tobacconomics

Economic Research Informing
Tobacco Control Policy

The Illicit Cigarette Market in Montenegro

INSTITUTE FOR
HEALTH RESEARCH
AND POLICY

UIC

Citation

Tobacconomics. (2023). *The Illicit Cigarette Market in Montenegro*. A Tobacconomics Research Report. Chicago, IL: Tobacconomics, Health Policy Center, Institute for Health Research and Policy, University of Illinois Chicago.
www.tobacconomics.org

Authors

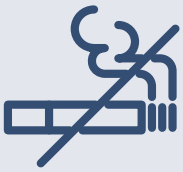
This Research Report was written by the Tobacconomics Team at the University of Illinois Chicago. It was peer reviewed by Hana Ross, PhD, Principal Research Officer, Southern Africa Labour and Development Research Unit, University of Cape Town, Cape Town, South Africa and Rijo John, PhD, Adjunct Professor, Rajagiri College of Social Sciences, Kerala, India.

This Research Report is funded by Bloomberg Philanthropies.

About Tobacconomics

Tobacconomics is a collaboration of leading researchers who have been studying the economics of tobacco control policy for nearly 30 years. The team is dedicated to helping researchers, advocates, and policy makers access the latest and best research about what's working—or not working—to curb tobacco consumption and its economic impacts. As a program of the University of Illinois Chicago, Tobacconomics is not affiliated with any tobacco manufacturer. Visit *www.tobacconomics.org* or follow us on Twitter *www.twitter.com/tobacconomics*.

Key Messages



The size of the illicit cigarette market has decreased markedly but is still high in Montenegro compared to many other countries in the region. The share of the illicit market for cigarettes decreased by half in 2022 (to between 22.1 and 26 percent) compared to 51 percent in 2019.

Tax administration improvements are key to reducing the illicit market. The large decrease in the illicit market coincides with the government of Montenegro's enactments of a prohibition of the storage of cigarettes in the country's main free-trade zone in the Port of Bar in addition to increased surveillance and enforcement measures.

Smokers who are unemployed, low-income, and more than 25 years old are more likely to buy illicit packs. Awareness campaigns and cessation services should be targeted to particular groups more prone to buying such products.

Table of Contents

List of Figures

List of Tables

Executive Summary

This study estimates the size of the illicit cigarette market in Montenegro and evaluates which factors affect the purchase of illicit cigarettes. For that purpose, three surveys were conducted: two surveys of smokers in 2019 and 2022 and one littered pack collection survey in 2022. Additionally, to investigate whether there was a sudden shock in the illicit market due to specific legislative changes, the illicit cigarette market is estimated using a gap analysis, comparing tax-paid cigarette sales with estimated consumption from the national Household Budget Survey from the years 2006–2017.

This research is expected to fill the gap in local evidence on the illicit cigarette market for accelerating the progress of effective tobacco taxation and control policies. The lack of this type of research has potentially undermined the efforts of more systematic monitoring and implementation of tobacco control measures. Montenegro ratified the Protocol to Eliminate Illicit Trade in Tobacco Products (Official Gazette, 2017), and even though the government of Montenegro has adopted all relevant regulations for tobacco control there remains much to be done to ensure the legislation is effective. The findings of this research aim to provide recommendations to policy makers to reduce overall high levels of tobacco use, which should also result in a decrease in illicit cigarette market.

Key findings of this research are the following:

- ***The size of the illicit cigarette market has decreased markedly but is still high in Montenegro compared to many other countries in the region. The share of the illicit market for cigarettes decreased by half in 2022 (to between 22.1 and 26 percent) compared to 51 percent in 2019.*** Most illicit packs are associated with illicit brands and cigarette packs missing excise tax stamps and with inappropriate health warning labels. The lowest percentage of illicit packs are those defined as being purchased at a pre-defined low-price threshold, which suggest that price is not a determining factor whether to buy illicit vs. licit cigarettes.
- ***The large decrease in the illicit market coincides with the government of Montenegro's enactments of a prohibition of the storage of cigarettes in the country's main free-trade zone in the Port of Bar in July 2021 and concomitant increased surveillance measures.*** It is considered an international best practice to prohibit the storage of goods like cigarettes that are easy to smuggle in free-trade zones. This prohibition in 2021 almost certainly contributed to the large decline in the market share of illicit cigarettes. At the same time, the government also strengthened surveillance of the free-trade zone, located in Novi Duvanski Kombinat Podgorica (NDKP).
- ***Smokers who are unemployed, low-income, and more than 25 years old are more likely to buy illicit packs.*** This implies that the most economically disadvantaged groups and adults are more prone to buying such products. This fact is very important considering the results of previous research from Montenegro (Mugoša et al., 2019, 2020), which shows that poorer households on average spend a larger share (21.1 percent) of their budget on cigarettes than other income groups (between 5.3 and 7.1 percent).
- ***The proportion of illicit cigarettes estimated by the littered packs survey is slightly larger (26 percent) compared to the share from the smokers' survey (22.1 percent).*** However, when considering only illegal brands and missing tax

stamps as illicit and excluding the other two criteria (price and location), the percentage size of the illicit cigarette market calculated from the smokers' surveys and littered pack collection survey is approximately the same.

Based on these findings, it can be concluded that the government of Montenegro needs to further strengthen law enforcement to prevent illicit trade, including stronger measures and penalties, while investing in enforcement officers on the ground. Additionally, improved tax stamps are important for further prevention and reduction of the illicit cigarette market. Stamps that are difficult to counterfeit are critical to a well-functioning tracking and tracing system. Furthermore, according to obligations under the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC), all confiscated cigarettes should be destroyed. The results also show the necessity to specifically target particular groups—such as those who are lower-income, unemployed, and over the age of 25—by creating mass media campaigns against tobacco use and helping smokers quit. In sum, a comprehensive approach that includes increased tobacco excise taxes and proven non-price measures is the most effective way to combat the illicit cigarette market while decreasing tobacco use.

1. Introduction

The most effective way to reduce tobacco use is to increase tobacco excise taxes, which will also serve to increase government revenues (NCI, 2016). Availability of illicit cigarettes can undermine the effectiveness of price increases, however, by providing consumers with cheaper alternatives (Abdullah et al, 2020). Greater affordability of tobacco products can hinder economic growth and sustainable development by increasing the rate of tobacco use (known as "prevalence"), thereby exacerbating poverty and increasing disparities in health (Stoklosa et al., 2020) Moreover, higher smoking prevalence also results in reduced productivity and a higher burden on household and government budgets to cover the medical costs from tobacco-related diseases and premature deaths (Rezaei et al., 2016). Therefore, it is necessary to assess the magnitude and determinants of illicit cigarette market.

The institutional and regulative framework for tobacco control policies in Montenegro began by adopting four key laws : the Law on Tobacco, the Law on Limiting Use of Tobacco Products, the Law on Excise Taxes, and the Law on Ratification of the WHO FCTC. Marking tobacco products by an excise stamp to be legally placed on the market became mandatory in 2001, by the Law on Excise Taxes. The Law on Limiting Use of Tobacco Products from 2004 sets the obligation that each tobacco product must have an appropriate health warning and a label notifying the amount of harmful ingredients in cigarettes (tar, nicotine, and carbon monoxide). The Law on Tobacco was adopted in 2004 to administer the production, processing, and trade in tobacco and regulate the tobacco market, defining the obligation of setting up and maintaining of The Official Register of tobacco brands. In order to completely fulfil obligations set by EU directives and the WHO FCTC all these laws were amended several times until 2022, changing excise tax stamp and health warning composition and appearance, and accordingly conditions that tobacco product has to meet to be considered as legal.

The estimation of the magnitude of the illicit cigarette market is conducted empirically using several methods. The most frequently used methods are surveys of tobacco users, observational methods (examination of cigarette packs), gap analysis, and the application of different

econometric models (NCI, 2016). Reliance on expert opinion and tobacco trade monitoring are also sometimes used but they often lack rigor and credibility.

The survey approach implies direct contact with tobacco users, who provide detailed information about consumer purchases and behaviors. This method can include both the direct surveying process and examination of cigarette packs from photos of respondents' most recent tobacco purchase. In the direct interaction with the smoker, survey enumerators ask about socioeconomic characteristics, smoking patterns, and the price and place of pack purchases (Stoklosa et al., 2020). From the information obtained, the size of the illicit cigarette market can be estimated. However, depending on the cultural context, under-reporting may be an issue.

Examination of littered cigarette packs is an observational method by which systematically collected packs can be classified as illicit by comparing relevant pack details (such as tax stamp, health warning label, and illegal/legal brand classification) from tobacco legislation and regulation. Even though the results can be biased (some research suggests that smokers of legal and illicit packs litter at different rates), this method does not present problems with self-reporting. The method is relatively easy to implement and less costly, and researchers have more time to analyze the packs collected (Stoklosa et al., 2020). However, storage and spoilage of the packs may present challenges over time.

Gap analysis compares tax-paid cigarette sales with consumption estimated from national surveys. This method's main advantage is that it is easy to implement and requires only two sets of data. The main disadvantages are poor official sales data, weak survey data, and under-reporting of consumption in surveys (Stoklosa et al., 2020). Because of these weaknesses, the method is best utilized only to track trends.

Given the advantages and disadvantages of each method, the best practice is triangulation of methods to ensure robust results. This research, therefore, estimates the size of the illicit cigarette market and factors that influence the use of these products in 2019 and 2022 based on data obtained from smoker surveys, littered pack examination, and gap analysis. The aim is to provide fresh and timely evidence on the illicit cigarette market to inform tobacco tax policy discussions.

Despite the adoption of comprehensive tobacco control policies, the overall prevalence for all tobacco products (mostly manufactured cigarettes) in Montenegro is still higher than most countries in the region at 40.7 percent in 2019 (Mugoša et al., 2020) and 38 percent in 2022[1]. Timely estimates of illicit trade as well as determinants of consuming illicit cigarettes are relevant for policy making because they provide detailed information on the illicit cigarette market and examine changes in the market in the face of recent price increases, perhaps most important for key stakeholders like the Ministry of Finance, the Ministry of Health, and legislators.

This report is organized as follows: Section 2 reviews the literature while Section 3 focuses on data and methodology, Section 4 presents the results, and Section 5 discusses the findings and suggests policy recommendations.

[1] Both surveys included a nationally representative sample of 1,000 adult respondents.

2. Literature Review

Early research in this area relied mainly on existing surveys and respondents' self-report of using illicit tobacco products. Guindon et al. (2014) estimated tax avoidance/evasion using International Tobacco Control Policy Evaluation (ITC) Project surveys in 16 low- , middle-, and high-income countries, finding considerable variation across the globe. The authors also examined the characteristics of smokers more likely to evade, finding that lower income and education are typically associated with higher probability to evade at the level of the smoker, though with different magnitude across observed countries.

Joossens et al.'s (2014) study from 18 European countries examined the scope of tax evasion for manufactured cigarettes (MC) and hand-rolled tobacco (HR), based on data derived from face-to-face surveys of approximately 1,000 respondents from each country. Results showed that the average tax evasion in observed European countries was 6.5 percent, highest in Latvia (37.8 percent) and lowest in Portugal (almost zero percent). According to this study, the main factors that contributed to tax evasion were lower levels of education, the level of tobacco industry participation in evasion, and proximity to land or sea border with Russia, Ukraine, Belarus, or Moldova. The study also concludes that cigarette prices had no important influence on illicit trade. In terms of individual countries, Stoklosa and Ross (2014) estimated the extent of tax evasion in Poland at between 14.6 and 15.6 percent, depending on the method. The lower estimate was obtained from face-to-face survey data, while the higher estimate was calculated using data from cigarette packs littered on streets.

There have been a number of rigorous estimations of the illicit cigarette market in Latin America. An estimation of the illicit market in the capital region of Chile using a survey of smokers (n=851) and pack examination showed that 16.3 percent of smokers buy illicit cigarettes. Paraje et al. (2018) found illicit cigarette consumption to be more prevalent among low-income groups, those with less education, and the unemployed. Maldonado et al. (2018) found that illicit trade was 3.5 percent for five large Colombian cities, using a face-to-face survey with a sample of 1,697 respondents. They found the probability of consuming illicit cigarettes was higher for older smokers and students. Juarez et al. (2020) conducted two surveys in Mexico—interviews with smokers and a littered pack collection—with sample sizes of 2,396 respondents and 8,204 packs, respectively. They found the share of the illicit market was 7.6 percent according to the first method and 8.8 percent according to the pack inspections. As shown in other studies, those with a lower education level and higher smoking intensity were more prone to consume illicit packs. Research findings in Latin America and other regions have been consistently significantly lower than tobacco industry estimates, showing the importance of using various transparent and proven methodologies when estimating the illicit cigarette market.

There have also been recent empirical studies from other regions. Research from Georgia (Little et al., 2018) found that the illicit cigarette market is very low at 1.5 percent. Kartika et al. (2019) found a proportionally very small cigarette illicit cigarette market in Indonesia at less than two percent. Income increases were associated with a lower probability of buying illicit packs, and the results also demonstrated that price increases were not related to any increase in illicit trade. Research from South Africa (Blecher, 2010) found that the illicit market grew from 1997 to 2000, reaching around 9.4 percent to 11.5 percent of the total market. Similar methods on this market were applied by Vellios et al. (2019), showing a sharp increase in the illicit market for cigarettes from 2009, amounting to 30 to 35 percent in 2017. Notably, the increase in South Africa occurred with unchanged smoking prevalence.

Researchers also use gap analysis to track changes in illicit trade. The HM Revenue & Customs (HMRC) service, the fiscal authority in the United Kingdom, regularly provides illicit cigarette market estimates. The results for 2017 and 2018 show that an illicit market share was nine percent of the total market and was generally declining slowly, along with smoking prevalence. A gap analysis conducted in Canada showed, after the tax increase in 2005, a decreasing trend of the illicit cigarette market from 2007–2009 (Guindon et al., 2016). Paraje (2019) conducted gap analysis in five Latin American countries, showing that an increase of the illicit cigarette market was evident in Brazil (2008–2013), while Argentina experienced a decrease from 2005 to 2009 and stabilization afterwards. For Chile, Colombia, and Peru, the results showed no statistically significant evidence of an illicit market share increase.

The research conducted in the southeastern European (SEE) region in 2019[2] provides independent and objective evidence on the size and sources of the illicit tobacco market by focusing on two products with the highest prevalence: manufactured cigarettes (MC) and hand-rolled (HR) tobacco. Researchers used smokers' surveys of nationally representative samples of adults in each country of the region. Illicit cigarette packs were identified based on information from the respondent's last-purchased tobacco pack and questions related to its price, tax stamp, health warning, and place of purchase. According to STC-SEE data, 20.4 percent of all smokers in SEE countries purchased illicit MC or HR tobacco. It was significantly more likely among HR smokers, at 86.7 percent, and it varied relatively little across countries. Most of the HR tobacco comes from the informal market. Research also indicates that illicit HR tobacco is predominantly sold on the streets or in open markets, in 92 percent of the cases.

3. Data and Methodology

3.1. Smoker survey

The survey on tobacco use among adults in Montenegro in 2019 is part of the regional STC-SEE project, which was conducted during September and October of 2019. To track the changes of the results on the market, a smoker survey was also conducted in February 2022. Both surveys were conducted face-to-face in respondents' homes and included adults from 18 to 85 years of age. The 2019 survey sample includes 1,000 smokers and non-smokers, with the pack inspection part consisting of 407 current smokers of all tobacco products. On the other hand, the 2022 survey was conducted only on smokers, which explains why the pack inspection part has a larger sample (799) of current smokers of all tobacco products. The surveys are based on the same methodology and a similar questionnaire. The sampling frame for 2019 is based on the latest census in Montenegro, conducted in 2011.

The questionnaire is mostly based on the GATS Core Questionnaire with some additional questions (version 2.0, November 2010, and version 3.0, January 2019) from recent ITC and PPACTE surveys. The data for both surveys are weighted according to five factors leading to a representative sample in terms of geo-economic region, type of settlement (urban or rural), age group, gender, and level of education.

The questionnaire consists of sections related to tobacco use; cessation; second-hand smoke exposure; media; economics; and knowledge, attitudes, and perceptions of tobacco. In this study, the data used are mainly from the section titled "Last cigarette pack/tobacco product used." Relevant questions for pack inspection are related to packaging, tax stamps, health warning label, price, brands, and place and country of purchase. Respondents had the

[2] https://tobaccotaxation.org/cms_upload/pages/files/242_see_regional_tax_evasion_report_final.pdf

possibility to show the pack that they last purchased (95.8% in 2019 and 98.9% in 2022). One difference between the 2019 and 2022 surveys is in the number of tobacco product categories (8 in 2019 compared to 4 in 2022). Due to the small number of cases of some categories, in 2022 the maximum number of tobacco products was reduced to 4: MC, HR, electronic cigarettes, and heated tobacco products.

To validate the direct questions on illicit packs, the more comprehensive approach is applied, gathering different criteria that refer to national legislation. The benchmark criteria are set in compliance with the Law on Tobacco (Official Gazette, 2015), Law on Excise Taxes (Official Gazette, 2018), and Law on Limiting the Use of Tobacco (Official Gazette, 2019). Following Joossens et al. (2014), a pack of MC is defined as illicit if it has at least one of the following five characteristics, according to current legislation in effect in Montenegro:

- illicit place of purchase in Montenegro;
- illicit brand in Montenegro;
- lack of health warning label and/or inappropriate health warning label;
- missing tax stamp and/or inappropriate tax stamp; or
- price that defines a pack as illicit (EUR 1.33 for 2019 and EUR 1.4 for 2022), which is lower than 70 percent[3] of the lowest price (EUR 1.9 in 2019, EUR 2.0 in 2022) of cigarettes in the country according to the WHO's 2020 Global Tobacco Control Report.

Cigarette packs purchased abroad are not identified as illicit in Montenegro, regardless of whether they are licit or illicit. If they are purchased in a lower tax jurisdiction, they represent tax avoidance. However, the percentage of such packs in this survey was negligible. In addition, packs purchased domestically in duty-free shops or at discounts also represent tax avoidance. Unfortunately, the information from the survey was not sufficient to determine whether the cigarette packs were purchased as part of a promotion or at a discount. Since no packs were identified with a duty-free stamp and discounts on cigarettes are not very common in Montenegro, this study assumes that the size of tax avoidance in Montenegro is very small and that most of the illicit cigarette sales represents tax evasion.

According to the responses it is impossible to precisely estimate the HR weight and the number of cigarettes per pack since the respondents did not report the weight of the HR tobacco last purchased. For this reason, price per pack of HR cannot be used as criteria for illicit packs, which is why the result on illicit cigarette market could be underestimated. As a result, only place of purchase, tax stamp, and HWL are criteria used to identify HR tobacco as illicit.

Table 1 shows more details of identification of illicit packs for MC, as defined by legislation, according to survey answers to questions for each characteristic.

Considering these characteristics, illicit packs are classified by the variable "Identification of an Illicit Pack" (IIP). It is important to mention that packs with a removed or destroyed stamp are not classified as illicit, as the stamp could be removed when the pack is opened. Additionally, packs that were not shown by the respondent are also excluded from IIP (4.2% of all respondents in 2019 and 1.1% in 2022). In the analysis, the IIP represents the dependent variable, while independent variables in the model are:

- Sociodemographic variables: gender, age, level of education, region, type of residence, household income[4] (with

[3] In line with the WHO recommendation that the excise tax should be at least 70 percent of the retail price.

[4] As income variable was recorded in intervals rather than exact amounts, the average of the interval is calculated and used. As the data contain a large number of missing values, intervals are imputed based on other sociodemographic characteristics.

Table 1

Identification of illicit packs for MC as defined by legislation

Source of purchase	Illicit (yes/no)
In grocery stores, kiosks	no
On the street or on the open market from the independent/individual seller[1]	yes
Café/Restaurant/Club/Discotheque	no
Internet	no
In specialized tobacco shops[1]	no
Duty-free shops[2]	no
In other countries (grocery stores, specialized tobacco shops, etc.)[1]	no
Tax stamp	
Local stamp[2]	no
Stamp removed or destroyed[2]	yes/no
Lack of stamp[2]	yes
Lack of stamp but purchased abroad[4]	no
Foreign stamp purchased locally[2]	yes
Foreign stamp purchased in duty-free shop[2]	no
Health warning label	
Health warnings in local language[3]	no
Health warnings in foreign language, domestically purchased[3]	yes
No health warnings[3]	yes
Health warning label in foreign language, purchased abroad[4]	no
Brand	
Brand is not listed on the Official Register of tobacco brands, unless purchased abroad[1]	yes

[1] *Law on Tobacco*

[2] *Law on Excise Taxes; in case of destroyed or removed excise tax stamp, other criteria must be considered to determine whether the pack is illicit or licit. If the pack is legal according to all other criteria, the scope of this study does not allow appropriate determination whether this tax stamp is legitimate. Therefore, such a pack is considered legal.*

[3] *Law on Limiting the Use of Tobacco*

[4] *Not defined in legislation. This is why if a pack is purchased abroad it is not considered illicit in the country of destination, even though it is illicit in the country of origin.*

imputed missing observations), and employment status;

- Variables related to smoking behavior: smoking status (daily, less than daily), smoking intensity (number of cigarettes per day), and spending on tobacco per month;
- Proximity to a lower tax/price jurisdiction – distance variables.

This model controls for the impact of lower-tax jurisdictions and their distance to the nearest border crossing on the prevalence of illicit purchases. Neighboring countries Albania, Kosovo, and Serbia had lower prices compared to the price of the most-sold brand in 2019 in Montenegro, while in 2022 this was true only for Albania and Kosovo. For calculation of distance variables, the most-sold brand price is used. The following variables are formed to account for border proximity:

- Distance variable defined as:

$$DV = \frac{\text{price difference (MNE}-\text{NC)}}{\text{driving distance (MNE to NC)}} \quad (1)$$

where NC represents neighboring countries with lower prices of the most-sold brand, compared to the most-sold brand in Montenegro (MNE). Depending on the incentive for border crossing to purchase cheaper tobacco—price difference or driving distance—two distance variables can be applied.[5]

The distance variable is defined as the weighted average of the price differences between Montenegro and other neighboring countries, using proximity in kilometers to the border of a neighboring country with lower price jurisdiction as weights. In this case it is assumed that the decision to travel to the neighboring country depends both on the difference in price and the distance.

The distance variable is a dummy for municipalities in Montenegro that are nearest to the border (three dummies for 2019—DV Kosovo, DV Serbia, and DV Albania—with the exclusion of DV Serbia in 2022).

Logistic regression modeling is used to assess the impact of sociodemographic characteristics, smoking behavior, and distance variables on the illicit cigarette market. The probability of illicit cigarette market (Pr) is estimated applying Equation 2[6]:

$$\Pr(Y_i = y_i) = f(X\beta) \quad (2),$$

where Yi represents IIP, while X stands for the group of independent variables. Two models are estimated—the first using only the sample of MC smokers and the second using MC and HR smokers together (MCHR). In both models the dependent variable is binary, taking the value of 1 if the inspected pack is illicit and 0 otherwise. Since there are no available data on HR price, the distance variable is not included as an independent variable in the second model.

3.2. Littered pack examination

The design of the littered pack collection survey relies on the information from the STC-SEE, as well as data from the Statistical Office of Montenegro, or Monstat. Smoking probability by municipality is estimated using information on sociodemographic characteristics (age, gender, and education) from the Household Budget Survey (HBS).[7] To conduct the littered pack examination research, it is critical to define the sample and the route, so information on road lengths is therefore needed. For each PSU in a municipality, the length is calculated using information on local roads in cities, as it is assumed that the majority of littered packs can be found along the roads due to the higher density of people in transit. The average length of these type of roads is obtained from the Secretariat for Transport in the seven chosen municipalities.

[5] Equation 1, in the case of distance variable 1 (DV1), takes into account the bordering country with the highest price difference and the corresponding driving distance from each Montenegrin municipality to the nearest border crossing with that country. For distance variable 2 (DV2), Equation 1 considers driving distance from each municipality in Montenegro to the nearest country with lower prices and the corresponding price difference of that country.

[6] There are 16 specifications tested in the first model (MC) with different combinations of smoking behavior and distance variables. The three best models are chosen according to information criteria AIC, BIC, pseudo R, and log-likelihood. These models passed all specification tests (Linktest, Hosmer and Lemeshow (HL) goodness of fit test). The second model (MCHR) is comprised of four specifications, three with smoking behavior variables individually and one excluding these variables. From these, three models that passed all specification tests are chosen (tables A11-A12a in Appendix A).

