tobaccotaxation
Economic Research Informing
Tobacco Taxation Policy

Study of Tobacco Tax Avoidance and Evasion in Serbia, 2019

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Institute of Economic Sciences

Belgrade, Serbia, 2021

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EXECUTIVE SUMMARY

Creating effective tobacco control policies requires objective assessment of the size, causes, and characteristics of the illicit tobacco market. Elimination of the illicit market is one of few desirable policy outcomes on which tobacco control officials and tobacco industry representatives can find consensus, given that they both agree that tackling the illicit tobacco market is a high priority. However, their agreement is only declarative, as their attitudes about the causes and policy measures that should be applied to deal with the illicit market differ significantly. The tobacco industry claims that tobacco tax increases will boost illicit trade, resulting in a decrease of tax revenues without reducing smoking prevalence. The industry, therefore, often tends to overstate the size of the illicit market, emphasizing the risks and consequences of its expansion and presenting tax increases as its major cause. However, academic studies find no or a relatively weak relationship between taxes and the size of the illicit market (Joossens & Raw, 2008; Joossens et al., 2009). Contrary to industry claims, these studies find that adequate control policies and institutions are of critical importance in addressing illicit trade.

This study assesses the size and specifics of the illicit manufactured cigarette (MC) and hand-rolled (HR) tobacco market in Serbia including, the size of the illicit MC and HR tobacco market in Serbia, demographic and socioeconomic characteristics of consumers of illicit MC and HR tobacco in Serbia, places of purchase of tobacco products, and compliance with specific tobacco product labeling requirements.

Data for the study is from the Survey on Tobacco Consumption in Southeastern Europe (STC-SEE),[1] conducted by the Institute of Economic Sciences in 2019. The illicit market analysis is based on survey responses of current users of MC (669 respondents) and HR tobacco (70 respondents) in the Republic of Serbia. The research combines two approaches suggested by the International Agency for Research on Cancer (IARC) Handbook (2011) to assess the extent of tax evasion and avoidance: observational data collection and survey of tobacco users' purchase behaviors. The observational approach was conducted through direct inspection of tobacco product packs shown by respondents during the interviews. Tobacco products are identified as illicit if they are not included within the list of approved tobacco brands in Serbia or if they are not adequately labeled with a tax stamp and health warning. The survey of tobacco users is a complementary approach to determine illicit status, particularly for respondents who refused to show their packs, based on questions related to the purchase of the last-purchased tobacco product, including place of purchase and price paid.

Key findings of the research are as follows:

- **The Serbian MC market is predominantly legal**. Around 2.6 percent of MC smokers evade taxes. Taking smoking intensity into consideration, the total share of illicit MC consumption amounts to 2.4 percent of the MC market. At the same time, with almost nine out of ten HR smokers using illicit HR tobacco, the **HR tobacco market has an**

[1] http://dcs.ien.bg.ac.rs/61/

extremely high degree of tax evasion. Around 88.2 percent of HR smokers consume illicit HR tobacco, which accounts for 90.7 percent of total HR tobacco consumption.

- Almost **half of the identified illicit packs of MC were bought at legal points of sale**, whereas all illicit HR tobacco packages were purchased illegally in the "green market."[2]
- **Evasion is higher in border municipalities, indicating that proximity to a border is a relevant factor of illicit status.** Most illicit MC packs (11 out of 13) were identified in southwestern Serbia. Four out of the five municipalities in that region have the shortest driving distances to Montenegro. With the exception of North Macedonia, the illicit MC brands identified are most likely produced in jurisdictions with higher tax levels than Serbia.
- **The availability of illicit MC and HR tobacco products reduces the effects of tobacco taxes on the lower-income population due to their relatively lower price.** The probability of consuming illicit MC and HR tobacco is likely to be inversely correlated with household income. The share of illicit MC and HR tobacco packs among smokers with monthly household income below €200 is 10.1 percent and 93.8 percent, respectively, which is significantly higher than average.
- **Older smokers (55 years and older) are more likely to consume illicit MC (6.9 percent)** than younger smokers (0.7 percent). The same applies for consumption of illicit HR tobacco, with 98.6 percent among smokers 55 years or older compared to 71.6 percent among younger smokers. Since older tobacco consumers are in general less sensitive to price changes of tobacco products, potential price effects are further mitigated by the availability of cheaper alternatives, especially illicit HR tobacco.
- **Male smokers are more likely than females (65.2 percent versus 34.5 percent, respectively) and smokers in rural areas are more likely than those in urban areas (56.9 percent versus 43.1 percent, respectively) to use HR tobacco packs without appropriate health warnings**.

In summary, the MC market in Serbia is predominantly legal, with a relatively low share of tax evasion (2.6 percent) and avoidance (1.1 percent). Although HR tobacco accounts for only 16.8 percent of total tobacco use in Serbia (372,000 adults, including those who smoke both MC and HR tobacco products),[3] the HR tobacco market is—with almost 90 percent illicit share—a serious source of tax evasion that requires an urgent policy response. Such an enormous difference between MC and HR tobacco illicit rates further supports the argument that the volume of the illicit market has a weak relationship with the price of legal tobacco products. The results of the

[2] Green or open air markets are very common in the Balkans. Located in a designated area (sometimes fenced) with rows or stalls where agricultural goods are sold, usually in the center of the municipality or a neighborhood, green markets are commonly characterized by the absence of strict controls, except for some aspects of trade (for example, the control of scales used to measure goods and the inspection of fresh meat). Sellers are usually required to pay a daily or monthly fee to the municipal government to be able to sell goods in these markets. Fees vary by municipality, location of the market, and location of the stalls at the market.

[3] Zubović, J., Jovanović, O., Đukić, M., Jolović, N., & Vladisavljević, M. (2020). *Adult tobacco consumption in Serbia, 2019*. Institute of Economic Sciences, Belgrade, Serbia.

STC-SEE[4] confirm that the majority of HR tobacco users consume HR tobacco as a cheaper substitute for MC. Research results of this study additionally confirm that the probability of consuming illicit—and at the same time less expensive—tobacco products is higher for people with lower household income, males, and residents of rural areas. The exclusive places of purchase of illicit HR tobacco products in Serbia are green markets.

The following targeted policy interventions below would eliminate the main sources of tax evasion:

- **Strengthen the capacity of tobacco control administration as a key component of the tobacco control system**. In line with the WHO Protocol to Eliminate Illicit Trade in Tobacco Products (signed by the Serbian government in 2017), Serbia should strengthen the capacities of the tobacco control system, supporting tobacco control administration in tackling illicit tobacco products and protecting control policies from the influence of the tobacco industry (Article 5.3 of the WHO FCTC). The latter is particularly important within the Serbian policy context, given the relatively close cooperation between the tobacco industry and Serbian authorities.
- **Control the supply chain.** Given the widespread presence of illicit HR cigarettes (88.2 percent of the total HR prevalence)—all of them being purchased in green markets—the government should strengthen law enforcement and impose stricter sanctions for each actor in the supply chain (growers, manufacturers, exporters/importers, wholesalers, and retailers). Adoption of new measures to tackle the illicit HR tobacco market should be considered, such as imposing excise tax on raw tobacco and requiring stamps on cured tobacco packages to ensure tracking.
- **Strengthen control of tobacco product sales in (high-risk) border regions**. Although this research confirms a relatively low percentage of current MC smokers in Serbia (2.6 percent), and only 2.4 percent of the share of total MC consumption is illicit, most illicit MC packs identified were found near the border with Montenegro. Since the sales of illicit MC in Montenegro are relatively high compared to other Western Balkan countries, protection of the border with Montenegro should be prioritized.

[4] Ibid.

CHAPTER 1. INTRODUCTION

While an essential tool for reducing tobacco use, tobacco tax increases can at the same time provide an incentive for manufacturers, tobacco consumers, and criminal networks to engage in tax evasion (Guindon et al., 2014). Tax evasion and tax avoidance diminish the effectiveness of tobacco tax policies and provide access to tobacco products at lower prices, thereby contributing to increases in tobacco use (Chaloupka et al., 2011; West et al., 2008; mentioned in Joossens et al., 2014).

Illegal methods of circumventing tobacco taxes are called tax evasion and are conducted with the aim of evading payment of all or some tobacco taxes (Ross & Blecher, 2019). Tax evasion involves the purchase of smuggled, illicitly manufactured, or counterfeited tobacco products. Small-scale smuggling operations usually occur between neighboring countries or at the regional level. This involves moving products across the border over the allowable limits and/or when products purchased "for personal consumption" in one country are sold for profit in another country without paying appropriate taxes. In many small-scale operations, some taxes have been paid, even if in another jurisdiction (Ross & Blecher, 2019). Small-scale smuggling generally offers lower profits and arises in response to absolute price differences between adjacent jurisdictions, short travel distances, and the opportunity costs of time (Merriman et al., 2000; mentioned in Ross & Blecher, 2019). Therefore, small-scale smuggling is likely to be smaller if the absolute price differentials are small, distances to travel are greater, and the unemployment level is low (Ross & Blecher, 2019). Some studies suggest that a tobacco tax increase can lead to more small-scale tax evasion (Merriman et al., 2000; Chernick & Merriman, 2013; mentioned in Ross & Blecher, 2019). However, since the supply of illegal products via these channels is relatively small, the change in the overall size of the illicit tobacco market is minimal (Paraje, 2018; Kaplan et al., 2017; mentioned in Ross & Blecher, 2019).

Tax-evading activities are often undertaken by larger criminal networks and within large-scale operations (Chaloupka et al., 2011). Large-scale smuggling generally involves non-payment of all taxes and is not limited to one region, as products are often moved long distances. The main motivation is individual or corporate greed, money laundering, or financing of other criminal activities. These operations can involve counterfeits, genuine products with counterfeit tax stamps, illicit white cigarettes, or domestic production beyond declared amounts. They often take advantage of "in-transit" regimes and/or tax-free zones (Ross, 2015; mentioned in Ross & Blecher, 2019). Large-scale operations that are responsible for the majority of products in illegal cigarette markets provide higher profits, and their emergence is often driven by high levels of corruption, the existence of criminal networks, and weak tax administration (Joossens, 1999; Council of the European Union, 2005; mentioned in Ross & Blecher, 2019).

Illicit manufacturing refers to violating tax and other laws regulating tobacco production. One form of illicit manufacturing is underreporting of actual production quantities, when only a portion of the product is transferred to the black market. Complete tax evasion occurs when total production is hidden and sold illicitly. Illicit manufacturing includes counterfeiting, or the practice of using a trademark without permission (IARC, 2011). Tobacco control measures aim to

eliminate the illicit market in all its forms including smuggling, illicit manufacturing, and counterfeiting. In addition to application of global, regional, and subregional laws and agreements, elimination of the illicit market implies development and implementation of national legislation (WHO, 2013a).

Legal mechanisms for avoiding paying taxes are called tax avoidance (Ross & Blecher, 2019), referring to purchases by individual tobacco users in lower-tax jurisdictions (Joossens & Raw, 2012). These include cross-border shopping, tourist shopping, duty-free shopping, internet and other direct purchases, and industry reformulation and/or repositioning (Chaloupka et al., 2011). Tax avoidance is often a consequence of weak policy or administrative capacity (Ross & Blecher, 2019).

Research on the illicit tobacco market is producing more and more evidence to support the development of adequate policies. Joossens et al. (2014) analyze global data on the illicit cigarette trade since 2007. They find that almost 12 percent of global cigarette consumption is illicit, including 17 percent in low-income, 12 percent in middle-income, and 10 percent in high-income countries (IARC, 2011). A study conducted on 2010 data finds that about 6.5 percent of cigarettes consumed in 18 European countries are illicit (Joossens et al., 2014). Depending on the methodology, the size of the illicit cigarette market in the United States varies from 8.5 percent to 21.0 percent of the total cigarette market (NRC & IOM, 2015; mentioned in Ross & Blecher, 2019). The United Kingdom government publishes annual estimates of the size of tobacco tax evasion and tax avoidance using the gap analysis method, estimating the gap between survey-reported consumption and government tax data. The estimate for the 2015/2016 financial fiscal year indicates that about 13 percent of the cigarette market is illegal (HMRC, 2017; mentioned in Ross & Blecher, 2019). The size of the illicit cigarette market in Brazil seems to fluctuate between 29 percent and 43 percent (Szklo et al., 2017; mentioned in Ross & Blecher, 2019), while only about 3.5 percent of the market is illicit in Colombia (Maldonado et al., 2018; mentioned in Ross & Blecher, 2019). An academic study in India estimates the illicit cigarette market share to be about 3 percent, while the tobacco industry claims that the share of the illicit market is close to 20 percent of the total market (John and Ross, 2017; mentioned in Ross & Blecher, 2019).

Global Adult Tobacco Surveys (GATS) from Turkey, Romania, Greece, the Russian Federation, and Ukraine present findings on the source of cigarette purchases and the absence of tax stamps on cigarettes as indicators of illicit trade. Among manufactured cigarette smokers in Turkey, purchasing is mostly done at stores or kiosks (95.6 percent), which are legal sources. Only 2.6 percent of smokers bought their last cigarettes from street vendors, which are illegal sources, and 0.2 percent obtained cigarettes from vending machines, which are banned (WHO, 2014). By examining the last-purchased pack of manufactured cigarettes among current smokers in Romania, the most common sources of purchase are stores (84.3 percent), followed by kiosks (6.6 percent), and street vendors (3.5 percent) (WHO, 2012). Among manufactured cigarette smokers in Greece, the most common sources of purchase are kiosks (79.8 percent), followed by stores (13.7 percent), and street vendors (2.0 percent) (WHO, 2013b); while among manufactured cigarette smokers in the Russian Federation, only 1.6 percent bought their last cigarettes from street vendors and 0.2 percent obtained cigarettes from vending machines (WHO, 2018). Most manufactured cigarette smokers in Ukraine report purchasing cigarettes from licit sources. However, almost 3 percent of purchases are made from street vendors, which

represent an illicit source of cigarettes (WHO, 2017). The absence of tax stamps or health warnings on cigarettes is often a clear indicator of illicit trade. WHO research conducted in Turkey finds that 9.1 percent of manufactured cigarettes consumed in 2012 were smuggled, as they did not have adequate tax stamps. The same research shows that health warnings were missing in the case of 8.6 percent of packs of manufactured cigarettes indicating that those packs were smuggled (WHO, 2014).

The most important research inputs for policy makers include estimation of the size of the illicit market, analysis of the sources and types of illicit tobacco products, and demographic and socioeconomic characteristics of illicit tobacco consumers. Existing research results are also used in designing the structure of this study. In the next chapter this study's data and methodology are presented. Chapter three provides results related to the size and specific characteristics of the illicit market in Serbia, including the results of econometric analyses aimed at detecting the most important factors contributing to tax evasion and avoidance. The final chapter discusses the key research findings and links them with the leading policy issues that need to be tackled in order to eliminate the illicit market.

