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Asena Caner, Belgi Turan, Berna Tarı Kasnakoğlu, Yenal Can Yiğit, Donald S. Kenkel and Alan D. Mathios

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The Impact of Price, Legality, and Flavor Availability on Consumer Decisions: A Discrete Choice Analysis of Nicotine Products in an Illicit Market

Asena Caner, Belgi Turan, Berna Tarı Kasnakoğlu, Yenal Can Yiğit[1]
TOBB University of Economics and Technology (TOBB ETÜ), Ankara, Türkiye

Donald S. Kenkel, Alan D. Mathios
Department of Economics, Brooks School of Public Policy, Cornell University, USA

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Abstract

This study examines consumer preferences for manufactured cigarettes, roll-your-own cigarettes, and e-cigarettes in Türkiye, focusing on the impact of product attributes—such as price, legal status of e-cigarettes, and flavor availability—on consumer choices. Using a discrete choice experiment (DCE) embedded in an online survey, the research analyzes how these attributes influence decisions among Turkish adults, with a particular emphasis on the implications of regulations like e-cigarette bans. The findings reveal significant price sensitivity, both regarding the own price of products and the prices of substitute products. Additionally, the results suggest that regulatory measures, especially those targeting legal status, play a crucial role in shaping public health outcomes and consumer behavior.

Keywords: Tobacco Control, Smoking, E-cigarettes, Sales Bans, Consumer Choice, Türkiye
JEL codes: I12, I18, K32, D12

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1. Introduction

Smoking cigarettes is known to carry a substantial amount of health risk. Despite global efforts to eliminate smoking, its prevalence remains troubling, with 1.3 billion tobacco users worldwide who face the risk of tobacco-related mortality and morbidity if they do not quit (WHO, 2023). In Türkiye, almost 30 percent of adults are current smokers (TurkStat, 2022) and smoking prevalence rate has not been decreasing. Within the past 15 years, smoking rates were reported as 27.4 percent in 2008, 23.8 percent in 2012, 29.6 percent in 2016 (GATS, 2008-2012-2016), and 31.2 percent in 2022 (Tepav, 2023). Consequently, there persists an urgent need to explore effective strategies for curbing smoking.

The past decade has seen major changes in the tobacco market as non-combustible cigarette-like electronic nicotine delivery systems emerged. Generally known as electronic cigarettes (or e-cigarettes), these new products have increased their popularity over time. In Türkiye, the official statistics indicate that e-cigarette use was about 1.5-1.9 percent of the adult population in 2022, with rates slightly higher among younger adults compared to older adults (TurkStat, 2022).

The emergence of e-cigarettes has sparked a debate about their advantages and disadvantages. Some argue that their trial and use among non-smokers could lead to nicotine addiction and potentially result in smoking dependency. Moreover, the availability of various flavors is often mentioned to be enticing to especially younger consumers. Conversely, others argue that e-cigarettes pose significantly less health risk than traditional smoking, serving as a potential smoking substitute and aid in smoking reduction or cessation. The significantly lower relative risk profile of e-cigarettes based on evidence, combined with the heavy burden of smoking, has presented a key regulatory challenge, leaving policymakers puzzled on how to balance the benefits for adults who may use e-cigarettes to complement the tested and approved methods of reducing and quitting smoking on one side, with the cost of uptake and use among new users on the other side (Lee at al., 2021; Balfour et al. 2021). Given the uncertainty surrounding the optimal regulatory approach and the rising prevalence of the new products, governments in many countries responded by banning their sales. Türkiye banned the import of e-cigarettes with a presidential decree issued on February 25, 2020 (Decree No. 2149).

The ban on the imports of e-cigarettes is a policy development that has led to the emergence of an illegal market for these new products and has posed new research questions. Despite the ban, some consumers continue to use e-cigarettes. Understanding the economic and health consequences of the ban requires research that addresses the emergence of illegal markets. In this research we aim to contribute to the literature on the economics of illegal markets. We examine the effects of product types (packaged cigarettes, roll-your-own (RYO) cigarettes, e-cigarettes, and a "use nothing" option), as well as the influence of price, legal status, and flavor availability on consumer choice, using an online discrete choice experiment. We explore how specific attributes of nicotine products shape consumer decision-making. In particular, we focus on understanding the impact of legal status of products in a market where RYO cigarettes and cigarette-like products are prevalent, despite being distributed through under-the-counter channels.

2. Background and Institutional Framework

2.1 The Regulatory Landscape and Tobacco Product Use in Türkiye

Türkiye has long been at the forefront of tobacco control and was one of the first nations to sign and ratify the WHO Framework Convention on Tobacco Control (FCTC). It was also the first to fully implement all MPOWER measures at their most stringent levels. Free smoking cessation services have been offered to smokers, although uptake remains limited. Cigarettes are subject to stringent regulations and high taxation. Advertising and promoting tobacco products are prohibited, and anti-tobacco campaigns are broadcasted regularly via mandatory television and radio slots. Public smoking has been prohibited since 1996 (Law number 4207[2]), with the ban progressively extending to encompass educational, health, sports, and entertainment facilities, indoor public spaces, as well as entertainment venues, such as cafes, restaurants, and bars. The law also prohibited the sale of tobacco products via vending machines or over electronic environments such as the telephone, television, and internet, and also shipment by couriers for sales purposes.

In 2013, an amendment to Law 4207 redefined tobacco products to include “all kinds of hookahs and cigarettes that do not contain tobacco but are used in a way that imitates

[2] The Law on Prevention and Control of Hazards of Tobacco Products https://www.mevzuat.gov.tr/mevzuatmetin/1.5.4207.pdf

tobacco products"[3]. This expanded the application of existing restrictions on tobacco use and sales to non-combustible products.

In January 2020, the country introduced plain packaging and stricter combined graphic and textual health warnings on cigarette packs (Caner, et al. 2023). Regarding flavor regulation, it should be noted that Türkiye banned cigarettes containing menthol and related additives starting in 2020. Turkish regulation on characteristic flavor (the scent or flavor noticed before or during the use of tobacco products that can be distinguished from the tobacco's own flavor originating from an additive such as but not limited to fruit, spices, herbs, alcohol, sugar, menthol or vanilla) mandated that cigarettes which have used flavors in their production cannot be present in the market after 2020[4].

Moreover, a presidential decree issued on February 25, 2020 (Decree No. 2149), prohibited the import of products that are specifically "consumed by being heated or being lit, other than cigarettes, shredded tobacco products for hand-rolled cigarettes, tobacco products for use in pipes, tobacco products for use in hookahs, cigars, and cigarillos, and all products that are used to imitate tobacco products regardless of their nicotine content including electronic cigarettes and electronic hookahs as well as electronic devices, apparatus, spare parts, and solutions used in the consumption of these products."[5] However, Circular No. 2020/7 allowed for limited personal imports, permitting individuals to bring one device and a small number of cartridges or solutions for personal use (solutions up to 30 ml, or a total of 10 disposable electronic cigarettes).

In Türkiye, cigarette-like products can only be produced with approval from the Ministry of Agriculture and Forestry, though no approvals have been granted to date. The combination of import restrictions and a production ban effectively bars these products from the market. Smoking bans also extend to cigarette-like items, and there are strict limitations on advertising and promotion. Türkiye's cessation programs and recommendations do not include e-cigarettes or HTPs.

[3] http://www.resmigazete. gov.tr/eskiler/2013/06/20130611-1.htm. Accessed June 03, 2024.
[4] Regulation on the Procedures and Principles Related to the Production Methods, Labeling and Surveillance of Tobacco Products, Friday March 1, 2019, Official Gazette, Edition: 30701, https://assets.tobaccocontrollaws.org/uploads/legislation/Turkey/Turkey-2019-Regs.pdf
[5] Decision Concerning Electronic Cigarettes and Similar Devices and Certain Tobacco Products and Products that are Used to Imitate Tobacco Products, Feb 25, 2020, Official Gazette, 31050, https://assets.tobaccocontrollaws.org/uploads/legislation/Turkey/Turkey-Decision-No.-2149.pdf

Despite robust regulatory measures to curtail tobacco use, smoking remains widespread in Türkiye. In 2022, nationwide surveys[6] reported that approximately 35% of adults (44% of men and 27% of women) smoked regularly or daily, with an additional 6% smoking occasionally. Among smokers, many initiated smoking before the legal age of 18—65% of men and 50% of women—while 27% of men and 33% of women smokers started between the ages of 18 and 24.

Data from 2022 also revealed the daily consumption patterns of young adults aged 18-30. Around 26% smoked 6-10 cigarettes daily, 30% consumed 11-20, 14% smoked 21-30, 9% smoked over 30, and the rest smoked fewer than 6 cigarettes per day. Smoking prevalence also correlated positively with income, rising from 31-32% in the lowest income group to 45% in the highest.

In Türkiye, factory-made (packaged) cigarettes are the most widely consumed tobacco product among adults.; however, a significant portion of users opt for loose tobacco to prepare their own roll-your-own (RYO) cigarettes. The legal, regulated sales of loose tobacco by major cigarette manufacturers account for a smaller share of the market compared to the illegally sold loose or pre-rolled tobacco, often distributed under-the-counter. A 2022 nationwide survey[7] investigated the product choice of daily smokers and found that 76.5% of adult smokers use packaged cigarettes daily, while 28.6% of them use RYO cigarettes. Other products such as waterpipes, cigars, and cigarillos had notably lower daily usage rates. Although e-cigarette sales are banned in the country, some consumers still obtain them. The 2022 Turkish Health Research Survey estimated that vaping was more common among individuals aged 15-24 (1.90%) and 25-34 (1.82%), with lower rates in other age groups.