[7] HBS or national survey, is conducted annually, with the aim to provide data on average households' expenditure and consumption size and structure. Households are surveyed during one month per year, once a year. This survey covers 21 municipalities in three regions in Montenegro: North, Central, and South. The database for each year provides detailed characteristics on households, comprising socioeconomic and demographic features. The number of surveyed households each year is on average 1,202. There are 15,068 households in the whole sample, on average 1,508 per year, with 6,808 households with tobacco consumption.

The littered pack collection is limited to seven major cities because it is difficult to have a completely nationally representative sample due to the lower probability of finding littered packs in less densely populated or rural areas. To fully represent all rural areas, the costs of the study would significantly increase as it would require more labor hours and other costs (such as transportation) to cover these areas. Nevertheless, the study is valid because the representative samples are established for each of the chosen cities, which are spread across the country with sufficient numbers of people living in each city.

The pack collection survey was conducted in seven cities in Montenegro, chosen by region. The selection within each of the three regions was made by city size criteria by selecting two major cities from the North (Bijelo Polje and Pljevlja), two from the South (Bar and Herceg Novi), and three cities from the Center (Podgorica-Capital city, Danilovgrad, and Nikšić). The total number of packs to be collected or sample size *n* is determined using the following formula:

$$n = \frac{Z^2_{1-\alpha/2} \cdot P(1-P) \cdot DEFF}{\delta^2} \quad (3)$$

where:

$Z^2_{1-\alpha/2}$ = quantile of the standard normal distribution for 95 percent confidence (critical Z score is Z1 – 0.05 / 2 = 1.96),

P = prevalence of illicit packs,

δ = estimation error for the proportion of illicit packs, and

$DEFF$ = design effect.[8]

The desired sample size depends on illicit cigarette prevalence (P). The estimated P in Montenegro according to the results of from the 2019 STC-SEE study is 51 percent. Taking the margin of error of 4 percent (δ = 0.04), the estimated sample size for this study is 1,200 packs. Even though pack examination studies may imply greater samples (Barker et al., 2016), when increasing the precision of δ, the results show that in this case the research would not be cost-effective. Using the smoking prevalence data from HBS and the total sample size, the researchers determined the number of packs to be collected by municipalities. More details can be found in Table A14 in Appendix A.

Cluster sampling

In this research the cluster sampling technique is used, as in various other littered pack collection studies (Merriman, 2010; Stoklosa & Ross, 2014; Barker et al., 2016; Ross et al., 2019). The first step of sampling requires the definition of PSUs. As a primary sampling unit (PSU), election polling place location is used in the research, due to unavailability of information on census tracts. The sampling frame for the PSU selection is the list of polling places and the exact number of voters in each PSU. Using the information based on polling place, it is possible to determine the geographical area of the PSU, with streets and addresses. After the first stage of sampling (selecting 188 PSUs [9]), it was necessary to design the routes where the littered packs were to be collected (the second stage). The length of each route was

[8] DEFF is design effect, which is often estimated by the rule of thumb and according to previous research. When cluster sampling is applied, DEFF of 2 or greater is usually used (Bostoen and Chalabi, 2006; Maas and Hox, 2005). In this research DEFF of 2 is used.

[9] Dividing minimum travel distance with average road length in each PSU per municipality provides the information on the number of PSUs that should be included in the final sample. Once the number of PSUs is chosen, the selection of PSUs can occur in two ways: random selection and probability proportional to size (PPS). In this research the PPS method is applied, as the size of the pack population and/or prevalence is significantly different among the PSUs. Weighting was done by the number of smokers per PSU. From a total of 727 PSUs (354,009 voters), 188 PSUs were selected from the selected municipalities, with the addresses as the starting points for the walking protocol of pollsters. This means that each PSU has its own probability of selection and is sampled based on the appropriate weight.

determined by the number of packs that was expected to be found per kilometer, total sample size, and the number of PSUs selected. A pilot study[10] provided the information that pollsters were on average likely to collect two packs per kilometer. This information was used to determine minimum travel distance needed to collect the necessary amount of packs per municipality, defined in tables A13 and A14 in Appendix A. Based on the length of routes and defined walking protocol, the starting points were defined (given in Appendix B). More details on the protocol of littered pack collection are given in Appendix B.

IIP Criteria

According to the Montenegrin legislation, a pack is considered legal if it follows these criteria:

1. The tax stamp should have a serial number, QR Code, MNE coat of arms and label "Crna Gora Ministarstvo finansija," hologram, and letter symbol (Decree on Marking Tobacco Products and Alcoholic Drinks with Control Excise Stamps).
2. The brand must be on the formal list of legal brands, provided by the Ministry of Finance.
3. The combined warning (graphic and text) must be on the back side of the pack, covering 65 percent of its surface. The message of the combined warning must be in the local language and one of the messages prescribed by the Law on Limiting Use of Tobacco Products (Article 44).
4. The general message on the front of the pack must be in the local language and one of the messages prescribed by the Law on Limiting Use of Tobacco Products (Article 42). The message must cover at least 30 percent of surface on the front.
5. The information on chemicals' quantity, in milligrams, that tobacco products contain must be given as a warning on the left side of the front of the pack. These ingredients are tar, nicotine, and carbon monoxide.
6. Packs must contain unique identification that gives information related to specific details on production (such as date of pack production, producer, and product description).
7. There must be a secure symbol that is partially visible, partially invisible, to protect unauthorized use.

A cigarette pack is considered illicit if it does not have one or more of the first six listed characteristics. The seventh characteristic is not included. The main reason is that a certain number of packs can reach the market from cigarette stocks under earlier Montenegrin legislation that did not prescribe this condition as a measure of the designation of legal packs.

Additionally, cigarette packs with foreign tax stamps were classified as legal, as health warning label had to be in local language of the country issuing the tax stamp.

3.3. Gap analysis

The gap model estimates the difference between the total cigarette market measured by relevant surveys and tax-paid cigarette sales. The gap method uses the information on smoking prevalence and intensity from different surveys. These data are combined with population estimates to determine the approximation of the total

[10] After conducting a pilot survey, it was determined the route that the pollster needs to cover is 37.5 kilometers on average, in order to collect an estimated number of packs. More details can be found in tables B2 and B3 in Appendix B.

number of cigarettes consumed. To estimate the gap, the analysis also uses data related to the quantity of tax-paid cigarettes. Table 2 gives an overview of the data used.

Smoking prevalence and intensity are obtained from the HBS data from 2006–2017. Population size (adults aged 15 and older) is obtained from the most recent census data, from which Monstat projects the estimates for the observed period. The age structures for the population and smoking prevalence are the same, which makes the data comparable. Table 3 shows the official numbers for population size and cigarettes consumed for each year.

The basic assumption of the model is to compare the total number of cigarettes consumed (survey data) in a specific period of time (L^S) with the number of cigarettes paying taxes (L^T):

$$L^S = (L^T - L^P) + L^I \quad (4).$$

Table 2

Sources of data

	Data	Year	Source	Utilization
1	Smoking prevalence	2006-2017	Statistical office of Montenegro - Monstat	Estimation of total number of cigarettes consumed
2	Smoking intensity	2006-2017	Statistical office of Montenegro - Monstat	Estimation of total number of cigarettes consumed
3	Population size	2006-2017	Statistical office of Montenegro - Monstat	Estimation of total number of cigarettes consumed
4	Used excise tax stamps – number of cigarettes	2016-2017	National tax authorities and/or from national customs offices	Estimation of total number of cigarettes consumed paying taxes

Table 3

Population size and number of cigarettes consumed

Year	Population size (aged 15+)	Number of cigarettes (based on excise stamps)
2006	491,838	2,190,973,780
2007	493,522	2,262,861,940
2008	495,553	2,161,914,100
2009	497,919	1,520,862,400
2010	500,218	1,531,287,600
2011	501,530	1,387,520,780
2012	502,905	1,099,379,600
2013	504,463	1,093,771,600
2014	506,028	1,006,293,700
2015	507,319	919,853,700
2017	509,695	530,996,560

Source: Statistical office of Montenegro – Monstat and Ministry of Finance

If data are available for the quantity of cigarettes that are produced in the country and pay taxes but are smuggled out of the country (L^P), these should be excluded. L^I represents the gap or the difference between the actual consumption and the consumption paying taxes. Under the assumption that the proportion of legal cigarettes is constant over time (for example, non-tax-paying cigarettes due to duty-free allowances), the variability in L^I is caused by illicit trade only, which is why the gap is estimated through the L^I variable:

$$L^I = L^S - (L^T - L^P) \quad (5).$$

Further analysis includes two steps: calculating the total number of smokers and the total number of cigarettes consumed by smokers in a specific period of time (L^S).

Under-reporting arguably represents the largest problem associated with gap analysis and the calculated value of the total number of cigarettes consumed by smokers. Smokers in practice tend to under-report their smoking habits, which also applies to children in the household who smoke. Generally, it is assumed that the under-reporting is constant over time, permitting evaluation of the relation between total consumption and tax-paid consumption, but as a trend rather than firm estimates of illicit market size. Furthermore, Montenegro largely depends on tourism, suggesting that calculation of overall consumption using surveys likely misses these cigarettes, which is a dynamic that must be considered. Fortunately, tourism does not fluctuate annually too much, though the time of year of the surveys must be evaluated because tourism is higher in the warmer months.

In order to obtain more precise estimates, the gap analysis uses total market consumption and its 95-percent confidence interval bounds in addition to tax-paid cigarette sales. Confidence interval bounds are estimated using a bootstrapping method (for example 1,000 draws). The base year in this research is 2006 to follow the evolution of illicit market trends over time.

4. Results

4.1. Size and characteristics of the illicit cigarette market – smoker surveys 2019 and 2022

Based on STC-SEE (2019), out of 1,000 respondents 394 are current smokers of MC and 23 are current smokers of HR tobacco. The data related to current smokers who consume tobacco products other than MC and HR are excluded from the further analysis because of the negligible number of these observations. The number of users of e-cigarettes and heated tobacco products in STC-MNE (2022) is 14 (12 with weights) and 38 (31 with weights), respectively, which is higher compared to the 2019 data (7 users of e-cigarettes and 2 users of heated tobacco).

The final sample of MC current smokers in 2019 is 388 (379 with weights), and for HR it is 13 (14 with weights). Due to the lack of pictures (respondents who declined to show their pack) or answers related to the last-purchased pack, six observations from MC (1.9 percent) and nine observations from the sample of HR current smokers (38.5 percent) are excluded. For the shown packs, information from the pack pictures is cross-checked against information from the database to remove potential errors in the data entry process. The final sample for the survey in 2022 is 705 (708 with

weights) MC current smokers and 45 (48 with weights) HR current smokers. In both samples, a small number of observations are dropped (0.3 percent for MC and 3.8 percent for HR) because respondents declined to show their pack or to answer the questions related to the last-purchased pack (eight observations from the MC sample and five from the HR sample).

Due to the negligible number of observations related to HR, the illicit HR tobacco market is not analyzed separately. Instead, in the following analysis the focus will be given to smokers of MC only and all smokers of MC and/or HR combined.

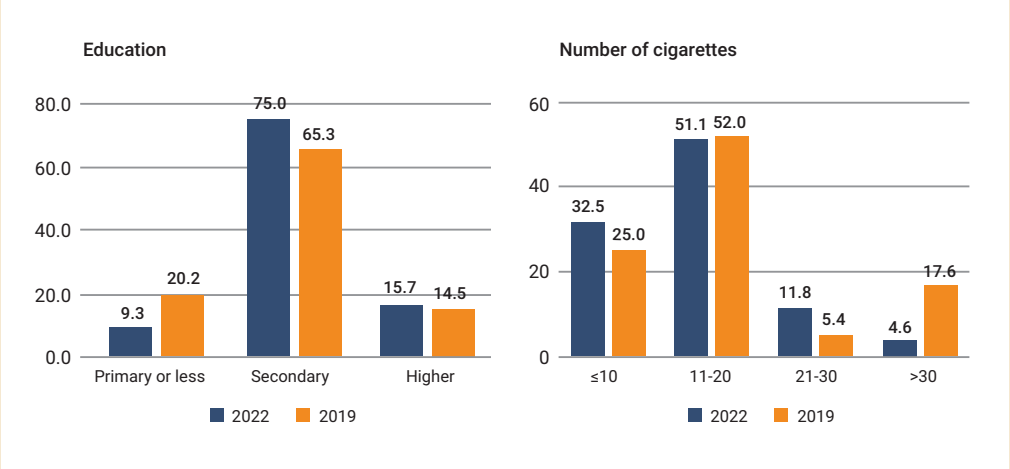
Descriptive statistics on HR consumption are available in the Appendix.

Manufactured cigarettes (STC-SEE 2019 and STC-MNE 2022)

The highest percentage of smokers, in both years, has a secondary level of education and lives in urban areas. They are usually daily smokers, and half of them smoke 11–20 cigarettes per day (Figure 1) and mostly spend 4–12 percent of their household budget on cigarettes.

Figure 1

Percentage distribution of MC smokers in 2019 and 2022, by education and number of cigarettes per day



Note: Sample size STC-MNE = 708, STC-SEE = 379

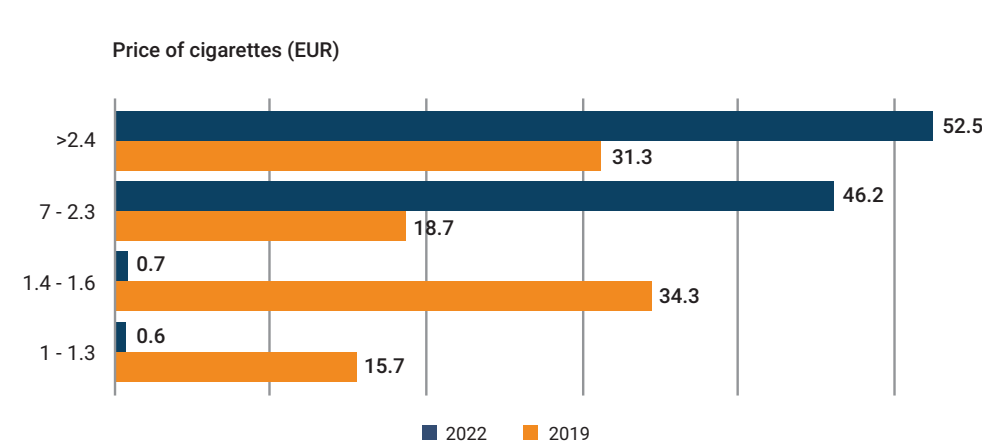
Source: Authors' calculations using STC-MNE and STC-SEE data for Montenegro

Notably, in 2022, prices were generally higher[11]. More than a half of smokers reported cigarette purchases in the range of EUR 2.4–5.0 per pack, compared to 2019, when the prices typically ranged from EUR 1.4–1.6 (Figure 2).

[11] Average CPI in period from 2019 to 2021 is 0.83 percent.

Figure 2

Percentage distribution of MC smokers in 2019 and 2022, by price paid for cigarettes (EUR)

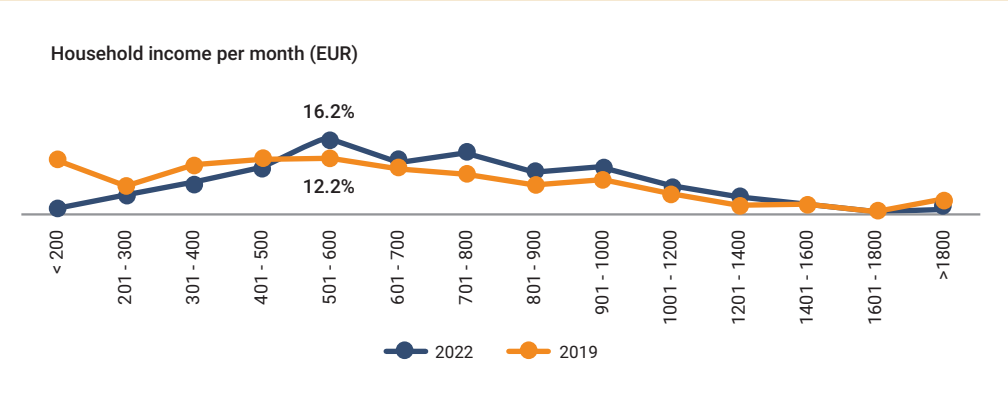


Note: Sample size STC-MNE = 708, STC-SEE = 379

Source: Authors' calculations using STC-MNE and STC-SEE data for Montenegro

Figure 3

Percentage distribution of MC smokers in 2019 and 2022, by household income per month (EUR)



Note: Sample size STC-MNE = 708, STC-SEE = 379

Source: Authors' calculations using STC-MNE and STC-SEE data for Montenegro

In 2019, half of smokers reported lower household income (less than EUR 600), while in 2022 the level of income for the same share of smokers was relatively higher—on average EUR 700 (Figure 3). More details on other sociodemographic characteristics of the MC sample in both years can be found in tables A5 and A5a in Appendix A.

The percentage of the illicit cigarette market in 2022 decreased significantly compared to 2019.

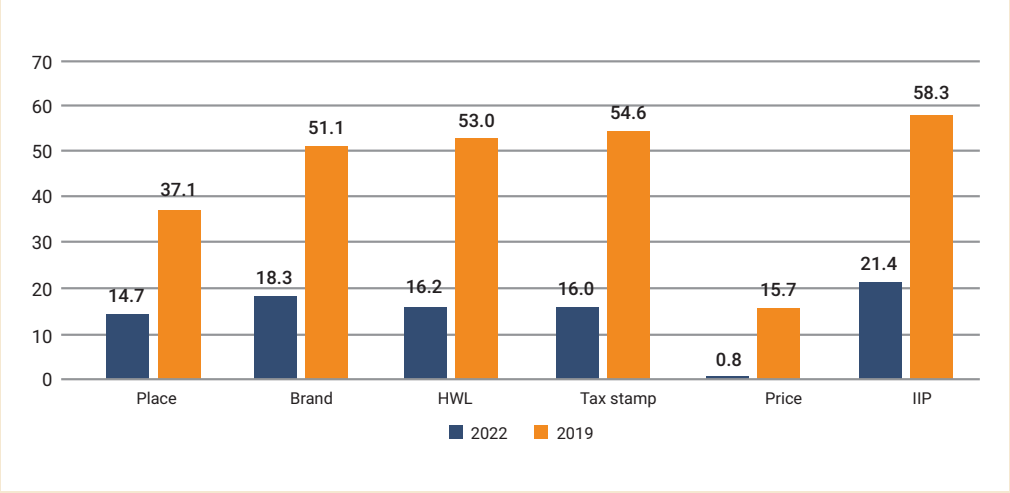
The percentage of the illicit cigarette market decreased from 58.3 percent in 2019 to 21.4 percent in 2022. There was a reduction of about 70 percent of all characteristics that define the packs as illegal, which ultimately led to a significant reduction in the overall percentage of the illicit cigarette market.

For example, in 2019 the percentage of illegal packs without an appropriate tax stamp was 54.6 percent, while in 2022 only 16 percent of packs did not have an appropriate tax stamp. Regarding the place of purchase, in 2019 results show that 37.1 percent of packs were bought at an illicit place, compared to only 14.7 percent in 2022. The lowest percentage of illicit packs, in both years, is found according to the criteria of price, or a price lower than 70 percent of the lowest price in the country (EUR 1.33 in 2019 and EUR 1.4 in 2022). Almost all illicit packs in 2022 were bought at a price that defines a pack as legal (higher than EUR 1.4), and the same is true for the majority (3/4) in 2019, when the legal price was EUR 1.33 and higher. Figure 4 presents more details regarding the criteria of IIP in both surveys.

The findings for illicit brands are similar for both years: the majority of illicit packs (a higher percentage in 2019 compared to 2022) were brands not on the formal list of legal brands, packs with no tax stamp and packs with a health warning in a foreign language (Figure 5). More details of cross-

Figure 4

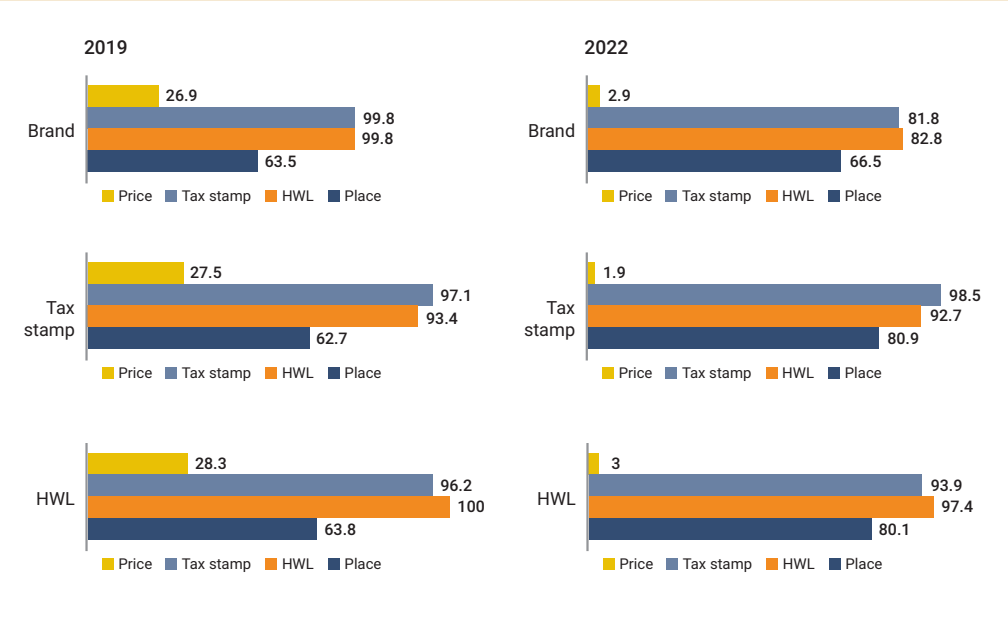
Percentage of illicit packs (MC) in 2019 and 2022, by IIP criteria



Note: Sample size STC-MNE = 708, STC-SEE = 379

Source: Authors' calculations using STC-MNE and STC-SEE data for Montenegro

Figure 5
Interrelation between criteria of identification of IIP (MC) in 2019 and 2022



Note: Sample size STC-MNE = 708, STC-SEE = 379

Source: Authors' calculations using STC-MNE and STC-SEE data for Montenegro

tabulation of IIP characteristics can be found in tables A7 and A7a in Appendix A.

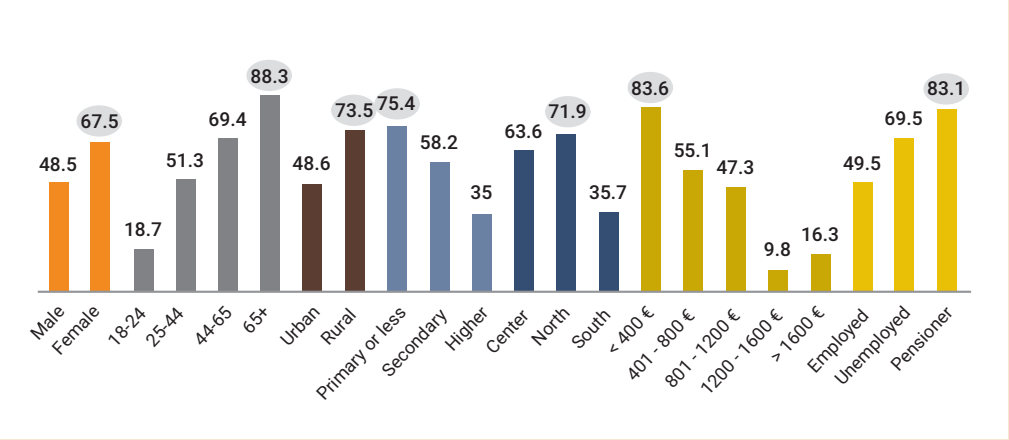
Overall the illicit cigarette market, measured by IIP variables, was also analyzed from the aspect of sociodemographic and smoking behavior characteristics, to understand the profile of smokers of illicit packs.