CHAPTER 2. DATA AND METHODOLOGY

2.1. ABOUT THE SURVEY

The Survey on Tobacco Consumption in Southeastern Europe (STC-SEE 2019) is a part of the Accelerating Progress on Effective Tobacco Tax Policies in Low- and Middle- Income Countries project, funded by the University of Illinois Chicago's Institute for Health Research and Policy. STC-SEE 2019 was conducted in Albania, Bosnia and Herzegovina, Kosovo,* North Macedonia, Montenegro, and Serbia during September and October 2019. The total sample size covered by the STC-SEE 2019 survey was 7,006 respondents. While five out of the six countries had sample sizes of 1,000 respondents each, the nationally representative survey for Serbia involved 2,000 respondents.

The sample frame for Serbia is based on the latest census, conducted in 2011 (Statistical Office of the Republic of Serbia, 2014). The target population of the survey in Serbia included men and women aged 18 to 85 (hereinafter "adults"). The method was a face-to-face interview at respondents' homes (inside the home, on the terrace, or in the garden) using a Computer-Assisted Personal Interview (CAPI) methodology. The length of the interviews was approximately 30 minutes each. Interviewers used the STC-SEE questionnaire developed by the Institute of Economic Sciences and adapted to the needs of the research. The STC-SEE questionnaire is mostly based on the GATS Core Questionnaire with Optional Questions (version 2.0, Nov. 2010, and version 3.0, Jan. 2019). Beside GATS, questionnaires developed by research teams engaged in ITC and PPACTE surveys were also used for adaptation of several sections. The survey results were used to measure various indicators about tobacco use, tobacco cessation, secondhand smoke exposure, economics of tobacco use, media, attitudes and perceptions, and tax avoidance and tax evasion.

Data used in the Study on Tobacco Tax Avoidance and Evasion in Serbia refer to the section titled "Last cigarette pack/tobacco product used" (Section G in the STC-SEE questionnaire). All current users of any tobacco products were asked for details about their last-purchased cigarette or other tobacco product pack including health warning labels (HWLs), tax stamps, price of the pack, and place of purchase.

Adult Tobacco Consumption in Serbia 2019 (2020) is a study prepared by the Institute of Economic Sciences that contains additional information on the STC-SEE sampling design, survey questionnaire, data processing and aggregation, and data weighting, as well as sample and population characteristics.

2.2. IDENTIFYING ILLICIT AND TAX AVOIDANCE PACKS

According to IARC handbooks (2008, 2011), there are several methods to estimate the size of tax avoidance and tax evasion:

1) Comparison of tax-paid sales and individually reported consumption measures – The aim of this method is to compare tobacco consumption data from official legal sales (collected from official sources) and primary data (collected through representative surveys). The difference between them may indicate the extent of tax avoidance and tax evasion.

2) Survey of tobacco users' purchase behaviors – The aim of this method is to conduct a nationally representative survey and collect data about tobacco product purchases including the place of purchase and price per pack.

3) Observational data collection – This method refers to nationally representative surveys. The idea is to identify tax-avoided and/or tax-evaded packs through observation of tobacco product packs shown by the respondent during the interview. Tobacco product packs can be examined for tax stamps, HWL, and other pack markings such as brand or price.

Observational data collection is recognized as useful for capturing some aspects of tax avoidance and tax evasion in a country (NCI & WHO, 2016). It is used in several countries and major surveys—including Poland, France, the United States, the PPACTE survey, and the ITC survey—to estimate the extent of tax avoidance and tax evasion. STC-SEE used the PPACTE and ITC questionnaires as a foundation for the section about illicit tobacco products. In this research, the same method is applied in six SEE countries to estimate the extent of tax avoidance and tax evasion.

The identification of illicit tobacco products also takes into account the relevant tobacco legislation in the Republic of Serbia, the Law on Tobacco,[5] which stipulates which tobacco products are allowed to be sold on the Serbian market:

- Tobacco products can be sold on the Serbian market if they are registered and classified within the Register of Tobacco Brands (Article 37 of the Law on Tobacco). Therefore, MC and HR tobacco brands that are not classified within the Register are not considered legal.
- Retail sales of tobacco products may be carried out by an economic entity registered within the appropriate Register of Tobacco Retailers (Article 45). Therefore, sales "on the street or green markets," referring to sales from retailers that have not been registered within the official Register of Tobacco Retailers, are not considered legal.
- Every pack of tobacco product (single or carton) to be sold in the Republic of Serbia must contain a printed general and specific warning (Article 77). Health warnings are required to cover 30 percent of the front (general warning) and 40 percent of the rear display area of the package (specific warning). Twelve health warnings are currently approved by the law. Pictorial health warnings are not required in existing regulations.
- Article 2 of the regulation specifies the appearance of the excise stamp and the type of data on the stamp; the manner and procedure of approving and issuing stamps; and marking of excisable goods. The tax stamp should be affixed on the box (pack) of the tobacco product, under cellophane, so that the packet cannot be opened without tearing the stamp.[6]

[5] http://www.duvan.gov.rs/public/files/Dokumenti/Propisi/Zakoni/ZakonODuvanu/Zakon_o_duvanu5.pdf
[6] https://www.mfin.gov.rs/propisi/uredba-o-izgledu-kontrolne-akcizne-markice-vrsti-podataka-na-markici-i-nacinu-i-postupku-odobravanja-i-izdavanja-markica-vodjenja-evidencija-o-odobrenim-i-izdatim-markicama-i-obelezavanja-cigareta-i/

To identify the presence of tax evasion and avoidance, interviewees were asked about the price and place of their last-purchased pack of MC and HR tobacco. In addition, packs were examined to check whether the tax stamp and health warning labels met the criteria for legal packs.

An MC pack is considered as illicit if at least one of the following applies:

1. **Purchased from an illicit source** – not a legal brand or purchased from individuals selling cigarettes independently at local markets, through a delivery service, door-to-door, or on the street;
2. **Without the appropriate health warnings** – a pack with health warnings in a foreign language or without health warnings, unless purchased in another country or a duty-free shop;
3. **Without the appropriate tax stamp** – a pack with a foreign stamp or missing a tax stamp, unless purchased in another country or a duty-free shop; or
4. **Purchased at a price lower than 70 percent of the lowest price of cigarettes in the country** as listed in the WHO country profile, unless purchased in another country or a duty-free shop.

An HR package is considered as illicit if at least one of the following applies:

1. **Purchased from an illicit source** – not a legal brand or purchased from individuals selling cigarettes independently at local markets, through a delivery service, door-to-door, on the street, or cheap cigarettes sold from legitimate retailers;
2. **Without the appropriate health warnings** – a pack with health warnings in a foreign language or without health warnings, unless purchased in another country or a duty-free shop; or
3. **Without the appropriate tax stamp** – a pack with a foreign stamp or missing a tax stamp, unless purchased in another country or a duty-free shop.

Since information on weight for HR packages was not collected and due to the large differences in package sizes—particularly for illicit products—it is not possible to apply price criteria for identification of illicit HR products. For this reason, HR tax evasion may be underestimated.

2.3. ESTIMATING THE PROBABILITY OF TAX EVASION AND AVOIDANCE

To separate the effects of the independent variable on the probability of evasion, a tax evasion probability model is applied. Since the dependent variable in the model is binary (tax evasion versus no tax evasion), a binary choice model is used to estimate the probability of tax evasion. Following the model definition, a maximum likelihood estimator (MLE) is used to fit the coefficients to the logit model.

Three models are estimated: 1) tax evasion of MC; 2) tax evasion of HR tobacco; and 3) overall evasion, which includes both smokers of MC and HR tobacco. For the latter model, in the case where smokers used both products, if tax was evaded on either a smoker is classified as a tax evader.

Each of the models can be represented as:

$$Y = P(y_i = 1) = f(\Gamma' X).$$

Y is an indicator variable taking the value of 1 if the purchase is considered to be an instance of tax evasion and zero otherwise. *X* represents the vector of potential determinants used in the analysis, including gender (=1 if female, =0 otherwise), age,[7] level of education (=1 if primary, =2 if secondary, =3 if tertiary), labor market status (=1 if employed, =2 if unemployed, =3 if inactive), region (NUTS2 level), type of residence (=1 if urban, =0 otherwise), household income per capita group (three equal household income groups),[8] and number of children in the household.

In addition, the model controls for the proximity to a (lower) tax jurisdiction with a dummy variable for municipalities at the border[9] as well as variables representing the distance to countries with lower-priced tobacco products (Kosovo and North Macedonia) and countries with high levels of tax evasion (Montenegro and Bosnia and Herzegovina).[10] Distance measures include distances of municipalities (in kilometers) to each of the four countries,[11] minimum distance to a country with lower-priced tobacco products (Kosovo or North Macedonia), and the average price difference weighted by the distance between Serbia and countries with lower-priced tobacco products.[12] Furthermore, the model controls for smoking intensity (number of cigarettes smoked per week) and weekly expenditure on tobacco.[13] However, due to potential endogeneity of these variables, they are included in separate models. Additionally, a model excluding these variables is estimated. Finally, in the overall evasion model, dummy variables for the product type (MC, HR, or both) are included.

Since the border and distance variables are created at the municipality level while all other variables are at the individual level, clustered standard errors at the municipality level are used in order to account for higher levels of aggregation. Additionally, heteroscedasticity-robust standard errors are applied in all three models to control for potential heteroscedasticity.

The small number of instances of tax evasions (in the MC model) and small sample (in the HR model) can lead to potential bias in the coefficients. To account for the potential bias, penalized maximum likelihood estimation (PMLE) is used since it effectively reduces the bias. The estimator

[7] The age in years declared by the respondent is used in the analysis. Age squared is also used in the specification, but since it is not statistically significant, it is excluded from the analysis.

[8] As income variable was recorded in intervals rather than exact amounts, the average of the interval is calculated and divided by the number of the household members. The variable obtained in this way is then divided into three equal groups. As the data contain a large number of missing values, intervals are imputed based on other personal and household characteristics in order to avoid sample attrition.

[9] Municipalities are the second-level administrative subdivisions in Serbia, which form the basic units of local government. The full list of municipalities can be found at: http://publikacije.stat.gov.rs/G2018/PdfE/G201813045.pdf.

[10] According to STC-SEE data, MC evasion rates in Montenegro and Bosnia and Herzegovina are 57.7 and 18.1 percent, respectively. These rates are much higher than the one for Serbia, which is 2.6 percent (See Vladisavljević et al., 2021).

[11] Distance in kilometers was calculated via Google Maps as a driving distance (in km) between each municipality and the respective border crossing.

[12] Price difference is calculated based on the price of the most-sold brand in each country. The variable was created in the following way: $((Price_{SER} - Price_{KOS}) * Dist_{KOS} + (Price_{SER} - Price_{NMC}) * Dist_{NMC}) / (Dist_{KOS} + Dist_{NMC})$.

[13] Smoking status (daily or less than daily) could not be used, due to perfect prediction since there was no evasion among less than daily smokers.

is proposed by Firth (1993), and the procedure is implemented using *firthlogit* command in STATA (Coveney, 2016). However, this procedure does not allow for clustered standard errors. Therefore the marginal effects for MLE and PMLE are calculated, and the results are combined to derive conclusions.

CHAPTER 3. RESULTS

3.1. SIZE AND CHARACTERISTICS OF TAX EVASION AND AVOIDANCE

The initial sample of MC smokers consists of 675 observations representing the respondents who declared themselves as current MC smokers that were asked to show their last-purchased pack and provided answers about the last-purchased pack of MC. Six observations were dropped from the initial sample as the respondents declined both to show their pack and to answer the questions related to the last-purchased pack or they provided incomplete answers, so illicit status could not be determined. Therefore, the final sample includes 669 observations. In order to classify them into one of the three categories (illicit, tax avoidance, or licit), the following steps are applied:

1. In cases where the respondent showed the last-purchased pack (562 out of 669 respondents or 84.2 percent of the total, Figure 1 and Table A1), a photo of the pack was taken. These photos were examined to determine if the tax stamp and health warning labels meet the criteria for legal MC packs.
2. For the examined packs that meet the criteria related to tax stamps and health warnings, the respondents' answers to questions related to the price and place of purchase of the last-purchased pack of MC are considered.
3. In cases where the respondent refused to show their pack (107 out of 669), the information recorded by the numerator is considered based on the respondent's answers to questions related to the last-purchased pack about the tax stamp, health warning label, price, and place of purchase of the last-purchased pack.
4. If the MC pack meets at least one of the illicit criteria, it is considered illicit.

More details about the specific criteria for selection of the MC packs into the illicit or tax avoidance category are provided above in section 2.2, "Identifying illicit and tax avoidance packs."

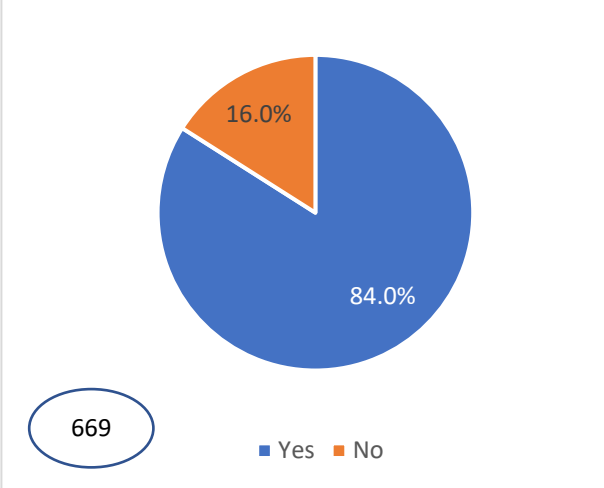
The initial sample of HR tobacco consists of 83 observations representing the respondents who declared themselves as current HR smokers who were asked to show their last-purchased package and provided answers about the last-purchased package of HR tobacco. Five observations were dropped from the initial sample as the respondents did not provide answers to the questions related to the last-purchased HR tobacco package. Out of the remaining 78 observations, eight observations were excluded from the sample as they both refused to show their HR tobacco package and provided incomplete answers on questions related to the last-purchased package, which made it impossible to determine illicit status. Therefore, the final sample includes 70 observations. In order to classify them into one of the three categories (illicit, tax avoidance, or licit), the following steps are applied:

1. In cases where the respondent showed their last-purchased package of HR tobacco (39 out of 70 respondents or 55.7 percent of the total sample, Figure 2 and Table A1a), the tax stamp and health warning labels are examined to determine if they meet the criteria for legal HR packages.

2. For the examined packages that meet the criteria related to tax stamps and health warnings, the respondents' answers to questions related to the place of purchase of the last-purchased package of HR tobacco are considered.
3. In cases where the respondent refused to show their package, the information recorded by the numerator is considered based on the respondent's answers to questions related to the last-purchased package of HR tobacco about the tax stamp, health warning label, and place of purchase of the last-purchased package.
4. If the HR package meets at least one of the illicit criteria, it is considered illicit.