The high prevalence of combustible tobacco products, including packaged cigarettes and roll-your-own (RYO) cigarettes, alongside the prohibition of non-combustible and flavored products, has fostered an illicit market for tobacco products. This context raises critical questions about how consumers make decisions regarding tobacco use under different regulatory frameworks. To explore these questions, we design and implement a discrete choice experiment. In this experiment, participants choose among product

[6] https://www.tepav-he.org/en/publications/newsletters/
[7] https://www.tepav-he.org/en/publications/newsletters/

types—packaged cigarettes, RYO cigarettes, e-cigarettes, or a "use nothing" option—while product attributes such as price, legal status, and flavor availability vary across choice sets. Before detailing the experiment and data collection process, we first elaborate on the evolving tobacco market and the regulation of e-cigarettes.

2.2 The Evolution of Tobacco Markets and the Regulation of E-Cigarettes

With the emergence of non-combustible alternatives, including electronic cigarettes (e-cigarettes), other vaping devices, and heated tobacco products, the tobacco product market has undergone significant changes. Although traditional combustible cigarettes remain the most used tobacco product among adults in many countries including Türkiye, non-combustible alternatives are rapidly gaining traction (Delnevo et al., 2016). These products utilize heat rather than combustion, allowing users to inhale vapor containing nicotine released by heat.

Research indicates with high certainty that nicotine-containing e-cigarettes improve quit rates compared to nicotine replacement therapy (Lindson et al. 2024). Adult smokers often value these products for their effectiveness in aiding smoking cessation (Marti, Buckell, Maclean, & Sindelar, 2019). Additionally, because these devices avoid combustion and the harmful byproducts it generates, users experience reduced exposure to toxicants and carcinogens (Polosa et al., 2013; McNeill et al., 2015). However, non-combustible products are not entirely risk-free. Their use can still involve the inhalation of potentially harmful additives, such as flavorings and preservatives. Furthermore, their nicotine content poses a risk of addiction, particularly for new users who might not have otherwise initiated tobacco use (Soneji et al., 2017). These products also offer appealing features—such as customizable designs, a variety of flavors, and lower costs compared to traditional cigarettes—that can attract consumers, especially younger individuals (McNeill et al., 2021). This trend persists even in the face of regulatory restrictions (Yang et al., 2020; Yingst et al., 2019). The debate over the benefits and risks of non-combustible tobacco products remains ongoing. While some emphasize their potential to aid smoking cessation and reduce harm, others highlight concerns about their appeal to youth and their addictive potential (Samet and Barrington-Trimis, 2021; Balfour et al., 2021).

Although substantial scientific evidence supports the notion that electronic cigarettes are less harmful than traditional cigarettes (Allcott and Rafkin, 2022), many countries,

including Türkiye, have enacted various bans and restrictions on their sale and use. In some cases, governments have introduced taxes on e-cigarettes to discourage their use, particularly among young people. While such measures effectively reduce e-cigarette consumption among youth, they have also been found to inadvertently increase cigarette smoking (Abouk et al., 2023). A similar unintended consequence has been observed with restrictions on flavored e-cigarettes. Although these regulations decrease the use of flavored products among young users, they often lead to higher rates of conventional cigarette smoking, undermining public health goals (Cotti et al., 2024; Saffer et al., 2024).

Other studies have explored the broader implications of regulatory actions. For example, research has examined the impact of menthol product bans on consumer behavior (Wackowski et al., 2014), and the influence of cannabis legalization on consumer perceptions (Fataar, Goodman & Hammond, 2021; Amlung et al., 2018). Additionally, several studies have focused on restrictions targeting e-cigarette use and their consequences (Posner et al., 2022; Nguyen and Bornstein, 2021; Pettigrew et al., 2023). These findings highlight the complex and sometimes counterproductive outcomes of tobacco-related policies.

Tam et al. (2024) examined how flavored e-cigarette users respond to both real-life and hypothetical flavor bans. In a survey of U.S. young adults aged 18–34, they found that the majority (80.9%) continued vaping following an actual flavor ban. Among these, 60.2% persisted with flavored e-cigarettes, 25.9% switched to non-flavored alternatives, and 13.9% used both types. However, 12.5% of exclusive vapers and 38.6% of dual users transitioned to combustible tobacco. A smaller percentage (5.3%) of exclusive vapers quit all nicotine products. When asked about a hypothetical federal flavor ban, 60.8% of exclusive vapers and 60.4% of dual users indicated they would continue vaping, with 42.7% opting for flavored e-cigarettes, 37.1% for non-flavored products, and 20.2% using both. Additionally, 34.5% of exclusive vapers said they would quit all nicotine products, while 20.9% reported they would switch to combustible tobacco.

This research aims to contribute to the expanding literature on the economics of illegal markets. Interest in this topic has been increasing over recent years. Some researchers studied the illegal market for drugs and compared prohibition of sales in this market to legalization combined with excise taxation (Becker, Grossman, Murphy, 2006). A review

of the literature on the public health consequences of legalizing marijuana reported that there is little credible evidence to suggest that legalization promotes marijuana use among teenagers; however, there is convincing evidence that young adults consume less alcohol when medical marijuana is legalized (Anderson and Rees, 2021).

Two studies utilized inter-state variations in U.S. regulations to assess the effects of e-cigarette flavor bans using a difference-in-differences methodology. Cotti et al. (2024) found that flavor restrictions significantly reduced frequent and daily e-cigarette use among youth by 1.2 to 2.5 percentage points. However, the bans also led to increased substitution toward combustible cigarettes, particularly among individuals aged 18–20. Similarly, Saffer et al. (2024) observed that young adults reduced e-cigarette use by approximately 2 percentage points following flavor bans, but this decrease was accompanied by an increase in cigarette smoking. For adults aged 25 and older, flavor bans had no measurable impact on e-cigarette or cigarette use.

Yang et al. (2024) explored whether banning menthol cigarettes, flavored cigars, and flavored e-cigarettes would drive users to illicit markets. Their findings suggest that a significant proportion of users would turn to illegal channels to obtain banned products: 24–30% of smokers, 21–41% of dual users, and 35–39% of e-cigarette users indicated they would seek illicit sources. This evidence highlights two key behavioral responses to bans: some users continue consuming the prohibited products through illegal means, while others switch to legally available alternatives.

Using DCE data, Kenkel et al. (2024a) analyzed how a proposed ban on menthol cigarettes in the U.S. might influence consumer behavior. Their findings indicate that such a prohibition would significantly increase the proportion of menthol smokers attempting to quit. However, some consumers would likely seek illegal menthol cigarettes. On average, consumers' willingness to pay to avoid engaging in an illicit market was estimated to be equivalent to a substantial tax of $8.44 per pack. Another study by the same authors (Kenkel et al., 2024b) uses DCE data to examine how Australian smokers respond to the unique e-cigarette market shaped by the country’s prescription requirement for these products and the emergence of an illegal e-cigarette market, driven by demand from individuals unwilling or unable to obtain a prescription. They estimate that the average utility loss associated with an illegal retail market amounts to AU$7.90

per pack-equivalent. On a national scale, the findings suggest that permitting e-cigarette sales without requiring prescriptions could yield annual benefits totaling AU$1.8 billion.

In summary, research providing empirical evidence on the effectiveness and consequences of sales bans is growing rapidly. In this study, following Caner et al. (2024), we employ a DCE to gather data on consumer choices of nicotine products among Turkish adults. Our analysis focuses on four product alternatives: packaged cigarettes, roll-your-own (RYO) cigarettes, e-cigarettes, and a "use nothing" option. We examine how these choices are influenced by key product attributes, including price (low, average, high), legal status (packaged cigarettes: legal; RYO cigarettes: illegal; cigarette-like products: legal, illegally sold under-the-counter, or strictly banned), and flavor options (packaged cigarettes: tobacco only, menthol available; RYO: tobacco flavor; cigarette-like products: tobacco flavor only, or a variety of flavors).

In particular, we focus on understanding the impact of regulations of these nicotine products on consumers in a market where RYO cigarettes and cigarette-like products are prevalent, despite being distributed through unrecorded, under-the-counter channels.

3. Conceptual Framework

The empirical analyses in this research originate from the conceptual framework of the economics of consumer behavior. Focusing on the demand-side of the market for tobacco products, we assume that consumers choose the product that maximizes their utility, which is a function of consumer characteristics and product attributes. Consumers may have heterogeneous preferences; some may prefer combustible products (packaged cigarettes or roll-your-own (RYO) cigarettes), whereas others may prefer non-combustible products (electronic cigarettes or heated tobacco products).

In this study, we explore the decision-making process of consumers and the tradeoffs they face when choosing a tobacco product by using a discrete choice experiment (DCE) embedded in an online survey. DCEs are commonly used to collect stated-preference data in many fields, including marketing, health, and economics. They are known to have strong internal validity to determine causal effects. They also have strong external validity when used to assess preferences for goods that are familiar and simple and that are similar to goods that consumers purchase (McFadden, 2017; Penn and Hu, 2018; Kenkel et al., 2024a).