Figures 6a and 6b demonstrate that females buy more illicit packs compared to males. That difference is larger in 2019 (67.5 vs. 48.5 percent, respectively) than in 2022 (23.0 vs. 19.3, respectively). In 2019, more than 80 percent of smokers who consumed illicit cigarettes were older than 65, retired, and came from low-income households. In 2022 the age structure of these smokers had changed only slightly, with more than half of illicit cigarette smokers over 45 years old, mostly coming from low-income households and being unemployed.

Taking into account smokers' behavior and characteristics (figures 7a and 7b), the results demonstrate that the highest expenditure (80.6 percent) on illicit packs in 2019 is related to smokers who spend EUR 28–45 monthly on cigarettes, while in 2022 the expenditures were higher, with smokers spending EUR 46–65 per month on cigarettes (28 percent). In 2019, 70 percent of smokers reported that more than 20 percent of their budget was spent on cigarettes, while in 2022, these allocations decreased, with the majority of smokers spending 4–12 percent of their budget on cigarettes. In both years, smokers who smoke between 21 and 30 cigarette per day buy more illicit packs compared to other groups.

Figure 6a

Percentage of MC smokers who smoked illicit cigarettes in 2019, by sociodemographic characteristics

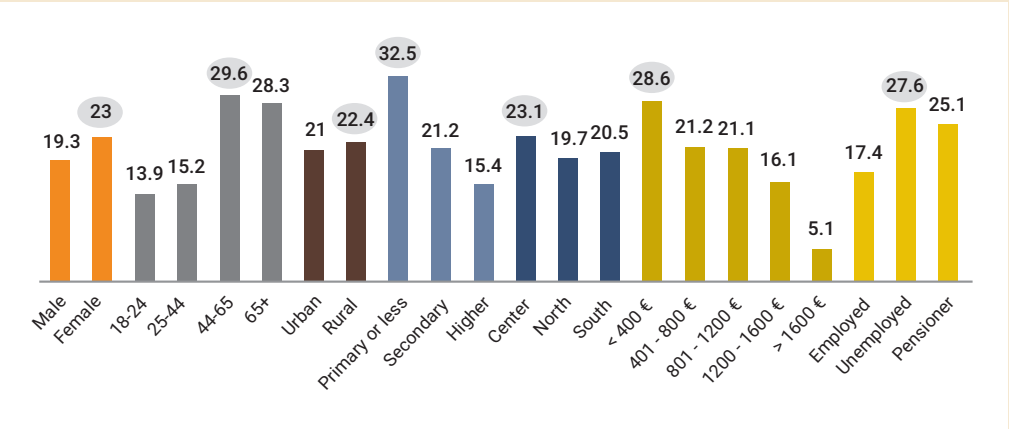


Note: Sample size = 379; there is a statistically significant difference among categories of each demographic characteristic; univariate tests show equality of proportion only between Center and North regions (F = 2.07, p = 0.30).

Source: Authors' calculations using STC-SEE data for Montenegro

Figure 6b

Percentage of MC smokers who smoked illicit cigarettes in 2022, by sociodemographic characteristics

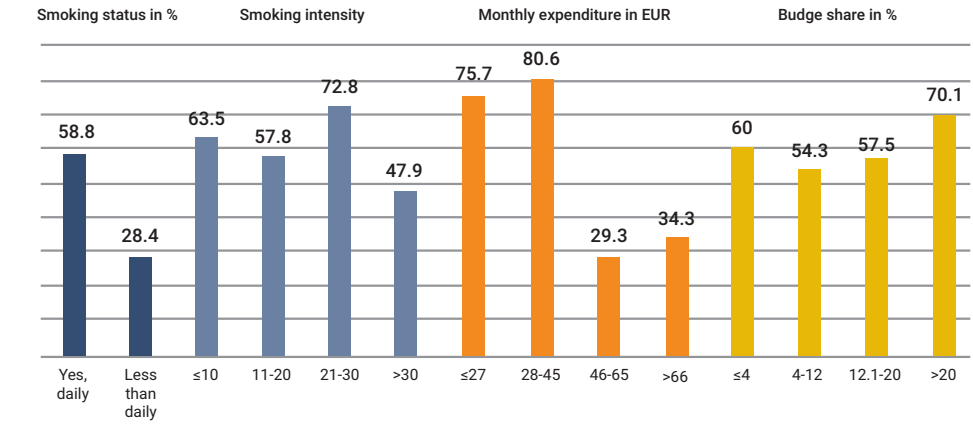


Note: Sample size = 708; test showed equality of proportion between male and female (F=1.46, p = 0.23), urban and rural (F = 0.17, p = 0.68), and regions (F=0.48, p = 0.62).

Source: Authors' calculations using STC-MNE data for Montenegro

Figure 7a

Percentage of MC smokers who smoked illicit cigarettes in 2019, by smokers' behavior and characteristics

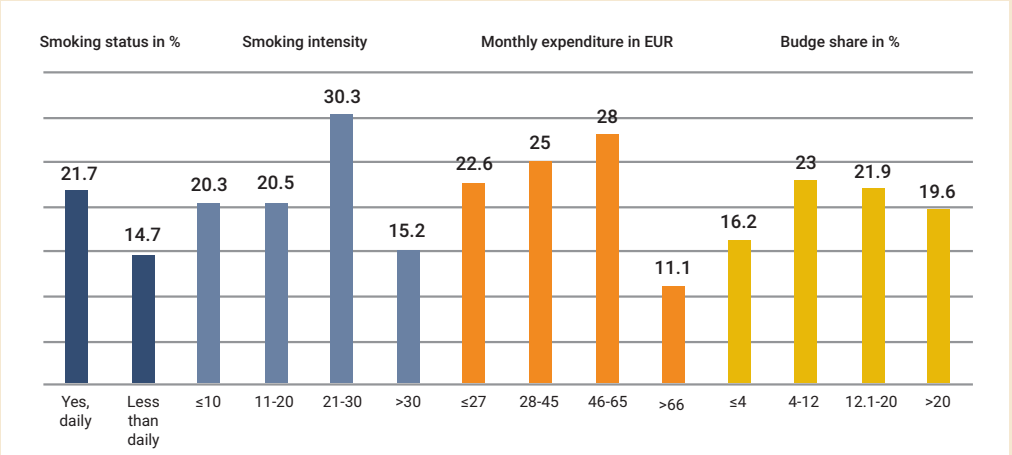


Note: Sample size = 379; there is a statistically significant difference among categories of each smoking characteristic.

Source: Authors' calculations using STC-SEE data for Montenegro

Figure 7b

Percentage of MC smokers who smoke illicit cigarettes in 2022, by smokers' behavior and characteristics



Note: Sample size = 708; test shows equality of proportion between categories of smoking status (F = 1.24, p = 0.26), smoking intensity (F = 1.46, p = 0.22), and budget share (F = 1.04, p = 0.37).

Source: Authors' calculations using STC-MNE data for Montenegro

Figure 7c

Percentage distribution of packs, by legal brand in 2022 and 2019 by percentage

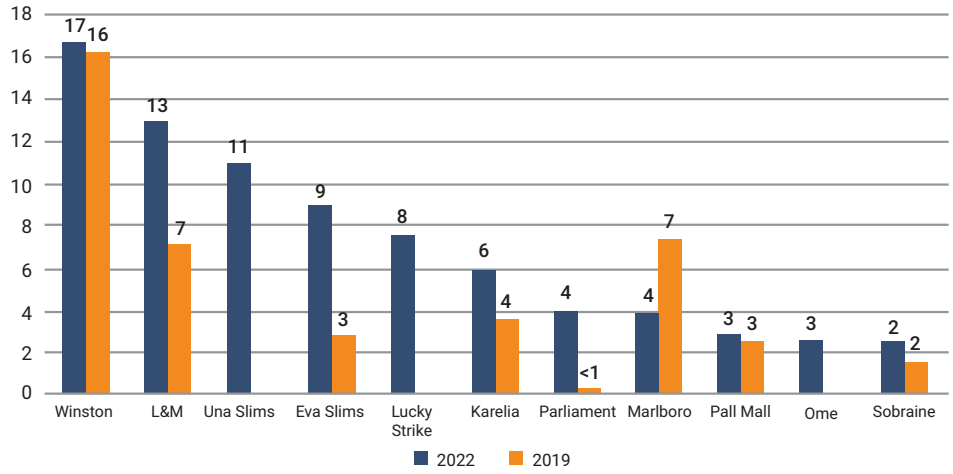
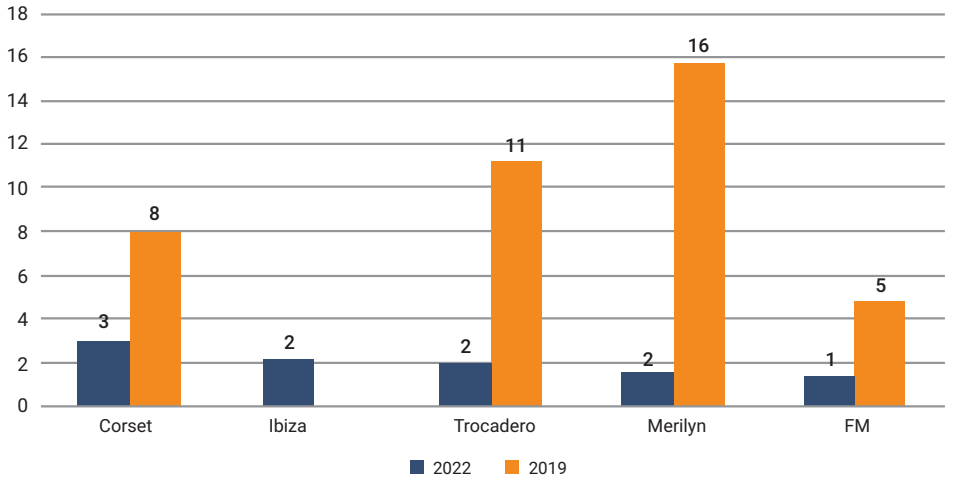


Figure 7d

Percentage distribution of packs, by illegal brand in 2022 and 2019



Note: Sample size STC-MNE = 708, STC-SEE = 379

Source: Authors' calculations using STC-MNE and STC-SEE data for Montenegro

Overall, the average consumer of illicit packs in 2019 smoked 18.5 cigarettes per day, spent EUR 38.10 monthly on cigarettes, and had a household monthly income of EUR 501. Compared to 2019, the average consumer of illicit packs in 2022 smoked fewer cigarettes per day (16.4), spent more monthly on cigarettes (EUR 52.20), and had higher monthly household income of EUR 668.60. The sociodemographic and behavior structure of consumers by each identification of illicit pack criteria is presented in tables A8a and A8b in Appendix A.

As can be seen in Figure 7c, the most used legal brand in both years was Winston. The consumption of L&M brand in 2022 almost doubled compared to 2019, which made this brand the second most consumed. On the other hand, there is a significant decrease in consumption of widely used illicit brands in 2022 compared to 2019 (Trocadero and Merilyn), with the increasing share of legally consumed cigarettes.

4.2. Factors affecting probability of buying illicit cigarettes

This study explores the impact of sociodemographic and smoking behavior factors associated with a purchase of illicit cigarettes using logistic regression. To estimate the impact of these factors, from the three best models one is used as the preferred according to information criteria (Model 3, tables A11 and A11a in Appendix A).

The results for the MC preferred model in 2019 show that females, persons older than 25, and those living in rural areas are more likely to buy illicit packs. Females are 14.4 percent more likely to buy illicit packs than males. People living in rural areas are 25.5 percent more likely to consume illicit cigarettes compared to smokers from urban areas. Consumption of illicit cigarettes is more probable as a smoker's age increases, wherein the eldest (aged 65 and older) have a 69.1 percent higher probability of purchasing illicit cigarettes compared to the youngest smokers' age group (18–24). There is no statistically significant relationship between employment status of the smoker and the probability of buying illicit cigarettes.

In 2019 in Montenegro, there is a statistically significant negative association between household income and the probability of purchasing illicit cigarettes. The wealthiest smokers have a 53-percent lower probability of purchasing illicit cigarettes compared to the poorest income group. A similar relationship is found when it comes to education levels, wherein smokers with higher education are 23.1 percent less likely to consume illicit cigarettes compared to those with a primary education level. Additionally, consumption of illicit cigarettes is less present in the south compared to the center region (Table A11 in Appendix A).

The results in 2022 are similar (Table A11a in Appendix A) to those of 2019. A higher probability of illicit cigarette consumption is associated with older smokers and mainly those concentrated in the south and center compared to the north (with a higher probability in the south compared to the north). Moreover, households with children aged from 5–14 years and the unemployed are more likely to buy illicit cigarettes. The same applies to the wealthiest households. Other variables, even though not statistically significant, show that males are more likely to buy illicit packs compared to females and those with secondary and a higher level of education are less likely to buy illicit packs compared to those with a primary education level (Table A11a in Appendix A).

Smoking behavior variables (smoking intensity, smoking status, spending on cigarettes per month) do not show significant impacts on the probability of consumption of illicit cigarettes (STC-SEE, 2019). Among the distance variables, the only significant dummy variable was for the municipalities bordering Serbia (Table A11 in Appendix A). In 2022, the results show that those who spend more on cigarettes each month are less likely to buy illicit cigarettes.

The results from the preferred MCHR model are the same as in the case of MC model. These results are expected, because of the negligible number of HR sample observations (See tables A12 and A12a in Appendix A as well as Appendix C).

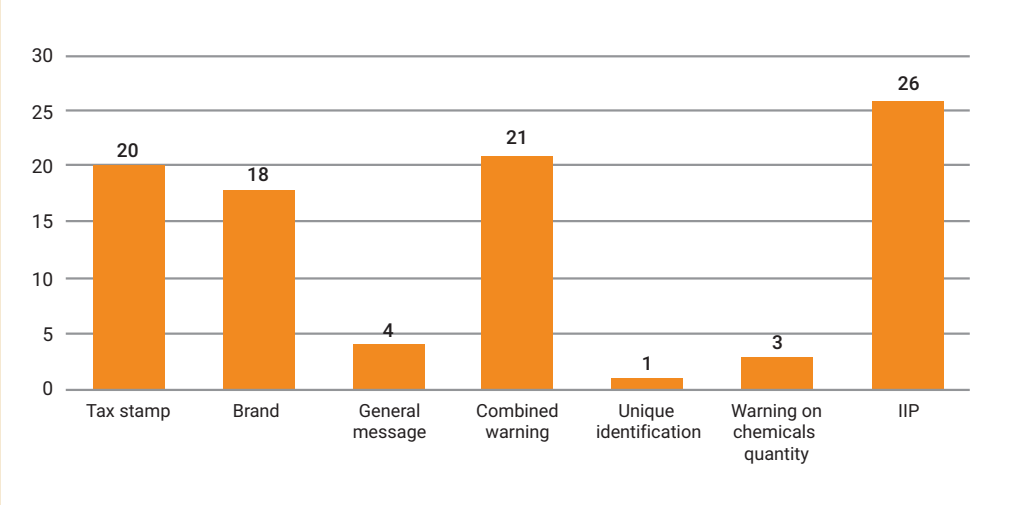
4.3. Size and characteristics of the illicit market – littered packs examination

According to the results (Figure 8), 26 percent of the collected packs are illicit (out of 1,200 in total). Regarding the IIP criteria, the largest numbers of illicit packs are associated with illicit brands, are missing tax stamps, or have an inappropriate health warning label (graphic and text). The smallest percentages of illicit packs are those that do not have a warning on chemical quantity or are missing the unique identification. A brand called Corset Lilac Super Slim has the highest share in the illicit packs sample, while the most-smoked legal brand is Winston X-style Long Blue.

Analyzing the data by municipalities, Bijelo Polje (12 percent) and Pljevlja (14 percent) show the lowest levels of illicit consumption, while the highest levels of illicit packs are found in Danilovgrad (46 percent) and Herceg Novi (45 percent) (Figure 9).

Figure 8

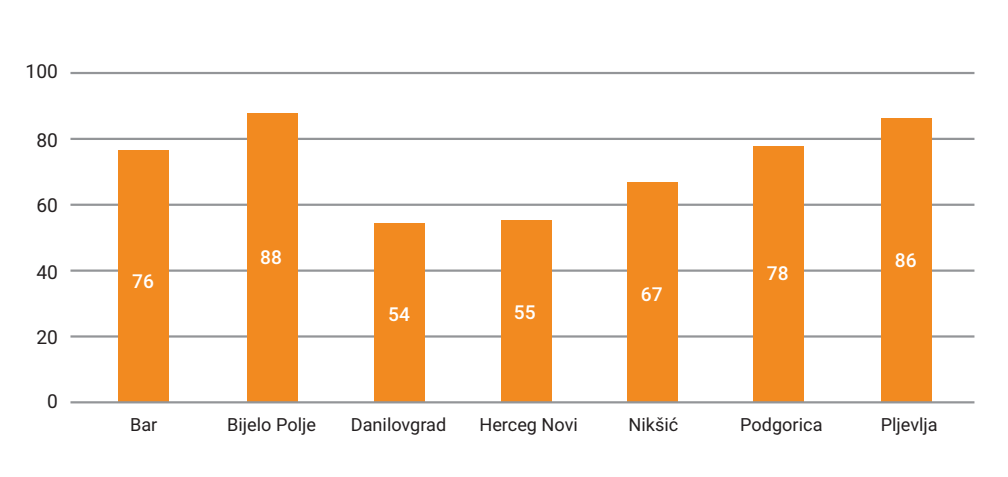
Number of illicit littered packs, by IIP criteria



Note: Sample size = 1,200

Figure 9

Number of illicit packs by municipality



Notes: Sample size = 1,200; north region: Bijelo Polje and Pljevlja; center region: Podgorica, Nikšić, and Danilovgrad; south region: Herceg-Novi and Bar.

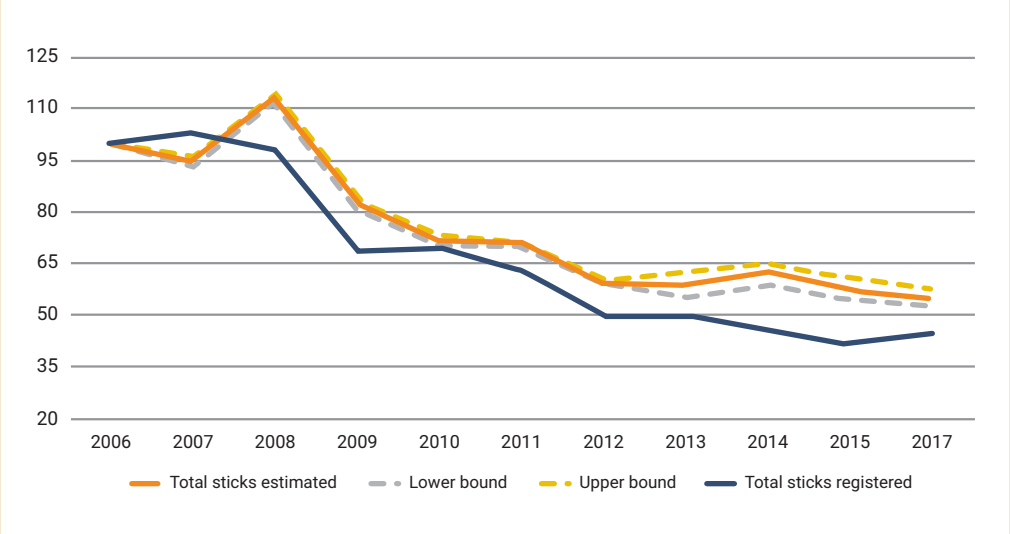
4.4. Size and characteristics of illicit cigarette market – gap analysis

The gap analysis results are derived from the comparison of tax-paid cigarette sales and consumption estimates from HBS (2006–2017). Figure 10 demonstrates that the rate of tax-paid market growth (total sticks registered) lies below the 99-percent confidence interval, implying that the non-tax-paid market grew in relative terms, specifically since 2013. Total cigarette consumption decreased during the period observed, as well as legal sales.

As previously mentioned, the main limitation of this method is under-reporting. But, in the case of Montenegro, under-reporting of prevalence and intensity appear to be fairly constant across time:

- Children's smoking participation is constant over time (<15).
- The variation in number of tourists from the three main source countries is low during the period observed (government revenues from tourism mainly depend on tourists traveling from these countries).

Figure 10
Gap analysis 2006–2017 (Index, 2006=100)



5. Discussion and Policy Recommendations

This research estimates the extent of the illicit cigarette market in the tobacco market in Montenegro. The results show that the illicit market share in 2022 decreased significantly compared to 2019, from 51 percent in 2019 to between 22.1 and 26.0 percent in 2022. This large decrease in the share of the market for illicit cigarettes coincides with government measures to combat the illicit tobacco market in the country.

One of the most effective measures, which is considered a best practice for controlling illicit cigarettes, is the implementation and enforcement of the government decision on the prohibition of storage of tobacco products on the territory of the free-trade zone in the Port of Bar starting in July, 2021 (Bar is in the southern municipality in Montenegro). Additionally, border protection (customs officers and police) vigilance has been strengthened and surveillance has increased in the free-trade zone of Novi Duvanski Kombinat Podgorica (NDKP). As a result, there were major cigarette seizures in 2022, including 150,000 packs between May and June and another 5,000 packs in July (which is 0.4 percent of legal sales in 2021). Following the obligations of the WHO Framework Convention on Tobacco Control (FCTC) (2003) and the Illicit Trade Protocol (2013), to which Montenegro is a party, these confiscated illicit cigarettes should be destroyed.

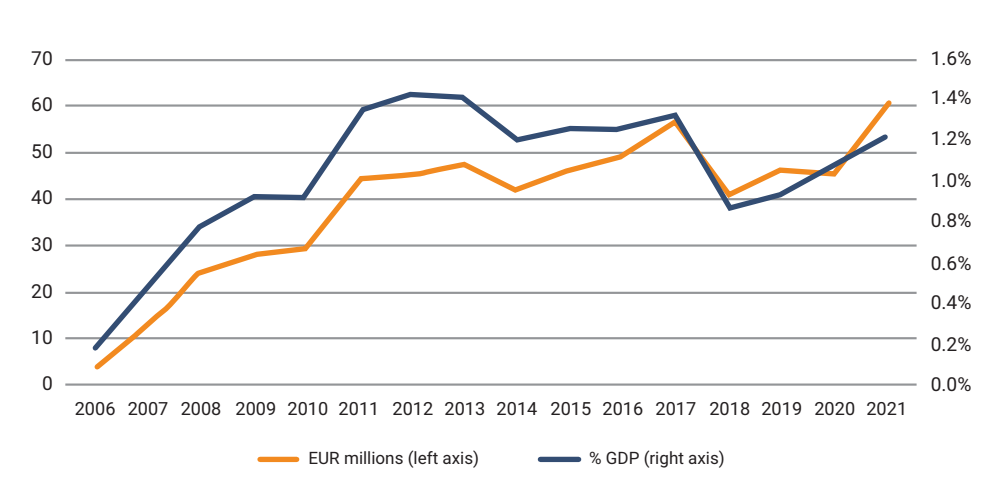
The impact of these measures is also reflected in the excise tax revenues, as the collection in 2021 reached 1.2 percent of gross domestic product (GDP) (Figure 11) for the first time since the decline below one percent in 2018. Since the introduction of a mixed excise tax system in 2005, the government of Montenegro had steadily increased the excise tax on tobacco products. The specific excise increased from EUR 5 per 1,000 cigarette sticks in January 2009 to EUR 30 in December 2017, while

the ad valorem rate was reduced from 40 to 32 percent during that period. After the specific excise was increased to EUR 40 in January 2018, the government decided to revise it down to EUR 30 in August 2018, due to a significant reduction in revenues. This policy remained in effect until the end of 2019, after which the specific excise was gradually increased annually by EUR 3.5 while the ad valorem rate was annually reduced by 1.5 percentage points. Following the recovery of revenue collection in 2021, a EUR 3.5 increase in the specific excise and 1.5 percentage point reduction in the ad valorem rate was implemented twice in 2022 (in January and June). In January of 2023, the specific excise increased again by EUR 3.5 to a total of EUR 47.5 per 1,000 sticks. At the same time, revenues from the tobacco excise increased by 52.5% in 2022 as compared to 2021.