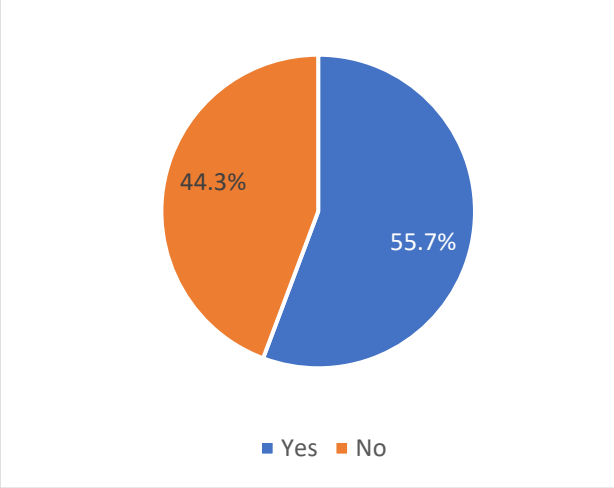
More details about the criteria for the selection of HR packages into the illicit or tax avoidance category are provided above in section 2.2, "Identifying illicit and tax avoidance packs."

Figure 1. *Percentage of smokers who showed a pack of MC*



Source: Authors' calculations based on data from STC-SEE 2019

Figure 2. *Percentage of smokers who showed a package of HR tobacco*



Source: Authors' calculations based on data from STC-SEE 2019

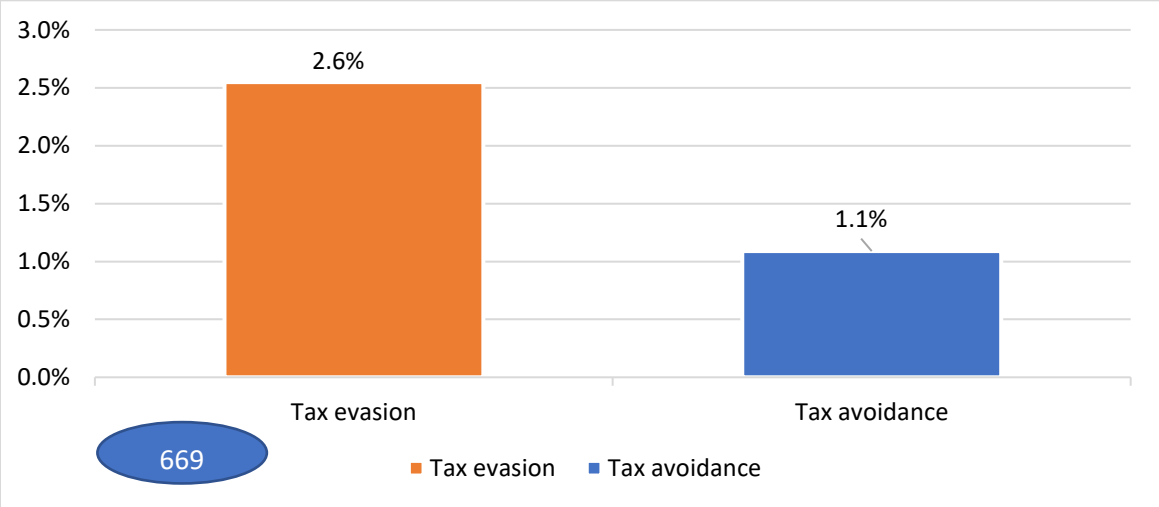
Given the illicit criteria and the results of the STC-SEE 2019, which estimated the level of tobacco consumption, the MC market in Serbia is considered to be predominantly legal, with 2.4 percent of the total MC consumption being illicit.[14] Around 2.6 percent of MC smokers consume illicit MC, whereas 1.1 percent of MC smokers avoid tobacco tax (Figure 3).

Overall, the total share of illicit consumption in Serbia accounts for 15.2 percent of the tobacco market (Table A2a), which includes the 2.4 percent illicit MC consumption and the 90.7 percent consumption of illicit HR tobacco (described in further detail in the paragraph related to HR tobacco consumption).

[14] Illicit MC consumption is calculated by multiplying the share of illicit MC consumption (2.6 percent) with the average smoking intensity of MC smokers who evade tax (15.9 cigarettes per day).

Around 2.6 percent of MC smokers use illicit packs (almost 60,000 adults). Taking into consideration the smoking intensity of individual smokers, the total share of illicit MC consumption accounts for 2.4 percent of the Serbian MC market.

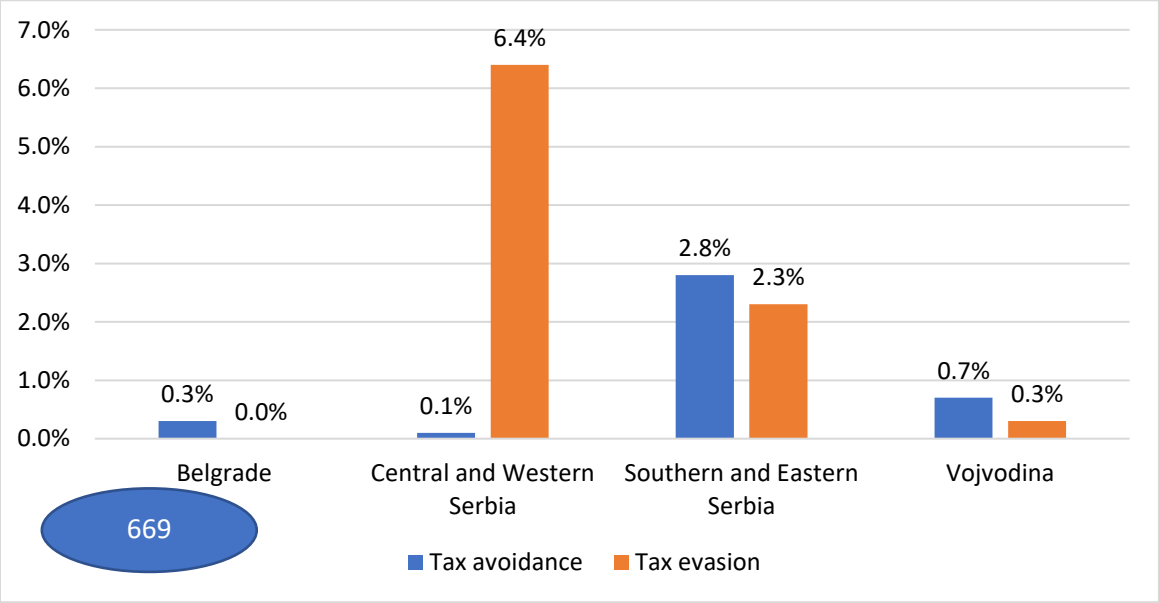
Figure 3. *Percentage of MC smokers who evade and avoid taxes*



Source: Authors' calculations based on data from STC-SEE 2019

The share of MC smokers who evade and avoid taxes is slightly higher in the southern parts of the country than in Belgrade and Vojvodina.

Figure 4. *Percentage of MC smokers who evade and avoid tax, by region*



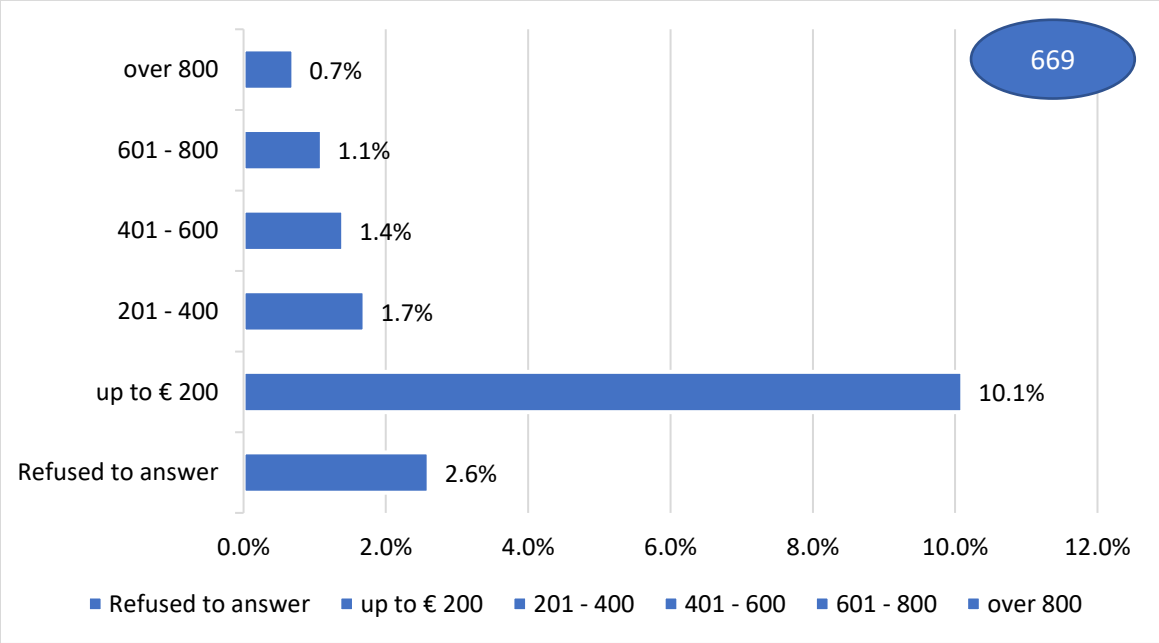
Source: Authors' calculations based on data from STC-SEE 2019

With regard to specific socioeconomic characteristics (Table A2b), illicit trade is slightly more present in Central and Western Serbia as well as in Southern and Eastern Serbia than in Belgrade and Vojvodina, where almost 100 percent of the observed market is legal (Figure 4).

As expected, current smokers with a relatively lower income are more likely to consume illicit MC than others. The share of illicit MC among respondents with a monthly household income below €200 is 10.1 percent, which is considerably higher compared to other income groups (Figure 5). Use of illicit MC is more likely among older smokers (55 years and older), amounting to 6.9 percent of their total prevalence (Figure 6). Illicit MC packs are less present among smokers younger than age 55 (0.7 percent), while no illicit MC packs are identified among current smokers younger than 34 years of age. There are no noticeable differences between genders nor between smokers living in urban versus rural settings (Table A2b).

The probability of consuming illicit MC is significantly higher for low-income smokers.

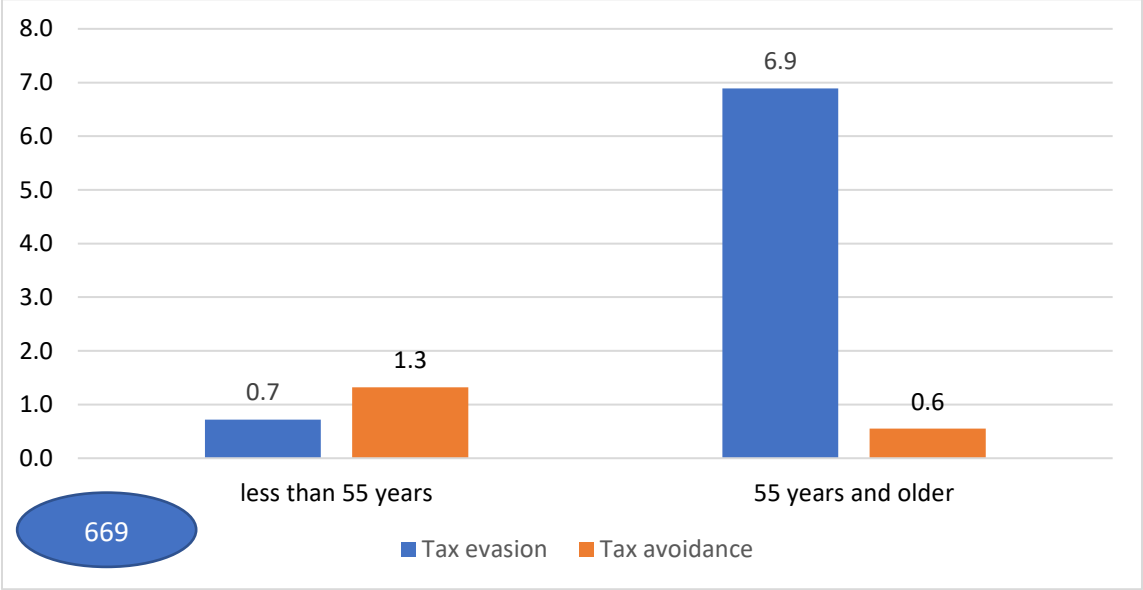
Figure 5. *Percentage of MC smokers who evade and avoid tax, by income group*



Source: Authors' calculations based on data from STC-SEE 2019

Consumers aged 55 and older are more prone to consuming illicit MC (6.9 percent) when compared to smokers younger than age 55 (0.7 percent).

Figure 6. *Percentage of MC smokers who evade and avoid tax, by age group*



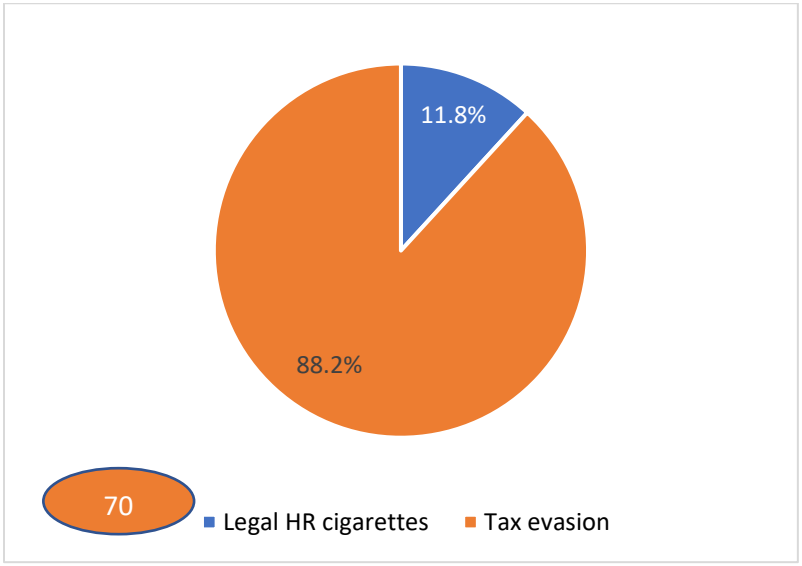
Source: Authors' calculations based on data from STC-SEE 2019

Unlike the MC market, the HR market is predominantly illicit (Figure 7), as almost 9 out of 10 current HR cigarette smokers consume illicit HR cigarettes. Taking into consideration both the share of HR tobacco consumers who smoke illicit HR cigarettes and their individual smoking intensity (average number of cigarettes consumed per day), illicit HR tobacco consumption represents 90.7 percent of the total HR tobacco market (Table A2a). No examples of tax avoidance are identified. While HR cigarettes are much more popular in Vojvodina (the prevalence for HR tobacco in Vojvodina is 12.4 percent) than in Belgrade, Southeastern, and Central and Western Serbia (8.0 percent, 4.8 percent, and 3.6 percent, respectively),[15] the share of HR cigarette smokers who evade tax is higher in Central and Western Serbia and in Belgrade—at 98.5 percent and 94.8 percent, respectively (Figure 8).