Our research assesses the role that attributes of the products (in particular, prices, legal status, and flavor availability) play in consumers' choices. As explained in more detail below, in order not to overcomplicate the analysis, we considered a scenario mirroring real-life circumstances, in which there are only three product alternatives in the market: packaged cigarettes, RYO cigarettes, and cigarette-like products (referring to non-combustible products such as electronic cigarettes or heated tobacco products), ignoring the other nicotine products such as waterpipes or cigars. If the consumer is not interested in any of these three products, there is the fourth option of choosing none and quitting using tobacco products.

In the policy environment of Türkiye, it is important to understand how consumers evaluate different products and their attributes when deciding on using them or not. Prices, legal status, and flavor availability were chosen as attributes particularly to study policy implications. For instance, the effect of e-cigarette bans on consumer behavior is, a priori, ambiguous. Banning e-cigarettes might reduce their consumption; however, if e-cigarettes and cigarettes are substitutes, the ban could lead to an unintended consequence of inducing consumers to use more cigarettes. Price is another important attribute that influences consumer decisions. In Türkiye, packaged cigarettes are regulated and heavily taxed, whereas roll-your-own cigarettes and e-cigarettes are not, making them potentially less costly choices for consumers. Flavored products are banned, but flavors may play an important role in determining consumers' choice.

In this study, we use discrete choice models to study the factors that determine the choice of nicotine products. The DCE generates choice data under various scenarios. In each scenario, the participants have the option to choose one of the three products, or to use nothing and quit, generating four possible outcomes.

Our discrete choice models rely on the random utility model (McFadden, 1974; Train, 2009): A decision maker, n, faces a choice among J alternatives. The utility that this person receives from alternative j is:

$$U_{nj} = V_{nj} + \varepsilon_{nj}$$

Utility U_{nj} is decomposed into the representative utility V_{nj} (or systematic component), explained by observed attributes (of the alternatives and/or the decision maker), and an

unobserved random utility term. It is assumed that V_{nj} depends on parameters that are unknown to the researcher and therefore estimated statistically.

The unobserved random utility ε_n is assumed to come from a distribution $f(\varepsilon_n)$. If people faced the same observed utility, V_{nj} for all j, then their choices would differ according to the values that ε_{nj} take for the alternatives j, drawn from the same distribution $f(\varepsilon_n)$. It is assumed that the chosen alternative is the one that provides the highest utility. In other words, alternative j is chosen if and only if $U_{nj} \geq U_{nk}\ \forall k \neq j$. Hence, we derive the probability that individual n chooses alternative j as:

$$P_{nj} = Prob\big(\varepsilon_{nk} - \varepsilon_{nj} \leq V_{nj} - V_{nk}, \forall k \neq j\big)$$

$$P_{nj} = \int_{\varepsilon} I\big(\varepsilon_{nk} - \varepsilon_{nj} \leq V_{nj} - V_{nk}, \forall k \neq j\big)\, f(\varepsilon_n)\, d\varepsilon_n\,.$$

P_{nj} is a multidimensional integral over ε_n. Depending on the specification of density $f(\varepsilon_n)$, different discrete choice models and choice probabilities can be obtained. A widely used assumption is that ε_n is independent and identically distributed (iid) according to extreme value distribution across all j, leading to a closed form logit specification of the *probability that individual n chooses alternative j.* Specifying representative utility as a linear function of attributes of alternative j, the probability becomes:

$$P_{nj} = \frac{e^{V_{nj}}}{\sum_{k=1}^{J} e^{V_{nk}}} = \frac{e^{\beta' x_{nj}}}{\sum_{k=1}^{J} e^{\beta' x_{nk}}}\,.$$

For any two alternatives i and k, the ratio of the logit probabilities P_{ni}/P_{nk} does not depend on any alternatives other than i and k. In other words, the relative odds of choosing *i* over *k* are the same regardless of what other alternatives are available or what the attributes of the other alternatives are, and substitution is proportional across alternatives. This is known as the independence from irrelevant alternatives (IIA) property. The assumption of iid error term may not be appropriate in some cases. For example, packaged cigarettes and RYO cigarettes are similar in that they are both combustible products. A person who likes one of these products probably likes the other one, too. If so, then the unobserved factors affecting the two are correlated and not independent.

We also employ the linear probability model alongside the nonlinear choice models to gain additional insights into the magnitude and direction of the coefficient estimates.

Additionally, the linear probability model estimates serve as a basis for comparison with the estimates obtained from the nonlinear models.

We estimate models separately for the choices made immediately and 6 months later. Upon estimating the coefficients of the model, we examine policy-relevant counterfactual scenarios.

The emerging literature on the topic has raised numerous critical and policy-relevant questions, which we address in this research. Our study explores how consumers respond to changes in the prices of packaged cigarettes, RYO cigarettes, and e-cigarettes, as well as their reactions to bans of product sales or flavor availability. Additionally, we investigate factors influencing the decision to quit and the product attributes associated with that choice. We also consider how consumers might behave under different regulatory environments. The overarching goal of our research is to contribute to evidence-based tobacco regulatory policymaking.

4. Survey Design and Data

General Information

This research is based on an experimental inquiry into how the attributes of nicotine products influence consumers' choices. A detailed questionnaire was implemented using an online opt-in survey. Online opt-in surveys are commonly used by social scientists as a valuable source of data on a range of topics (Hulland and Miller 2018; Mercer, Lau, and Kennedy 2018; Sostek 2019). Our research design and our questionnaire have been reviewed and approved by the Human Research Review Board of TOBB University of Economics and Technology. The official ethical approval has the protocol number E-27393295-100-56588, dated 12 March 2024.

The Sample

We have contracted with the survey firm SSRS to conduct the survey and assist in designing the DCE. SSRS conducts a wide range of survey research, including sample design, experimental design, data collection, and data analysis. The firm has experience in conducting research on public opinion and social science for academic and non-profit institutions. Moreover, SSRS has considerable experience in conducting tobacco control research and in designing and implementing DCEs.

SSRS used an opt-in non-probability online panel (that solicited participants via a website partner, referrals, direct enrollments, etc.) in Türkiye. The panel offered a vast variety of eligible respondents from a host of demographic categories that can "simulate" the study population; therefore, the survey was able to obtain a sample distribution suggestive of the smoker population in the country. Participants of the online survey were randomly selected, with loose quotas applied to have a sufficient number of respondents in different age groups, geographical regions, and different genders to ensure the sample is similar to the projected universe.

Initially, a "soft launch" was conducted where a limited number of panelists were invited to participate. The soft launch survey data were carefully checked for accuracy, completeness, and non-response to specific questions, so any issues were identified and resolved prior to the full launch. This ensured that all questionnaire content and skip patterns were correct, so that the final sample meets the study goals.

People were allowed to participate in the questionnaire regardless of their knowledge about the products or the legal status of the products in Türkiye. The survey was optimized for smartphone/mobile device administration and was adapted to all operating systems and browsers. Sampled panelists were emailed an invitation with a unique passcode-embedded link to complete the survey online. Reminder emails were sent out as appropriate. In appreciation for their participation, respondents received panel rewards ("prize points") for their participation.

Sample Size

As determined by the SSRS, the target sample size of the non-probability panel was about 2000 observations. The sample had two distinct groups: Smokers (daily or non-daily) and Non-Smokers. A weight was computed to balance the S*moker* data to population benchmark distributions for smokers in Türkiye for ages 18-65. A similar weight was computed for non-smokers of the same age group. In survey research, weights are usually normalized to sum to the unweighted completed interviews sample size for smokers and non-smokers, respectively. Also, weights are often trimmed at the 2nd and 98th percentiles to ensure that individual respondents do not have too much influence on survey-derived estimates. Benchmarks to match the sample to the population were

derived from the Turkish Health Survey (THS) 2022 (TurkStat, 2022) and from the most recent statistics published by the Turkish Statistical Institute.

The margin of error of the survey was defined as the largest 95% confidence interval (around 50%) for any estimated proportion based on the total sample. The aim was to restrict the margin of error for the final combined reproportioned weight overall to ± 3.1 percentage points, which required a total sample size of 2008. The approach of the SSRS to handle any missing demographic data was to employ a technique called "hot decking". Hot deck imputation replaces the missing values of a respondent randomly with another similar respondent without missing data. These were further determined by variables predictive of non-response that are present in the entire file.

The Questionnaire

Survey questions were patterned on established surveys such as the Global Adult Tobacco Survey, Health Research Survey of Türkiye, and other custom surveys we have designed in previous studies about tobacco consumption. The questions were intended to reflect the general predisposition of smokers and nonsmokers as regards health risk perceptions and the legal status of nicotine products, as well as daily consumption patterns. The products that were inquired about were conventional cigarettes (factory-made and hand-rolled --or roll-your-own (RYO)-- cigarettes) and non-combustible cigarette-like products (e-cigarettes such as Vuse, Smok, Puff, ElfBar, Vozol, and heated tobacco products such as IQOS and GLO). The questionnaire is further explained below:

Part I: Product Consumption:

This part collected basic data on the region of residence, gender, and age of the respondent. Smoking status was determined by responses to four questions as follows: A non-smoker is a person who has not smoked 100 cigarettes so far, or has not smoked in last 30 days, or has not purchased cigarettes in last 30 days, or currently does not smoke cigarettes at all.

A daily smoker is a person who has smoked at least 100 cigarettes, and smoked in the past 30 days, and purchased cigarettes in the last 30 days, and currently smokes cigarettes every day. A non-daily smoker is a person who has smoked at least 100 cigarettes, and smoked in the past 30 days, and purchased cigarettes in the past 30 days, and smokes

cigarettes occasionally. Questions on smoking intensity, age at initiation, preferred flavor (if any) were asked to daily and non-daily smokers.