It is also worth considering that the reduction in revenue collection at the beginning of 2018 coincided with the opening of a new free economic zone in May 2018 within the premises of a former state-owned cigarette factory in Podgorica, NDKP, which was acquired by the United Arab Emirates (UAE)–based BMJ Industries in 2016. Ross et al. (2016) find that one-third of manufacturers producing so-called "illicit whites" operate in the free-trade zones of Russia, Cyprus, and the UAE. Following the government's announcement regarding the strengthening of monitoring and surveillance of the free-trade zone of NDKP (Vlada Crne Gore, 2021), the owner announced they would be closing the factory (Kapor, 2021).

The littered pack survey estimates the scope of illicit cigarette trade in Montenegro using a sample that includes seven major cities in Montenegro. The littered pack collection method has the potential to report accurate information about illicit cigarette market size using a simple, reliable, and relatively inexpensive methodology. The littered pack collection results show that the proportion of illicit cigarettes from the littered packs is slightly

Figure 11
Tobacco excise tax revenues, 2006–2021



Source: Ministry of Finance, Government of Montenegro

larger (26 percent) compared to the STC-MNE estimate using face-to-face survey (22.1 percent). The results confirm the best practice of cross-validating estimates with both methods whenever possible, but they also show that using one of the two methods would also be acceptable in any given year.

The gap analysis trend results imply that the non-tax-paid market grew in relative terms from 2013 to 2017. Unfortunately, due to the lack of HBS data after 2017, the estimation could not be performed for the subsequent years. When new HBS data are available, the trend analysis can be extended, though there will be a significant gap between years.

This research also shows that households with lower income (poorer smokers) and lower education levels are more prone to evading cigarette taxes. The same applies to unemployed smokers compared to employed ones. A higher probability of consuming illicit cigarettes is also associated with older smokers. Additionally, the smokers' survey from 2022 showed that households with a higher number of children aged 5–14 are more likely to buy illicit cigarettes.

From these findings, the following policy recommendations are offered:

- Strengthen governance by investing more in tax administration and enforcement to reduce the share of illicit trade. This means introducing strong measures and penalties, while investing in enforcement officers on the ground.
- Destroy all seized illicit cigarettes to comply with FCTC and Illicit Trade Protocol obligations as well as to protect public health and prevent future tobacco-related diseases and premature deaths.
- Target awareness campaigns and cessation services to particular groups with a higher likelihood of evasion (such as smokers with lower income and unemployed smokers) by creating mass media campaigns about the harms of tobacco use and funding accessible cessation programs for smokers who want to quit, including counseling and cessation medications.

Potential limitations of the study include the insufficient official sales data and problem with under-reporting of consumption in surveys. This is why the gap method should be utilized only to track trends. Moreover, in the case of pack examination survey, the uncertainty around the identification of spoiled packs' (e.g., damaged tax stamp) legal status might be problematic though fortunately there were relatively few of these packs.

References

1. Guindon, E. G., Driezen, P., Chaloupka, F. J., & Fong, G. T. (2014). Cigarette tax avoidance and evasion: Findings from the international tobacco control policy evaluation (ITC) project. *Tobacco Control*, *23*(SUPPL. 1). https://doi.org/10.1136/tobaccocontrol-2013-051074
2. Joossens, L., Lugo, A., La Vecchia, C., Gilmore, A. B., Clancy, L., & Gallus, S. (2014). Illicit cigarettes and hand-rolled tobacco in 18 European countries: A cross-sectional survey. *Tobacco Control*, *23*(0), 17-23. doi:10.1136/tobaccocontrol-2012-050644
3. Jovanovic, J., & Kapor, G. (2022). Oduzete cigarete stigle iz Dubaija. Vijesti. https://www.vijesti.me/vijesti/crna-hronika/620592/oduzete-cigarete-stigle-iz-dubaija
4. Kapor, G. (2021). Vlasnici Novog duvanskog kombinata odlučili da ugase fabriku. Vijesti. https://www.vijesti.me/vijesti/ekonomija/577677/vlasnici-novog-duvanskog-kombinata-odlucili-da-ugase-fabriku
5. Law of Tobacco, Official Gazette of the Republic of Montenegro, PL No. 48/08, 76/08, 40/11, 42/15
6. Law on Excise Tax, Official Gazette of the Republic of Montenegro, PL No. 065/01, 012/02, 076/05 and Official Gazette of the Republic of Montenegro PL No. 076/08, 050/09, 078/10, 040/11, 061/11, 028/12, 038/13, 045/14 008/15, 001/17, 50/17, 55/18
7. Law on Limiting Use of Tobacco Products, Official Gazette of the Republic of Montenegro, P.L.No. 052/04 and Official Gazette of the Republic of Montenegro, PL No. 032/11, 047/11, 003/16
8. Law on Ratification of the Protocol to Eliminate Illicit Trade in Tobacco Products, Official Gazette of the Republic of Montenegro 5/17
9. Little, M., Ross, H., Bakhturidze, G., & Kachkachishvili, I. (2019). Illicit tobacco trade in Georgia: Prevalence and perceptions. *Tobacco Control*, 1–7. https://doi.org/10.1136/tobaccocontrol-2018-054839
10. Maldonado, N., Llorente, B. A., Iglesias, R. M., & Escobar, D. (2018). Measuring illicit cigarette trade in Colombia. *Tobacco Control*, 1–7. https://doi.org/10.1136/tobaccocontrol-2017-053980
11. Mugoša, A., Laković, T., Kovačević, M., Čizmović, M., & Popović, M. (2020). *Adult tobacco use in Montenegro*. The Institute of Socioeconomic Analysis, Podgorica, Montenegro.
12. Mugoša, A., Čizmović, M., Laković, T., & Popović, M. (2019). *The effectiveness of tax policy changes in Montenegro – smoking behavior by socioeconomic status*. The Institute of Socioeconomic Analysis, Podgorica, Montenegro.
13. Marquez, P.V., Krasovksy, K., & Andreeva, T. (2019). *Overview of tobacco use, tobacco control legislation and taxation*. World Bank
14. Paraje, G. (2019). Illicit cigarette trade in five South American countries: A gap analysis for Argentina, Brazil, Chile, Colombia, and Peru. *Nicotine & Tobacco Research*, *21*(8), 1079-1086. doi: 10.1093/ntr/nty098. PMID: 29767772.

15. Paraje, G., Araya, D., & Drope, J. (2020). Illicit cigarette trade in Metropolitan Santiago de Chile. *Tobacco Control*, *29*(1), 68–73. https://doi.org/10.1136/tobaccocontrol-2018-054546

16. Radio Slobodna Evropa. (2021). Vlada Crne Gore: *Kraj šverca cigareta preko Luke Bar*. https://www.slobodnaevropa.org/a/crna-gora-sverc-cigare-bar-luka-/31372306.html

17. Ross, H., & Blecher, E. (2019). *Illicit trade in tobacco products need not hinder tobacco tax policy reforms and increases*. Tobacconomics White Paper. Chicago, IL: Tobacconomics, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago.

18. Ross, H., Vellios, N., Clegg Smith, K., Ferguson, J., & Cohen J. E. (2016). A closer look at 'cheap white' cigarettes. *Tobacco Control*, *25*, 527–531.

19. Saenz De Miera Juarez, B., Reynales-Shigematsu, L. M., Stoklosa, M., Welding, K., & Drope, J. (2020). Measuring the illicit cigarette market in Mexico: A cross validation of two methodologies. *Tobacco Control*, 1–7. https://doi.org/10.1136/tobaccocontrol-2019-055449

20. Stoklosa, M., & Ross, H. (2014). Contrasting academic and tobacco industry estimates of illicit cigarette trade: Evidence from Warsaw, Poland. *Tobacco Control*, *23*(0), 30-34. http://dx.doi.org/10.1136/tobaccocontrol-2013-051099

21. Tomović, P. (2022). *Prodaja zaplijenjenih cigareta komplikuje evropske integracije Crne Gore*. Radio Slobodna Evropa. https://www.slobodnaevropa.org/a/zaplijenjene-cigarete-prodaja-crna-gora-sverc/31963479.html

22. U.S. National Cancer Institute and World Health Organization. (2016). *The economics of tobacco and tobacco control*. National Cancer Institute Tobacco Control Monograph 21. NIH Publication No. 16-CA-8029A. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; and Geneva, CH: World Health Organization.

23. Vlada Crne Gore. (2021). *Predlog odluke o zabrani skladištenja duvanskih proizvoda na teritoriji slobodne zone „Luka Bar" sa Analizom mogućnosti isključenja ili zabrane skladištenja duvanskih proizvoda iz oblasti slobodne zone "Luka Bar"*. https://www.gov.me/dokumenta/f644dc45-8ad2-4249-a0c2-2043d3b6faa5

24. Widya, K., Rahmanda, M. T., Dwi, R. N., Herni, R., Luhur, F. M., & Setyo, B. (2019). *The illicit cigarette trade in Indonesia*. Perkumpulan PRAKARSA.

25. World Health Organization. (2003). *WHO Framework Convention on Tobacco Control*. https://fctc.who.int/publications/i/item/9241591013

26. World Health Organization. (2013). *Protocol to Eliminate Illicit Trade in Tobacco Products*. https://fctc.who.int/publications/i/item/9789241505246

Appendix A

Table A1a

Linktest (MC) 2019

Model 1				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.09	0.14	7.85	0.00
_hatsq	-0.08	-0.08	-1.39	0.16
_cons	0.09	0.15	0.59	0.56
Model 2				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.09	0.14	7.85	0.00
_hatsq	-0.08	0.06	-1.39	0.16
_cons	0.09	0.15	0.59	0.20
Model 3				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.07	0.14	7.73	0.00
_hatsq	-0.07	0.06	-1.16	0.25
_cons	0.07	0.15	0.49	0.63

Table A1b

Linktest (MC) 2022

Model 1				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.17	0.38	3.05	0.00
_hatsq	0.07	0.15	0.49	0.63
_cons	0.07	0.25	0.28	0.78
Model 2				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.18	0.40	2.95	0.00
_hatsq	0.08	0.16	0.50	0.62
_cons	0.07	0.26	0.29	0.77
Model 3				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.19	0.38	3.10	0.00
_hatsq	0.08	0.15	0.55	0.58
_cons	0.08	0.25	0.31	0.76

Table A2a

Hosmer and Lemeshow goodness of fit test (MC) 2019

Model 1					
groups	**5**	**10**	**15**	**20**	**50**
chi2	4.62	12.71	11.20	17.79	57.05
p	0.20	0.12	0.60	0.40	0.15
Model 2					
groups	**5**	**10**	**15**	**20**	**50**
chi2	4.52	11.15	10.50	27.02	50.49
p	0.21	0.19	0.65	0.06	0.34
Model 3					
groups	**5**	**10**	**15**	**20**	**50**
chi2	5.73	10.43	15.93	20.61	52.66
p	0.13	0.24	0.25	0.24	0.26

Table A2b

Hosmer and Lemeshow goodness of fit test (MC) 2022

Model 1					
groups	**5**	**10**	**15**	**20**	**48**
chi2	1.03	9.79	11.68	23.03	48.66
p	0.80	0.28	0.55	0.19	0.45
Model 2					
groups	**5**	**10**	**15**	**20**	**50**
chi2	1.00	3.72	8.63	28.41	35.53
p	0.88	0.88	0.80	0.06	0.91
Model 3					
groups	**5**	**10**	**15**	**20**	**50**
chi2	3.93	14.58	19.70	24.66	50.13
p	0.27	0.07	0.10	0.14	0.39

Table A3a

Linktest (MCHR) 2019

Model 1				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.08	0.14	7.81	0.00
_hatsq	-0.07	0.06	-1.16	0.25
_cons	0.07	0.15	0.49	0.63
Model 2				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.08	0.14	7.83	0.00
_hatsq	-0.07	0.06	-1.21	0.23
_cons	0.07	0.15	0.50	0.61
Model 3				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.06	0.14	7.82	0.00
_hatsq	-0.05	0.06	-0.90	0.37
_cons	0.06	0.15	0.38	0.71

Table A3b

Linktest (MCHR) 2022

Model 1				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.33	0.19	6.90	0.00
_hatsq	0.15	0.06	2.51	0.01
_cons	0.08	0.15	0.57	0.57
Model 2				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.46	0.40	3.62	0.00
_hatsq	0.22	0.18	1.24	0.21
_cons	0.14	0.20	0.71	0.48
Model 3				
	Coef.	**Std. Err.**	**z**	**P>z**
_hat	1.27	0.40	3.14	0.00
_hatsq	0.13	0.18	0.72	0.47
_cons	0.08	0.20	0.42	0.68

Table A4a

Hosmer and Lemeshow goodness of fit test (MCHR) 2019

Model 1					
groups	**5**	**10**	**15**	**20**	**50**
chi2	8.84	16.89	28.84	32.49	57.04
p	0.03	0.03	0.01	0.02	0.15
Model 2					
groups	**5**	**10**	**15**	**20**	**50**
chi2	10.42	18.13	27.60	30.24	54.35
p	0.01	0.02	0.01	0.04	0.21
Model 3					
groups	**5**	**10**	**15**	**20**	**50**
chi2	4.88	9.56	32.41	27.28	57.07
p	0.18	0.30	0.00	0.07	0.15

Table A4b

Hosmer and Lemeshow goodness of fit test (MCHR) 2022

Model 1					
groups	**5**	**10**	**15**	**20**	**50**
chi2	6.00	13.73	21.65	21.24	59.84
p	0.11	0.09	0.06	0.27	0.12
Model 2					
groups	**5**	**10**	**15**	**20**	**50**
chi2	1.75	6.59	10.35	15.67	56.94
p	0.63	0.58	0.67	0.62	0.18
Model 3					
groups	**5**	**10**	**15**	**20**	**50**
chi2	1.86	6.39	13.40	15.03	49.72
p	0.60	0.60	0.42	0.66	0.41

Table A5a

Percentage distribution of smokers by sociodemographic and smoking behavior characteristics (MC) 2019

	Percentage	95% CI
Gender		
Male	48.2	(43.2, 53.3)
Female	51.8	(46.7, 56.8)
Age		
18-24	8.5	(6.1, 11.8)
25-44	44.1	(39.1, 49.1)
45-65	41.1	(36.2, 46.1)
65+	6.4	(4.3, 9.3)
Type of residence		
Urban	61.0	(56.0, 65.8)
Rural	39.0	(34.2, 44.0)
Education level		
Primary or less	20.2	(16.5, 24.6)
Secondary	65.3	(60.4, 70.0)
Higher	14.5	(11.2, 18.4)
Region		
Center	45.6	(40.6, 50.7)
North	27.4	(23.1, 32.1)
South	27.1	(22.8, 31.8)
Price		
1-1.3	15.7	(12.4, 19.7)
1.4-1.6	34.3	(29.7, 39.3)
1.7-2.3	18.7	(15.1, 22.9)
2.4-3.7	31.3	(26.8, 36.2)
Household income per month (EUR)		
Less than 200	12.0	(9.1, 15.7)
Between 201 and 300	6.2	(4.1, 9.1)
Between 301 and 400	10.9	(8.1, 14.5)
Between 401 and 500	12.1	(9.2, 15.8)
Between 501 and 600	12.2	(9.2, 15.9)
Between 601 and 700	10.3	(7.6, 13.8)
Between 701 and 800	8.9	(6.4, 12.3)
Between 801 and 900	6.6	(4.5, 9.5)
Between 901 and 1000	7.8	(5.4, 10.9)
Between 1001 and 1200	4.6	(2.9, 7.2)
Between 1201 and 1400	2.0	(1.0, 4.0)
Between 1401 and 1600	2.4	(1.2, 4.5)
Between 1601 and 1800	0.9	(0.3, 2.6)
Over 1800	3.3	(1.9, 5.7)
Personal income per month (EUR)		
Less than 200	18.7	(15.1, 23.0)
Between 200 and 300	19.1	(15.5, 23.4)
Between 301 and 400	23.7	(19.7, 28.2)
Between 401 and 500	15.9	(12.5, 19.9)
Between 501 and 600	8.6	(6.1, 11.8)
Between 601 and 700	4.0	(2.4, 6.5)

Table A5a

Percentage distribution of smokers by sociodemographic and smoking behavior characteristics (MC) 2019 (cont'd)

	Percentage	95% CI
Between 701 and 800	3.9	(2.4, 6.4)
Between 801 and 900	3.4	(2.0, 5.8)
Between 901 and 1000	2.0	(1.0, 4.1)
Between 1001 and 1200	0.0	(0.0, 0.0)
Between 1201 and 1400	0.0	(0.0, 0.0)
Over 1400	0.8	(0.2, 2.4)
Employment		
Employed	63.6	(58.6, 68.3)
Unemployed	25.2	(21.0, 29.8)
Pensioner	11.2	(8.4, 14.8)
Smoking status		
Yes, daily	98.4	(96.5, 99.3)
Less than daily	1.6	(0.7, 3.5)
Number of cigarettes per day		
≤10	25.0	(20.9, 29.6)
11-20	52.0	(47.0, 57.0)
21-30	5.4	(3.6, 8.2)
>30	17.6	(14.1, 21.8)
Expenditure (monthly)		
≤27	23.4	(19.4, 27.9)
28-45	33.0	(28.4, 37.9)
46-65	18.7	(15.0, 22.9)
>66	24.9	(20.8, 29.5)
Number of cigarettes per week		
≤70	25.0	(20.9, 29.6)
71-140	52.0	(47.0, 57.0)
141-210	5.4	(3.6, 8.2)
>210	17.6	(14.1, 21.8)
Expenditure (weekly)		
≤7	27.4	(23.1, 32.1)
7.1-13	33.8	(29.2, 38.7)
13.1-19	20.8	(2.1, 25.2)
>19	18.0	(14.4, 22.2)
Budget share		
≤4	22.6	(18.6, 27.1)
4-12	50.9	(45.9, 55.9)
12.1-20	11.5	(8.6, 15.1)
>20	15.0	(11.7, 18.9)

Note: Sample size = 379

Table A5b

Percentage distribution of smokers by sociodemographic and smoking behavior characteristics (MC) 2022

	Percentage	95% CI
Gender		
Male	44.9	(41.2, 48.6)
Female	55.1	(51.4, 58.8)
Age		
18-24	13.9	(11.3, 16.4)
25-44	41.6	(37.9, 45.2)
45-65	37.3	(33.7, 40.9)
65+	7.3	(5.4, 9.2)
Type of residence		
Urban	71.3	(67.9, 74.6)
Rural	28.7	(25.4, 32.1)
Education level		
Primary or less	9.3	(7.2, 11.5)
Secondary	74.6	(71.4, 77.9)
Higher	16	(13.3, 18.7)
Region		
Center	45.6	(40.6, 50.7)
North	27.4	(23.1, 32.1)
South	27.1	(22.8, 31.8)
Price		
1-1.3	0.6	(0.0, 1.2)
1.4-1.6	0.7	(0.1, 1.4)
1.7-2.3	46.2	(42.5, 49.8)
2.4-5	52.5	(48.8, 56.2)
Household income per month (EUR)		
Less than 200	1.7	(0.7, 2.6)
Between 201 and 300	4.9	(3.3, 6.5)
Between 301 and 400	6.8	(4.9, 8.6)
Between 401 and 500	10	(7.8, 12.2)
Between 501 and 600	16.2	(13.4, 18.9)
Between 601 and 700	11.7	(9.4, 14.1)
Between 701 and 800	13.7	(11.1, 16.2)
Between 801 and 900	9.3	(7.1, 11.4)
Between 901 and 1000	10.3	(8.1, 12.6)
Between 1001 and 1200	5.9	(4.2, 7.7)
Between 1201 and 1400	4.1	(2.6, 5.5)
Between 1401 and 1600	2.8	(1.6, 4.0)
Between 1601 and 1800	1.4	(0.5, 2.3)
Between 1801 and 2000	0.3	(-0.1, 0.7)
Between 2001 and 2200	0.2	(-0.1, 0.6)
Between 2201 and 2400	0.2	(-0.1, 0.4)
Over 2400	0.6	(0.1, 1.2)
Personal income per month (EUR)		
Less than 200	10.8	(8.5, 13.1)
Between 200 and 300	13.1	(10.6, 15.6)
Between 301 and 400	20.8	(17.8, 23.7)

Table A5b

Percentage distribution of smokers by sociodemographic and smoking behavior characteristics (MC) 2022 (cont'd)

	Percentage	95% CI
Between 401 and 500	14.7	(12.1, 17.3)
Between 501 and 600	14.9	(12.3, 17.6)
Between 601 and 700	7.5	(5.6, 9.4)
Between 701 and 800	8.3	(6.3, 10.4)
Between 801 and 900	3.7	(2.3, 5.1)
Between 901 and 1000	2.6	(1.5, 3.8)
Between 1001 and 1200	2.5	(1.3, 3.6)
Between 1201 and 1400	0.3	(-0.1, 0.8)
Between 1401 and 1600	0.3	(-0.1, 0.7)
Employment		
Employed	58.4	(54.8, 62.1)
Unemployed	30.4	(27.0, 33.8)
Pensioner	11.2	(8.8, 13.5)
Smoking status		
Yes, daily	95.3	(93.7, 96.8)
Less than daily	4.7	(3.2, 6.3)
Number of cigarettes per day		
≤10	32.5	(29.0, 35.9)
11-20	51.1	(47.4, 54.8)
21-30	11.8	(9.4, 14.2)
>30	4.6	(3.0, 6.1)
Expenditure (monthly)		
≤27	13.2	(10.7, 15.8)
28-45	24.2	(21.0, 27.4)
46-65	31.9	(28.4, 35.3)
>66	30.7	(27.3, 34.1)
Number of cigarettes per week		
≤70	32.5	(29.0, 35.9)
71-140	51.1	(47.4, 54.8)
141-210	11.8	(9.4, 14.2)
>210	4.6	(3.0, 6.1)
Expenditure (weekly)		
≤7	16.9	(14.1, 19.7)
7.1-13	27.8	(24.5, 31.1)
13.1-19	37.9	(34.3, 41.5)
>19	17.4	(14.6, 20.2)
Budget share		
≤4	17	(14.2, 19.8)
4-12	59.5	(55.9, 63.1)
12.1-20	15.1	(12.5, 17.8)
>20	8.4	(6.3, 10.4)

Note: Sample size = 708

Table A5c

Percentage distribution of smokers by sociodemographic and smoking behavior characteristics (HR) 2022

	Percentage	95% CI
Gender		
Male	87.7	(78.1, 97.4)
Female	12.3	(2.6, 21.9)
Age		
18-24	6.9	(-0.6, 14.3)
25-44	15.1	(4.6, 25.7)
45-65	47.5	(32.8, 62.2)
65+	30.4	(16.9, 44.0)
Type of residence		
Urban	61.7	(47.4, 76.0)
Rural	38.3	(24.0, 52.6)
Education level		
Primary or less	10.1	(1.2, 19.0)
Secondary	80.6	(69.0, 92.3)
Higher	9.3	(0.7, 17.8)
Region		
Center	53.7	(39.0, 68.4)
North	32.3	(18.5, 46.1)
South	14.0	(3.8, 24.2)
Price		
0.4 or less	27.4	(14.3, 40.5)
From 0.5 to 0.7	35.4	(21.4, 49.5)
From 0.8 to 1	24.9	(12.1, 37.6)
From 1.1 to 5	12.3	(2.6, 22.0)
Household income per month (EUR)		
Less than 200	4.0	(-1.8, 9.8)
Between 201 and 300	13.4	(3.4, 23.4)
Between 301 and 400	7.2	(-0.4, 14.9)
Between 401 and 500	9.4	(0.8, 18.0)
Between 501 and 600	9.8	(1.1, 18.6)
Between 601 and 700	21.0	(9.0, 33.0)
Between 701 and 800	4.2	(-1.7, 10.1)
Between 801 and 900	10.2	(1.3, 19.1)
Between 901 and 1000	7.2	(-0.4, 14.8)
Between 1001 and 1200	5.2	(-1.3, 11.8)
Between 1201 and 1400	0.0	(0.0, 0.0)
Between 1401 and 1600	2.0	(-2.1, 6.2)
Between 1601 and 1800	3.1	(-2.0, 8.3)
Between 1801 and 2000	3.1	(-2.0, 8.3)
Between 2001 and 2200	0.0	(0.0, 0.0)
Between 2201 and 2400	0.0	(0.0, 0.0)
More than 2400	0.0	(0.0, 0.0)
Personal income per month (EUR)		
Less than 200	7.3	(-0.4, 14.9)
Between 200 and 300	31.9	(18.2, 45.6)
Between 301 and 400	27.8	(14.6, 41.0)