[15] Zubović, J., Jovanović, O., Đukić, M., Jolović, N., & Vladisavljević, M. (2020). *Adult tobacco consumption in Serbia, 2019*. Institute of Economic Sciences, Belgrade, Serbia.

The HR cigarette market in Serbia is mainly illicit, with 88.2 percent of HR smokers evading tax.

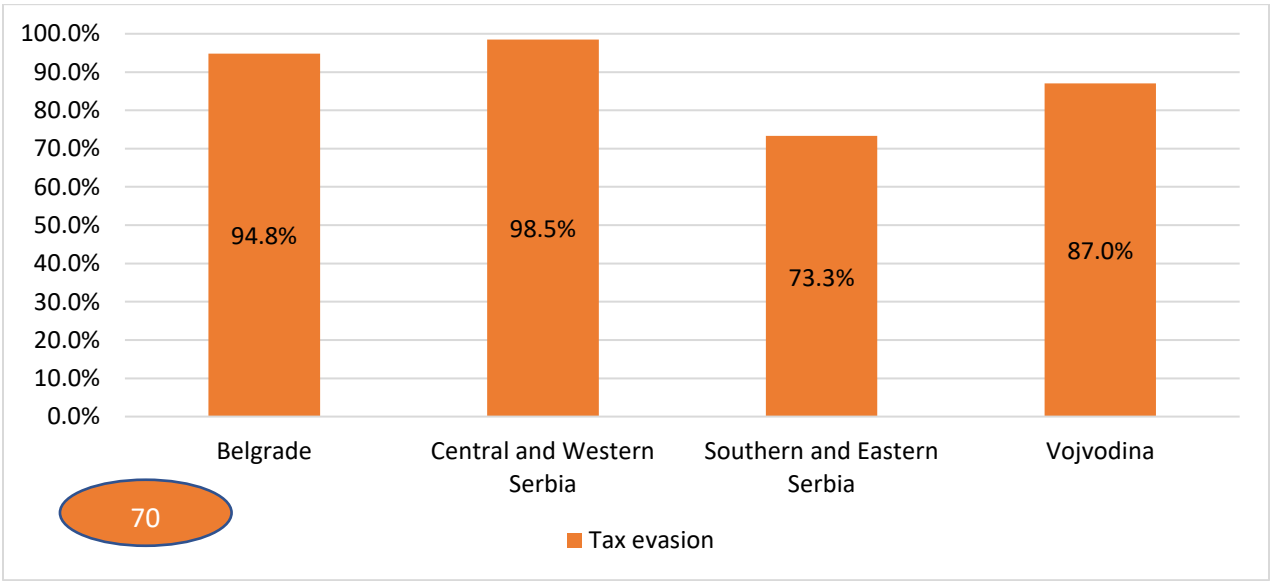
Figure 7. *Percentage of HR smokers who evade tax*



Source: Authors' calculations based on data from STC-SEE

The share of HR cigarette smokers who evade tax is higher in Southeastern Serbia than in other regions.

Figure 8. *Percentage of HR smokers who evade tax, by region*

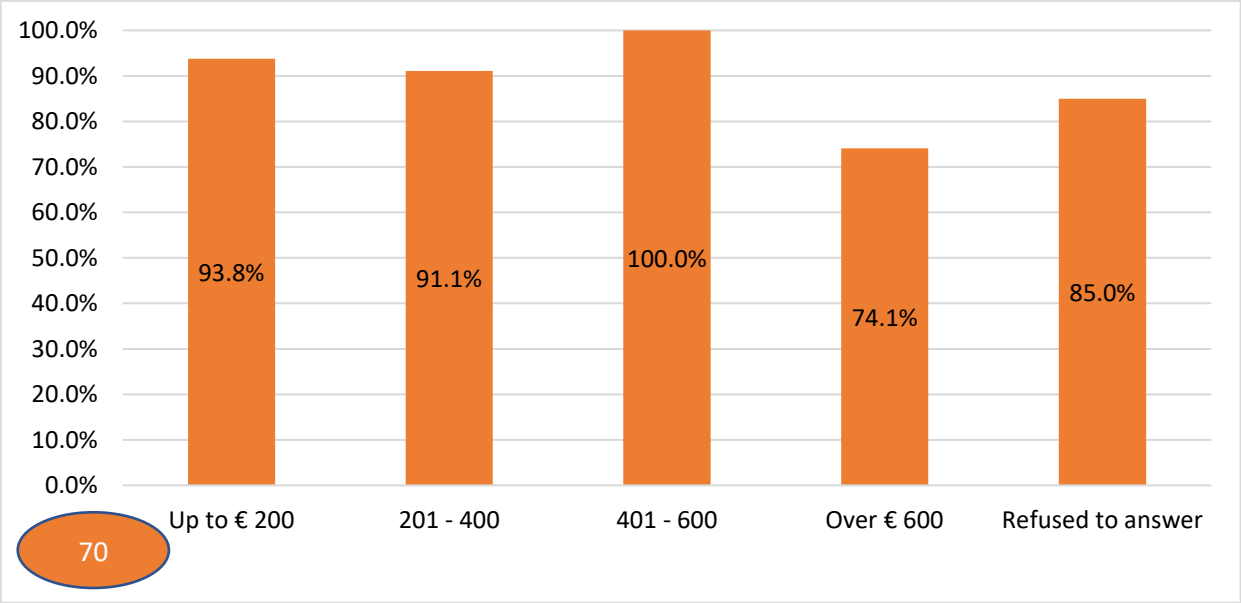


Source: Authors' calculations based on data from STC-SEE

The share of HR smokers living in households with a monthly income under €200 who evade tax is slightly higher compared to those in the income group between €600 and €800 (Figure 9). Similar to illicit MC consumption patterns, older smokers are more likely to consume HR illicit cigarettes than younger smokers. Illicit HR cigarette use is relatively more likely among current smokers aged 55 years and older (98.6 percent) than among younger ones (Figure 10) and among smokers living in rural (95.3 percent) than urban areas (80.5 percent) (Table A3). Although around 60 percent of current HR cigarette smokers are men,[16] the probability of consuming illicit HR does not differ significantly between genders.

The likelihood of tax evasion is slightly higher among smokers living in households with a monthly income under €200.

Figure 9. *Percentage of HR smokers who evade tax, by household income*

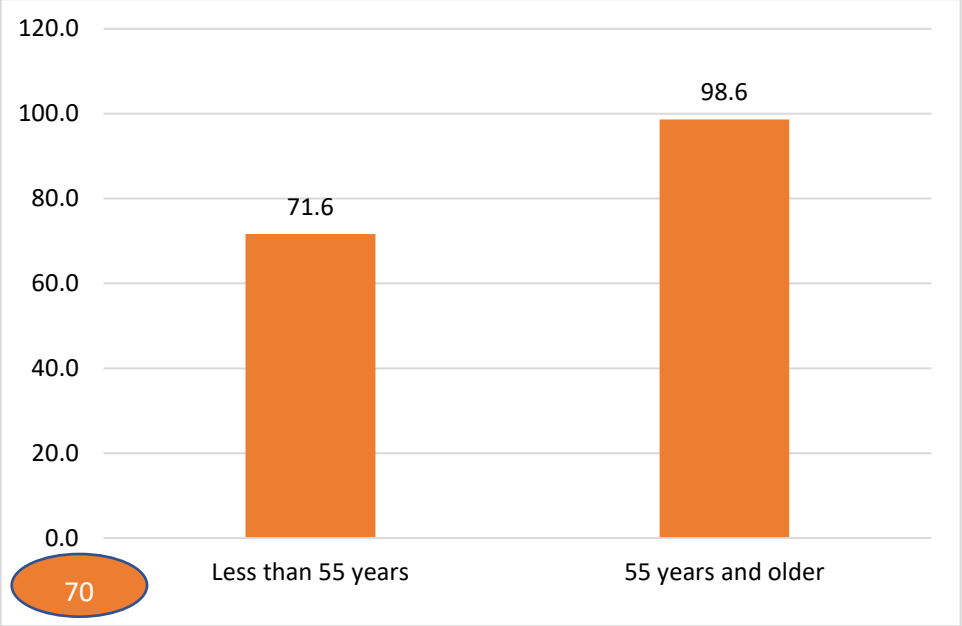


Source: Authors' calculations based on data from STC-SEE 2019

[16] Ibid.

The prevalence of illicit HR tobacco consumption is higher among smokers aged 55 years and older.

Figure 10. *Percentage of HR smokers who evade tax, by age group*

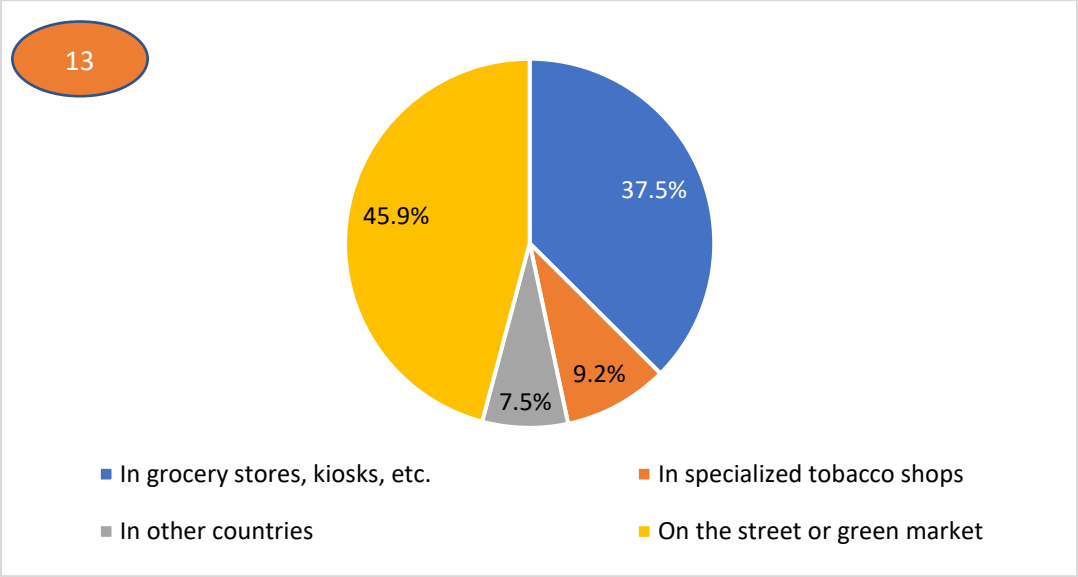


Source: Authors' calculations based on data from STC-SEE 2019

Streets and green markets are the most common places of purchase of illicit MC packs (45.9 percent), followed by grocery stores and specialized tobacco shops (37.5 percent and 9.2 percent, respectively) (Figure 11), indicating that it is still possible to purchase an illicit pack of MC at legal points of sale. However, it should be noted that, given the relatively small number of illicit MC packages, the sample of 13 observations is relatively small from which to derive reliable conclusions. On the other hand, evidence of the place of purchase for the HR cigarettes illicit market is much stronger: from the sample of 56 observations it is evident that the green market is almost the exclusive place of purchase for this type of tobacco product (Figure 12).

Almost half of identified illicit MC packs were purchased on the green market.

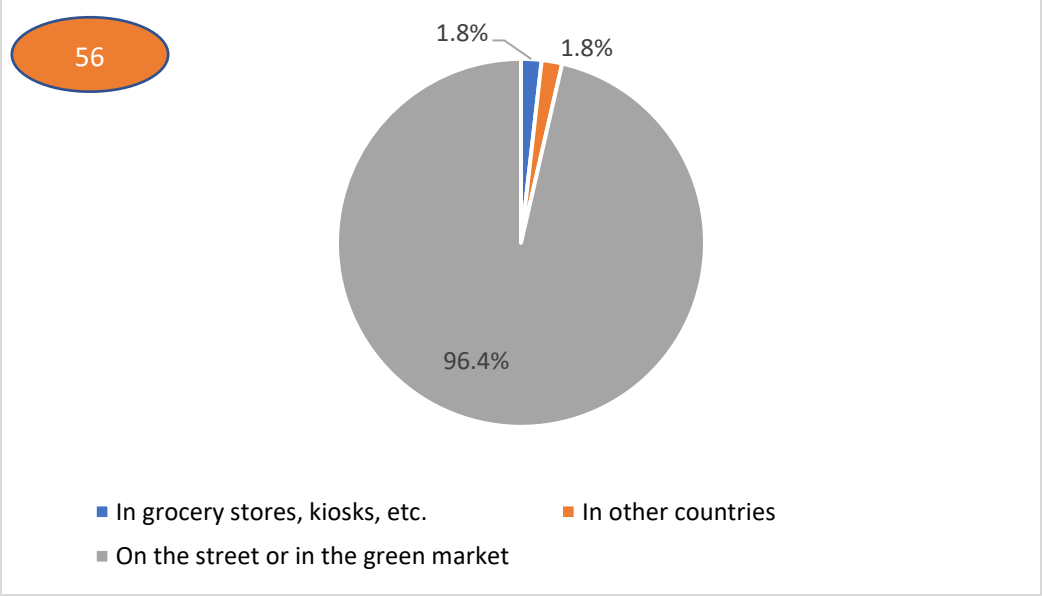
Figure 11. *Percentage of illicit packs of MC, by place of purchase*



Source: Authors' calculations based on data from STC-SEE 2019

Green markets are the place of purchase of most illicit HR tobacco.

Figure 12. *Percentage of illicit packages of HR tobacco, by place of purchase*



Source: Authors' calculations based on data from STC-SEE 2019

To understand the illicit MC brand structure, researchers identified which cigarettes had been produced in other countries and smuggled and sold in Serbia. In total, 13 illicit packs are identified from six different brands (Merilyn, Ashima, Trokadero, FM, Donatela, and Art). All identified illicit HR cigarette packages are unbranded/homemade tobacco purchased in the green market.

All identified illicit MC packs in Serbia are considered "illicit whites" or "cheap whites," which refer to illicit MCs that are legally produced in countries of origin but sold without paying all required duties, often in tax jurisdictions other than the one in which they were produced. They all have HWLs in English but lack an appropriate tax stamp, indicating that they have been smuggled to Serbia through illicit trade channels. Unlike brands like Donatella, FM, and Art, brands such as Ashima, Trokadero, and Merilyn are even included in the official list of tobacco brands allowed to be sold in the Serbian market. However, no cases of legal consumption of Ashima, Trokadero, and Merylin are identified within our sample. Ashima is a brand produced in China,[17] whereas the country of origin of Trokadero and FM is North Macedonia.[18] Donatella brand is produced by Trikala Ltd. Merilyn is made by Kings Tobacco International, a Bulgarian tobacco producer.[19] It should be noted that, with the exception of the North Macedonian brands, most of these MC brands are produced in jurisdictions with tax levels that are higher than in Serbia. Therefore, their presence cannot be explained by high tobacco tax levels but more likely due to a lack of law enforcement.