Important for our research, and as preparation for the DCE part, price data were collected from smokers of cigarettes based on their most recent purchase. Depending on whether they bought cigarettes by the pack, the carton, they rolled their own cigarettes (RYO), or bought individual cigarettes, price data were collected from smokers to determine the price paid per pack (20) of cigarettes.

Other questions gathered data on consumption on cigarette-like non-combustible products or heated tobacco products (HTPs). To ensure that the participants understand what products the questions are about, several popular brand names were mentioned (such as Vuse, Smok, Puff, ElfBar, and Vozol for e-cigarettes, and IQOS, and GLO for HTPs), along with an explanatory note that said "E-cigarettes, e-cigs, e-hookahs, vapes, or mods are battery powered devices that usually contain a nicotine-based liquid that is vaporized and inhaled and may contain flavors. There are also cigarette-like non-combustible products known as heated tobacco products (such as IQOS, and GLO)." Questions were asked on consumption pattern, age at initiation, whether they purchased abroad or in Türkiye, whether the product contains nicotine, and preferred flavor (if any).

Part II: Discrete Choice Experiment (DCE):

Participants who stated in the first part that they smoke or vape were presented with a real-life situation (i.e., a scenario) where they needed to choose among four alternatives (packed cigarettes, roll-your-own (RYO) cigarettes, cigarette-like products (e-cigarettes or HTPs), or use nothing) (see Tables 1 and 2). The products had three attributes (price, legal status, and flavor availability). To ensure that the respondents understood which products are offered to them, the photos of the products (a cigarette pack with no brand logo, several rolled cigarettes in a plastic bag (as commonly sold in Türkiye), and some e-cigarette devices with no brand) were shown on screen along with the information about their price, legal status, and flavor availability.

Respondents were asked to state their choices that they would make today and 6 months later. There were 12 different choice sets, each presented twice (one for today and the

other for 6 months later), totaling 24 choices per respondent. The attributes varied across the 12 choice sets.

The legal status of the packed cigarettes had one level: an original, legally sold product with a banderole. The legal status of RYO cigarettes had one level: an illegally sold product with no banderole (unrecorded sale, under-the-counter, or illegal retail sale). The legal status of the cigarette-like products had three levels: An original, legally sold product with a banderole; an illegally sold product with no banderole (unrecorded sale, under-the-counter); a product that is strictly banned and not available in shops, on the internet etc., only available on the street or can be bought abroad, may be called an illegal street sale.)

The flavor availability for packed cigarettes had two levels: Tobacco flavor only; or menthol flavor also available. The flavor availability for roll-your-own cigarettes had one level: Tobacco flavor only. The flavor availability for cigarette-like products had two levels: A variety of flavors available (such as tobacco, fruit, sweet, mint, menthol); or only tobacco flavor available.

The prices of the products were determined as follows: For packed cigarettes, price had three levels: The price actually paid per pack of cigarettes, half that price, and double that price. In our sample, the average price was 63 TL (with a standard deviation of 7.8). The price of RYO cigarettes was the average market price determined by the researchers at the time of the experiment (single level). The price of cigarette-like products had three levels: the average market price determined by the researchers; half that price; and double that price.

Table 1: Product Attributes and Levels

		OPTIONS			
		Packaged Cigarette	**Roll Your Own (RYO)**	**E-Cig or HTP**	**Quit**
ATTRIBUTE	**Price**	0,5 P P (actual price paid) 2P	30 TL	20 TL 40 TL 80 TL	-
	Sale Type	Legal with banderole	Illegally sold	Legal with banderole Illegally sold Strictly Banned	-
	Flavor	Tobacco only Menthol available	Tobacco	Tobacco only Variety of Flavors	-

Table 2: DCE Module Screen

	Option 1	Option 2	Option 3	Option 4
	 **(Packed Cigarettes)**	 **(Roll Your Own)**	 **(E-cigarette or a heated tobacco product)**	None
PRICE	3 Levels	1 Level	3 Levels	I will quit smoking cigarettes and not use e-cigarettes.
SALE TYPE	1 Level	1 Level	3 Levels	
FLAVOR	2 Levels	1 Level	2 Levels	
Please select one option.	O	O	O	O

***Part III: Demographics*:**

In this last section, all participants were queried about the highest level of education they attained and the educational backgrounds of their parents. Additionally, participants will be asked about their discretionary income, defined as the portion of their earnings available for leisure activities, entertainment, and discretionary purchases after meeting essential expenses such as rent, educational fees, food, and transportation.

5. Empirical Analyses

Descriptive Statistics

A total of 1121 respondents were exposed to and completed the DCE module, making a choice in the 24 choice sets presented to them (12 sets for their immediate choice and the same 12 choice sets for 6 months later).

As shown in Table 3, the largest group comprises exclusive cigarette smokers, making up 56.96% of the sample. This indicates that traditional cigarettes remain the dominant product of choice among participants. The second-largest group is Cig-RYO users (16.87%), who consume both cigarettes and roll-your-own (RYO) tobacco. Exclusive RYO users account for 12.90%, showing that RYO tobacco holds a significant share as an alternative to manufactured cigarettes. Interestingly, triple users—those who consume cigarettes, RYO, and e-cigarettes—represent 6.08%, reflecting a smaller but notable segment that engages with multiple product types. The percentage of exclusive e-cigarette users is relatively small (1.29%), highlighting that e-cigarettes are less popular as a sole product choice. However, mixed usage involving e-cigarettes, such as triple users (6.08%) and dual users (Cigarette-E-cigarette users (5.44%) and E-cigarette-RYO users (0.46%)) demonstrates that e-cigarettes are more commonly used in combination with other products rather than exclusively.

Table 3: Participants by Product Use (N and %)

Category	N	%
Exclusive Cigarette Smokers	618	56.96%
Exclusive RYO Users	140	12.90%
Exclusive E-cigarette Users	14	1.29%
Cigarette - RYO Users	183	16.87%
Cigarette - E-cigarette Users	59	5.44%
E-cigarette - RYO Users	5	0.46%
Triple Users	66	6.08%

Note: 36 users who did not specify the product they used are not included in this table.

Table 4 presents a detailed overview of smoking status, educational attainment, and regional distribution, disaggregated by gender. Among all respondents, the majority (85.01%) are daily smokers, with a smaller proportion (14.99%) identifying as non-daily smokers. The pattern is consistent across genders, though males have a slightly higher prevalence of daily smoking at 87.65%, compared to 82.23% among females. Conversely, a higher proportion of females are non-daily smokers (17.77%) compared to males (12.35%).

Table 4 also presents descriptive statistics on the educational and regional distribution of those who participated in the DCE. Regarding educational attainment, more than half of the participants (52.90%) have completed high school, while 39.70% have attained

university education or higher. A smaller proportion, 7.40%, have only elementary-level education or less. Gender differences are notable here: 45.97% of females have university-level education or higher, compared to 33.74% of males, indicating a higher educational attainment among women in the ever-smoker sample. More males (56.35%) have completed high school compared to females (49.27%). Elementary education remains less common for both genders but is slightly more prevalent among males (9.91%) than females (4.76%).

Regional distribution indicates that nearly half of the respondents (49.24%) reside in the Western region, followed by the Central region (22.93%) and smaller proportions in the South (12.31%), East (9.99%), and North (5.53%). This trend holds across genders, with the Western region hosting the largest share of both males (49.39%) and females (49.08%). However, the Central region has a slightly higher female representation (25.82%) compared to males (20.17%), while males are more represented in the Northern and Eastern regions.

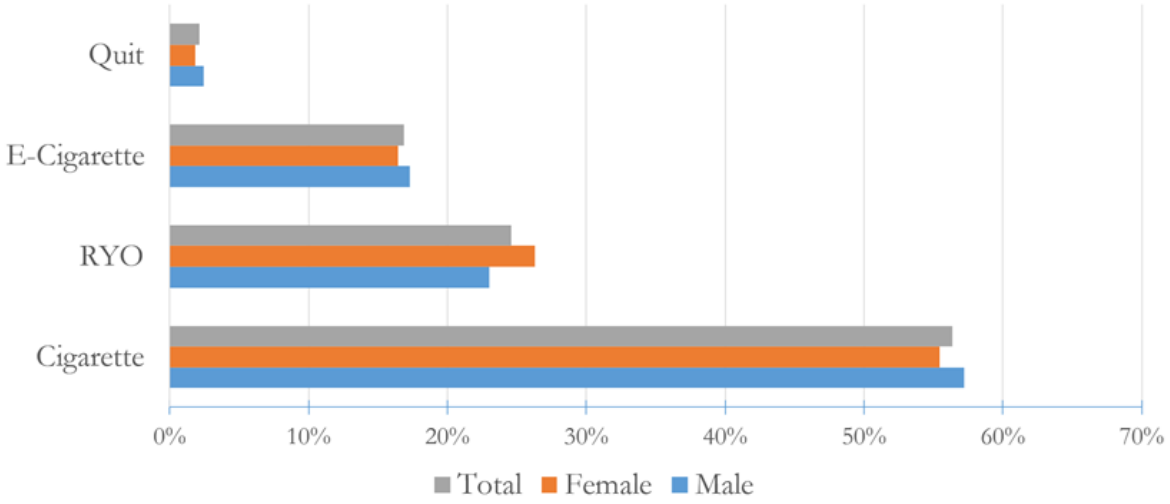
Table 4: Descriptive Statistics of Survey Participants

Category	All (N)	All (%)	Female (N)	Female (%)	Male (N)	Male (%)
Smoker Status						
Daily Smoker	953	85.01%	449	82.23%	504	87.65%
Non-Daily-Smoker	168	14.99%	97	17.77%	71	12.35%
Education						
Elementary or less	83	7.40%	26	4.76%	57	9.91%
High School	593	52.90%	269	49.27%	324	56.35%
University and above	445	39.70%	251	45.97%	194	33.74%
Region of residence						
West	552	49.24%	268	49.08%	284	49.39%
Central	257	22.93%	141	25.82%	116	20.17%
South	138	12.31%	66	12.09%	72	12.52%
North	62	5.53%	20	3.66%	42	7.30%
East	112	9.99%	51	9.34%	61	10.61%
N	1121	100.00%	546	100.00%	575	100.00%

Notes: Daily Smoker and Non-Daily-Smoker are as defined in the text. Education categories are determined according to the highest education level completed. Region categories are the five main regions of Türkiye according to NUTS-1 regional classification (West: TR1, TR2, TR3, TR4; Central: TR5, TR7; South: TR6; North: TR8, TR9; East: TRA, TRB, TRC.)