Table A5c

Percentage distribution of smokers by sociodemographic and smoking behavior characteristics (HR) 2022 (cont'd)

	Percentage	95% CI
Between 401 and 500	19.4	(7.7, 31.0)
Between 501 and 600	8.2	(0.1, 16.2)
Between 601 and 700	3.1	(-2.0, 8.2)
Between 701 and 800	2.4	(-2.1, 6.9)
Between 801 and 900	0.0	(0.0, 0.0)
Between 901 and 1000	0.0	(0.0, 0.0)
Between 1001 and 1200	0.0	(0.0, 0.0)
Between 1201 and 1400	0.0	(0.0, 0.0)
Between 1401 and 1600	0.0	(0.0, 0.0)
Between 1601 and 1800	0.0	(0.0, 0.0)
Between 1801 and 2000	0.0	(0.0, 0.0)
Employment		
Employed	43.5	(28.9, 58.1)
Unemployed	12.4	(2.7, 22.1)
Pensioner	44.1	(29.5, 58.7)
Smoking status		
Yes, daily	96.9	(91.9, 102.0)
Less than daily	3.1	(-2.0, 8.1)
Smoking intensity (daily)		
≤15	38.7	(24.3, 53.0)
16-20	14.5	(4.1, 24.9)
21-30	41.5	(27.0, 56.0)
>30	5.3	(-1.3, 12.0)
Expenditure (monthly)		
≤12	16.9	(5.9, 27.9)
13-16	0.0	(0.0, 0.0)
17-20	15.5	(4.8, 26.1)
>20	67.6	(53.8, 81.4)
Smoking intensity (weekly)		
≤105	38.7	(24.3, 53.0)
106-140	14.5	(4.1, 24.9)
141-210	41.5	(27.0, 56.0)
>210	5.3	(-1.3, 12.0)
Expenditure (weekly)		
≤3	16.9	(5.9, 27.9)
3.1-4	0.0	(0.0,0.0)
4.1-5	15.5	(4.8, 26.1)
>5	67.6	(53.8, 81.4)
Budget share		
≤3	21.5	(9.4, 33.6)
3.1-5	29.9	(16.4, 43.4)
5.1-12	41.9	(27.4, 56.4)
>12	6.7	(-0.7, 14.1)

Note: Sample size = 48

Table A6a

Characteristics of illicit cigarette market identification (MC) 2019

	Percentage	95% CI
Place of purchase		
Legal	62.9	(58.0, 67.7)
Illicit	37.1	(32.2, 42.0)
Brand		
Legal	48.9	(43.8, 53.9)
Illicit	51.1	(46.1, 56.2)
Health warning label		
Legal	47.0	(41.9, 52.0)
Illicit	53.0	(48.0, 58.1)
Tax stamp		
Legal	45.4	(40.4, 50.4)
Illicit	54.6	(49.6, 59.6)
Price		
Legal	84.3	(80.6, 88.0)
Illicit	15.7	(12.1, 19.4)
Identification of illicit pack		
Legal	41.7	(36.7, 46.7)
Illicit	58.3	(53.3, 63.3)

Note: Sample size = 379

Table A6b

Characteristics of illicit cigarette market identification (MC) 2022

	Percentage	95% CI
Place of purchase		
Legal	85.3	(82.7, 87.9)
Illicit	14.7	(12.1, 17.3)
Brand		
Legal	81.7	(78.8, 84.5)
Illicit	18.3	(15.5, 21.2)
Health warning label		
Legal	83.8	(81.1, 86.6)
Illicit	16.2	(13.4, 18.9)
Tax stamp		
Legal	84.0	(81.3, 86.7)
Illicit	16.0	(13.3, 18.7)
Price		
Legal	99.2	(98.6, 99.9)
Illicit	0.8	(0.1, 1.4)
Identification of illicit pack		
Legal	78.6	(75.6, 81.7)
Illicit	21.4	(18.3, 24.4)

Note: Sample size = 708

Table A6c

Characteristics of illicit cigarette market identification (HR) 2022

Characteristics (illicit packs)	Percentage	95% CI
Place		
Mini/super/hyper markets	3.0	(-2.0, 8.0)
Kiosks	11.4	(2.1, 20.6)
In other countries	3.3	(-1.9, 8.5)
On the street	3.9	(-1.7, 9.5)
On the open market	76.8	(64.6, 89.1)
Café/restaurant	1.6	(-2.0, 5.3)
Brand		
Homemade unbranded tobacco	82.1	(71.0, 93.2)
Tarabosh	2.4	(-2.0, 6.8)
Georges Karelias and Sons	15.5	(5.0, 26.0)
Health warning label (HWL)		
HWL in local language	12.1	(2.7, 21.6)
HWL in foreign language	3.4	(-1.9, 8.6)
No health warnings	84.5	(74.0, 95.0)
Tax stamp		
Local stamp	6.8	(-0.5, 14.1)
Lack of stamp	93.2	(85.9, 100.5)

Note: Sample size = 48

Table A7a

Cross-tabulation of characteristics for IIP (MC) 2019

	Place of purchase	Brand	Health warning label	Tax stamp	Price
Place of purchase	-	87.5 (82.0, 92.9)	91.2 (86.5, 95.8)	92.2 (87.8, 96.6)	32.1 (24.3, 39.7)
Brand	63.5 (56.7, 70.3)	-	99.8 (99.1, 100.0)	99.8 (99.1, 100.0)	26.9 (20.6, 33.1)
Health warning label	63.8 (57.2, 70.5)	96.2 (93.5, 98.8)	-	100.0 (100.0, 100.0)	28.3 (22.0, 34.5)
Tax stamp	62.7 (56.1, 69.3)	93.4 (90.0, 96.7)	97.1 (94.8, 99.3)	-	27.5 (21.4, 33.5)
Price	75.8 (64.9, 86.6)	87.5 (79.0, 95.8)	95.5 (90.2, 100.0)	95.5 (90.2, 100.0)	-

Note: Sample size = 379

Table A7b

Cross-tabulation of characteristics for IIP (MC) 2022

	Place of purchase	Brand	Health warning label	Tax stamp	Price
Place of purchase	-	83 (75.8, 90.2)	88.2 (82.0, 94.4)	88.2 (82.0, 94.4)	2 (-0.7, 4.8)
Brand	66.5 (58.3, 74.6)	-	82.8 (76.3, 89.3)	81.8 (75.1, 88.4)	2.9 (0.0, 5.8)
Health warning label	80.1 (72.7, 87.4)	93.9 (89.5, 98.3)	-	97.4 (94.6, 100.3)	3.3 (0.0, 6.5)
Tax stamp	80.9 (73.7, 88.2)	93.7 (89.3, 98.2)	98.5 (96.2, 100.7)	-	1.9 (-0.6, 4.4)
Price	39.9 (-1.8, 81.7)	85.8 (80.2, 91.4)	70.6 (31.8, 109.4)	39.9 (-1.8, 81.7)	-

Note: Sample size = 708

Table A8a

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MC) 2019

	Place	Brand	Health warning label	Tax stamp	Price	IIP	Wald F	
Total	37.1 (32.5, 42.1)	51.1 (46.0, 56.2)	53.0 (47.1, 58.0)	54.6 (49.6, 59.6)	15.7 (12.0, 19.4)	58.3 (53.3, 63.3)	F	p
Gender							14.4	0.0
Male	40.3 (33.2, 47.4)	40.8 (33.7, 48.0)	42.3 (35.1, 49.5)	43.5 (36.3, 50.7)	16.6 (11.2, 22.0)	48.5 (41.2, 55.8)		
Female	34.2 (27.5, 40.9)	60.7 (53.9, 67.6)	63.0 (56.2, 69.8)	65.0 (58.3, 71.7)	14.9 (9.9, 19.9)	67.5 (60.9, 74.0)		
Age							22.0	0.0
18-24	7.3 (0.0, 16.4)	18.7 (5.2, 32.2)	18.7 (5.2, 32.2)	18.7 (5.2, 32.2)	0.0 (0.0, 0.0)	18.7 (5.2, 32.2)		
25-44	31.3 (24.3, 38.4)	40.7 (33.2, 48.1)	43.6 (36.0, 51.1)	46.5 (38.9, 54.1)	13.4 (8.3, 18.6)	51.3 (43.7, 58.9)		
45-65	48.1 (40.2, 56.0)	65.9 (58.4, 73.3)	66.9 (59.5, 74.3)	66.9 (59.5, 74.3)	19.5 (13.3, 25.8)	69.4 (62.2, 76.7)		
65+	46.2 (26.3, 66.2)	71.5 (53.5, 89.6)	74.5 (57.1, 92.0)	79.4 (63.2, 95.6)	27.5 (9.6, 45.4)	88.3 (75.4, 101.1)		
Type of residence							25.8	0.0
Urban	27.4 (21.6, 33.1)	42.6 (36.2, 49.0)	45.5 (39.1, 51.9)	47.1 (40.7, 53.6)	9.8 (6.0, 13.6)	48.6 (42.2, 55.1)		
Rural	52.4 (44.3, 60.5)	64.4 (56.7, 72.2)	64.8 (57.1, 72.5)	66.3 (58.6, 73.9)	25.0 (18.0, 32.0)	73.5 (66.4, 80.6)		
Education level							12.5	0.0
Primary or less	35.8 (25.0, 46.5)	71.0 (60.8, 81.2)	71.0 (60.8, 81.2)	75.4 (65.7, 85.0)	13.5 (5.8, 21.1)	75.4 (65.7, 85.0)		
Secondary	40.7 (34.6, 46.9)	50.8 (44.6, 57.1)	53.6 (47.4, 59.8)	54.7 (48.5, 60.9)	17.8 (13.0, 22.6)	58.2 (52.0, 64.4)		
Higher	22.8 (11.6, 33.9)	24.6 (13.1, 36.0)	25.2 (13.7, 36.8)	25.2 (13.7, 36.8)	9.3 (1.6, 17.0)	35.0 (22.4, 47.7)		
Region							17.2	0.0
Center	51.0 (43.5, 58.4)	61.4 (54.1, 68.7)	62.9 (55.7, 70.1)	63.3 (56.1, 70.5)	23.2 (16.9, 29.5)	63.6 (56.4, 70.8)		
North	27.9 (19.2, 36.5)	61.5 (52.1, 70.9)	65.3 (56.1, 74.5)	70.5 (61.7, 79.3)	12.9 (6.4, 19.4)	71.9 (63.2, 80.6)		
South	23.2 (15.0, 31.4)	23.3 (15.1, 31.5)	23.9 (15.7, 32.2)	23.9 (15.7, 32.2)	5.9 (1.3, 10.5)	35.7 (26.4, 45.0)		
Personal income per month (EUR)							**194.3**	**0.0**
Less than 400	39.4 (33.1, 45.7)	59.3 (52.9, 65.6)	60.9 (54.7, 67.2)	63.3 (57.1, 69.5)	19.1(14.1, 24.2)	65.8 (59.7, 72.0)		
Between 401 and 800	36.6 (28.0, 45.1)	40.9 (32.2, 49.7)	43.7 (34.9, 52.5)	44.1 (35.2, 52.9)	10.5 (5.1, 16.0)	50.7 (41.8, 59.6)		
Between 801 and 1200	20.0 (2.7, 37.2)	26.5 (7.4, 45.6)	26.5 (7.4, 45.6)	26.5 (7.4, 45.6)	10.0 (0.0, 23.0)	26.5 (7.4, 45.6)		
More than 1200	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)		
Household income per month (EUR)							29.96	0.0
Less than 400	44.9 (35.6, 54.2)	75.3 (67.2, 83.4)	78.1 (70.4, 85.9)	81.7 (74.4, 88.9)	31.7 (23.0, 40.4)	83.6 (76.7, 90.5)		
Between 401 and 800	39.4 (31.9, 46.9)	46.4 (38.7, 54.0)	48.2 (40.6, 55.9)	48.6 (40.9, 56.3)	9.5 (5.0, 14.0)	55.1 (47.5, 62.7)		
Between 801 and 1200	34.4 (23.3, 45.4)	44.3 (32.8, 55.9)	45.7 (34.1, 57.3)	46.4 (34.8, 58.0)	11.7 (4.2, 19.2)	47.3 (35.7, 58.9)		
Between 1200 and 1600	6.3 (0.0, 18.1)	3.5 (0.0, 12.4)	3.5 (0.0, 12.4)	9.8 (0.0, 24.2)	0.0 (0.0, 0.0)	9.8 (4.6, 24.2)		
More than 1600	4.0 (0.0, 13.6)	12.8 (0.0, 29.2)	12.8 (0.0, 29.2)	12.8 (0.0, 29.2)	3.5 (5.6, 12.6)	16.3 (0.0, 34.4)		
Employment							15.4	0.0
Employed	36.3 (30.2, 42.3)	41.7 (35.4, 47.9)	43.7 (37.4, 50.0)	44.8 (38.5, 51.1)	10.0 (6.2, 13.8)	49.5 (43.2, 55.8)		
Unemployed	34.9 (25.3, 44.4)	62.7 (53.0, 72.5)	65.2 (55.7, 74.8)	67.5 (58.1, 76.9)	17.3 (9.7, 24.9)	69.5 (60.3, 78.8)		
Pensioner	47.2 (32.2, 62.3)	78.7 (66.4, 91.1)	78.3 (65.9, 90.8)	81.1 (69.3, 92.9)	44.8 (29.8, 59.8)	83.1 (71.9, 94.4)		
Price							480.7	0.0
1-1.3	75.8 (64.9, 86.7)	87.5 (79.0, 95.9)	95.5 (90.2, 100.7)	95.5 (90.2, 100.7)	100.0 (100.0, 100.0)	100.0 (100.0, 100.0)		
1.4-1.6	59.0 (50.5, 67.5)	99.5 (98.4, 100.7)	99.2 (97.6, 100.7)	99.2 (97.6, 100.7)	0.0 (0.0, 0.0)	100.0 (100.0, 100.0)		
1.7-2.3	7.2 (1.2, 13.3)	15.0 (6.6, 23.3)	17.1 (8.3, 25.9)	18.6 (9.5, 27.7)	0.0 (0.0, 0.0)	18.6 (9.5, 27.7)		
2.4-3.7	11.6 (5.8, 17.4)	1.4 (-0.7, 3.5)	2.6 (-0.3, 5.4)	6.7 (2.2, 11.2)	0.0 (0.0, 0.0)	15.4 (8.9, 21.9)		

Table A8a

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MC) 2019 (cont'd)

	Place	Brand	Health warning label	Tax stamp	Price	IIP	Wald F	
Smoking status							2.7	0.1
Yes, daily	37.4 (32.5, 42.4)	51.6 (46.5, 56.7)	53.4 (48.3, 58.5)	55.0 (50.0, 60.1)	15.8 (12.1, 19.5)	58.8 (53.8, 63.8)		
Less than daily	18.4 (0.0, 49.4)	22.4 (0.0, 55.6)	28.4 (0.0, 64.4)	28.4 (0.0, 64.4)	10.0 (0.0, 33.9)	28.4 (0.0, 64.4)		
Number of cigarettes per day							2.0	0.1
≤10	40.8 (30.8, 50.7)	47.6 (37.5, 57.7)	52.6 (42.5, 62.7)	56.7 (46.7, 66.7)	14.7 (7.5, 21.8)	63.5 (53.8, 73.3)		
11-20	33.3 (26.7, 39.9)	52.5 (45.5, 59.5)	53.7 (46.8, 60.7)	54.9 (47.9, 61.8)	14.4 (9.5, 19.3)	57.8 (50.9, 64.8)		
21-30	48.8 (27.1, 70.4)	64.5 (43.8, 85.2)	64.5 (43.8, 85.2)	64.5 (43.8, 85.2)	19.9 (2.6, 37.2)	72.8 (53.6, 92.1)		
>30	39.7 (28.0, 51.5)	47.9 (35.9, 59.9)	47.9 (35.9, 59.9)	47.9 (35.9, 59.9)	19.7 (10.1, 29.3)	47.9 (35.9, 59.9)		
Expenditure (monthly)							35.1	0.0
≤27	49.5 (39.1, 59.9)	67.7 (57.9, 77.4)	71.9 (62.6, 81.3)	74.3 (65.2, 83.5)	16.8 (9.0, 24.6)	75.7 (66.7, 84.6)		
28-45	43.9 (35.2, 52.7)	69.8 (61.8, 77.9)	72.6 (64.7, 80.4)	74.3 (66.6, 82.0)	23.3 (15.8, 30.7)	80.6 (73.6, 87.5)		
46-65	21.9 (12.2, 31.6)	20.7 (11.2, 30.1)	20.7 (11.2, 30.1)	23.1 (13.2, 32.9)	4.5 (0.0, 9.4)	29.3 (18.6, 39.9)		
>66	27.9 (18.8, 37.0)	33.6 (24.1, 43.2)	33.6 (24.1, 43.2)	33.6 (24.1, 43.2)	13.1 (6.2, 19.9)	34.3 (24.7, 43.9)		
Number of cigarettes per week								
≤70	40.8 (30.8, 50.7)	47.6 (37.5, 57.7)	52.6 (42.5, 62.7)	56.7 (46.7, 66.7)	14.7 (7.5, 21.8)	63.5 (53.8, 73.3)	2.1	0.1
71-140	33.3 (26.7, 39.9)	52.5 (45.5, 59.5)	53.7 (46.8, 60.7)	54.9 (47.9, 61.8)	14.4 (9.5, 19.3)	57.8 (50.9, 64.8)		
141-210	48.8 (27.1, 70.4)	64.5 (43.8, 85.2)	64.5 (43.8, 85.2)	64.5 (43.8, 85.2)	19.9 (2.6, 37.2)	72.8 (53.6, 92.1)		
>210	39.7 (28.0, 51.5)	47.9 (35.9, 59.9)	47.9 (35.9, 59.9)	47.9 (35.9, 59.9)	19.7 (10.1, 29.3)	47.9 (35.9, 59.9)		
Expenditure (weekly)							32.6	0.0
≤7	54.8 (45.2, 64.4)	70.9 (62.1, 79.6)	75.1 (66.7, 83.4)	77.1 (69.0, 85.2)	14.3 (7.6, 21.1)	78.3 (70.3, 86.2)		
7.1-13	38.0 (29.6, 46.4)	59.8 (51.3, 68.4)	62.0 (53.6, 70.5)	65.1 (56.8, 73.3)	24.4 (16.9, 31.8)	74.6 (67.1, 82.2)		
13.1-19	25.7 (16.0, 35.4)	29.0 (19.0, 39.1)	29.0 (19.0, 39.1)	29.0 (19.0, 39.1)	12.7 (5.4, 20.1)	29.8 (19.7, 40.0)		
>19	21.9 (12.0, 31.7)	30.2 (19.3, 41.1)	30.2 (19.3, 41.1)	30.2 (19.3, 41.1)	5.0 (0.0, 10.2)	30.2 (19.3, 41.1)		
Budget share							1.7	0.2
≤4	41.3 (30.9, 51.8)	52.8 (42.2, 63.4)	56.8 (46.3, 67.3)	59.3 (48.9, 69.7)	15.2 (7.6, 22.8)	60.0 (49.6, 70.4)		
4-12	39.1 (32.2, 46.0)	46.2 (39.2, 53.3)	48.2 (41.1, 55.3)	48.2 (41.1, 55.3)	11.9 (7.3, 16.5)	54.3 (47.2, 61.3)		
12.1-20	31.7 (17.8, 45.5)	57.5 (42.8, 72.3)	57.5 (42.8, 72.3)	57.5 (42.8, 72.3)	17.5 (6.2, 28.8)	57.5 (42.8, 72.3)		
>20	28.4 (16.6, 40.2)	60.3 (47.5, 73.0)	60.3 (47.5, 73.0)	67.1 (54.9, 79.4)	28.1 (16.4, 39.8)	70.1 (58.2, 82.1)		
Average								
Number of cigarettes per day	19.4 (17.2, 21.6)	19.4 (17.7, 21.2)	19.1 (17.4, 20.7)	18.8 (17.1, 20.4)	22.3 (19.0, 25.6)	18.5 (16.9, 20.1)		
Expenditure (monthly)	39.3 (34.9, 43.7)	38.7 (35.1, 42.2)	37.9 (34.5, 41.4)	37.9 (34.6, 41.3)	38.5 (32.8, 44.2)	38.1 (34.9, 41.3)		
Price	1.5 (1.4, 1.6)	1.4 (1.4, 1.5)	1.4 (1.4, 1.5)	1.5 (1.4, 1.5)	1.2 (1.2, 1.3)	1.5 (1.5, 1.6)		
Household income per month (EUR)	542.2 (495.3, 589.1)	495.8 (450.7, 540.9)	495.5 (451.4, 539.5)	493.6 (449.4, 537.9)	432.5 (352.5, 512.6)	501.0 (458.2, 543.9)		
Personal income per month (EUR)	358.3 (329.4, 387.2)	321.5 (294.8, 348.1)	323.0 (297.0, 349.0)	319.7 (293.9, 345.4)	310.4 (257.9, 362.9)	323.1 (298.5, 347.7)		
Budget share	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.1 (0.1, 0.2)	0.1 (0.1, 0.2)	0.2 (0.1, 0.2)	0.1 (0.1, 0.2)		