3.1.1. Health Warning Labels (HWLs)

MC packs and HR tobacco packs can be further distinguished by the health warning label. Health warning labels (HWLs) are an instrument used to reduce the demand for tobacco products. They are the most visible health information intervention presented to smokers (NCI & WHO, 2016). An individual who smokes, on average, one pack of cigarettes per day (20 cigarette sticks) is exposed to the warning label 600 times monthly or 7,200 times in a year, because they see the health warning each time they take a cigarette stick out of the pack (NCI & WHO, 2016). Similarly, adults (both smokers and non-smokers) are exposed to the positive effects of HWLs on cigarette packs at the time of purchase.

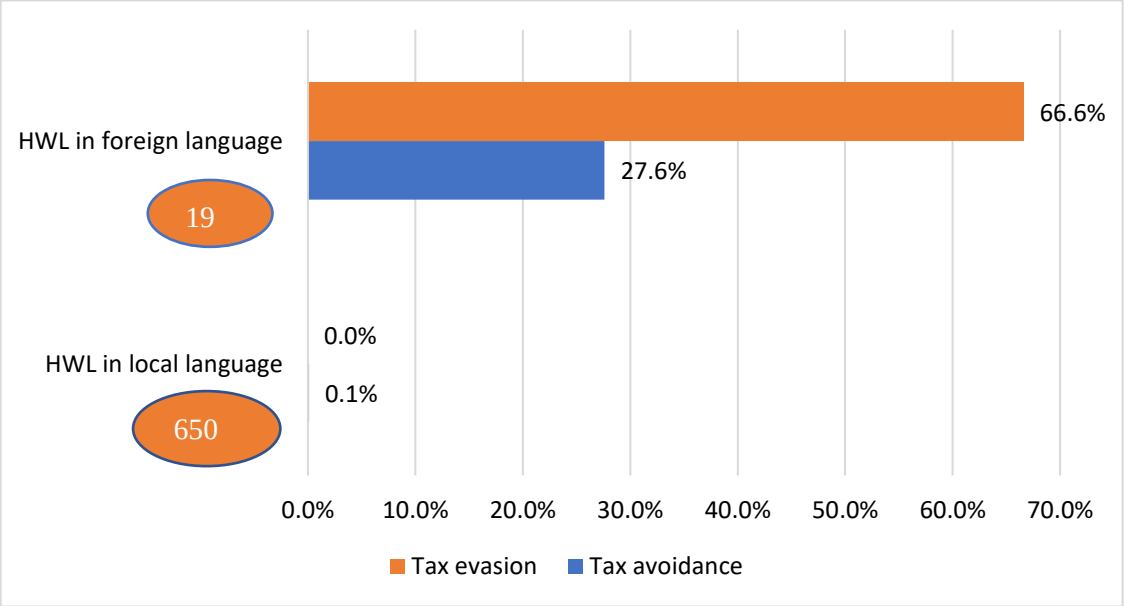
Two main types of HWL are identified—labels in the local language and labels in a foreign language. It is worth noting that, besides these two types, MC packs and HR tobacco packages can also be without HWLs (labels are not present). According to the survey results, 95.8 percent of current smokers showed MC packs with HWLs in the local language and 3.8 percent with HWLs in a foreign language (Table A6). Female smokers are more likely than males to use MC packs with HWL in a foreign language (5.2 percent versus 2.4 percent, respectively). Additionally, MC packs with HWLs in a foreign language are more likely to be smoked by smokers in rural than in urban areas (5.3 percent and 2.9 percent, respectively).

[17] http://www.cigarety.by/brand.php?n=10&l=0&p=0&w=ASHIMA+
[18] http://www.trokaderofm.com/portfolio.html
[19] https://ktinternational.eu/brands#regional-brands

The survey results show that MC packs with HWLs in a foreign language are illicit in most cases (Figure 13). As expected, all MC packs with HWLs in the local language are legal packs, and tax was avoided on only 0.1 percent of these packs.

Two-thirds of MC packs with HWLs in a foreign language are illicit packs.

Figure 13. *Percentage of MC packs, by type of HWL*

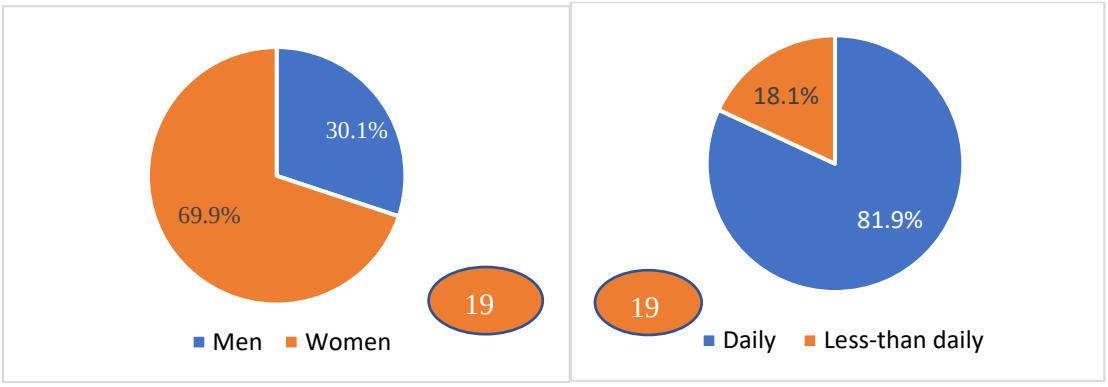


Source: Authors' calculations based on data from STC-SEE 2019

Based on information on HWL on each pack from the survey data, all packs with foreign HWL purchased domestically are identified as illicit, as no MC packs were identified with destroyed or absent HWLs. Due to the small number of observations (sample size of 19), the data analysis for MC packs is limited (Table A7). Six out of 19 packs have a HWL in a foreign language and qualify as tax avoidance cases. Still, it can be concluded that most of the MC packs without the appropriate health warning labels are used by daily smokers and by women (81.9 percent and 69.9 percent, respectively) (Figure 14).

Most MC packs without the appropriate HWL are smoked by daily smokers and by women.

Figure 14. *Percentage of MC packs without the appropriate HWL, by gender and smoking status*



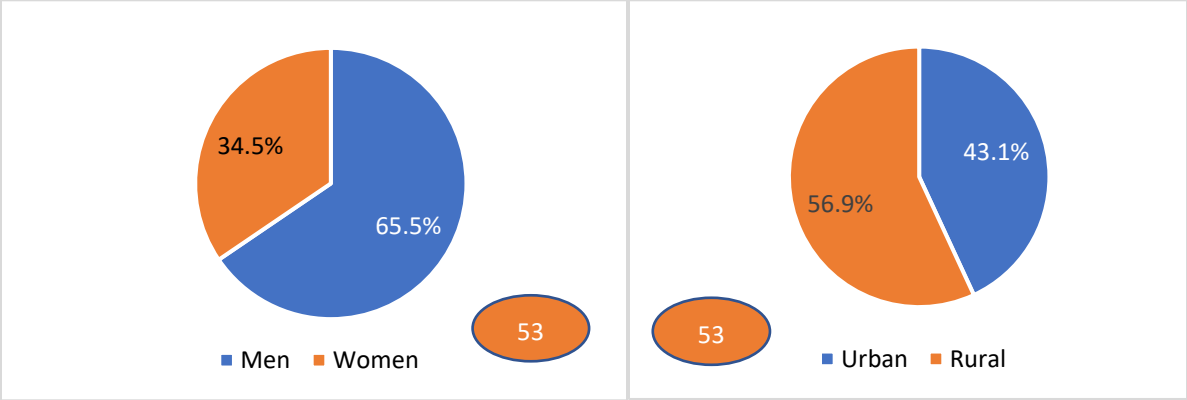
Source: Authors' calculations based on data from STC-SEE 2019

Depending on the type of HWL that is present, HR tobacco packages can be identified as tax evaded or avoided. According to STC-SEE data, 21.3 percent of HR tobacco packs have HWLs in the local language and 78.7 percent do not have HWLs at all. (Table A8). Compared by gender, men are more likely to smoke HR tobacco without HWLs on the package than women (79.8 percent and 76.6 percent, respectively). Men are also more likely to smoke HR tobacco without HWLs on the pack than packs with HWLs in the local language (79.8 percent and 20.2 percent, respectively). Additionally, smokers in rural areas are more likely to smoke HR tobacco without HWLs than smokers in urban areas (85.5 percent and 71.2 percent, respectively) (Table A8).

Figure 15 shows the percentage distribution of HR tobacco without appropriate HWLs, by gender and type of residence. In the case of HR tobacco, packs without appropriate HWLs include only packs with no HWLs. STC-SEE did not record any packs with HWLs in a foreign language, based on pictures taken by the numerator of smokers' last-purchased packs or based on respondents' answers. Because all HR tobacco packs without HWLs were bought on the green market (packed in plastic bags, measured grams of raw tobacco) and without a brand name on it, they can be considered as illicit. Comparing by gender, men buy HR tobacco packs without HWLs more than women (65.5 percent and 34.5 percent, respectively). Smokers in rural areas are also more likely to buy HR tobacco packs without HWLs compared to those in urban areas (56.9 percent and 43.1 percent, respectively).

Men buy HR tobacco packs without appropriate HWLs more than women, as do respondents in rural areas compared to urban.

Figure 15. *Percentage distribution of HR tobacco without the appropriate HWL, by selected demographic characteristics*



Source: Authors' calculations based on data from STC-SEE 2019

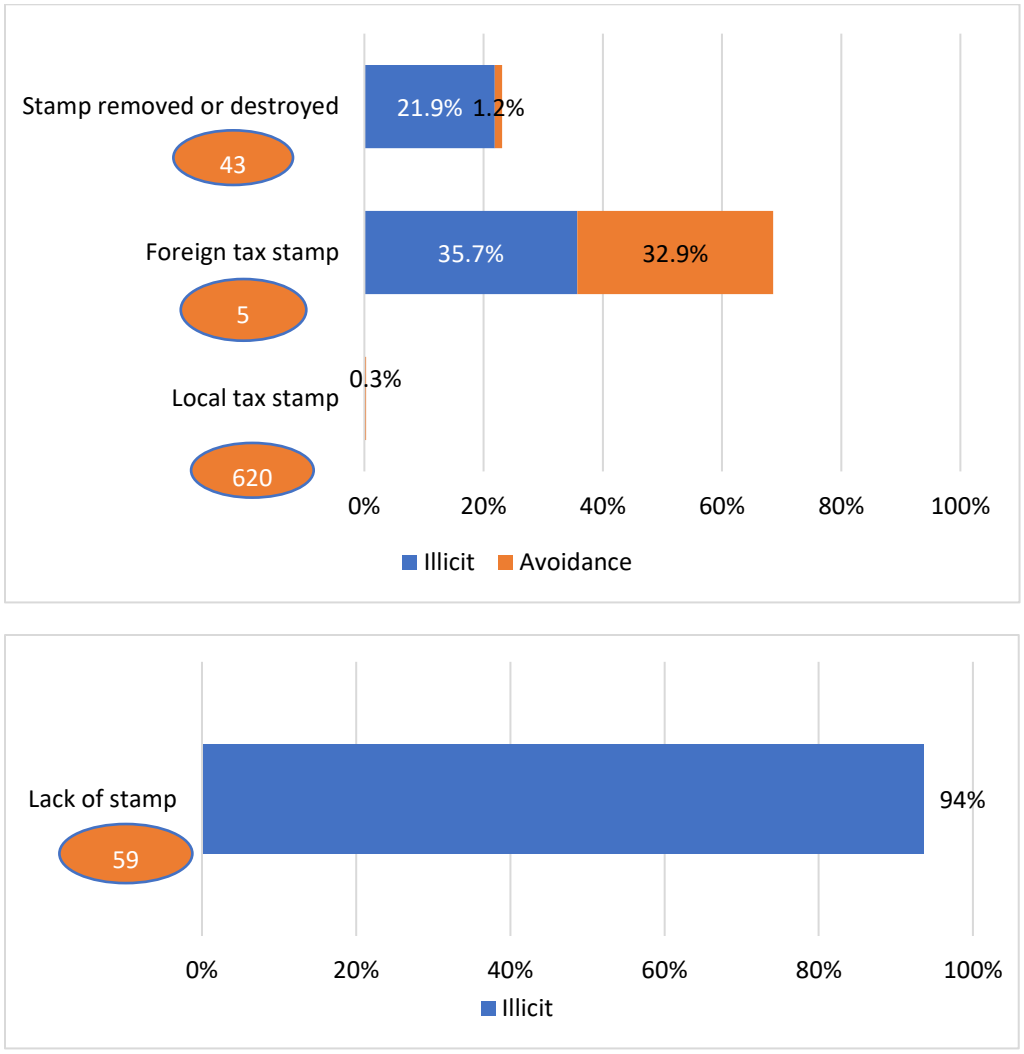
3.1.2. Tax Stamps

An appropriate tax stamp is one of the criteria used in the observational method to identify the illicit status of a tobacco product. Results can be biased in some cases due to errors made by interviewers or inadequate answers from the respondents. However, data collected based on the last-purchased MC pack and HR tobacco pack (especially if it is shown and pictured) is essential in the classification of tobacco product packs. Certainly, a stamp that is removed or destroyed is not acceptable as an appropriate tax stamp on a pack of tobacco products. However, the largest number of tax stamps are removed or destroyed by the smokers themselves, so other criteria must be utilized in identifying the illicit packs. If all other criteria comply, that pack is considered illicit.

Based on survey results and pictures of packs or answers provided by respondents, 21.9 percent of MC packs with a tax stamp that is removed or destroyed are tax evasion cases, and only 1.2 percent are tax avoidance. The remaining MC packs are legal since none of the other illicit criteria are met (a review of the photographs taken by numerators shows that the stamps were removed when smokers opened their packs). Only 0.3 percent of MC packs with a local tax stamp are identified as tax avoidance because they were bought in duty-free shops (in addition to the tax stamps, respondents provided answers that the place of purchase was duty-free). In contrast to MC packs, most HR tobacco packs that do not have a tax stamp at all are identified as illicit (Figure 16). Due to the lack of sufficient observations the demographic analysis is limited, but the results are presented in tables A10 and A11.

Tax evasion is identified in two out of ten MC packs with a tax stamp that is removed or destroyed as well as in nine out of ten HR tobacco packs without a tax stamp.