Figure 1 illustrates the distribution of product choices among the DCE participants. While traditional cigarettes are the most common choice, a significant proportion of individuals opt for RYO cigarettes, followed by e-cigarettes and quit options.

Figure 1: Consumer Choices of Nicotine Products in the DCE



Econometric Models

In our study, two different microeconometric models were estimated: The linear probability model and McFadden's logit model (also known as alternative-specific conditional logit model), as described below.

Linear probability model estimates

We estimate the linear probability model to analyze how product attributes are associated with the chosen product. This model estimates the choice probability for each of the product alternatives separately. To account for the repeated responses from the same participant, we estimate the panel data ordinary least squares model using the "xtreg" command in Stata program, using participant fixed effects.

$$Product_{ij} = \beta_0 + \beta_{price,j}\, x\, price_{ij} + \beta_{price,-j}\, x\, price_{i,-j} + \beta_{flavor,j}\, x\, flavor_{ij} + \beta_{flavor,-j}\, x\, flavor_{i,-j} + \beta_{legality,j}\, x\, legality_{ij} + \beta_{legality,-j}\, x\, legality_{i,-j} + \epsilon_{ij} \quad (1)$$

$Product_{ij}$: The binary dependent variable for individual i, takes the value of 1 for the chosen product alternative j (cigarette, RYO, e-cigarette, quit) and 0 for the alternatives not chosen.

$\beta_{price,j}$: The coefficient of the price of the chosen product j

$\beta_{price,-j}$: The coefficients of the prices of other product alternatives.

$\beta_{flavor,j}$: The coefficient of flavor availability for product j

$\beta_{flavor,-j}$: The coefficients of flavor availability for other alternatives.

$\beta_{legality,j}$: The legal status coefficient of product j

$\beta_{legality,-j}$: The legal status coefficients of other product alternatives.

Price is a continuous variable, whereas legal status and flavor availability are categorical variables. The levels of flavor availability and legal status are as shown before in Tables 1-2.

Table 5 displays the results of the linear probability model for the entire sample of participants. The results reveal several key insights regarding consumer preferences for nicotine products both immediately and six months in the future. First, the results clearly highlight the significant role of both own-price and substitute-price effects on consumer choices regarding nicotine products. Specifically, higher cigarette prices lead to a statistically significant reduction (a 1 TL increase generating a 0.2 percentage point (pp) decline) in the likelihood of choosing cigarettes, indicating strong price sensitivity for this product. Similarly, the price of e-cigarettes influences consumer decisions, with a slight negative effect on the choice of e-cigarettes (a 1 TL increase generating a 0.1 pp decline), demonstrating sensitivity to own price. Moreover, there is an evident substitution effect. For instance, as cigarette prices increase, individuals are more likely to switch to RYO cigarettes, e-cigarettes, or even quit options (a 1 TL increase in cigarette price generating a 0.1, 0.1, and 0.02 pp increase in the probability of choosing these options, respectively). This pattern holds true for both immediate choices and those projected six months in the future. The results also suggest that a rise in e-cigarette prices by 1 TL is associated with an increase in the probability of choosing cigarettes (0.1 pp), RYO (0.1 pp), and quit (0.02 pp) options. Although these estimates may seem small, they are economically meaningful (in addition to being statistically significant), given that in our sample the average prices for cigarettes and e-cigarettes are 63 TL and 30 TL, respectively. Furthermore, in real-

world scenarios, taxation can substantially increase the prices of tobacco products, amplifying these observed own-price and cross-price effects. Consequently, such price changes could lead to sizable shifts in consumer behavior.

The results also indicate that flavor preferences significantly impact consumer choices regarding nicotine products, with notable differences observed. Specifically, the analysis reveals that menthol cigarettes are less likely to be chosen than traditional tobacco flavored cigarettes, as indicated by the negative coefficient across both immediate and future choices (-0.030 and -0.022). When menthol cigarettes are available, RYO, e-cigarette, and quit options are more likely to be chosen for immediate consumption, whereas for consumption in 6 months, only RYO is more likely to be chosen when a pack of menthol cigarettes is made available. The availability of e-cigarettes in various flavors has no statistically significant effect on product choices today, but it has a positive effect of choosing to quit altogether (use nothing).

The results also highlight the significant impact of the legality of nicotine products on consumer choices. First, the illegal status of RYO has no effect on consumer choices as indicated by small and statistically insignificant coefficient estimates for the "illegally sold" variable in the RYO columns. Secondly, when either illegally sold or strictly banned e-cigarettes are available, consumers are less likely to use them, as reflected by the negative and significant coefficients. This indicates that consumers are less likely to choose e-cigarettes under these legal restrictions. Our findings also suggest that consumers shift their preferences toward traditional tobacco products when e-cigarettes are unavailable or restricted. These findings are valid for the immediate choice as well as the choice in 6-months' time. We also detect a positive effect on choosing RYO in 6 months when e-cigarettes are strictly banned. Such a substitution effect highlights that regulatory restrictions on e-cigarettes may unintentionally increase demand for traditional tobacco products, which are perceived as more familiar or accessible, even when illegally sold. This finding is also consistent with Caner et al. (2024), which, using an experimental design, shows that illegal products are perceived as more harmful and less appealing compared to their legally sold counterparts by consumers. This perception likely contributes to the significantly lower preference for illegally sold and strictly banned e-cigarettes. While strict regulations and bans on e-cigarettes reduce their consumption,

they may inadvertently encourage the use of cigarettes and RYO tobacco, potentially undermining public health objectives.

The constant terms for each product category indicate that, in the absence of other influencing factors, cigarettes remain the most chosen option, followed by e-cigarettes and RYO. Overall, the findings highlight the significant roles that price, flavor preferences, and product legality play in shaping consumer behavior, both immediately and in the longer term.

Tables 6, 7, and 8 present the linear probability model broken down by age groups (18-30, 31-45, and 46-65, respectively) to reveal patterns in consumer choices regarding product attributes in these age groups. Two key points are worth noting. First, younger adults (ages 18–30) are more likely to choose e-cigarettes (at 10% statistical significance) today when flavored e-cigarettes are available. Second, individuals aged 31–45, similar to other age groups, shun e-cigarettes when they are illegally sold or strictly banned, but they differ from other participants by not showing a detectable preference for the other products in this case.

Table 5: Linear Probability Model of Consumer Choices of Nicotine Products: All respondents

	Choice Now				Choice 6 months from Now			
	Cig	RYO	E-Cig	Quit	Cig	RYO	E-Cig	Quit
Cigarette Price	-0.002***	0.001***	0.001***	0.0002***	-0.002***	0.001***	0.001***	0.0002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
E-Cigarette Price	0.001***	0.001***	-0.001***	0.00002***	0.001***	0.001***	-0.001***	-0.00001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Base Tobacco (Cig)								
Menthol (Cig)	-0.030***	0.013**	0.014**	0.004*	-0.022***	0.022***	0.001	-0.0004
	(0.007)	(0.006)	(0.006)	(0.002)	(0.007)	(0.006)	(0.006)	(0.002)
Base Tobacco (E-Cig)								
Various (E-Cig)	-0.007	0.001	0.003	0.003	-0.004	-0.004	0.003	0.004**
	(0.007)	(0.006)	(0.005)	(0.002)	(0.007)	(0.006)	(0.005)	(0.002)
Legality (Base Legal with Banderole)								
Illegally Sold	0.029***	0.009	-0.037***	-0.0005	0.030***	0.011	-0.042***	0.001
	(0.008)	(0.007)	(0.007)	(0.003)	(0.008)	(0.007)	(0.007)	(0.003)
Strictly Banned	0.025***	0.002	-0.026***	-0.001	0.027***	0.015**	-0.038***	-0.004
	(0.008)	(0.007)	(0.007)	(0.002)	(0.008)	(0.007)	(0.007)	(0.003)
Constant	0.715***	0.092***	0.193***	0.0003	0.672***	0.071***	0.242***	0.015***
	(0.013)	(0.011)	(0.010)	(0.004)	(0.013)	(0.011)	(0.011)	(0.004)
N	13,452	13,452	13,452	13,452	13,452	13,452	13,452	13,452
# of respondents	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121