Note: Sample size = 379

Table A8b

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MC) 2022

	Place	Brand	Health warning label	Tax stamp	Price	IIP
Total	14.68 (12.1, 17.3)	18.33 (15.5, 21.2)	16.2 (13.4, 18.9)	16.0 (13.3, 18.7)	0.7 (0.1, 1.4)	21.4 (18.3, 24.4)
Gender						
Male	12.6 (8.9, 16.2)	16 (12.0, 20.0)	13 (9.3, 16.6)	12.5 (8.9, 16.2)	0.8 (-0.2, 1.8)	19.3 (15.0, 23.7)
Female	16.4 (12.7, 20.1)	20.2 (16.2, 24.2)	18.8 (14.9, 22.7)	18.8 (14.9, 22.7)	0.7 (-0.1, 1.5)	23 (18.8, 27.2)
Age						
18-24	13.9 (7.1, 20.8)	10.8 (4.7, 17.0)	12.5 (5.9, 19.0)	12.5 (5.9, 19.0)	0 (0.0, 0.0)	13.9 (7.1, 20.8)
25-44	9.8 (6.4, 13.2)	13.2 (9.3 , 17.0)	11.4 (7.8, 15.1)	11 (7.4, 14.6)	0.5 (-0.3, 1.4)	15.2 (11.1, 19.3)
45-65	18.8 (14.0, 23.5)	25 (19.7, 30.2)	21.1 (16.2, 26.0)	21.1 (16.2, 26.1)	1 (-0.2, 2.3)	29.6 (24.1, 35.1)
65+	23 (11.4, 34.5)	28.3 (15.9, 40.6)	25 (13.1, 36.8)	25 (13.1, 36.8)	1.9 (-1.8, 5.7)	28.3 (15.9, 40.6)
Type of residence						
Urban	15.1 (12.0, 18.2)	17.8 (14.4, 21.1)	15.7 (12.5, 18.9)	15.8 (12.6, 19.0)	0.5 (-0.1, 1.1)	21 (17.4, 24.5)
Rural	13.6 (8.9, 18.3)	19.7 (14.2, 25.2)	17.4 (12.2, 22.6)	16.5 (11.4, 21.6)	1.4 (-0.2, 3.0)	22.4 (16.6, 28.1)
Education level						
Primary or less	23 (12.8, 33.1)	30.9 (19.7, 42.1)	30.8 (19.6, 41.9)	29.6 (18.6, 40.6)	1.7 (-1.4, 4.8)	32.5 (21.2, 43.8)
Secondary	15.6 (12.5, 18.6)	17.8 (14.6, 21.1)	15.7 (12.6, 18.8)	15.6 (12.5, 18.7)	0.8 (0.0, 1.5)	21.2 (17.8, 24.7)
Higher	5.8 (1.5, 10.1)	13.2 (7.0, 19.5)	9.6 (4.2, 15.1)	9.8 (4.3, 15.2)	0 (0.0, 0.0)	15.4 (8.7, 22.1)
Region						
Center	18.1 (13.8, 22.5)	21.5 (16.9, 26.1)	20.4 (15.9, 24.9)	20.6 (16.1, 25.2)	0.4 (-0.3, 1.1)	23.1 (18.3, 27.8)
North	10.1 (6.0, 14.2)	14.9 (10.1, 19.8)	10.6 (6.4, 14.8)	10.7 (6.5, 15.0)	0.8 (-0.4, 1.9)	19.7 (14.3, 25.1)
South	14.2 (9.3, 19.0)	17 (11.7, 22.2)	15.5 (10.4, 20.5)	14.4 (9.4, 19.3)	1.3 (-0.3, 3.0)	20.5 (14.8, 26.2)
Personal income per month (EUR)						
Less than 400	14.4 (10.5, 18.3)	19 (14.6, 23.3)	17.6 (13.4, 21.8)	17.4 (13.2, 21.6)	1.3 (0.1, 2.6)	21.4 (16.9, 25.9)
Between 401 and 800	15.8 (11.8, 19.7)	19.8 (15.4, 24.1)	16.9 (12.8, 21.0)	16.7 (12.6, 20.8)	0.4 (-0.3, 1.0)	22.6 (18.0, 27.1)
Between 801 and 1200	12.4 (4.2, 20.6)	10 (2.5, 17.4)	7.3 (0.8, 13.7)	7.3 (0.8, 13.7)	0 (0.0, 0.0)	17.7 (8.2, 27.2)
More than 1200	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)
Household income per month (EUR)						
Less than 400	17.5 (9.8, 25.1)	24.1 (15.5, 32.8)	20.7 (12.5, 28.8)	20.1 (12.0, 28.2)	4.6 (0.4, 8.8)	28.6 (19.5, 37.8)
Between 401 and 800	16 (12.3, 19.8)	19.1 (15.1, 23.2)	17.6 (13.7, 21.5)	17.6 (13.7, 21.5)	0 (0.0, 0.0)	21.2 (17.0, 25.3)
Between 801 and 1200	12.8 (7.9, 17.6)	16.3 (10.9, 21.7)	13.1 (8.2, 18.0)	12.7 (7.8, 17.5)	0 (0.0, 0.0)	21.1 (15.1, 27.1)
Between 1200 and 1600	9.9 (1.5, 18.3)	13.6 (4.0, 23.3)	12 (2.8, 21.2)	12.3 (3.1, 21.6)	0 (0.0, 0.0)	16.1 (5.7, 26.5)
More than 1600	5.1 (-4.7, 15.0)	5.1 (-4.7, 15.0)	5.1 (-4.7, 15.0)	5.1 (-4.7, 15.0)	5.1 (-4.7, 15.0)	5.1 (-4.7, 15.0)
Employment						
Employed	10.1 (7.2, 13.0)	14.7 (11.3, 18.1)	11.4 (8.3, 14.4)	11.5 (8.4, 14.5)	0.4 (-0.2, 1.0)	17.4 (13.7, 21.0)
Unemployed	21.8 (16.3, 27.3)	23.5 (17.8, 29.2)	22.8 (17.2, 28.4)	22.8 (17.2, 28.4)	0.5 (-0.4, 1.5)	27.6 (21.6, 33.6)
Pensioner	19 (10.3, 27.6)	23.3 (14.0, 32.7)	23.3 (14.0, 32.7)	21.3 (12.2, 30.3)	3.3 (-0.6, 7.3)	25.1 (15.6, 34.7)
Price						
1-1.3	23.7 (-17.1, 64.5)	62.7 (16.2, 109.1)	62.7 (16.2, 109.1)	23.7 (-17.1, 64.5)	100 (100.0, 100.0)	100 (100.0, 100.0)
1.4-1.6	39.7 (-2.2, 81.6)	90.5 (65.4, 115.6)	70.2 (31.0, 109.3)	70.2 (31.0, 109.3)	21.5 (-13.7, 56.6)	90.5 (65.4, 115.6)
1.7-2.3	27.8 (22.9, 32.7)	33.7 (28.6, 38.9)	31 (26.0, 36.1)	31.3 (26.3, 36.4)	0 (0.0, 0.0)	36.6 (31.4, 41.9)
2.4-5	2.7 (1.0, 4.3)	3.3 (1.5, 5.1)	1.8 (0.4, 3.2)	1.7 (0.4, 3.0)	0 (0.0, 0.0)	6.1 (3.6, 8.5)

Table A8b

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MC) 2022 (cont'd)

	Place	Brand	Health warning label	Tax stamp	Price	IIP
Smoking status						
Yes, daily	15.1 (12.4, 17.8)	18.5 (15.6, 21.4)	16.5 (13.7, 19.3)	16.3 (13.5, 19.1)	0.8 (0.1, 1.5)	21.7 (18.6, 24.8)
Less than daily	6.6 (-1.8, 15.0)	14.7 (2.6, 26.7)	10 (-0.2, 20.2)	10 (-0.2, 20.2)	0 (0.0, 0.0)	14.7 (2.6, 26.7)
Number of cigarettes per day						
≤10	16.2 (11.5, 21.0)	15.3 (10.6, 19.9)	15.1 (10.5, 19.8)	14.8 (10.2, 19.4)	0 (0.0, 0.0)	20.3 (15.1, 25.5)
11-20	13.7 (10.2, 17.3)	18.5 (14.5, 22.5)	15.7 (11.9, 19.4)	16 (12.2, 19.8)	0.3 (-0.3, 0.9)	20.5 (16.4, 24.7)
21-30	17.1 (9.0, 25.2)	28.4 (18.7, 38.1)	23.9 (14.8, 33.1)	22 (13.1, 30.9)	5 (0.3, 9.7)	30.3 (20.4, 40.1)
>30	8.1 (-1.3, 17.5)	12.1 (0.9, 23.4)	8.6 (-1.1, 18.2)	8.6 (-1.1, 18.2)	0 (0.0, 0.0)	15.2 (2.8, 27.6)
Expenditure (monthly)						
≤27	18.2 (10.4, 26.0)	20.9 (12.7, 29.2)	20.9 (12.7, 29.1)	20.1 (12.0, 28.2)	1.2 (-1.0, 3.4)	22.6 (14.1, 31.0)
28-45	18.1 (12.4, 23.9)	20 (14.0, 25.9)	20.2 (14.2, 26.3)	19.3 (13.4, 25.2)	1.9 (-0.2, 3.9)	25 (18.5, 31.5)
46-65	20.2 (14.9, 25.4)	24.9 (19.2, 30.5)	20.8 (15.4, 26.1)	21.5 (16.1, 26.9)	0 (0.0, 0.0)	28 (22.1, 33.9)
>66	4.7 (1.9, 7.6)	9.1 (5.3, 13.0)	6.1 (2.9, 9.3)	5.9 (2.8, 9.0)	0.5 (-0.4, 1.4)	11.1 (6.9, 15.3)
Number of cigarettes per week						
≤70	16.2 (11.5, 21.0)	15.3 (10.6, 19.9)	15.1 (10.5, 19.8)	14.8 (10.2, 19.4)	0 (0.0, 0.0)	20.3 (15.1, 25.5)
71-140	13.7 (10.2, 17.3)	18.5 (14.5, 22.5)	15.7 (11.9, 19.4)	16 (12.2, 19.8)	0.3 (-0.3, 0.9)	20.5 (16.4, 24.7)
141-210	17.1 (9.0, 25.2)	28.4 (18.7, 38.1)	23.9 (14.8, 33.1)	22 (13.1, 30.9)	5 (0.3, 9.7)	30.3 (20.4, 40.1)
>210	8.1 (-1.3, 17.5)	12.1 (0.9, 23.4)	8.6 (-1.1, 18.2)	8.6 (-1.1, 18.2)	0 (0.0, 0.0)	15.2 (2.8, 27.6)
Expenditure (weekly)						
≤7	19.4 (12.3, 26.5)	21.5 (14.1, 28.8)	20.8 (13.5, 28.1)	20.2 (13.0, 27.4)	0.9 (-0.8, 2.7)	23.4 (15.8, 31.0)
7.1-13	16.1 (11.0, 21.3)	17.7 (12.3, 23.0)	17.2 (11.9, 22.5)	16.4 (11.2, 21.5)	1.6 (-0.1, 3.4)	22.9 (17.0, 28.7)
13.1-19	15.4 (11.1, 19.8)	19.3 (14.6, 24.1)	16.4 (11.9, 20.8)	17 (12.5, 21.5)	0 (0.0, 0.0)	21.7 (16.8, 26.6)
>19	6.1 (1.9, 10.3)	14.1 (8.0, 20.3)	9.6 (4.4, 14.8)	9.1 (4.0, 14.2)	0.8 (-0.8, 2.4)	16.2 (9.7, 22.7)
Budget share						
≤4	13 (7.0, 19.1)	13.7 (7.5, 19.8)	13.1 (7.1, 19.1)	13.6 (7.5, 19.8)	0 (0.0, 0.0)	16.2 (9.6, 22.7)
4-12	16.4 (12.8, 19.9)	19.8 (16.0, 23.6)	18 (14.3, 21.7)	17.7 (14.0, 21.3)	0.5 (-0.2, 1.2)	23 (18.9, 27.0)
12.1-20	10.2 (4.5, 16.0)	17 (9.9, 24.2)	11.6 (5.5, 17.6)	11 (5.1, 17.0)	3 (-0.2, 6.2)	21.9 (14.1, 29.8)
>20	14 (5.2, 22.9)	19.6 (9.4, 29.7)	17.7 (8.0, 27.5)	17.7 (8.0, 27.5)	0 (0.0, 0.0)	19.6 (9.4, 29.7)
Average						
Number of cigarettes per day	15.2 (13.6, 16.8)	17.1 (15.8, 18.5)	16.5 (15.0, 17.9)	16.5 (15.0, 17.9)	21.9 (16.3, 27.6)	16.4 (15.1, 17.8)
Expenditure (monthly)	47.7 (43.6, 51.8)	52 (47.5, 56.5)	48 (44.2, 51.9)	48.3 (44.6, 52.1)	46.2 (29.2, 63.2)	52.2 (48.0, 56.3)
Price	2 (2.0, 2.1)	2.1 (2.0, 2.2)	2 (2.0, 2.1)	2 (2.0, 2.1)	1.3 (1.2, 1.3)	2.1 (2.0, 2.2)
Household income per month (EUR)	663.4 (607.6, 719.3)	653.4 (601.9, 704.9)	650 (595.4, 704.6)	652.8 (597.8, 707.7)	549.7 (27.4, 1,072.1)	668.6 (619.8, 717.4)
Personal income per month (EUR)	443.1 (399.8, 486.4)	420.9 (384.3, 457.5)	413.4 (375.8, 451.0)	415.2 (377.3, 453.1)	321.9 (247.0, 396.9)	439.3 (403.5, 475.0)
Budget share	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.1 (0.1, 0.1)

Note: Sample size = 708

Table A8c

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (HR) 2022

	Place	Brand	Health warning label	Tax stamp	IIP	Wald F	
Total	80.72 (69.3, 92.2)	82.1 (71.0, 93.2)	87.9 (78.4, 97.3)	93.2 (85.9-100.5)	93.2 (85.9, 100.5)	F	p
Gender						3.5	0.1
Male	78.1 (65.3, 90.9)	79.7 (67.2, 92.1)	86.2 (75.5, 96.9)	92.3 (84.1, 100.6)	92.3 (84.1, 100.6)		
Female	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Age						**1.75**	**1.9**
18-24	50 (-6.1, 106.1)	0 (0.0, 0.0)	50 (-6.1, 106.1)	50 (-6.1, 106.1)	50 (-6.1, 106.1)		
25-44	59.9 (22.8, 96.9)	70.8 (36.4, 105.2)	70.8 (36.4, 105.2)	100 (100.0, 100.0)	100 (100.0, 100.0)		
45-65	86.3 (72.0, 100.6)	85.9 (71.5, 100.4)	90.9 (78.9, 102.8)	93 (82.4, 103.6)	93 (82.4, 103.6)		
65+	88.9 (72.1, 105.7)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Type of residence						**3.9**	**0**
Urban	92.8 (83.2, 102.5)	92.8 (83.2, 102.5)	92.8 (83.2, 102.5)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Rural	62.4 (40.1, 84.7)	65.9 (44.1, 87.7)	80.4 (62.1, 98.7)	83 (65.7, 100.3)	83 (65.7, 100.3)		
Education level						**3.5**	**0.1**
Primary or less	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Secondary	78.5 (65.1, 92.0)	80.3 (67.2, 93.3)	87.6 (76.8, 98.4)	91.4 (82.2, 100.6)	91.4 (82.2, 100.6)		
Higher	73.7 (31.1, 116.3)	73.7 (31.1, 116.3)	73.7 (31.1, 116.3)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Region						**1.98**	**0.1**
Center	82.4 (67.1, 97.7)	87.2 (73.8, 100.6)	91.8 (80.7, 102.8)	100 (100.0, 100.0)	100 (100.0, 100.0)		
North	80.4 (60.6, 100.2)	77.1 (56.1, 98.0)	87 (70.2, 103.8)	90.1 (75.2, 105.0)	90.1 (75.2, 105.0)		
South	75.1 (41.0, 109.1)	75.1 (41.0, 109.1)	75.1 (41.0, 109.1)	75.1 (41.0, 109.1)	75.1 (41.0, 109.1)		
Personal income per month (EUR)						0.4	0.5
Less than 400	85.3 (72.8, 97.8)	85 (72.4, 97.6)	93.5 (84.8, 102.2)	95 (87.4, 102.7)	95 (87.4, 102.7)		
Between 401 and 800	71 (47.8, 94.3)	76 (54.2, 97.9)	76 (54.2, 97.9)	89.4 (73.7, 105.2)	89.4 (73.7, 105.2)		
Between 801 and 1200	-	-	-	-	-		
More than 1200	-	-	-	-	-		
Household income per month (EUR)						1.8	0.2
Less than 400	75.1 (50.7, 99.5)	96 (84.9, 107.1)	96 (84.9, 107.1)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Between 401 and 800	89.1 (75.4, 102.9)	83.6 (67.2, 99.9)	89.1 (75.4, 102.9)	92.1 (80.3, 104.0)	92.1 (80.3, 104.0)		
Between 801 and 1200	63.9 (34.2, 93.6)	56 (25.2, 86.7)	71.2 (43.2, 99.2)	84.8 (62.6, 107.0)	84.8 (62.6, 107.0)		
Between 1200 and 1600	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
More than 1600	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Employment						-	-
Employed	75.5 (56.3, 94.7)	73.7 (54.0, 93.3)	79.3 (61.2, 97.4)	92 (79.9, 104.1)	92 (79.9, 104.1)		
Unemployed	72.2 (34.7, 109.7)	44.4 (2.8, 86.0)	72.2 (34.7, 109.7)	72.2 (34.7, 109.7)	72.2 (34.7, 109.7)		
Pensioner	87.1 (72.3, 102.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Smoking status						3.5	0.1
Yes, daily	80.1 (68.4, 91.9)	81.5 (70.1, 93.0)	87.5 (77.7, 97.2)	93 (85.5, 100.5)	93 (85.5, 100.5)		
Less than daily	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		

Table A8c

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (HR) 2022 (cont'd)

	Place	Brand	Health warning label	Tax stamp	IIP	Wald F	
Smoking intensity (daily)						1.8	0.2
≤15	78.1 (59.2, 97.1)	69.8 (48.7, 90.8)	78.1 (59.2, 97.1)	91.5 (78.8, 104.3)	91.5 (78.8, 104.3)		
16-20	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
21-30	74.1 (54.0, 94.1)	85.8 (69.8, 101.7)	91.7 (79.1, 104.3)	91.7 (79.1, 104.3)	91.7 (79.1, 104.3)		
>30	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Expenditure (monthly)						1.9	0.2
≤12	79.4 (50.4, 108.3)	59 (23.8, 94.2)	79.4 (50.4, 108.3)	79.4 (50.4, 108.3)	79.4 (50.4, 108.3)		
13-16							
17-20	78.2 (47.3, 109.1)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
>20	81.6 (68.0, 95.2)	83.7 (70.7, 96.7)	87.2 (75.5, 99.0)	95.1 (87.5, 102.7)	95.1 (87.5, 102.7)		
Smoking intensity (weekly)						1.8	0.2
≤105	78.1 (59.2, 97.1)	69.8 (48.7, 90.8)	78.1 (59.2, 97.1)	91.5 (78.8, 104.3)	91.5 (78.8, 104.3)		
106-140	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
141-210	74.1 (54.0, 94.1)	85.8 (69.8, 101.7)	91.7 (79.1, 104.3)	91.7 (79.1, 104.3)	91.7 (79.1, 104.3)		
>210	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Expenditure (weekly)						1.9	0.2
≤3	79.4 (50.4, 108.3)	59 (23.8, 94.2)	79.4 (50.4, 108.3)	79.4 (50.4, 108.3)	79.4 (50.4, 108.3)		
3.1-4							
4.1-5	78.2 (47.3, 109.1)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)	100 (100.0, 100.0)		
>5	81.6 (68.0, 95.2)	83.7 (70.7, 96.7)	87.2 (75.5, 99.0)	95.1 (87.5, 102.7)	95.1 (87.5, 102.7)		
Budget share						-	-
≤3	83.8 (60.4, 107.2)	67.7 (38.0, 97.4)	83.8 (60.4, 107.2)	83.8 (60.4, 107.2)	83.8 (60.4, 107.2)		
3.1-5	72.7 (48.7, 96.7)	78.2 (56.0, 100.4)	78.2 (56.0, 100.4)	88.5 (71.3, 105.7)	88.5 (71.3, 105.7)		
5.1-12	83.3 (66.3, 100.2)	90.9 (77.8, 104.0)	96.8 (88.8, 104.8)	100 (100.0, 100.0)	100 (100.0, 100.0)		
>12	88.2 (56.9, 119.5)	88.2 (56.9, 119.5)	88.2 (56.9, 119.5)	100 (100.0, 100.0)	100 (100.0, 100.0)		
Average							
Number of cigarettes per day	20.6 (17.7, 23.6)	21.5 (18.7, 24.4)	21.2 (18.3, 24.0)	20.8 (18.1, 23.5)	20.8 (18.1, 23.5)		
Expenditure (monthly)	27.2 (23.6, 30.9)	27.4 (24.0, 30.9)	26.8 (23.4, 30.2)	28.5 (24.6, 32.4)	28.5 (24.6, 32.4)		
Household income per month (EUR)	675.7 (538.2, 813.1)	648.9 (509.5, 788.3)	653.9 (523.0, 784.7)	666.2 (540.2, 792.1)	666.2 (540.2, 792.1)		
Personal income per month (EUR)	340.5 (300.0, 381.0)	337.9 (296.3, 379.5)	338.6 (299.8, 377.5)	354.6 (311.9, 397.3)	354.6 (311.9, 397.3)		
Budget share	0.1 (0.0, 0.1)	0.1 (0.0, 0.1)	0.1 (0.0, 0.1)	0.1 (0.0, 0.1)	0.1 (0.0, 0.1)		

Note: Sample size = 708

Table A9a

Characteristics of illicit cigarette market identification (MCHR) 2019

	Percentage	95% CI
Place of purchase		
Legal	60.8	(56.0, 65.5)
Illicit	39.2	(34.5, 44.1)
Brand		
Legal	48.0	(43.2, 52.9)
Illicit	52.0	(47.1, 56.8)
Health warning label		
Legal	46.0	(41.1, 50.8)
Illicit	54.1	(49.2, 58.9)
Tax stamp		
Legal	44.4	(39.6, 49.3)
Illicit	55.6	(50.7, 60.4)
Identification of illicit pack		
Legal	40.2	(35.5, 45.1)
Illicit	59.8	(54.9, 64.5)

Note: Sample size = 393

Table A9b

Characteristics of illicit cigarette market identification (MCHR) 2022

	Percentage	95% CI
Place of purchase		
Legal	81.2	(78.4, 84.0)
Illicit	18.8	(16.0, 21.6)
Brand		
Legal	77.6	(74.6, 80.6)
Illicit	22.4	(19.4, 25.4)
Health warning label		
Legal	79.3	(76.4, 82.2)
Illicit	20.7	(17.8, 23.6)
Tax stamp		
Legal	79.1	(76.2, 82.0)
Illicit	20.9	(18.0, 23.8)
Identification of illicit pack		
Legal	74.1	(70.9, 77.2)
Illicit	25.9	(22.8, 29.1)

Note: Sample size = 751

Table A10a

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MCHR) 2019

	Place	Brand	Health warning label	Tax stamp	IIP	Wald F	
Total	39.2 (34.5, 44.1)	51.98 (47.1, 56.8)	54.05 (49.2, 58.9)	55.58 (50.7, 60.4)	59.81 (54.9, 64.5)	F	p
Gender						13.5	0.0
Male	42.3 (35.3 - 49.4)	66.7 (59.4 - 74.0)	67.0 (59.7 - 74.2)	67.0 (59.7 - 74.2)	70.5 (63.5 - 77.6)		
Female	36.3 (29.6 - 42.9)	73.3 (56.1 - 90.4)	76.1 (59.6 - 92.6)	80.6 (65.3 - 96.0)	89.0 (76.8 - 101.1)		
Age						13.5	0.0
18-24	7.3 (-1.7 - 16.4)	42.8 (35.8 - 49.9)	43.3 (36.2 - 50.4)	44.4 (37.3 - 51.5)	50.6 (43.4 - 57.7)		
25-44	33.5 (26.5 - 40.6)	60.6 (53.8 - 67.3)	64.2 (57.5 - 70.8)	66.1 (59.6 - 72.6)	68.5 (62.1 - 74.9)		
45-65	50.0 (42.2 - 57.7)	18.7 (5.2 - 32.2)	18.7 (5.2 - 32.2)	18.7 (5.2 - 32.2)	18.7 (5.2 - 32.2)		
65+	49.5 (30.1 - 68.9)	41.3 (33.9 - 48.6)	45.3 (37.9 - 52.7)	48.1 (40.7 - 55.6)	53.1 (45.7 - 60.6)		
Type of residence						26.2	0.0
Urban	29.6 (23.8 - 35.5)	43.2 (36.9 - 49.5)	46.8 (40.5 - 53.2)	48.4 (42.1 - 54.8)	50.2 (43.9 - 56.6)		
Rural	54.0 (46.1 - 61.8)	65.5 (58.0 - 73.0)	65.2 (57.7 - 72.7)	66.6 (59.2 - 74.1)	74.6 (67.7 - 81.5)		
Education level						12.9	0.0
Primary or less	40.4 (29.8 - 51.0)	69.7 (59.7 - 79.6)	72.0 (62.2 - 81.7)	76.0 (66.8 - 85.2)	77.1 (68.1 - 86.2)		
Secondary	42.0 (35.9 - 48.1)	51.9 (45.7 - 58.1)	54.3 (48.1 - 60.4)	55.3 (49.2 - 61.5)	59.1 (53.0 - 65.2)		
Higher	24.8 (13.6 - 36.0)	26.7 (15.2 - 38.2)	27.2 (15.6 - 38.8)	27.2 (15.6 - 38.8)	37.8 (25.2 - 50.4)		
Region						20.0	0.0
Center	52.2 (44.8 - 59.6)	62.4 (55.2 - 69.5)	63.9 (56.8 - 71.0)	64.2 (57.1 - 71.3)	64.6 (57.5 - 71.6)		
North	33.3 (24.6 - 42.0)	61.6 (52.7 - 70.6)	66.0 (57.2 - 74.7)	70.7 (62.3 - 79.1)	74.2 (66.2 - 82.3)		
South	23.2 (15.0 - 31.4)	23.3 (15.1 - 31.5)	23.9 (15.7 - 32.2)	23.9 (15.7 - 32.2)	35.7 (26.4 - 45.0)		
Personal income per month (EUR)						213.4	0.0
Less than 400	49.2 (40.2 - 58.2)	74.3 (66.4 - 82.2)	79.0 (71.7 - 86.3)	82.3 (75.4 - 89.1)	84.9 (78.4 - 91.3)		
Between 401 and 800	40.1 (32.7 - 47.5)	47.3 (39.8 - 54.9)	48.8 (41.2 - 56.3)	49.1 (41.5 - 56.7)	55.9 (48.4 - 63.5)		
Between 801 and 1200	35.8 (24.8 - 46.8)	45.6 (34.1 - 57.0)	45.7 (34.3 - 57.1)	46.4 (34.9 - 57.8)	48.5 (37.0 - 59.9)		
More than 1200	6.3 (-5.5 - 18.1)	3.5 (-5.4 - 12.4)	3.5 (-5.4 - 12.4)	9.8 (-4.6 - 24.2)	9.8 (-4.6 - 24.2)		
Household income per month (EUR)	4.0 (-5.6 - 13.6)	12.7 (-3.7 - 29.2)	12.7 (-3.7 - 29.2)	12.7 (-3.7 - 29.2)	16.3 (-1.9 - 34.4)		
Less than 400						32.9	0.0
Between 401 and 800	40.9 (34.7 - 47.2)	60.2 (54.0 - 66.4)	61.4 (55.2 - 67.6)	63.7 (57.6 - 69.8)	66.9 (60.9 - 72.8)		
Between 801 and 1200	39.9 (31.4 - 48.4)	41.9 (33.3 - 50.4)	45.9 (37.3 - 54.6)	46.3 (37.7 - 54.9)	53.3 (44.7 - 62.0)		
Between 1200 and 1600	20.0 (2.7 - 37.2)	26.5 (7.4 - 45.6)	26.5 (7.4 - 45.6)	26.5 (7.4 - 45.6)	26.5 (7.4 - 45.6)		
More than 1600	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)	0.0 (0.0 - 0.0)		
Employment						18.7	0.0
Employed	36.7 (30.6 - 42.7)	42.3 (36.1 - 48.5)	43.7 (37.4 - 49.9)	44.8 (38.5 - 51.1)	50.1 (43.8 - 56.4)		
Unemployed	39.1 (29.6 - 48.6)	62.4 (52.9 - 71.8)	66.6 (57.4 - 75.7)	68.7 (59.7 - 77.7)	71.5 (62.7 - 80.3)		
Pensioner	52.5 (38.2 - 66.8)	79.5 (67.9 - 91.0)	80.5 (69.2 - 91.8)	83.0 (72.2 - 93.7)	84.8 (74.6 - 95.1)		
Smoking status						0.3	0.6
Yes, daily	39.1 (34.2 - 44.0)	52.8 (47.8 - 57.8)	54.1 (49.1 - 59.1)	55.7 (50.7 - 60.7)	60.0 (55.1 - 64.9)		
Less than daily	44.5 (11.7 - 77.3)	15.2 (-8.5 - 38.9)	51.3 (18.3 - 84.2)	51.3 (18.3 - 84.2)	51.3 (18.3 - 84.2)		