Figure 16. *Percentage of MC packs (top figure) and HR tobacco packs (bottom figure), by type of tax stamp*



Source: Authors' calculations based on data from STC-SEE 2019

3.2. FACTORS AFFECTING PROBABILITY OF TAX EVASION OR AVOIDANCE

Results of the estimations of the tax evasion models are presented in Appendix B of this report. For each of the three models: 1) tax evasion of MC (Table B3), 2) tax evasion of HR tobacco (Table B4), and 3) overall evasion (Table B5), both MLE and PMLE estimations are presented.[20] Based on

[20] After initial estimates, the variables for smoking intensity (number of cigarettes smoked per week) and weekly spending on tobacco products were dropped due to large standard errors that indicate multicollinearity. At the same time, signs of the estimated coefficients are contrary to the expected, indicating endogeneity. Results of these estimates are available upon request.

the results of the estimations, probabilities of evasion are calculated for smokers with certain characteristics as well as the marginal effects of the variables (logit model).

Table B3 reports the results of evasion for the MC model. The results suggest that evasion is higher in the municipalities on the border, indicating that proximity to the border is a relevant factor. Evasion is 3.9 percentage points higher in border areas: the probability of evasion in border areas is 4.6 percent, while for the non-border areas it is 0.7 percent. In order to explore this finding in more detail, variables measuring distance to neighboring countries in which MC evasion is high (Montenegro and Bosnia and Herzegovina) or in which the prices of MC are lower (Kosovo and North Macedonia) are included in the model. For the latter group of countries estimations also include variables measuring minimum distance to a country with lower prices of tobacco products (Kosovo or North Macedonia) and the average price difference weighted by the distance between Serbia and countries with lower prices of tobacco products. Out of all distance variables only distance to Montenegro is significant, indicating that the effect of the border variable can be explained by proximity of municipalities to the country with the overwhelmingly highest evasion in the region.[21] More detailed analysis of the municipalities indicates that 11 out of the 13 cases of illicit MC packs are in the region of southwestern Serbia, in municipalities Novi Pazar – 6, Kraljevo – 3, Užice and Prijepolje – 1 (Table A2c), which, in this sample, are four out of the five municipalities with the shortest driving distances to Montenegro.

Furthermore, the results suggest that older smokers are more likely to evade, with the probability of tax evasion being 0.1 percentage points higher for each additional year of age. While type of residence, education, and labor market status have no impact on tax evasion,[22] results suggest that persons from low-income groups are more likely to evade, although the evidence is only marginally significant, due to a small number of positive cases. Overall, the fact that only 2.6 percent of smokers evade tax could prevent some of the factors from being significant.

Table B4 reports the results from the estimation of the HR tax evasion model. The model suggests a strong impact of the income group as evasion is about 50 percentage points higher in low- and middle-income households than in high-income households (estimated probability of tax evasion is 83 percent for low- and middle-income households and 33 percent for high-income).[23] Similar to the findings of the model for MCs, older smokers are relatively more likely to evade, as the probability of tax evasion for HR is 0.1 percentage point higher for each additional year of age. The effects of gender, having small children, residence, and regional effects are not significant. As the overall sample for the estimation of this model is relatively small (70 smokers) this could have prevented some of the factors from being significant. Finally, the effects of border municipalities or distance variables were not significant, indicating that HR evasion—unlike MC evasion—is not determined by proximity to other countries.

[21] As all the countries are bordering Serbia to the south or west, the significance of each variable was tested separately to avoid multicollinearity issues. Results including insignificant variables available upon request.

[22] Due to the fact that there is no MC evasion in Belgrade, regional variables could not be used in the model since they would predict the outcome perfectly.

[23] Due to multicollinearity issues with income group, labor market status, and education level variables, only income group variables are used in the specification.

Table B5 presents the results of the overall model of tax evasion. The model confirms the following impacts of the variables: 1) evasion is higher in border areas, 2) older smokers are more likely to evade, and 3) households with lower income are more prone to evasion (although significance remains at marginal levels ($p<0.1$) and is not consistent across the models). Furthermore, the model confirms that smokers of HR, compared to MC smokers, are more likely to purchase their tobacco product illegally. Using distance variables does not improve specification, as out of all distance variables only distance to Montenegro is significant, but only at a marginal level.

CHAPTER 4. DISCUSSION AND RECOMMENDATIONS

The effectiveness of tobacco control strategies (including fiscal and pricing policies) can be diminished due to tax avoidance (licit) and tax evasion (illicit). Moreover, the presence of tax avoidance and tax evasion results in lower budget revenues and lower prices for smokers, as well as increases in tobacco use (PPACTE, 2012).

This study fills the gap in evidence on tobacco tax avoidance and evasion in Serbia as well as increases the awareness of the associated characteristics (price, warnings, tax stamps, place of purchase, and demographic and socioeconomic characteristics of smokers who use illicit MC and HR tobacco). Indicators presented in the study (detailed in Chapter 3 and Appendix A) provide useful information about the percentage distribution of illicit packs and packs with tax avoidance, the percentage distribution of packs with illegal brands, and the percentage distribution of packs without appropriate warnings and tax stamps. All indicators are calculated for both MC and HR tobacco packs. Based on the STC-SEE 2019 findings for Serbia, this study provides recommendations to policy makers to improve existing legislation and strengthen control of tobacco growing and tobacco sales on green markets and streets.

According to information provided by current smokers on their last-purchased tobacco pack and the illicit status criteria, the MC market in Serbia is predominantly legal. The share of identified illicit MC smokers amounts to 2.6 percent of MC smokers. If smoking intensity (average daily consumption measured by the number of cigarettes consumed) is taken into account, the share of illicit MC consumption amounts to 2.4 percent of the Serbian MC market. On the other hand, the HR tobacco market is predominantly illicit. The estimated share of illicit HR tobacco smokers is 88.2 percent. Illicit HR tobacco consumption accounts for 90.7 percent of the HR tobacco market.

Compared by income groups, smokers with average monthly household income under €200 buy illicit MC packs more than others. The estimated share of illicit MC consumption among the poorest smokers is 10.1 percent. Similarly, the share of low-income HR smokers who use illicit tobacco is almost four times higher than the share for higher-income groups (monthly household income between €600 and €800) (93.8 percent and 25.9 percent, respectively).

Place of purchase is one of the essential criteria for identifying the extent of tax avoidance and tax evasion. As expected, streets and green markets are the predominant places of purchase for illicit MC packs (45.9 percent) as well as for illicit HR tobacco packs (96.4 percent). Besides the place of purchase, acceptable criteria for classification of illicit and tax avoidance packs include HWLs and tax stamps. According to the STC-SEE results, most MC packs with HWLs in a foreign language are illicit. On the other hand, survey enumerators found no HR tobacco packs with HWLs in a foreign language but only packs with HWLs in the local language and packs without any HWL. All HR tobacco packs without HWLs are illicit packs. Regarding the tax stamps, in most cases smokers themselves removed or destroyed the tax stamps, so other criteria were utilized to identify illicit and tax-avoidance packs.

The results of the tax evasion model for MCs suggest that evasion is higher in municipalities on the border. Additionally, older smokers are more likely to evade. The results for the tax evasion model for HR suggest that income group has a high impact on evasion, with levels in low- and middle-income households about 50 percentage points higher than in high-income households. The overall model of tax evasion confirms that evasion is higher in border areas; older smokers are more likely to evade; and households with lower income are more prone to evasion. Having small children also increases the likelihood of evading. Finally, the model confirms that smokers of HR cigarettes are more likely to purchase their tobacco product illegally than MC smokers.

Building on the analysis of the survey findings, recommendations for policy makers and other stakeholders are:

1. **Strengthen the capacity of the tobacco control system.** In line with the WHO Framework Convention on Tobacco Control's Protocol to Eliminate Illicit Trade in Tobacco Products, the Serbian government should continue strengthening the capacity of tax authorities and other tobacco control officials to detect illicit products, supporting their integrity and independence. Important steps towards an effective tobacco control system include implementation of an effective track-and-trace system and suspension of any form of cooperation with the tobacco industry.
2. **Control the supply chain.** The Serbian government should undertake efforts to control and regulate the supply chain. Given that 100 percent of illicit HR tobacco products are purchased in "green markets," it would be relatively easy to detect all actors in the illicit supply chain (growers, manufacturers, wholesalers, and retailers). Law enforcement and strict financial and non-financial sanctions should be imposed to reduce the share of the HR tobacco illicit market. Government should consider adoption of stricter sanctions for violators, including permanent loss of license for actors in the supply chain involved in illicit trade activities. In addition, in line with the experiences of other tobacco-producing countries, the government should consider imposing excise tax on "dry tobacco," or tobacco separated from the living plant, and putting the excise stamp on the packages of dry tobacco, allowing raw tobacco or tobacco product inputs to be tracked. It would also be important to ensure supervision of the tobacco crops' destruction if necessary.
3. **Strengthen control of tobacco product sales in border regions**. This research found that, although the share of illicit MC is relatively low (2.6 percent of current MC consumers), the majority of illicit MC packs (more than 80 percent) were identified in the Central and Western parts of Serbia, and more than half in Novi Pazar, a city close to the Montenegro border. Since MC tax evasion, according to this STC-SEE research, is by far the most represented in Montenegro, policy makers should pay particular attention in protecting the border with Montenegro.

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APPENDIX A

Table A1a. *Percentage and absolute number of current smokers who showed the last-purchased package of manufactured cigarettes (MC) and hand-rolled (HR) tobacco, unweighted*

Characteristics	Showed a package		Refused to show a package	
	Percentage	Number of respondents	Percentage	Number of respondents
MC smokers*	84.0	562	16.0	107
HR tobacco smokers**	55.7	39	44.3	31

Notes: *sample size = 669, **sample size = 70

Table A1b. *Distribution of illicit MC packs according to the illicit status criteria (number of observations, unweighted)*

Characteristics	Place of purchase (Illicit source)	Inappropriate or missing HWL	Inappropriate or missing tax stamp	Price
Illicit MC packs	On the street	HWL in foreign language	Lack of stamp	Price lower than 70% of the lowest price
Number of cases	8	13	11	0
Percentage	1.2%	1.9%	1.6%	0%

Table A1c. *Distribution of illicit HR tobacco packages according to the illicit status criteria (number of observations, unweighted)*

Characteristics	Place of purchase (illicit source)	Inappropriate or missing HWL	Inappropriate or missing tax stamp
Illicit HR tobacco packs	On the street	No HWL	Lack of stamp
Number of cases	54	53	53
Percentage	77.1%	75.7%	75.7%

Table A2a. *Share of the illicit MC and HR tobacco consumption*

	Licit cigarette consumption			Illicit cigarette consumption			Evasion rate (%)
	Average number of cigarettes smoked	Number of smokers	Total cigarette consumption	Average number of cigarettes smoked	Number of smokers	Total cigarette consumption	
MC	17.3	2,224,728	38,452,392	15.9	59,387	943,244	2.4%
HR	11.9	51,769	616,593	15.6	386,949	6,034,238	90.7%
Total			39,068,986		446,335	6,977,482	15.2%

Note: The evasion rate is calculated as a ratio of total illicit cigarette consumption and total consumption (licit + illicit).

Table A2b. *Percentage distribution of current smokers who evaded and avoided tax on their last-purchased pack of MC, by selected demographic and socioeconomic characteristics*

Characteristics	Tax evasion	Tax avoidance
	Percentage (95% CI)	
Overall	**2.6 (1.3 - 3.8)**	**1.1 (0.3, 1.9)**
Gender		
Male	2.2 (0.6 - 3.8)	0.2 (0.0 - 0.7)
Female	2.9 (1.1 - 4.7)	1.9 (0.4 - 3.4)
Age		
18-24	0.0	0.0
25-34	0.0	0.0
35-44	1.8 (0.0 - 3.9)	0.4 (0.0 - 1.5)
45-54	0.5 (0.0 - 1.6)	4.1 (0.7 - 7.5)
55-64	8.1 (3.4 - 12.7)	0.5 (0.0 - 1.6)
65-74	4.2 (0.0 - 10.0)	0.8 (0.0 - 1.4)
75-85	3.5 (0.0-19.3)	0.0
Residence		
Urban	2.3 (0.8 - 3.8)	0.6 (0.0 - 1.3)
Rural	3.0 (0.8 - 5.1)	1.9 (0.2 - 3.6)
Region		
Belgrade	0.0	0.3 (0.0 - 1.4)
Central and West Serbia	6.4 (2.8 - 9.9)	0.1 (0.0 - 0.6)
South and East Serbia	2.3 (0.2 - 4.5)	2.8 (0.4 - 5.1)
Vojvodina	0.3 (0.0 - 1.3)	0.7 (0.0 - 2.0)
Educational level		
Primary or less	6.7 (3.0 - 10.4)	2.6 (0.2 - 5.0)

Characteristics	Tax evasion	Tax avoidance
	Percentage (95% CI)	
Vocational	1.0 (0.0 - 2.7)	0.0
High school	0.8 (0.0 - 2.0)	0.8 (0.0 - 2.0)
Higher	1.6 (0.0 - 4.0)	0.8 (0.0 - 2.4)
Refused to answer	0.0	0.0
Household income (in €/month)		
200 or less	10.1 (0.9 - 19.3)	0.0
201 - 400	1.7 (0.0 - 4.7)	0.6 (0.0 - 2.3)
401 - 600	1.4 (0.0 - 4.5)	1.4 (0.0 - 0.4)
601 - 800	1.1 (0.0 - 3.9)	0.7 (0.0 - 3.1)
over 800	0.7 (0.0 - 2.5)	0.8 (0.0 - 2.8)
Refused to answer	2.6 (0.9 - 4.3)	1.4 (0.1 - 2.7)

Note: Sample size = 669

Table A2c. *Municipalities with the highest number of identified illicit MC packs*

Characteristics	Novi Pazar	Zajecar	Kraljevo	Uzice	Prijepolje	Subotica
Number of illicit MC packs	6	1	3	1	1	1
Percent of illicit MC packs	10%	2.5%	5%	2%	2%	2.5%

Table A3. *Percentage distribution of current smokers who evaded tax on the last-purchased pack of HR tobacco, by selected demographic and socioeconomic characteristics*

Characteristics	Tax evasion
	Percentage (95% CI)
Overall	**88.2 (81.9 - 94.6)**
Gender	
Male	87.6 (79.4 - 95.8)
Female	89.3 (78.8 - 99.8)
Age	
18-24	0.0
25-34	31.2 (0.0 - 100.0)
35-44	89.5 (72.6 - 100.0)
45-54	66.2 (42.8 - 89.8)
55-64	98.7 (95.4 - 100.0)
65-74	98 (87.4 - 100.0)
75-85	100 (n/a)
Residence	
Urban	80.5 (69.0 - 92.1)
Rural	95.3 (89.4 - 100.0)
Region	
Belgrade	94.8 (82.3 - 100.0)
Central and West Serbia	98.5 (92.8 - 100.0)
South and East Serbia	73.3 (49.8 - 96.9)
Vojvodina	87 (77.3 - 96.8)
Educational level	
Primary or less	98.4 (95.1 - 100.0)
Vocational	75.4 (55.2 - 95.6)
High school	69.4 (44.9 - 93.9)
Higher	82.8 (13.2 - 100.0)
Refused to answer	0.0
Household income (in €/month)	
200 or less	93.8 (80.3 - 100.0)
201 - 400	91.1 (73.9 - 100.0)
401 - 600	100 (n/a)
601 - 800	74.1 (38.7 - 100.0)
over 800	0.0
Refused to answer	85 (74.7 - 95.3)