Notes: Standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 6: Linear Probability Model of Consumer Choices of Nicotine Products: Ages 18-30

	Choice Now				Choice 6 Months from Now			
	Cig	RYO	E-Cig	Quit	Cig	RYO	E-Cig	Quit
Cigarette Price	-0.002***	0.001***	0.001***	0.0002***	-0.002***	0.001***	0.001***	0.0002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
E-Cigarette Price	0.000***	0.001***	-0.001***	5.19e-05	0.001***	0.001***	-0.001***	3.99e-05
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Base Tobacco (Cig)								
Menthol (Cig)	-0.013	-0.002	0.015	-0.0003	-0.005	0.020**	-0.010	-0.004
	(0.012)	(0.010)	(0.010)	(0.003)	(0.012)	(0.010)	(0.010)	(0.004)
Base Tobacco (E-Cig)								
Various (E-Cig)	-0.004	-0.011	0.016*	-0.002	-0.010	-0.0009	0.004	0.006*
	(0.011)	(0.010)	(0.009)	(0.003)	(0.011)	(0.009)	(0.010)	(0.004)
Legality (Base Legal with Banderole)								
Illegally Sold	0.026*	0.009	-0.030**	-0.004	0.034**	0.008	-0.040***	-0.002
	(0.014)	(0.012)	(0.012)	(0.004)	(0.014)	(0.012)	(0.012)	(0.005)
Strictly Banned	0.023*	-0.008	-0.012	-0.003	0.023*	0.022*	-0.034***	-0.010**
	(0.014)	(0.012)	(0.012)	(0.004)	(0.014)	(0.012)	(0.012)	(0.004)
Constant	0.708***	0.097***	0.187***	0.008	0.682***	0.046**	0.244***	0.028***
	(0.022)	(0.019)	(0.019)	(0.006)	(0.022)	(0.018)	(0.019)	(0.007)
N	5,136	5,136	5,136	5,136	5,136	5,136	5,136	5,136
# of respondents	428	428	428	428	428	428	428	428

Notes: Standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 7: Linear Probability Model of Consumer Choices of Nicotine Products: Ages 31-45

	Choice Now				Choice 6 Months from Now			
	Cig	RYO	E-Cig	Quit	Cig	RYO	E-Cig	Quit
Cigarette Price	-0.003***	0.002***	0.001***	0.0002***	-0.002***	0.001***	0.001***	0.0002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
E-Cigarette Price	0.001***	0.0005***	-0.001***	3.54e-06	0.001***	0.001***	-0.001***	-7.22e-05
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Base Tobacco (Cig)								
Menthol (Cig)	-0.041***	0.023***	0.012	0.005*	-0.034***	0.027***	0.005	0.003
	(0.010)	(0.009)	(0.008)	(0.003)	(0.011)	(0.009)	(0.009)	(0.003)
Base Tobacco (E-Cig)								
Various (E-Cig)	-0.005	0.004	-0.003	0.005	0.002	-0.013	0.008	0.004
	(0.010)	(0.008)	(0.008)	(0.003)	(0.010)	(0.008)	(0.008)	(0.003)
Legality (Base Legal with Banderole)								
Illegally Sold	0.019	0.011	-0.031***	0.001	0.014	0.013	-0.029***	0.002
	(0.012)	(0.010)	(0.010)	(0.004)	(0.013)	(0.011)	(0.010)	(0.004)
Strictly Banned	0.010	0.013	-0.025**	0.001	0.014	0.016	-0.032***	0.001
	(0.012)	(0.010)	(0.010)	(0.004)	(0.012)	(0.011)	(0.010)	(0.004)
Constant	0.716***	0.087***	0.199***	-0.002	0.657***	0.083***	0.247***	0.013**
	(0.019)	(0.016)	(0.015)	(0.006)	(0.019)	(0.016)	(0.016)	(0.006)
N	5,964	5,964	5,964	5,964	5,964	5,964	5,964	5,964
# of respondents	497	497	497	497	497	497	497	497

Notes: Standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 8: Linear Probability Model of Consumer Choices of Nicotine Products: Ages 46-65

	Choice Now				Choice 6 Months from Now			
	Cig	RYO	Cig	RYO	Cig	RYO	Cig	RYO
Cigarette Price	-0.003***	0.002***	0.0004**	0.0003***	-0.003***	0.002***	0.0004***	0.0004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
E-Cigarette Price	0.001**	0.0003	-0.001***	1.04e-05	0.0004*	0.001**	-0.001***	3.38e-05
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Base Tobacco (Cig)								
Menthol (Cig)	-0.041**	0.018	0.014	0.010*	-0.029*	0.014	0.014	0.001
	(0.017)	(0.015)	(0.012)	(0.006)	(0.016)	(0.015)	(0.012)	(0.006)
Base Tobacco (E-Cig)								
Various (E-Cig)	-0.016	0.017	-0.008	0.006	-0.006	0.011	-0.009	0.003
	(0.016)	(0.014)	(0.011)	(0.005)	(0.015)	(0.014)	(0.011)	(0.006)
Legality (Base Legal with Banderole)								
Illegally Sold	0.060***	0.004	-0.068***	0.004	0.060***	0.013	-0.078***	0.005
	(0.020)	(0.017)	(0.014)	(0.007)	(0.020)	(0.018)	(0.014)	(0.007)
Strictly Banned	0.065***	-0.003	-0.063***	0.000	0.066***	-0.006	-0.059***	-0.001
	(0.019)	(0.017)	(0.014)	(0.007)	(0.019)	(0.017)	(0.014)	(0.007)
Constant	0.725***	0.097***	0.189***	-0.010	0.684***	0.097***	0.223***	-0.004
	(0.030)	(0.027)	(0.021)	(0.010)	(0.030)	(0.027)	(0.022)	(0.011)
N	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352
# of respondents	196	196	196	196	196	196	196	196

Notes: Standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Conditional logit model estimates:

In the linear probability model, we examine the choices for the products separately. To supplement this model and to examine in the utility space how consumer utility is affected by the attributes of the products in the choice set, we estimate the conditional logit (McFadden's logit) model. This model is then used for two purposes: First, to derive estimates for willingness to pay (WTP) for e-cigarette attributes; namely, flavor availability and legal status, and secondly, to conduct policy experiments and generate market shares of products under various policy scenarios.

The conditional logit model that we estimate can be written as follows:

$$U_{ij} = ASC_j + \beta_{price}\, x\, price_{ij} + \beta_{cigflavor}\, x\, cigflavor_{ij} + \beta_{ecigflavor}\, x\, ecigflavor_{ij} + \beta'_{eciglegality}\, x\, eciglegality_{ij} + \epsilon_{ij} \quad (2)$$

U_{ij}: Utility of individual i attained by choosing alternative j

ASC_j: Alternative-specific constant for alternative j (cigarette, RYO, e-cigarette, quit), showing the utility obtained from the products

β_{price}: Coefficient for the prices of the products

$\beta_{cigflavor}$: Coefficient for the availability of menthol flavor in packaged cigarettes

$\beta_{ecigflavor}$: Coefficient for the availability of various flavors in e-cigarettes

$\beta_{eciglegality}$: Coefficients for the legal status of e-cigarettes (illegally sold (illegal retail sale) or strictly prohibited (illegal street sale), base category: legal sale)

ϵ_{ij}: Random error term for individual i and alternative j

Price is a continuous variable, whereas legal status and flavor availability are categorical variables. The levels of flavor availability and legal status are as shown before in Tables 1 and 2.

As participants in the DCE were presented with a total of 12 choice sets (for today and for 6 months later, 24 in total), in the estimation of equation (1) we take into account that the same individual responses 12 times. For this reason, we use the "cmxtmixlogit" command (with fixed coefficients) in Stata program to estimate the coefficients of the panel data logit model.

Table 9 presents the estimation results for β coefficients and ASC_j in the logit model (equation 2) for consumer choices regarding nicotine products. Columns (1) to (4) show the results for immediate choices, while columns (5) to (8) display the results for choices made six months in the future. The results are presented for all respondents and separately for age groups, as indicated by the column labels. The results indicate that higher product prices significantly reduce consumer utility associated with the corresponding product choice. While menthol flavor in cigarettes is linked to significant disutility, individuals derive utility from the availability of various flavors in e-cigarettes.

The coefficients for legal status are identified through the variation in this attribute for e-cigarettes. Using legal sale as the base category, the estimates reveal significant consumer disutility for illegally sold and strictly banned e-cigarettes, with the strictly banned options imposing greater disutility than the illegally sold ones. Subgroup analysis by age shows that the disutility for illegally sold and strictly banned e-cigarettes is more pronounced for older adults (ages 46-65). In contrast, the coefficient estimates for younger adults are economically smaller in magnitude and also less precisely estimated. This pattern persists for choices made both immediately and six months into the future.

Among the three products, consumers derive the highest utility from consuming cigarettes, followed by e-cigarettes, RYO, and quitting, indicated by the ASC_j estimates. This pattern is consistent across all age groups and for both immediate choices and choices in 6 months. However, an exception is observed among the youngest adults (ages 18-30) in their choices 6 months later. This group ranks cigarettes highest, followed by e-cigarettes, RYO, and quitting. Notably, this group anticipates deriving the highest utility from smoking cigarettes, and higher utility from consuming e-cigarettes than RYO or quitting.

