in curbing gray market in general, and other activities in order to achieve public sensibility to government efforts in combating illegal trade. This should be easier in countries with developed official tobacco sector. Translating damages or lost public revenues at the gray tobacco market to measurable opportunity costs should mobilize wider public in fighting illicit tobacco trade. Finally, all stakeholders (governments, tax authorities, customs, tobacco industry, and academia) should jointly work on this problem since illegal trade does not know borders.

The results of these efforts should be permanently monitored by repeating the research regularly (e.g. every two years) or after each big change (e.g. increasing excise taxes or major regulative interventions), since attitudes in this field might change rather promptly as well. The lines for future research would be an in-depth analysis of other motives for buying at the gray market, going beyond the quantitative studies. Here the price elasticity modelling and estimating spill-overs from the official sector, i.e. legal to gray tobacco market, would help policy makers to create and implement successful measures to curb the gray market, keep stable budget revenues and to, in parallel, reduce smoking prevalence.

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