Note: Sample size = 70

Table A4. *Percentage distribution of current smokers of MC who evaded tax on the last-purchased pack, by place of purchase, gender, and type of residence*

Characteristics	In grocery stores and kiosks	In specialized tobacco shops	In other countries	On the street, on the green market from independent/individual sellers
	Percentage (95% CI)			
Overall	**37.5 (11.5 - 63.4)**	**9.2 (0.0 - 24.6)**	**7.5 (0.0 - 21.6)**	**45.9 (19.1 - 72.6)**
Gender				
Male	82.1 (43.1 - 100.0)	0.0	0.0	17.9 (0.0 - 56.9)
Female	6.2 (0.0 - 24.6)	15.6 (0.0 - 43.3)	12.7 (0.0 - 38.3)	65.5 (29.1 - 100.0)
Residence				
Urban	6.6 (0.0 - 26.4)	0.0	13.6 (0.0 - 41.0)	79.8 (47.7 - 100.0)
Rural	75.6 (35.0 - 100.0)	20.5 (0.0 - 58.7)	0.0	3.9 (0.0 - 22.3)

Note: Sample size = 13

Table A5. *Percentage distribution of current smokers of HR tobacco who evaded tax on the last-purchased pack, by place of purchase, gender, type of residence, and level of education*

Characteristics	In grocery stores and kiosks	In other countries (grocery stores, specialized tobacco shops, etc.)	On the street, on the green market from independent/individual seller
	Percentage (95% CI)		
Overall	**1.8 (0.0 - 5.4)**	**1.8 (0.0 - 5.4)**	**96.4 (91.4 - 100.0)**
Gender			
Male	0.0	3.1 (0.0 - 9.5)	96.9 (90.5 - 100.0)
Female	4.2 (0.0 - 12.8)	0.0	95.8 (87.2 - 100.0)
Residence			
Urban	0.0	3.6 (0.0 - 10.9)	96.4 (89.1 - 100.0)
Rural	3.6 (0.0 - 10.9)	0.0	96.4 (89.1 - 100.0)
Region			
Belgrade	0.0	0.0	100 (n/a)
Central and West Serbia	6.2 (0.0 - 19.5)	6.2 (0.0 - 19.5)	87.5 (69.3 - 100.0)
South and East Serbia	0.0	0.0	100 (n/a)
Vojvodina	0.0	0.0	100 (n/a)
Educational level			
Primary or less	0.0	0.0	100 (n/a)
Vocational	6.7 (0.0 - 21.0)	0.0	93.3 (79.0 - 100.0)
High school	0.0	0.0	100 (n/a)
Higher	0.0	16.7 (0.0 - 59.5)	83.3 (40.5 - 100.0)
Refused to answer	0.0	0.0	0.0

Notes: Sample size = 56; No packs were bought in specialized tobacco shops.

Table A6. *Percentage distribution of current smokers of MC, by type of HWL* and selected demographic and socioeconomic characteristics*

Characteristics	HWL in local language	HWL in foreign language
	Percentage (95% CI)	
Overall	**96.2 (94.7 - 97.6)**	**3.8 (2.3 - 5.3)**
Gender		
Male	97.6 (95.9 - 99.3)	2.4 (0.7 - 4.0)
Female	94.8 (92.4 -97.2)	5.2 (2.8 - 7.6)
Age		
18-24	100.0 (n/a)	0.0
25-34	100.0 (n/a)	0.0
35-44	97.0 (94.3 - 99.7)	3.0 (0.3 - 5.7)
45-54	95.5 (91.8 - 99.0)	4.5 (0.9 - 8.1)
55-64	91.4 (86.7 - 96.2)	8.6 (3.8 - 13.3)
65-74	95.0 (88.7 - 100.0)	5.1 (0.0 - 11.3)
75-85	96.5 (87.0 - 100.0)	3.5 (0.0 - 100.0)
Residence		
Urban	97.1 (95.5 - 98.8)	2.9 (1.2 - 4.5)
Rural	94.7 (91.8 - 97.4)	5.3 (2.5 - 8.1)
Region		
Belgrade	99.7 (98.6 - 100.0)	0.3 (0.0 - 1.3)
Central and West Serbia	93.6 (90.0 - 97.2.4)	6.4 (2.8 - 9.9)
South and East Serbia	94.1 (90.7 - 97.4)	5.9 (2.5 - 9.2)
Vojvodina	99.0 (97.3 - 100.0)	1.0 (0.0 - 2.6)
Educational level		
Primary or less	90.7 (86.3 - 95.1)	9.3 (4.9 - 13.6)
Vocational	98.0 (95.7 - 100.0)	2.0 (0.0 - 4.3)
High school	98.5 (96.8 - 100.0)	1.5 (0.0 - 3.1)
Higher	97.6 (94.7 - 100.0)	2.4 (0.0 - 5.3)
Refuse	100.0 (n/a)	0.0
Household income (in €/month)		
200 or less	89.9 (80.6 - 99.1)	10.2 (0.9 - 19.4)
201 - 400	97.7 (94.3 - 100.0)	2.3 (0.0 - 5.7)
401 - 600	97.1 (92.8 - 100.0)	2.9 (0.0 - 7.2)
601 - 800	98.2 (94.5 - 100.0)	1.8 (0.0 - 5.4)
over 800	98.5 (95.9 - 100.0)	1.5 (0.0 - 4.1)
Refused to answer	95.6 (93.4 - 97.8)	4.4 (2.2 - 6.6)

Notes: Sample size = 669; *No MC packs were identified without a HWL.

Table A7. *Demographic and socioeconomic structure of current smokers of MC whose last pack had a health warning label in a foreign language*

Characteristics	HWL in foreign language
	Percentage (95% CI)
Gender	
Male	30.1 (10.7 - 49.3)
Female	69.9 (50.6 - 89.2)
Age	
18-24	0.0 (n/a)
25-34	0.0 (n/a)
35-44	18.1 (1.9 - 34.3)
45-54	24.1 (6.1 - 42.1)
55-64	46.4 (25.4 - 65.4)
65-74	10.1 (0.0 - 22.8)
75-85	1.2 (0.0 - 5.7)
Residence	
Urban	46.3 (25.3 - 67.3)
Rural	53.7 (32.7 - 74.7)
Region	
Belgrade	1.7 (0.0 - 7.1)
Central and West Serbia	46.4 (25.4 - 67.4)
South and East Serbia	45.5 (24.6 - 66.5)
Vojvodina	6.4 (0.0 - 16.7)
Educational level	
Primary or less	64.8 (44.7 - 84.9)
Vocational	11.9 (0.0 - 25.6)
High school	12.3 (0.0 - 26.1)
Higher	10.9 (0.0 - 24.1)
Refuse	0.0 (n/a)
Current smoking status	
Daily	81.9 (65.7 - 98.1)
Less-than daily	18.1 (1.8 - 34.3)
Household income (in €/month)	
200 or less	18.1 (1.2 - 34.3)
201 - 400	6.7 (0.0 - 17.2)
401 - 600	7.2 (0.0 - 18.1)
601 - 800	4.1 (0.0 - 12.4)
over 800	4.7 (0.0 - 13.7)
Refused to answer	59.2 (38.5 - 79.9)

Note: Sample size = 19

Table A8. *Percentage distribution of current smokers of HR tobacco, by type of HWL* and selected demographic and socioeconomic characteristics*

Characteristics	HWL in local language	No HWL
	Percentage (95% CI)	
Overall	21.3 (13.2 - 29.4)	78.7 (70.6 - 86.8)
Gender		
Male	20.2 (10.2 - 30.1)	79.8 (69.9 - 89.8)
Female	23.4 (8.9 - 37.9)	76.6 (62.1 - 91.1)
Age		
18-24	100.0 (n/a)	0.0
25-34	73.6 (1.5 - 100)	26.5 (0.0 - 98.4)
35-44	10.5 (0.0 - 27.4)	89.5(72.6 - 100.0)
45-54	33.8 (10.2 - 57.3)	66.2 (42.7 - 89.8)
55-64	19.5 (8.1 - 30.9)	80.4 (69.0 - 91.9)
65-74	2.0 (0.0 - 100.0)	98.0 (87.4 - 100.0)
75-85	0.0	100.0 (n/a)
Residence		
Urban	28.8 (15.6 - 42.1)	71.2 (57.9 - 84.4)
Rural	14.5 (4.7 - 24.2)	85.5 (75.8 - 95.3)
Region		
Belgrade	5.2 (0.0 - 17.7)	94.8 (82.3 - 100.0)
Central and West Serbia	24.2 (3.6 - 44.8)	75.8 (55.2 - 96.4)
South and East Serbia	53.5 (26.9 - 80.0)	46.5 (19.9 - 73.1)
Vojvodina	14.1 (4.1 - 24.2)	85.8 (75.8 - 95.9)
Educational level		
Primary or less	16.8 (7.0 - 26.5)	83.2 (73.5 - 92.9)
Vocational	25.1 (4.5 - 45.6)	74.9 (54.2 - 95.5)
High school	30.6 (6.0 - 55.1)	69.4 (44.9 - 93.9)
Higher	29.1 (0.0 - 97.5)	70.9 (2.5 - 100.0)
Refuse	0.0	0.0
Household income (in €/month)		
200 or less	35.0 (8.5 - 61.5)	65.0 (38.5 - 91.5)
201 - 400	9.1 (0.0 - 27.1)	90.9 (72.9 - 100.0)
401 - 600	0.0	100.0 (n/a)
601 - 800	31.0 (0.0 - 66.4)	69.0 (33.6 - 100.0)
over 800	0.0	0.0
Refused to answer	24.2 (11.8 - 36.5)	75.8 (63.5 - 88.2)

Notes: Sample size = 70, *includes Do not know/Do not remember/Refuse to answer, **HR packs with foreign HWL were not identified.

Table A9. *Demographic and socioeconomic structure of current smokers of HR tobacco whose last-purchased pack did not have a health warning label*

Characteristics	Without HWL on pack*
	Percentage (95% CI)
Gender	
Male	65.5 (54.8 - 76.1)
Female	34.5 (23.9 - 45.2)
Age	
18-24	0.0
25-34	1.4 (0.0 - 4.1)
35-44	17.9 (9.3 - 26.5)
45-54	15.6 (7.5 - 23.7)
55-64	50.0 (38.8 - 61.2)
65-74	12.4 (5.0 - 19.8)
75-85	2.7 (0.0 - 6.3)
Residence	
Urban	43.1 (32.0 - 54.1)
Rural	56.9 (45.9 - 68.0)
Region	
Belgrade	18.1 (9.5 - 26.7)
Central and West Serbia	18.9 (10.1 - 27.7)
South and East Serbia	9.8 (3.1 - 16.5)
Vojvodina	53.2 (42.0 - 64.3)
Educational level	
Primary or less	62.2 (51.4 - 73.1)
Vocational	19.0 (10.2 - 27.8)
High school	14.6 (6.7 - 22.5)
Higher	4.1 (0.0 - 8.6)
Refused to answer	0.0
Household income (in €/month)	
200 or less	12.8 (5.3 - 20.3)
201 - 400	15.1 (7.0 - 23.1)
401 - 600	17.0 (8.6 - 25.4)
601 - 800	8.4 (2.2 - 14.7)
over 800	0.0
Refused to answer	46.7 (35.6 - 57.9)

Notes: Sample size = 53; *without the appropriate HWL—in Serbia only packs without HWL, because packs with a foreign HWL were not identified.

Table A10. *Percentage of illicit packs of MC and packs with tax avoidance, by type of tax stamp and selected demographic and socioeconomic characteristics*

Characteristics	Local tax stamp*	Foreign tax stamp**	Stamp removed or destroyed***
	Percentage (95% CI)		
Overall	100.0	100.0	100.0
Tax evasion	0.0	35.7 (7.5 - 63.8)	21.9 (10.3 - 33.4)
Tax avoidance	0.3 (0.0 - 0.7)	32.9 (5.3 - 60.5)	1.2 (0.0 - 4.3)
Gender			
Male			
Tax evasion	0.0	100.0 (n/a)	10.4 (0.0 - 23.9)
Tax avoidance	0.0	0.0	2.9 (0.0 - 10.3)
Female			
Tax evasion	0.0	6.2 (0.0 - 24.5)	30.6 (13.1 - 48.1)
Tax avoidance	99.4 (98.5 - 100.0)	48.0 (9.9 - 83.7)	0.0
Age			
18-54			
Tax evasion	0.0	6.2 (0.0 - 24.5)	8.3 (0.0 - 18.3)
Tax avoidance	0.3 (0.0 - 0.8)	48.0 (10.0 - 86.0)	0.0
55-85			
Tax evasion	0.0	100.0 (n/a)	43.6 (20.0 - 67.2)
Tax avoidance	0.2 (0.0 - 0.9)	0.0	3.2 (0.0 - 11.5)
Type of residence			
Urban			
Tax evasion	0.0	11.9 (0.0 - 55.4)	30.8 (12.6 - 49.1)
Tax avoidance	0.5 (0.0 - 1.2)	0.0	2.3 (0.0 - 8.3)
Rural			
Tax evasion	0.0	48.8 (9.0 - 88.7)	11.8 (0.0 - 25.5)
Tax avoidance	0.0	51.2 (11.3 - 91.0)	0.0
Region			
Belgrade			
Tax evasion	0.0	0.0	0.0
Tax avoidance	0.3 (0.0 - 1.4)	0.0	0.0
Central and West Serbia			
Tax evasion	0.0	74.0 (0.0 - 100.0)	46.2 (24.6 - 67.8)
Tax avoidance	0.0	26.0 (0.0 - 100.0)	0.0
South and East Serbia			
Tax evasion	0.0	33.3 (4.5 - 62.1)	0.0
Tax avoidance	0.5 (0.0 - 1.7)	33.3 (4.5 - 62.1)	0.0
Vojvodina			
Tax evasion	0.0	0.0	4.58 (0.0 - 18.6)
Tax avoidance	0.3 (0.0 - 1.1)	0.0	5.51 (0.0 - 20.9)

Notes: *sample size= 620, **sample size = 5, ***sample size = 43

Table A11. *Percentage of illicit packs of HR tobacco, by type of tax stamp and selected demographic and socioeconomic characteristics*