Table 9: Panel Conditional Logit Model Estimates for Consumer Choices of Nicotine Products

	Immediate Choice				Choice of 6 Months from Now			
	All	*Ages 18 – 30*	*Ages 31 – 45*	*Ages 46 - 65*	All	*Ages* 18 – 30	*Ages* 31 – 45	*Ages* 46 - 65
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Price	-0.011***	-0.010***	-0.011***	-0.012***	-0.011***	-0.010***	-0.011***	-0.012***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Base Flavor (Tobacco)								
Menthol cigarettes	-0.158***	-0.093	-0.184***	-0.224***	-0.125***	-0.068	-0.151***	-0.183**
	(0.037)	(0.060)	(0.055)	(0.089)	(0.037)	(0.059)	(0.055)	(0.088)
Various flavors in e-cigarettes	0.077	0.133*	0.024	0.088	0.094**	0.075	0.114*	0.076
	(0.047)	(0.075)	(0.070)	(0.130)	(0.045)	(0.072)	(0.066)	(0.119)
Legality (Base: Legal with Banderole)								
Illegally Sold	-0.177***	-0.098	-0.148*	-0.519***	-0.197***	-0.162*	-0.158*	-0.410***
	(0.057)	(0.090)	(0.085)	(0.156)	(0.055)	(0.087)	(0.081)	(0.141)
Strictly Banned	-0.254***	-0.227**	-0.191**	-0.580***	-0.212***	-0.180**	-0.132	-0.570***
	(0.058)	(0.093)	(0.087)	(0.159)	(0.055)	(0.088)	(0.081)	(0.146)
ASC (Base: Quit)								
Cigarette	4.170***	4.134***	4.221***	4.108***	3.655***	3.376***	3.835***	3.923***
	(0.070)	(0.115)	(0.107)	(0.160)	(0.060)	(0.091)	(0.096)	(0.153)
RYO	2.940***	2.780***	2.967***	3.297***	2.499***	2.087***	2.658***	3.111***
	(0.084)	(0.136)	(0.128)	(0.208)	(0.075)	(0.116)	(0.116)	(0.193)
E-Cigarette	2.737***	2.758***	2.817***	2.501***	2.432***	2.201***	2.618***	2.583***
	(0.075)	(0.121)	(0.113)	(0.176)	(0.065)	(0.098)	(0.102)	(0.166)
# of respondents	1.121	428	497	196	1.121	428	497	196

Notes: : ASC = alternative specific constant. Standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Willingness to Pay Estimates

In this subsection, we report willingness-to-pay (WTP) estimates. WTP for an attribute is the marginal rate of substitution between the attribute and the price, which is calculated as: $WTP_k = -\beta_k/\beta_{price}$. To estimate WTP for the non-price attributes, we re-parameterize the mixed logit model by normalizing the price coefficient and dividing all

non-price coefficients by the price coefficient, thereby expressing coefficients relative to price.

As shown in Table 10, individuals in all age groups are willing to pay a higher price for e-cigarettes that come in various flavors as opposed to only in tobacco flavor, both in their immediate choice and choice six months from now. Subgroup analysis by age groups show that in the immediate choice WTP for flavored e-cigarettes is the highest among youngest adults (ages 18-30), whereas in the choice 6 months later WTP is the highest in the 31-45 age group. The magnitudes of WTP for immediate and future choices are sizable, about 11% and 14%, respectively, of the average actual price per pack paid by the respondents in our sample.

In addition, we estimate that individuals in all age groups are willing to pay less for illegally sold and strictly banned products, compared to legal products with a banderole, both in their immediate choice and choice six months from now. Consistent with the results of the logit model, respondents are willing to pay less (28-33% less than the average price of a pack of cigarettes) for strictly banned e-cigarettes than illegally sold ones (23-26% less). This preference is particularly strong for individuals between the ages of 46 and 65, who would pay 49-68% less for e-cigarettes that are not sold legally.

Table 10: Willingness to Pay (WTP) Estimates in TL and as a % of average price of a pack of cigarettes

	Immediate Choice				Choice in 6 Months from now			
	All	*Ages 18 – 30*	*Ages 31 – 45*	*Ages 46 - 65*	All	*Ages* 18 – 30	*Ages* 31 – 45	*Ages* 46 - 65
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Flavor availability (Base: Tobacco only)								
Menthol cigarettes	-14.36	-8.99	-16.58	-18.21	-11.57	-6.59	-13.85	-15.38
	-23%	**-14%**	**-26%**	**-29%**	**-18%**	**-10%**	**-22%**	**-24%**
E-cig in various flavors	7.04	12.91	2.21	7.13	8.69	7.32	10.46	6.39
	11%	**20%**	**4%**	**11%**	**14%**	**12%**	**17%**	**10%**
Legal status (Base: Legal with Banderole)								
Illegally Sold	-16.10	-9.55	-13.33	-42.20	-18.24	-15.72	-14.50	-34.45
(illegal retail)	**-26%**	**-15%**	**-21%**	**-67%**	**-29%**	**-25%**	**-23%**	**-55%**
Strictly Banned	-23.09	-22.04	-17.21	-47.15	-19.63	-17.48	-12.11	-47.90
(illegal street)	**-37%**	**-35%**	**-27%**	**-75%**	**-31%**	**-28%**	**-19%**	**-76%**

Notes: In each cell, the first figure is the WTP estimate in Turkish liras, the second one shows the estimate as a % of average price of a pack of cigarettes (63 TL/pack) at the time of the survey. This is the average price paid by the respondents for a pack of cigarettes in their last purchase.

Policy Experiments

In this part of the paper, we conduct some policy experiments and study counterfactual scenarios. We predict and report the market shares of the product options in each of these scenarios. report willingness-to-pay (WTP) estimates. Market shares are the fractions of respondents who would choose one of the three nicotine products or the quitting option under the given counterfactual scenario.

Table 11 presents the predicted market shares. First, the baseline scenario reflects the choices of respondents in the DCE under the current situation in Türkiye: a legal cigarette market, an illegal retail RYO cigarette market, and an illegal retail e-cigarette market; cigarettes and RYO available only in tobacco flavor, while various flavors are offered in the e-cigarette market; and the prices reflect the average prices in the DCE.

The baseline scenario shows the current market shares of cigarettes, RYO, e-cigarettes, and the quit option as 60%, 21%, 17%, and 2%, respectively. In six months, the share of cigarettes is predicted to decline to 58%, while the shares of e-cigarettes and quitting are expected to rise to 18% and 3%, respectively. These predictions suggest a modest decline in the share of cigarettes and a slight increase in the shares of e-cigarettes and quitting.

Counterfactual scenarios 1 and 2 study the effects of a complete ban on flavors (only tobacco flavor available in all products) and the effect of making flavors available only in e-cigarettes. In these scenarios, those who enjoy flavored cigarettes and e-cigarettes would turn to RYO; therefore, the shares of cigarettes and e-cigarettes would slightly decrease, generating a shift towards RYO.

Counterfactual scenarios 3-6 study the effects of a change in the legal status of e-cigarettes in Türkiye. In these scenarios we keep the legal status of cigarettes and RYO the same as the current situation in the country and consider a change in the legal status of e-cigarettes to legal or to strictly banned. Making e-cigarettes legally available at the current average market prices would reduce the market share of cigarettes and raise the share of e-cigarettes (Scenario 3). However, because of consumers' sensitivity to prices, if the price of e-cigarettes doubled their current average level, the market shares of cigarettes and RYO would increase at the expense of e-cigarettes (Scenario 4). A strict ban on e-cigarettes, making their sale "illegal street sale", would slightly increase purchases of

cigarettes and RYO and slightly reduce purchases of e-cigarettes if implemented immediately, but the effect on choices made in 6 months' time would be a slight increase in the share of e-cigarettes at the expense of traditional cigarettes (Scenario 5). However, strictly banning e-cigarettes and raising their prices would definitely increase purchases of cigarettes and RYO and reduce purchases of e-cigarettes, both for the immediate situation and 6 months later (Scenario 6). None of the studies counterfactual scenarios would be strong enough to change the share of those who choose to quit using all of these products.

Table 11: Predicted Market Shares in Hypothetical Scenarios

	Immediate Choice				Choice in 6 months from now			
	Cigarettes	*RYO*	*E-cigarettes*	*Quit*	*Cigarettes*	*RYO*	*E-cigarettes*	*Quit*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Flavor availability:								
Scenario 1: Only tobacco flavor is available (no other flavors available in any product)	0.59 ↓	0.24 ↑	0.15 ↓	0.02	0.56 ↓	0.24 ↑	0.17 ↓	0.03
Scenario 2: Cigarettes and RYO only tobacco flavor, e-cigarettes available in various flavors	0.58 ↓	0.24 ↑	0.16 ↓	0.02	0.56 ↓	0.23 ↑	0.18	0.03
Legal status:								
Scenario 3: Cigarettes legal, RYO under-the-counter, e-cigarettes legal (e-cigarette price: current average price)	0.58 ↓	0.21	0.19 ↑	0.02	0.55 ↓	0.20 ↓	0.22 ↑	0.03
Scenario 4: Cigarettes legal, RYO under-the-counter, e-cigarettes legal (e-cigarette price: twice the current average price)	0.63 ↑	0.22 ↑	0.13 ↓	0.02	0.59 ↑	0.22 ↑	0.16 ↓	0.03
Scenario 5: Cigarettes legal, RYO under-the-counter, e-cigarettes strictly banned (e-cigarette price: current average price)	0.61 ↑	0.22 ↑	0.15 ↓	0.02	0.57 ↓	0.21	0.19 ↑	0.03
Scenario 6: Cigarettes legal, RYO under-the-counter, e-cigarettes strictly banned (e-cigarette price: twice the current average price)	0.64 ↑	0.23 ↑	0.11 ↓	0.02	0.61 ↑	0.23 ↑	0.13 ↓	0.03
Baseline Scenario: Cigarettes legal, RYO under-the-counter, e-cigarettes under-the-counter, only tobacco flavor for cigarettes and RYO, various flavors for e-cigarettes (prices: current average prices for all)	0.60	0.21	0.17	0.02	0.58	0.21	0.18	0.03

Notes: In each of these scenarios, the prices of the products are the average prices in the DCE, except for e-cigarettes, whose prices vary across scenarios as indicated in the table. The arrows in the table show the direction of change relative to the baseline scenario.