Table A10a

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MCHR) 2019 (cont'd)

	Place	Brand	Health warning label	Tax stamp	IIP	Wald F	
Number of cigarettes per day						1.2	0.1
≤10	41.6 (31.8 - 51.4)	49.0 (39.0 - 58.9)	51.3 (41.3 - 61.2)	55.2 (45.3 - 65.1)	64.5 (54.9 - 74.0)		
11-20	35.9 (29.4 - 42.5)	53.0 (46.2 - 59.9)	55.6 (48.8 - 62.4)	56.6 (49.8 - 63.4)	59.5 (52.8 - 66.3)		
21-30	50.8 (29.5 - 72.0)	65.9 (45.8 - 86.0)	65.9 (45.8 - 86.0)	65.9 (45.8 - 86.0)	73.9 (55.2 - 92.5)		
>30	41.9 (30.2 - 53.5)	48.8 (37.0 - 60.6)	49.7 (37.9 - 61.6)	49.7 (37.9 - 61.6)	49.7 (37.9 - 61.6)		
Expenditure (monthly)						37.5	0.0
≤27	55.2 (45.5 - 64.9)	68.9 (59.9 - 78.0)	73.0 (64.3 - 81.6)	75.1 (66.6 - 83.5)	78.7 (70.7 - 86.7)		
28-45	44.2 (35.5 - 52.9)	70.0 (62.0 - 78.0)	72.7 (64.9 - 80.5)	74.4 (66.8 - 82.1)	80.7 (73.8 - 87.6)		
46-65	21.9 (12.2 - 31.6)	20.6 (11.2 - 30.1)	20.6 (11.2 - 30.1)	23.1 (13.2 - 32.9)	29.3 (18.6 - 39.9)		
>66	28.4 (19.3 - 37.5)	33.4 (23.9 - 42.9)	34.1 (24.5 - 43.6)	34.1 (24.5 - 43.6)	34.7 (25.1 - 44.3)		
Number of cigarettes per week						1.2	0.1
≤70	41.6 (31.8 - 51.4)	49.0 (39.0 - 58.9)	51.3 (41.3 - 61.2)	55.2 (45.3 - 65.1)	64.5 (54.9 - 74.0)		
71-140	35.9 (29.4 - 42.5)	53.0 (46.2 - 59.9)	55.6 (48.8 - 62.4)	56.6 (49.8 - 63.4)	59.5 (52.8 - 66.3)		
141-210	50.8 (29.5 - 72.0)	65.9 (45.8 - 86.0)	65.9 (45.8 - 86.0)	65.9 (45.8 - 86.0)	73.9 (55.2 - 92.5)		
>210	41.9 (30.2 - 53.5)	48.8 (37.0 - 60.6)	49.7 (37.9 - 61.6)	49.7 (37.9 - 61.6)	49.7 (37.9 - 61.6)		
Expenditure (weekly)						35.7	0.0
≤7	59.1 (50.2 - 68.1)	71.6 (63.4 - 79.8)	75.6 (67.8 - 83.4)	77.4 (69.8 - 85.0)	80.6 (73.4 - 87.8)		
7.1-13	38.3 (29.9 - 46.7)	60.0 (51.6 - 68.5)	62.2 (53.8 - 70.6)	65.2 (57.0 - 73.5)	74.8 (67.2 - 82.3)		
13.1-19	25.7 (16.0 - 35.4)	29.0 (19.0 - 39.1)	29.0 (19.0 - 39.1)	29.0 (19.0 - 39.1)	29.8 (19.7 - 40.0)		
>19	22.6 (12.7 - 32.5)	29.9 (19.1 - 40.8)	30.8 (19.9 - 41.8)	30.8 (19.9 - 41.8)	30.8 (19.9 - 41.8)		
Budget share							
≤4	44.0 (33.5 - 54.4)	54.2 (43.7 - 64.7)	57.1 (46.7 - 67.5)	59.5 (49.2 - 69.9)	61.3 (51.0 - 71.5)	1.2	0.3
4-12	40.6 (33.9 - 47.4)	47.5 (40.7 - 54.4)	50.4 (43.6 - 57.3)	50.4 (43.6 - 57.3)	56.5 (49.7 - 63.4)		
12.1-20	35.1 (21.2 - 48.9)	59.7 (45.4 - 73.9)	57.6 (43.2 - 71.9)	57.6 (43.2 - 71.9)	59.7 (45.4 - 73.9)		
>20	30.0 (17.9 - 42.0)	58.5 (45.5 - 71.4)	59.6 (46.7 - 72.5)	66.6 (54.2 - 79.0)	69.6 (57.5 - 81.7)		
Average							
Number of cigarettes per day	19.6 (17.4 - 21.8)	19.5 (17.8 - 21.3)	19.1 (17.5 - 20.8)	18.9 (17.2 - 20.5)	18.6 (17.0 - 20.2)		
Expenditure (monthly)	39.6 (35.2 - 44.0)	38.9 (35.3 - 42.4)	38.1 (34.7 - 41.6)	38.1 (34.7 - 41.5)	38.3 (35.1 - 41.5)		
Price	1.5 (1.4 - 1.6)	1.4 (1.4 - 1.5)	1.4 (1.4 - 1.5)	1.5 (1.4 - 1.5)	1.5 (1.5 - 1.6)		
Household income per month (EUR)	539.0 (492.0 - 585.9)	493.2 (448.1 - 538.3)	493.0 (448.9 - 537.0)	491.2 (446.9 - 535.5)	495.7 (453.5 - 537.9)		
Personal income per month (EUR)	359.0 (329.9 - 388.1)	321.7 (295.0 - 348.5)	323.2 (297.1 - 349.4)	319.9 (294.1 - 345.8)	322.5 (297.8 - 347.2)		
Budget share	0.1 (0.1 - 0.1)	0.1 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0.1 - 0.2)		

Note: Sample size = 393

Table A10b

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MCHR) 2022

	Place	Brand	Health warning label	Tax stamp	IIP	Wald F	
Total	18.8 (16.0, 21.6)	22.4 (19.4, 25.4)	20.7 (17.8-23.6)	20.9 (18.0, 23.8)	25.9 (22.8, 29.1)	F	p
Gender						1.6	0.2
Male	20.4 (16.2, 24.5)	23.6 (19.2, 28.0)	21.7 (17.4, 25.9)	22 (17.7, 26.3)	28 (23.4, 32.7)		
Female	17.5 (13.7, 21.2)	21.3 (17.2, 25.3)	19.8 (15.9, 23.8)	19.9 (15.9, 23.8)	24 (19.8, 28.3)		
Age						16.6	0.0
18-24	15.1 (8.1, 22.1)	10.5 (4.5, 16.4)	13.7 (7.0, 20.4)	13.7 (7.0, 20.4)	15.1 (8.1, 22.1)		
25-44	11.1 (7.5, 14.6)	14.6 (10.6, 18.6)	12.9 (9.1, 16.7)	13.2 (9.3, 17.0)	17.3 (13.0, 21.6)		
45-65	24.4 (19.4, 29.4)	30.1 (24.7, 35.4)	26.9 (21.7, 32.0)	27.1 (22.0, 32.3)	35 (29.4, 40.5)		
65+	36.2 (24.5, 48.0)	42.9 (30.8, 55.0)	40.3 (28.3, 52.3)	40.3 (28.3, 52.3)	42.9 (30.8, 55.0)		
Type of residence						0.4	0.5
Urban	19.3 (15.9, 22.6)	21.8 (18.3, 25.3)	19.8 (16.4, 23.2)	20.3 (16.9, 23.8)	25.2 (21.5, 29.0)		
Rural	17.8 (12.8, 22.8)	23.7 (18.1, 29.3)	22.8 (17.3, 28.3)	22.2 (16.7, 27.6)	27.6 (21.7, 33.5)		
Education level						3.6	0.0
Primary or less	27 (16.6, 37.5)	34.6 (23.4, 45.7)	34.4 (23.3, 45.6)	33.3 (22.2, 44.4)	36.1 (24.8, 47.4)		
Secondary	19.9 (16.6, 23.2)	22.1 (18.7, 25.6)	20.7 (17.3, 24.0)	20.8 (17.4, 24.2)	26.1 (22.4, 29.7)		
Higher	8.3 (3.3, 13.3)	15.5 (8.9, 22.0)	12 (6.1, 17.9)	13.1 (7.0, 19.2)	18.5 (11.5, 25.5)		
Region						1.7	0.2
Center	23.3 (18.7, 27.9)	26.8 (22.0, 31.6)	26.1 (21.3, 30.9)	26.9(22.1, 31.8)	24.4 (18.8, 30.1)		
North	14.8 (10.1, 19.5)	19.1 (13.9, 24.2)	15.8 (11.0, 20.6)	16.1 (11.3, 21.0)	29.2 (24.3, 34.2)		
South	16.1 (11.0, 21.2)	18.8 (13.4, 24.2)	17.4 (12.2, 22.6)	16.3 (11.2, 21.4)	22.3 (16.5, 28.0)		
Personal income per month (EUR)						88.4	0.0
Less than 400	20.9(16.6, 25.2)	25 (20.5, 29.6)	24.6 (20.0, 29.1)	24.6 (20.0, 29.1)	28.2 (23.4, 32.9)		
Between 401 and 800	18.4 (14.2, 22.5)	22.4 (18.0, 26.9)	19.7 (15.4, 23.9)	20.1 (15.8, 24.4)	25.7 (21.0, 30.4)		
Between 801 and 1200	12.4 (4.2, 20.6)	10(2.5, 17.4)	7.3 (0.8, 13.7)	7.3 (0.8, 13.7)	17.7 (8.2, 27.2)		
More than 1200	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)		
Household income per month (EUR)						2.1	0.1
Less than 400	23.6 (15.5, 31.6)	32 (23.1, 40.9)	28.9(20.3, 37.5)	28.8 (20.2, 37.5)	36.5 (27.3, 45.6)		
Between 401 and 800	20.1 (16.1, 24.1)	22.8 (18.6, 27.0)	21.6 (17.5, 25.8)	21.8 (17.7, 25.9)	25.2 (20.8, 29.5)		
Between 801 and 1200	15.7 (10.5, 20.8)	18.6 (13.0, 24.1)	16.4 (11.1, 21.7)	16.7 (11.4, 22.0)	24.7 (18.6, 30.9)		
Between 1200 and 1600	11.6 (2.7, 20.6)	15.3 (5.2, 25.4)	13.7 (4.1, 23.3)	14 (4.3, 23.7)	17.7 (7.0, 28.4)		
More than 1600	17.7 (1.8, 33.6)	17.7 (1.8, 33.6)	17.7 (1.8, 33.6)	17.7 (1.8, 33.6)	17.7 (1.8, 33.6)		
Employment						7.7	0.0
Employed	13.3 (10.1, 16.5)	17.6 (14.0, 21.2)	14.7 (11.3, 18.0)	15.4 (12.0, 18.8)	21 (17.2, 24.9)		
Unemployed	22.8 (17.2, 28.3)	23.7 (18.0, 29.3)	23.7 (18.1, 29.3)	23.7 (18.1, 29.3)	28.4 (22.5, 34.4)		
Pensioner	33.1 (23.8, 42.3)	39.2 (29.6, 48.8)	39.2 (29.6, 48.8)	37.6 (28.0, 47.1)	40.6 (31.0, 50.3)		
Smoking status						0.1	0.8
Yes, daily	18.7 (15.9, 21.6)	22.1 (19.0, 25.1)	20.5 (17.6, 23.5)	20.7 (17.8, 23.7)	25.9 (22.6, 29.1)		
Less than daily	20.6 (8.0, 33.3)	27.5 (13.5, 41.4)	23.5 (10.3, 36.8)	23.5 (10.3, 36.8)	27.5 (13.5, 41.4)		

Table A10b

Percentage distribution of smokers that consume illicit cigarettes by sociodemographic and behavior characteristics and identification of illicit pack criteria (MCHR) 2022 (cont'd)

	Place	Brand	Health warning label	Tax stamp	IIP	Wald F	
Number of cigarettes per day						5.2	0
≤10	17.7 (12.8, 22.6)	16 (11.3, 20.8)	16.6 (11.8, 21.4)	16.2 (11.5, 21.0)	21.6 (16.3, 26.9)		
11-20	16.7 (12.9, 20.4)	21.3 (17.1, 25.4)	18.6 (14.6, 22.5)	19.6 (15.6, 23.6)	23.9(19.6, 28.2)		
21-30	29.2 (20.5, 37.9)	40.4 (31.0, 49.8)	37.9(28.6, 47.2)	36.4 (27.2, 45.6)	43 (33.5, 52.4)		
>30	18.7 (6.1, 31.3)	22.3 (8.8, 35.8)	19.1 (6.4, 31.9)	19.1 (6.4, 31.9)	25 (11.0, 39.0)		
Expenditure (monthly)						14.4	0.0
≤27	29.2 (20.9, 37.6)	32.4 (23.8, 41.0)	33.8 (25.1, 42.5)	33.1 (24.5, 41.7)	35.1 (26.4, 43.9)		
28-45	25.3 (19.1, 31.6)	26.8 (20.5, 33.2)	27.7 (21.3, 34.1)	26.8 (20.5, 33.2)	32 (25.3, 38.7)		
46-65	21 (15.8, 26.3)	25.6 (20.0, 31.3)	21.6 (16.3, 26.9)	23.2 (17.7, 28.7)	29.6 (23.7, 35.5)		
>66	5.6 (2.6, 8.6)	10(6.0, 13.9)	7 (3.6, 10.4)	7 (3.7, 10.4)	12.2 (7.8, 16.5)		
Number of cigarettes per week						5.2	0
≤70	17.7 (12.8, 22.6)	16 (11.3, 20.8)	16.6 (11.8, 21.4)	16.2 (11.5, 21.0)	21.6 (16.3, 26.9)		
71-140	16.7 (12.9, 20.4)	21.3 (17.1, 25.4)	18.6 (14.6, 22.5)	19.6 (15.6, 23.6)	23.9(19.6, 28.2)		
141-210	29.2 (20.5, 37.9)	40.4 (31.0, 49.8)	37.9(28.6, 47.2)	36.4 (27.2, 45.6)	43 (33.5, 52.4)		
>210	18.7 (6.1, 31.3)	22.3 (8.8, 35.8)	19.1 (6.4, 31.9)	19.1 (6.4, 31.9)	25 (11.0, 39.0)		
Expenditure (weekly)						5.9	0.0
≤7	32.2 (24.7, 39.8)	35.2 (27.4, 42.9)	35.7 (28.0, 43.5)	35.2 (27.5, 42.9)	37.8 (30.0, 45.7)		
7.1-13	20.4 (15.0, 25.9)	21.3 (15.8, 26.9)	21.4 (15.8, 26.9)	21.5 (16.0, 27.1)	27.6 (21.6, 33.7)		
13.1-19	15.9(11.5, 20.3)	19.8 (15.0, 24.6)	16.8 (12.4, 21.3)	17.5 (12.9, 22.0)	22.2 (17.2, 27.1)		
>19	6.6 (2.2, 11.0)	14.5 (8.3, 20.7)	10(4.7, 15.3)	10.1 (4.8, 15.4)	17.1 (10.5, 23.7)		
Budget share						0.9	0.5
≤4	21 (14.2, 27.8)	20.9(14.1, 27.8)	21.6 (14.7, 28.5)	22.1 (15.1, 29.1)	24.3 (17.1, 31.5)		
4-12	20.4 (16.7, 24.2)	24 (20.0, 28.0)	22.5 (18.7, 26.4)	22.7 (18.8, 26.6)	27.7 (23.5, 31.9)		
12.1-20	12.4 (6.3, 18.6)	19(11.7, 26.4)	13.7 (7.3, 20.2)	13.7 (7.3, 20.1)	24.2 (16.2, 32.2)		
>20	14 (5.2, 22.9)	19.6 (9.4, 29.7)	17.7 (8.0, 27.5)	17.7 (8.0, 27.5)	19.6 (9.4, 29.7)		
Average							
Number of cigarettes per day	17.1 (15.5, 18.7)	18.5 (17.2, 19.8)	18.1 (16.7, 19.5)	18.1 (16.7, 19.4)	17.7 (16.4, 19.0)		
Expenditure (monthly)	43.3 (39.7, 47.0)	47.3 (43.3, 51.2)	43.4 (40.0, 46.8)	43.8 (40.4, 47.2)	47.6 (44.0, 51.3)		
Price							
Household income per month (EUR)	670.9(616.8, 725.1)	655.8 (605.5, 706.0)	654.8 (602.5, 707.0)	660.3 (608.1, 712.5)	671.1 (624.4, 717.7)		
Personal income per month (EUR)	417.6 (383.5, 451.6)	403.4 (373.4, 433.5)	395.2 (365.6, 424.9)	400(370.2, 429.8)	421.7 (392.1, 451.2)		
Budget share	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)		

Note: Sample size = 751

Table A11a

Factors affecting probability of consuming illicit cigarettes (MC) 2019

Variables	Model 1	Se	Model 2	Se	Model 3	Se
Gender						
Male			.			
Female	0.175***	(0.062)	0.178***	(0.062)	0.144**	(0.063)
Age						
18-24						
25-44	0.340***	(0.117)	0.333***	(0.118)	0.360***	(0.108)
45-65	0.451***	(0.119)	0.445***	(0.121)	0.519***	(0.110)
65+	0.622***	(0.138)	0.615***	(0.140)	0.691***	(0.125)
Type of residence						
Urban						
Rural	0.276***	(0.061)	0.276***	(0.061)	0.255***	(0.060)
Education level						
Primary or less						
Secondary	-0.018	(0.094)	-0.019	(0.093)	0.008	(0.097)
Higher	-0.253**	(0.123)	-0.247**	(0.123)	-0.231*	(0.124)
Region						
Center						
North	-0.198	(0.164)	-0.200	(0.164)	0.000	(0.076)
South	-0.143**	(0.072)	-0.141*	(0.072)	-0.142*	(0.081)
HH income per month (EUR)						
Less than 200						
Between 201 and 300	-0.036	(0.154)	-0.036	(0.156)	-0.046	(0.148)
Between 301 and 400	-0.109	(0.108)	-0.107	(0.108)	-0.124	(0.103)
Between 401 and 500	-0.253**	(0.117)	-0.249**	(0.118)	-0.316***	(0.116)
Between 501 and 600	-0.192*	(0.114)	-0.188	(0.115)	-0.257**	(0.115)
Between 601 and 700	-0.191	(0.122)	-0.191	(0.123)	-0.226*	(0.118)
Between 701 and 800	-0.398***	(0.134)	-0.398***	(0.134)	-0.438***	(0.127)
Between 801 and 900	-0.236	(0.150)	-0.224	(0.151)	-0.245*	(0.141)
Between 901 and 1000	-0.305**	(0.138)	-0.304**	(0.138)	-0.260**	(0.127)
Between 1001 and 1200	-0.339**	(0.166)	-0.341**	(0.166)	-0.324**	(0.156)
Between 1201 and 1400	-0.470*	(0.244)	-0.469*	(0.243)	-0.421*	(0.252)
Between 1401 and 1600	-		-		-	
Between 1601 and 1800	-0.562	(0.389)	-0.564	(0.385)	-0.568	(0.386)
More than 1800	-0.548***	(0.201)	-0.548***	(0.201)	-0.530**	(0.212)
Employment						
Employed						
Unemployed	-0.020	(0.093)	-0.014	(0.093)	-0.015	(0.095)
Pensioner	0.002	(0.130)	0.003	(0.131)	0.021	(0.127)

Table A11a

Factors affecting probability of consuming illicit cigarettes (MC) 2019 (cont'd)

Variables	Model 1	Se	Model 2	Se	Model 3	Se
Smoking status			-0.144	(0.257)		
DV (Kosovo)	0.220	(0.145)	0.217	(0.146)		
DV (Serbia)	0.292**	(0.121)	0.291**	(0.121)		
No. of cig. per day					-0.007**	(0.003)
DV (nearest border)					4.814	(5.881)
Expenditure (monthly)						
BIC	523.4		529		520.9	
Pseudo R square	0.261		0.261		0.266	
Log likelihood	-184.4		-184.3		-183.2	
VIF	2.59		2.59		2.02	

Notes: Sample size = 379; table presents logit marginal effects at mean; standard errors in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

Table A11b

Factors affecting probability of consuming illicit cigarettes (MC) 2022

Variables	Model 1	Se	Model 2	Se	Model 3	Se
Gender						
Female			.			
Male	0.009	-0.041	0.007	-0.041	0.008	-0.040
Age						
18-24						
25-44	0.070***	-0.023	0.064***	-0.022	0.065***	-0.021
45-65	0.222***	-0.022	0.214***	-0.022	0.217***	-0.022
65+	0.278**	-0.119	0.282**	-0.121	0.274**	-0.116
Type of residence						
Urban						
Rural	-0.012	-0.027	-0.01	-0.028	-0.011	-0.025
HH with children aged from 5-14	0.002***	-0.001	0.002**	-0.001	0.002**	-0.001
Education level						
Primary or less						
Secondary	-0.002	-0.032	-0.005	-0.034	-0.002	-0.033
Higher	-0.027	-0.053	-0.029	-0.056	-0.025	-0.055
Region						
North						
Center	-0.007	-0.039	0.077*	-0.043	0.149**	-0.068
South	0.04	-0.044	0.094	-0.060	0.167**	-0.079

Table A11b

Factors affecting probability of consuming illicit cigarettes (MC) 2022 (cont'd)