Characteristics	Local tax stamp*	Stamp removed or destroyed**	Lack of stamp***
	Percentage (95% CI)		
Overall	100.0	100.0	100.0
Tax evasion	47.42 (8.4 - 86.4)	0.0	93.63 (88.4 - 98.8)
Tax avoidance	0.0	0.0	0.0
Gender			
Male			
Tax evasion	0.0	0.0	93.00 (86.3 - 99.6)
Tax avoidance	0.0	0.0	0.0
Female			
Tax evasion	65.06 (17.2 - 100.0)	0.0	94.92 (86.4 - 100.0)
Tax avoidance	0.0	0.0	0.0
Age			
18 – 54			
Tax evasion	0.0	0.0	83.65 (70.4 - 96.8)
Tax avoidance	0.0	0.0	0.0
55-85			
Tax evasion	87.31 (42.9 - 100.0)	0.0	99.63 (98.0 - 100.0)
Tax avoidance	0.0	0.0	0.0
Type of residence			
Urban			
Tax evasion	53.8 (11.0 - 96.5)	0.0	87.58 (76.8 - 98.3)
Tax avoidance	0.0	0.0	0.0
Rural			
Tax evasion	0.0	0.0	98.43 (94.8 - 100.0)
Tax avoidance	0.0	0.0	0.0
Region			
Belgrade			
Tax evasion	0.0	0.0	94.82 (82.3 - 100.0)
Tax avoidance	0.0	0.0	0.0
Central and West Serbia			
Tax evasion	100.0 (n/a)	0.0	98.07 (90.3 - 100.0)
Tax avoidance	0.0	0.0	0.0
South and East Serbia	0.0		
Tax evasion	0.0	0.0	82.96 (61.3 - 100.0)
Tax avoidance	0.0	0.0	0.0
Vojvodina			
Tax evasion	0.0	0.0	95.31 (88.7 - 100.0)
Tax avoidance	0.0	0.0	0.0

Notes: Sample size = 70, *sample size = 7, **sample size = 2, ***sample size = 59

Table A12. *Percentage distribution of current smokers of MC whose last-purchased pack had a HWL in a foreign language, by place of purchase, overall and by selected demographic and socioeconomic characteristics*

Characteristics	Place of purchase				
	In grocery stores (small independent grocery stores, mini/super/hyper markets), kiosks	In specialized tobacco shops	In other countries (grocery stores, specialized tobacco shops, etc.)	Duty-free shops	On the street, on the green market from independent/individual seller
	Percentage (95% CI)				
Overall	31.9 (12.2 - 51.5)	6.1 (0.0 - 16.2)	28.9 (9.8 - 47.9)	2.6 (0.0 - 9.3)	30.6 (11.1 - 49.9)
Gender					
Male	75.0 (34.3 - 100.0)	0.0	0.0	8.6 (0.0 - 35.0)	16.4 (0.0 - 51.2)
Female	13.4 (0.0 - 31.1)	8.7 (0.0 - 23.4)	41.3 (15.6 - 66.9)	0.0	36.6 (11.6 - 61.7)
Age					
18-24	0.0	0.0	0.0	0.0	0.0
25-34	0.0	0.0	0.0	0.0	0.0
35-44	22.7 (0.0 - 87.8)	33.7 (0.0 - 100.0)	31.8 (0.0 - 100.0)	0.0	11.9 (0.0 - 62.1)
45-54	14.8 (0.0 - 55.5)	0.0	75.0 (25.5 - 100.0)	0.0	10.1 (0.0 - 44.6)
55-64	39.0 (5.9 - 72.1)	0.0	10.8 (0.0 - 31.8)	5.6 (0.0 - 21.1)	44.7 (11.0 - 78.4)
65-74	60.0 (0.0 - 100.0)	0.0	0.0	0.0	39.9 (0.0 - 100.0)
75-85	0.0	0.0	0.0	0.0	100.0 (n/a)
Residence					
Urban	20.2 (0.0 - 47.4)	0.0	10.8 (0.0 - 31.9)	5.6 (0.0 - 21.2)	63.5 (30.7 - 96.2)
Rural	42.0 (11.6 - 72.4)	11.4 (0.0 - 30.9)	44.5 (13.9 - 75.1)	0.0	2.2 (0.0 - 11.2)
Region					
Belgrade	100.0 (n/a)	0.0	0.0	0.0	0.0
Central and West Serbia	14.8 (0.0 - 38.9)	13.2 (0.0 - 36.1)	10.8 (0.0 - 31.8)	0.0	61.3 (28.2 - 94.3)
South and East Serbia	47.6 (13.3 - 81.9)	0.0	52.4 (18.1 - 86.7)	0.0	0.0
Vojvodina	26.3 (0.0 - 100.0)	0.0	0.0	40.3 (0.0 - 100.0)	33.4 (0.0 - 100.0)

Characteristics	Place of purchase				
	In grocery stores (small independent grocery stores, mini/super/hyper markets), kiosks	In specialized tobacco shops	In other countries (grocery stores, specialized tobacco shops, etc.)	Duty-free shops	On the street, on the green market from independent/individual seller
	Percentage (95% CI)				
Current smoking status					
Daily	38.9 (15.6 - 62.0)	7.5 (0.0 - 19.9)	13.2 (0.0 - 29.1)	3.2 (0.0 - 11.4)	37.3 (14.4 - 60.2)
Less than daily	0.0	0.0	100.0 (n/a)	0.0	0.0

Note: Sample size = 19

Table A13. *Percentage distribution of current smokers of MC whose last-purchased pack had a HWL in a foreign language, by brand, overall and by selected demographic and socioeconomic characteristics*

Characteristics	Chesterfield	Karelia	Marlboro	Monus	Other
			Percentage (95% CI)		
Overall	5.8 (0.0 - 15.6)	5.3 (0.0 - 14.9)	2.6 (0.0 - 9.3)	1.7 (0.0 - 7.1)	84.7 (69.6 - 99.8)
Gender					
Male	0.0	0.0	8.6 (0.0 - 35.0)	0.0	91.9 (65.0 - 100.0)
Female	8.3 (0.0 - 22.6)	7.5 (0.0 - 21.3)	0.0	2.4 (0.0 - 10.3)	81.8 (61.8 - 100.0)
Residence					
Urban	0.0	11.4 (0.0 - 33.0)	5.6 (0.0 - 21.2)	3.6 (0.0 - 16.2)	79.5 (52.0 - 100.0)
Rural	10.8 (0.0 - 29.8)	0.0	0.0	0.0	89.2 (70.1 - 100.0)
Current smoking status					
Daily	7.1 (0.0 - 19.2)	6.4 (0.0 - 18.0)	3.2 (0.0 - 11.4)	2.0 (0.0 - 8.7)	81.3 (62.9 - 99.8)
Less-than daily	0.0	0.0	0.0	0.0	100.0 (n/a)

Note: Sample size = 19

Table A14. *Percentage distribution of current smokers of HR tobacco whose last-purchased pack had a HWL in a foreign language by place of purchase, overall and by selected demographic and socioeconomic characteristics*

Characteristics	Place of purchase	
	In grocery stores (small independent grocery stores, mini/super/hyper markets), kiosks	On the street, on the green market from independent/individual seller
	Percentage (95% CI)	
Overall	1.1 (0.0 - 3.3)	98.2 (96.6 - 100.0)
Gender		
Male	1.6 (0.0 - 5.5)	98.4 (94.8 - 100.0)
Female	0.0	100.0
Age		
18-24	0.0	0.0
25-34	0.0	100.0
35-44	0.0	100.0
45-54	0.0	100.0
55-64	2.1 (0.0 - 6.7)	97.9 (93.2 - 100.0)
65-74	0.0	100.0
75-85	0.0	100.0
Residence		
Urban	2.5 (0.0 - 7.9)	97.5 (92.1 - 100.0)
Rural	0.0	100.0
Region		
Belgrade	0.0	100.0
Central and West Serbia	5.6 (0.0 - 18.7)	94.4 (81.3 - 100.0)
South and East Serbia	0.0	100.0
Vojvodina	0.0	100.0
Educational level		
Primary or less	0.0	100.0
Vocational	0.0	100.0
High school	0.0	100.0
Higher	25.6 (0.0 - 100.0)	74.4 (0.0 - 100.0)
Refuse	0.0	0.0
Household income (in €/month)		
200 or less	0.0	100.0
201 - 400	0.0	100.0
401 - 600	0.0	100.0
601 - 800	0.0	100.0
over 800	0.0	0.0
Refused to answer	2.3 (0.0 - 7.3)	97.7 (92.7 - 100.0)

Note: Sample size = 53

APPENDIX B

Table B1. *List of variables included in the regression analysis*

Variable	Description
MC evasion HR evasion Total evasion	Evasion = 1, legal = 0 Evasion = 1, legal = 0 Evasion = 1, legal = 0
Female Age	Gender of the respondent =1 if female; =0 otherwise declared by the respondent
Primary education (omitted) Secondary education Tertiary education	ISCED groups 0 to 2 ISCED groups 3 and 4 ISCED groups 5 to 8
Employed (omitted) Unemployed Inactive	All employed including agriculture, part-time, and occasional workers including students, pensioners, and homemakers
Low income (omitted) Middle income High income	The questionnaire included a scale of 11 income categories in local currency intervals. In order to compute this welfare indicator, the average of the interval was divided by the number of household members and, based on that variable, individuals were divided into three equal groups.
Children 6-14 in the hh Children 0-5 in the hh	declared by the respondent declared by the respondent
Urban settlement	Registered by the enumerator
Border Distance to Montenegro	=1 if municipality is on the border with any country; =0 otherwise Driving distance (in km) between each municipality and the nearest border crossing (source: Google Maps)

Table B2. *Descriptive statistics of variables used in the regression analysis*

Variable	Sample	Mean	Standard deviation	Min	Max
MC evasion	663	0.019	0.144	0	1
HR evasion	70	0.800	0.403	0	1
Total evasion	715	0.098	0.297	0	1
Female	715	0.541	0.499	0	1
Age	715	45.0	14.7	18	83
Primary education	710	0.114	0.318	0	1
Secondary education	710	0.632	0.482	0	1
Tertiary education	710	0.254	0.435	0	1
Employed	694	0.637	0.481	0	1
Unemployed	694	0.112	0.316	0	1
Inactive	694	0.251	0.434	0	1
Low income	711	0.371	0.483	0	1
Middle income	711	0.339	0.474	0	1
High income	711	0.290	0.454	0	1
Urban settlement	715	0.607	0.489	0	1
Children 6-14 in the hh	715	0.248	0.432	0	1
Children 0-5 in the hh	715	0.124	0.330	0	1
Border	715	0.323	0.468	0	1
Distance to Montenegro	715	270.0	104.9	20.9	499

Table B3. *Estimation of tax evasion model for MC*

	Logit regression with cluster SE				Logit regression (PMLE)			
VARIABLES	**coef**	**se**	**coef**	**se**	**coef**	**se**	**coef**	**se**
Female	-0.071	(0.643)	0.124	(0.789)	-0.076	(0.600)	0.103	(0.657)
Age	0.065***	(0.022)	0.074***	(0.026)	0.056*	(0.031)	0.062*	(0.032)
Primary education (omitted)								
Secondary education	-0.395	(0.571)	-0.811	(0.768)	-0.416	(0.733)	-0.721	(0.784)
Tertiary education	0.587	(0.851)	0.121	(0.982)	0.496	(0.869)	0.118	(0.914)
Employed (omitted)								
Unemployed	-0.821	(1.638)	-1.058	(1.892)	-0.478	(1.125)	-0.641	(1.202)
Inactive	-0.168	(0.992)	-0.231	(0.716)	-0.118	(0.965)	-0.166	(0.926)
Low income (omitted)								
Middle income	-1.324***	(0.349)	-1.166***	(0.359)	-1.078	(0.844)	-0.903	(0.876)
High income	-1.635	(1.214)	-0.798	(0.924)	-1.400	(0.995)	-0.629	(0.909)
Children 6-14 in the hh	0.682	(0.541)	0.763	(0.507)	0.530	(0.657)	0.592	(0.696)
Children 0-5 in the hh	0.109	(0.604)	-0.040	(0.624)	0.150	(0.728)	0.052	(0.724)
Urban settlement	2.110**	(1.048)	1.515	(0.994)	1.880***	(0.723)	1.292	(0.811)
Border	2.047*	(1.064)			1.778***	(0.640)		
Distance to Montenegro			-0.013***	(0.005)			-0.012***	(0.003)
Constant	-8.371***	(1.430)	-4.898***	(1.294)	-7.198***	(1.990)	-4.114**	(1.918)
Observations	638		638		638		638	

Notes: Robust standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1

Table B4. *Estimation of tax evasion model for HR*

	Logit regression with cluster SE		Logit regression (PMLE)	
VARIABLES	**coef**	**se**	**coef**	**se**
Female	1.048	(0.835)	0.637	(0.767)
Age	0.132***	(0.038)	0.091***	(0.034)
Border	-0.501	(1.107)	-0.244	(0.921)
Belgrade (omitted)				
Vojvodina	0.496	(1.781)	0.138	(1.730)
West and Central Serbia	-1.807	(1.797)	-1.191	(1.242)
East and South Serbia	-1.106	(1.631)	-0.771	(1.234)
Low income (omitted)				
Middle income	-0.871	(0.738)	-0.657	(0.777)
High income	-4.551***	(1.231)	-3.044**	(1.295)
Children 6-14 in the hh	1.273	(1.229)	0.823	(1.111)
Urban settlement	-1.626	(0.997)	-1.138	(0.853)
Constant	-2.877*	(1.592)	-1.930	(1.712)
Observations	70		70	

Notes: Robust standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1

Table B5. Estimation of tax overall evasion model	Logit regression (MLE) with cluster SE		Logit regression (PMLE)	
VARIABLES	coef	se	coef	se
Smokes hand-rolled	7.272***	(1.131)	6.311***	(0.781)
Smokes both	5.867***	(1.154)	5.041***	(0.829)
Female	0.718	(0.570)	0.626	(0.530)
Age	0.088***	(0.020)	0.075***	(0.022)
Border	1.561***	(0.532)	1.372***	(0.501)
Belgrade (omitted)				
Vojvodina	1.260	(0.806)	1.064	(0.829)
West and Central Serbia	-1.009	(0.919)	-0.862	(0.907)
East and South Serbia	-0.693	(0.850)	-0.583	(0.849)
Primary education (omitted)				
Secondary education	-0.464	(0.465)	-0.422	(0.622)
Tertiary education	0.584	(0.751)	0.537	(0.793)
Employed (omitted)				
Unemployed	-0.178	(0.942)	-0.113	(0.721)
Inactive	-0.173	(0.590)	-0.135	(0.690)
Low income (omitted)				
Middle income	-0.773*	(0.454)	-0.652	(0.596)
High income	-1.937	(1.528)	-1.625*	(0.912)
Children 6-14 in the hh	0.035	(0.764)	0.025	(0.630)
Children 0-5 in the hh	1.857**	(0.782)	1.646**	(0.693)
Urban settlement	0.189	(0.444)	0.160	(0.507)
Constant	-9.738***	(1.685)	-8.460***	(1.746)
Observations	690		690	

Notes: Robust standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1