Variables	Model 1	Se	Model 2	Se	Model 3	Se
Household income per month (EUR)						
Less than 400						
Between 401 and 800	-0.046	-0.044	-0.054	-0.047	-0.051	-0.047
Between 801 and 1200	-0.011	-0.056	-0.016	-0.058	-0.014	-0.057
Between 1201 and 1600	-0.044	-0.055	-0.044	-0.057	-0.04	-0.057
More than 1600	-0.161**	-0.067	-0.170**	-0.070	-0.167**	-0.069
Employment						
Employed						
Unemployed	0.108**	-0.042	0.104**	-0.041	0.107***	-0.041
Pensioner	-0.031	-0.056	-0.04	-0.056	-0.034	-0.054
DV (Kosovo)					0.172	-0.141
DV (Albania)					0.172	-0.12
No. of cig. per day						
Expenditure (monthly)	-0.002***	-0.001	-0.002***	0.000	-0.002***	0.000
Average			0.302	-0.241		
Lowest price	3.292*	-1.834				
BIC	787.9		789.2		795.1	
Pseudo R square	0.07		0.07		0.07	
Log likelihood	-341.5		-342.1		-341.0	
VIF	3.62		3.75		4.10	

Notes: Sample size = 708; table presents logit marginal effects at mean; standard errors in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

Table A12a

Factors affecting probability of consuming illicit cigarettes (MCHR) 2019

Variables	Model 1	Se	Model 2	Se	Model 3	Se
Gender						
Male			.			
Female	0.164***	(0.059)	0.166***	(0.059)	0.130**	(0.061)
Age						
18-24						
25-44	0.354***	(0.117)	0.353***	(0.117)	0.372***	(0.113)
45-65	0.469***	(0.117)	0.468***	(0.118)	0.503***	(0.114)
65+	0.614***	(0.139)	0.612***	(0.140)	0.663***	(0.130)
Type of residence						
Urban						
Rural	0.231***	(0.057)	0.231***	(0.057)	0.243***	(0.057)

Table A12a

Factors affecting probability of consuming illicit cigarettes (MCHR) 2019 (cont'd)

Variables	Model 1	Se	Model 2	Se	Model 3	Se
Education level						
Primary or less						
Secondary	-0.016	(0.090)	-0.017	(0.090)	-0.001	(0.092)
Higher	-0.215*	(0.119)	-0.214*	(0.119)	-0.198*	(0.120)
Region						
Center						
North	0.049	(0.067)	0.048	(0.067)	0.013	(0.070)
South	-0.165**	(0.074)	-0.164**	(0.075)	-0.172**	(0.074)
HH income per month (EUR)						
Less than 200						
Between 201 and 300	-0.025	(0.132)	-0.028	(0.133)	-0.028	(0.123)
Between 301 and 400	-0.151	(0.101)	-0.152	(0.101)	-0.145	(0.096)
Between 401 and 500	-0.256**	(0.108)	-0.256**	(0.108)	-0.298***	(0.109)
Between 501 and 600	-0.212**	(0.106)	-0.213**	(0.105)	-0.265**	(0.109)
Between 601 and 700	-0.223*	(0.115)	-0.225*	(0.115)	-0.248**	(0.113)
Between 701 and 800	-0.417***	(0.125)	-0.419***	(0.125)	-0.441***	(0.122)
Between 801 and 900	-0.253*	(0.140)	-0.250*	(0.140)	-0.256*	(0.136)
Between 901 and 1000	-0.288**	(0.124)	-0.289**	(0.124)	-0.267**	(0.119)
Between 1001 and 1200	-0.342**	(0.157)	-0.344**	(0.157)	-0.335**	(0.152)
Between 1201 and 1400	-0.470**	(0.239)	-0.472**	(0.239)	-0.444*	(0.246)
Between 1401 and 1600						
Between 1601 and 1800	-0.522	(0.409)	-0.524	(0.409)	-0.566	(0.400)
More than 1800	-0.582***	(0.196)	-0.584***	(0.195)	-0.551***	(0.208)
Employment						
Employed						
Unemployed	-0.020	(0.091)	-0.017	(0.091)	-0.016	(0.092)
Pensioner	0.044	(0.116)	0.044	(0.116)	0.049	(0.115)
Smoking status			-0.057	(0.206)		
Number of cigarettes per day					-0.005**	(0.003)
Expenditure (monthly)						
BIC	523.6		529.5		524.9	
Pseudo R square	0.259		0.259		0.268	
Log likelihood	-190.1		-190		-187.7	
VIF	2.01		1.98		2.01	
Observations	394		394		394	

Notes: Sample size = 393; table presents logit marginal effects at mean; standard errors in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

Table A12b

Factors affecting probability of consuming illicit cigarettes (MCHR) 2022

Variables	Model 1	Se	Model 2	Se	Model 3	Se
Gender						
Female			.			
Male	0.041	-0.043	0.028	-0.049	0.077*	-0.04
Age						
18-24						
25-44	0.068***	-0.025	0.059**	-0.026	0.092***	-0.021
45-65	0.232***	-0.027	0.216***	-0.026	0.274***	-0.024
65+	0.301***	-0.112	0.273***	-0.103	0.358***	-0.117
Type of residence						
Urban						
Rural	-0.011	-0.026	-0.011	-0.026	-0.023	-0.028
HH with children aged from 5-14	0.004**	-0.002	0.004**	-0.002	0.003**	-0.001
Education level						
Primary or less						
Secondary	0.017	-0.035	0.008	-0.036	0.023	-0.034
Higher	-0.019	-0.057	-0.026	-0.06	-0.016	-0.056
Region						
North						
Center	0.060*	-0.036	0.058*	-0.035	0.035	-0.038
South	-0.001	-0.054	-0.015	-0.052	0.025	-0.062
HH income per month (EUR)						
Less than 400						
Between 401 and 800	-0.055	-0.048	-0.052	-0.044	-0.076	-0.049
Between 801 and 1200	-0.009	-0.064	-0.005	-0.06	-0.011	-0.064
Between 1201 and 1600	-0.062	-0.055	-0.061	-0.052	-0.062	-0.066
More than 1600	-0.081	-0.097	-0.076	-0.093	-0.1	-0.091
Employment						
Employed						
Unemployed	0.120**	-0.048	0.126***	-0.044	0.097**	-0.046
Pensioner	0.045	-0.075	0.051	-0.075	0.006	-0.068
Smoking status	0.02	-0.054				
Number of cigarettes per day			0.003	-0.003		
Expenditure (monthly)					-0.003***	-0.001
BIC	917.5		832		888.3	
Pseudo R square	0.068		0.07		0.102	
Log likelihood	-399.2		-398		-384.6	
VIF	2.04		2.06		2.06	

Figure A1

Municipal map of Montenegro

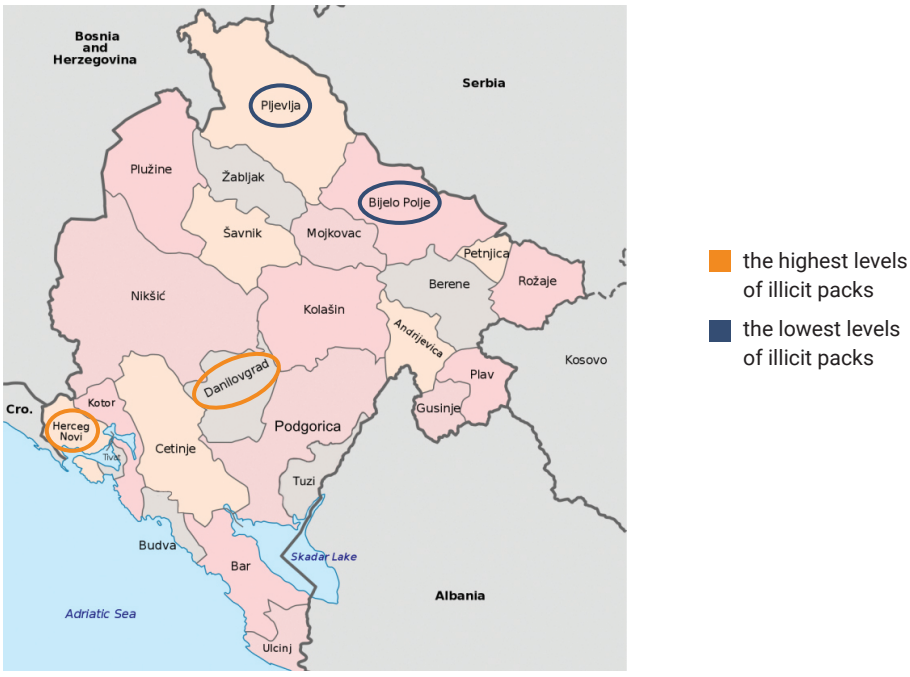


Table A13

Estimated cost of pack examination survey for different margins of error and sample sizes

P	DEFF	Z
0.5	2	1.96

		CI (95%)		Expenses				
n	M.E.	LB	UB	Pollsters	Supervisors	Data entry	Total fringe	Total
1,000	4.4%	45.6%	54.4%	3,904.0	1,400.0	1,220	509.9	7,033.9
1,200	4.0%	46.0%	54.0%	4,684.8	1,400.0	1,464	590.0	8,138.8
1,500	3.6%	46.4%	53.6%	5,856.0	2,100.0	1,830	764.9	10,550.9
1,800	3.3%	46.7%	53.3%	7,027.2	2,800.0	2,196	939.7	12,962.9
2,000	3.1%	46.9%	53.1%	7,808.0	2,800.0	2,440	1,019.8	14,067.8

Note: As planned in budget narrative, 16 pollsters were paid USD 122 per day (two days of work for 1,200 packs). This means that each pollster is getting on average USD 3.904 per pack. The expenses for supervisors and data entry are proportionally increased with the increase of n.

Table A14

Number of littered packs to be collected by chosen municipalities

Municipality	Prevalence (HBS)	Number of littered packs
Danilovgrad	5%	57
Nikšić	23%	278
Pljevlja	6%	76
Herceg Novi	6%	71
Bar	7%	86
Bijelo Polje	8%	97
Podgorica	45%	535
TOTAL number of packs	**1,200**	

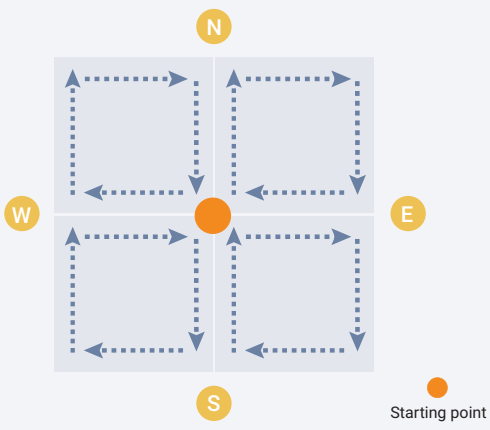
Appendix B

Littered packs protocol

The number of cigarette packs that can be collected per kilometer on average is used to determine the minimum travel distance needed to collect the required amount of all cigarette packs in the seven selected municipalities. Dividing the minimum travel distance by the average planned length that the pollsters will cover in relation to the starting point defined within the polling stations (PSUs) by municipality, we obtain information on the number of polling stations (PSUs) to be included in the final sample. It is assumed that the length of one route is 200 meters.

When choosing a starting point, consider that places where illicit packs are more likely to be found are not targeted. Therefore, in order to determine the routes, first the starting location in each PSU is spatially selected randomly, using free online random-point generators. After defining a random starting point, the next step is to define a walking protocol, by prescribing a route. For example, a specific length from the starting point is defined. First, pollsters are to go north of the starting point. Then they should turn right, until they finish a square with a defined length. This pattern could be repeated four times, each time choosing a different starting direction. On average, every pollster visited about 12 polling stations (detail information in tables B1–B3).

Starting points – distance



STARTING POINT
200m→200m→200m→200m=800m
4x800m=3200m

Fieldwork and staff training

All 16 pollsters and seven field managers (one in every municipality) were trained. Training for the littered pack collection consisted of classroom presentation and discussion, followed by field practice on the streets, as part of the two-day training. Following instructions, teams of pollsters were sent into the field for two days from 15 October 2021 to 17 October 2021. Pollsters visited each point in two days, depending on the number of packs that should be collected in each municipality. Supervisors continually monitored the dynamics of collection by their pollsters over the two days to ensure that the prescribed number of littered packs would be collected.

Pollsters thoroughly passed the field, collected, and made photo evidence of found packs. They regularly informed the field managers about the dynamics of collection and whether they were able to find a sufficient number of packs in that area. If not, the supervisor had to organize their work in another field. Some pollsters had to change location due to one of two reasons:

- collecting packs in rural regions; or
- collecting packs in clean areas of municipalities, where it is difficult to find enough packs.

Data processing

The collected packs are sent, and once delivered to the office, examined for completeness prior to data entry and processing. During the entry of data on the littered packs, according to defined criteria, each discarded littered pack is photographed from 6 sides, in order to determine with certainty whether it is illicit or not.

Table B1

Sampling of geographical regions using predicted smoking prevalence and probability proportional to size (PPS) method in Montenegro

Municipality	Prevalence (HBS)	Number of littered packs	Number of littered packs per pollster	Number of pollsters	Estimated km per pollster
Nikšić	23%	278	69	4	34.5
			69		34.5
			70		35.0
			70		35.0
Danilovgrad	5%	57	57	1	28.5
Podgorica	45%	535	77	7	38.5
			77		38.5
			77		38.5
			76		38.0
			76		38.0
			76		38.0
			76		38.0
Pljevlja	6%	76	76	1	38.0
Bijelo Polje	8%	97	97	1	48.5
Herceg Novi	6%	71	71	1	35.5
Bar	7%	86	86	1	43.0
TOTAL	**100%**	**1,200**	**1,200**	**16**	**600**

Table B2

Number of starting points by municipality

Municipality	Number of littered packs	Number of littered packs per pollster	Number of pollsters	Estimated km	Length 800m	Starting points	Starting points-municipality
Nikšić	278	69	4	34.5	43	11	44
		69		34.5	43	11	
		70		35.0	44	11	
		70		35.0	44	11	
Danilovgrad	57	57	1	28.5	36	9	9
Podgorica	535	77	7	38.5	48	12	84
		77		38.5	48	12	
		77		38.5	48	12	
		76		38.0	48	12	
		76		38.0	48	12	
		76		38.0	48	12	
		76		38.0	48	12	
Pljevlja	76	76	1	38.0	48	12	12
Bijelo Polje	97	97	1	48.5	61	15	15
Herceg Novi	71	71	1	35.5	44	11	11
Bar	86	86	1	43.0	54	13	13
TOTAL	**1,200**	**1,200**	**16**	**600**		**188**	**188**

Table B3

Information obtained from the collected packs by municipality

Section	Response	1	2	3	4	5	6	7
Identifier	City	Bar	Bijelo Polje	Danilo-vgrad	Herceg Novi	Nikšić	Podgorica	Pljevlja
	PSU (starting points)	13	16	8	11	43	84	12
	Pack	86	97	57	71	278	535	76
Tax stamp, %	Yes	74	88	74	56	68	78	84
	No	21	5	18	37	20	14	9
	Other country tax stamp	5	5	4	6	9	4	4
	Tax stamp thorn off or no tax stamp visible	0	2	5	1	3	4	3
Brand, %	List of brands	80	97	86	63	74	84	92
	Other (specify)	0	0	0	0	0	0	0
	Not visible	20	3	14	37	26	16	8
Combined warning – graphic and text, %	Yes	77	92	63	58	72	83	91
	No	23	8	37	42	28	17	9
Covers 65% of back side of pack, %	Not visible	-	-	-	-	-	-	-
General message on the front of the pack, %	Yes - List of messages in local languages prescribed by the Law	80	94	82	62	75	85	94
	No	5		2	21	4	3	1
	Not visible	-	-	-	-	-	-	-
	Messages in foreign language	15	6	16	17	21	12	5
	Messages not included in the list prescribed by the Law	-	-	-	-	-	-	-
Size of general message on the front of the pack - which covers 30 percent of its surface, %	Yes	95	100	98	79	95	97	99
	No	5	-	2	21	5	3	1
Warning on chemicals quantity in milligrams, %	Yes	97	99	98	99	100	99	100
	No	3	1	2	1	-	1	-

Appendix C

Hand-rolled cigarettes

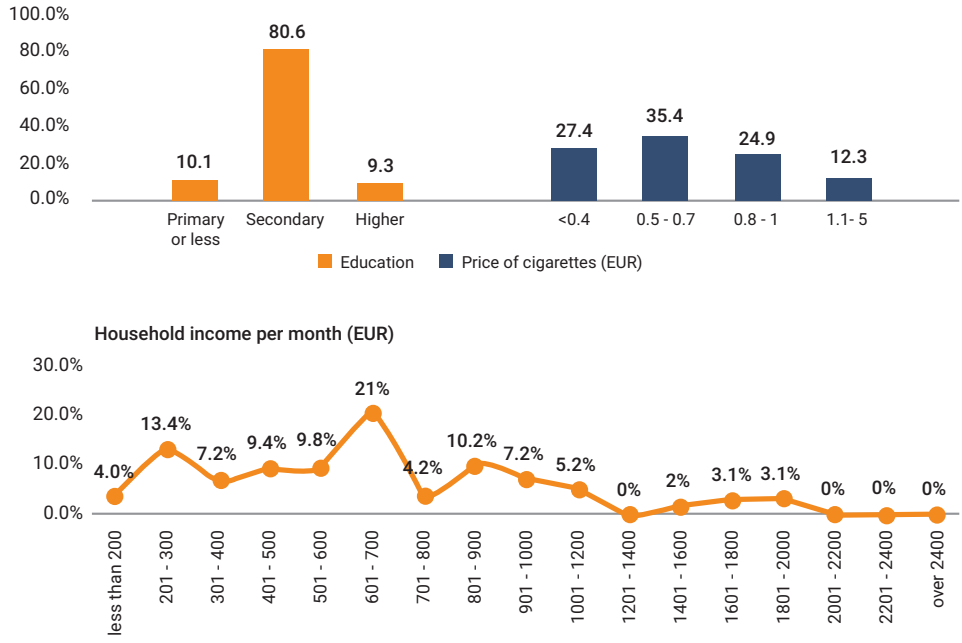
Due to the lack of data on HR tobacco in STC-SEE, in this report the results are given only based on the STC-MNE. Compared to the MC sample in 2021, where males and females consumed tobacco products almost equally (44.9 percent vs. 55.1 percent), the HR sample consists mostly of males (87.7 percent). Unlike MC users who are mostly employed, the largest percentage of HR smokers are pensioners (44.1). Almost all HR consumers in 2021 are daily smokers (96.9 percent) and 41.5 percent of them smoke 21–30 cigarettes per day (Table A5b in Appendix A). The highest percentage of HR smokers has a secondary level of education, one-fifth of smokers report household income between EUR 601 and EUR 700, and more than one-third report cigarettes purchased at prices in a range of EUR 0.5–0.7 (Figure C1).

The HR cigarette market is predominantly illicit.

While the consumption of HR tobacco in Montenegro is very small in comparison to consumption of MC, most HR smokers (93.2 percent) use illicit tobacco (Figure C2).

Figure C1

Percentage distribution of HR smokers, by education, reported price, and household income in 2022

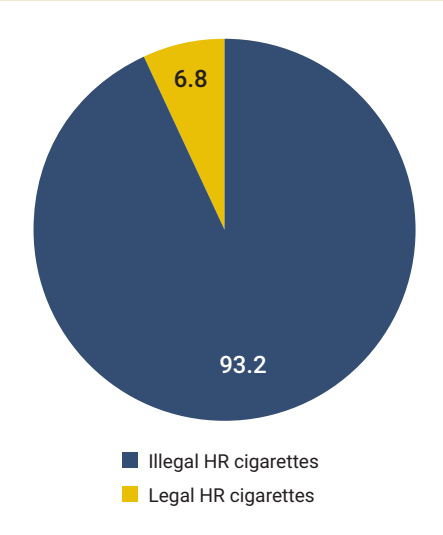


Note: Sample size = 48

Source: Authors' calculations using STC-MNE data for Montenegro

Figure C2

Percentage of HR smokers who smoke illicit tobacco in 2022



Note: Sample size = 48

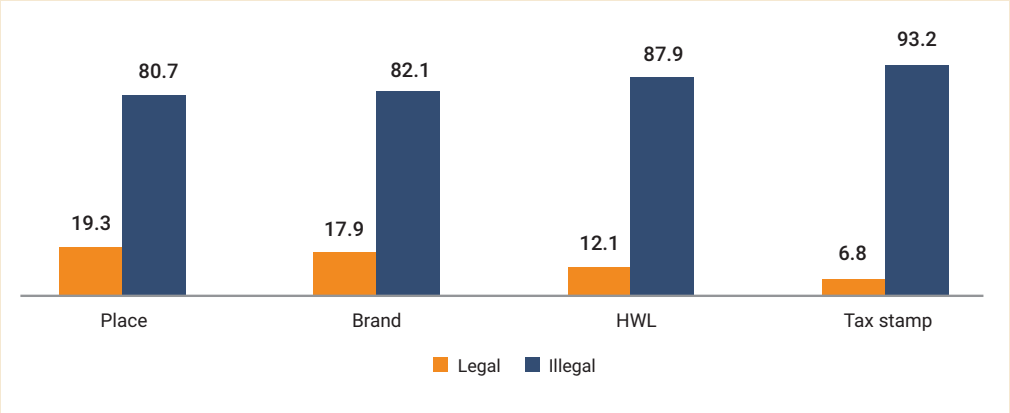
Source: Authors' calculations using STC-MNE data for Montenegro

The percentages are approximately the same in regard to brand and place of purchase, and 93.2 percent of illicit packs do not have an appropriate tax stamp (Figure C3). The majority of packs (84.5 percent) do not have a health warning label. Considering the place of purchase, results show that 80.7 percent of packs were bought in an illicit place—such as on the street or in a market (Table A6b in Appendix A).

Around 92 percent of current HR cigarette smokers are male, and most live in rural areas. The average consumer of illicit HR tobacco smokes 20.8 cigarettes per day, spends EUR 28.5 monthly on cigarettes and has a household monthly income of EUR 666.2. This consumer spends 10 percent of their budget share on illicit HR packs (Table A8b in Appendix A).

Figure C3

Percentage of illicit packs (HR) in 2022, by IIP criteria



Note: Sample size = 48

Source: Authors' calculations using STC-MNE data for Montenegro

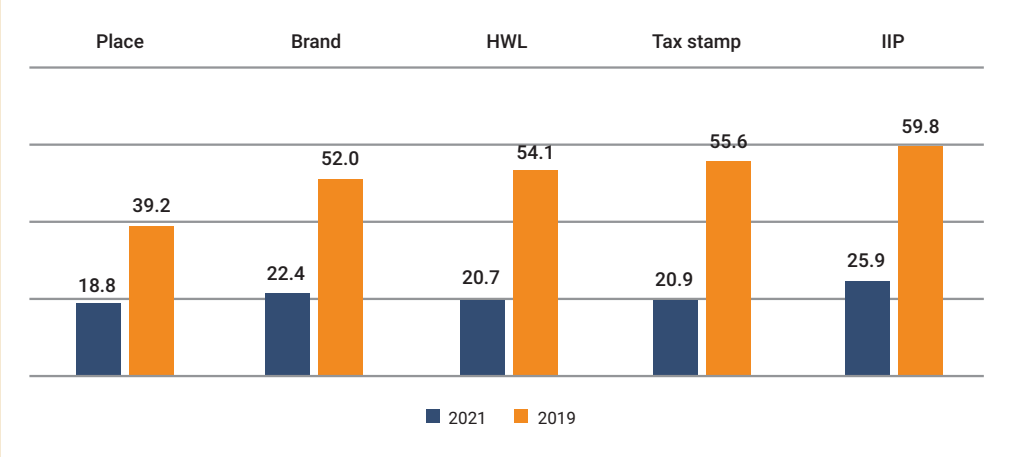
Combined MC and HR sample

In the sample that encompasses MC and HR smokers together (in both surveys from 2019 and 2021), the percentages of illicit cigarette market are similar as in the MC-only sample (tables A10 and A10a in Appendix A).

In 2019, more than half of smokers (59.8 percent) bought illicit MCHR cigarettes, and the least common IIP criterion was tobacco products bought in an illicit place of purchase (39.2 percent). In 2021, the total percent of illicit cigarette market was 25.9, being slightly higher than the illicit cigarette market from the MC-only sample. The percentages by IIP criteria are approximately the same in this year (Figure C4).

Figure C4

Percentage of illicit packs (MCHR) in 2019 and 2022, by IIP criteria



Note: Sample size STC-MNE = 751, STC-SEE = 393

Source: Authors' calculations using STC-MNE and STC-SEE data for Montenegro

www.tobacconomics.org

INSTITUTE FOR
HEALTH RESEARCH
AND POLICY
UIC