6. Conclusions

This study provides valuable insights into the factors that shape consumer choices regarding nicotine products, with a particular focus on price, flavor preferences, and the legal status of the products. The results consistently demonstrate the significant role of both own-price and substitute-price effects on consumer behavior. Higher prices lead to a noticeable reduction in choice of the associated product, with a strong substitution effect observed, where consumers are more likely to switch to alternative products or even quit. This substitution effect is evident not only for immediate choices but also for choices made six months in the future, indicating a persistent price sensitivity over time. The significant impact of price on consumer choices suggests that taxation and pricing policies remain highly effective tools in discouraging cigarette consumption. Policymakers can leverage this price sensitivity by implementing higher taxes on traditional cigarettes, while carefully monitoring and adjusting taxes on substitutes to ensure these products do not undermine the overall goal of reducing nicotine consumption.

Secondly, flavor preferences also play a critical role in consumer decision-making. Our findings from linear probability models indicate that menthol cigarettes are less likely to be chosen than regular tobacco flavored cigarettes. When menthol cigarettes are in the choice set, the RYO and e-cigarette options are more likely to be chosen. Moreover, younger adults (ages 18–30) are more likely to choose e-cigarettes (at 10% statistical significance) when flavored e-cigarettes are available for their immediate choice.

Thirdly, the legal status of nicotine products emerges as a critical factor in shaping consumer choices. The findings indicate that consumers display a clear aversion to illegally sold and strictly banned e-cigarettes. This suggests that regulatory uncertainty and perceived risks discourage e-cigarette consumption under strict bans or illegal sales. Our findings also suggest that consumers shift their preferences toward traditional tobacco products when e-cigarettes are unavailable or restricted. This substitution effect highlights a potential unintended consequence of banning e-cigarettes: consumers may shift toward more harmful alternatives such as combustible cigarettes and RYO tobacco. A regulated but controlled market for e-cigarettes—emphasizing product safety standards and marketing restrictions—could help mitigate these risks by providing smokers with a less harmful alternative while maintaining consumer trust. For RYO tobacco, which remains in high demand despite its illegal status, stronger enforcement

measures such as supply chain monitoring, targeted penalties for illegal sales, and enhanced cross-border controls are needed to address illicit trade and discourage harmful consumption patterns. Overall, these results emphasize the importance of a balanced regulatory approach that reduces harm without unintentionally driving consumers toward riskier products.

Overall, this study underscores the importance of comprehensive and integrated policy approaches that simultaneously address pricing, product characteristics, and legal frameworks. By leveraging these factors and using evidence-based policies, policymakers can promote public health. Further research could explore how these interventions interact with broader factors such as cultural norms, access to cessation support, and the evolving nicotine product landscape to refine strategies for reducing tobacco and nicotine use globally.

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REFERENCES

Abouk, Rahi, Charles Courtemanche, Dhaval Dave, Bo Feng, Abigail S. Friedman, Johanna Catherine Maclean, Michael F. Pesko, Joseph J. Sabia, and Samuel Safford. "Intended and Unintended Effects of E-Cigarette Taxes on Youth Tobacco Use." *Journal of Health Economics* 87 (2023): 102720.

Allcott, Hunt, and Charlie Rafkin. "Optimal Regulation of E-Cigarettes: Theory and Evidence." *American Economic Journal: Economic Policy* 14, no. 4 (2022): 1–50.

Amlung, Michael, Derek D. Reed, Vanessa Morris, Elizabeth R. Aston, Jane Metrik, and James MacKillop. "Price Elasticity of Illegal versus Legal Cannabis: A Behavioral Economic Substitutability Analysis." *Addiction* 114, no. 1 (2019): 112–18.

Anderson, D. Mark, and Daniel I. Rees. “The Public Health Effects of Legalizing Marijuana.” *Journal of Economic Literature* 61, no. 1 (2023): 86–143.

Balfour, David J., Neal L. Benowitz, Suzanne M. Colby, Dorothy K. Hatsukami, Harry A. Lando, Scott J. Leischow, Caryn Lerman, et al. “Balancing Consideration of the Risks and Benefits of E-Cigarettes.” *American Journal of Public Health* 111, no. 9 (2021): 1661–72.

Becker, Gary S., Kevin M. Murphy, and Michael Grossman. “The Market for Illegal Goods: The Case of Drugs.” *Journal of Political Economy* 114, no. 1 (2006): 38–60.

Caner, Asena, Belgi Turan, Mehmet Y. Gürdal, and Sibel Güven. "Perceptions of plain packaging and health warnings among university students in Turkey: a survey-based experiment." *BMC Public Health* 23, no. 1 (2023): 779.

Caner, Asena, Berna Tarı Kasnakoğlu, Belgi Turan, Yenal Can Yiğit, Donald S. Kenkel, and Alan D. Mathios. “A Discrete Choice Experiment in Türkiye to Assess Tradeoffs in Choosing Nicotine Products: Data Analysis Plan.” *Preregistration of an Analysis Plan with the Center for Open Science,* (2024).

Cotti, Chad, Charles Courtemanche, Yang Liang, Johanna Catherine Maclean, Erik Nesson, and Joseph Sabia. “The effect of e-cigarette flavor bans on tobacco use.” Working Paper No. 32535. *National Bureau of Economic Research*, (2024).

Delnevo, Cristine D., Daniel P. Giovenco, Michael B. Steinberg, Andrea C. Villanti, Jennifer L. Pearson, Raymond S. Niaura, and David B. Abrams. “Patterns of Electronic Cigarette Use among Adults in the United States.” *Nicotine & Tobacco Research* 18, no. 5 (2016): 715–19.

Fataar, Fathima, Samantha Goodman, Elle Wadsworth, and David Hammond. “Consumer Perceptions of ‘Legal’ and ‘Illegal’ Cannabis in US States with Legal Cannabis Sales.” *Addictive Behaviors* 112 (2021): 106563.

GATS (Global Adult Tobacco Survey). GATS Fact Sheet Turkey https://www.who.int/teams/noncommunicable-diseases/surveillance/data/turkey (2008-2012-2016).

Hulland, John, and Jeff Miller. ““Keep on Turkin’”?” *Journal of the Academy of Marketing Science* 46, no. 5 (2018): 789–94.

Kenkel, Donald S., Alan D. Mathios, Grace N. Phillips, Revathy Suryanarayana, Hua Wang, and Sen Zeng. “Understanding the Demand-Side of an Illegal Market: Prohibition of Menthol Cigarettes.” Working Paper No. 32148. *National Bureau of Economic Research*, (2024a).

Kenkel, Donald S., Alan D. Mathios, Grace N. Phillips, Revathy Suryanarayana, Hua Wang, and Sen Zeng. “Just What the Doctor Ordered? The Benefits and Costs of E-Cigarette Regulation in Australia.” Working Paper No. 32654. *National Bureau of Economic Research*, (2024b).

Lee, Peter N, David Abrams, Annette Bachand, Gizelle Baker, Ryan Black, Oscar Camacho, Geoffrey Curtin, et al. “Estimating the Population Health Impact of Recently Introduced Modified Risk Tobacco Products: A Comparison of Different Approaches.” *Nicotine & Tobacco Research* 23, no. 3 (2021): 426–37.

Lindson, Nicola, Ailsa R Butler, Hayden McRobbie, Chris Bullen, Peter Hajek, Rachna Begh, Annika Theodoulou, et al. “Electronic Cigarettes for Smoking Cessation.” *Cochrane Database of Systematic Reviews* 2024, no. 1 (2024). https://doi.org/10.1002/14651858.cd010216.pub8.

Marti, Joachim, John Buckell, Johanna Catherine Maclean, and Jody Sindelar. “To ‘Vape’ or Smoke? Experimental Evidence on Adult Smokers.” *Economic Inquiry* 57, no. 1 (2019): 705–25. https://doi.org/10.1111/ecin.12693.

McFadden, Daniel. "Conditional Logit Analysis of Qualitative Choice Behavior." *Frontiers in Econometrics* (1974).

McFadden, Daniel. "Stated preference methods and their applicability to environmental use and non-use valuations." In *Contingent valuation of environmental goods*, pp. 153-187. Edward Elgar Publishing, (2017).

McNeill, Ann, Lion Shahab Brose, Rachel Calder, Sara C. Hitchman, Peter Hajek, and Hayden McRobbie. “E-Cigarettes: An Evidence Update. ” *Public Health England* 3, no. 6 (2015): 14–15.

McNeill, Ann, Lion Shahab Brose, Rachel Calder, Eugenia Simonavicius, and Debbie Robson. “Vaping in England: An Evidence Update Including Vaping for Smoking Cessation. ” *London, UK: Public Health England* (2021): 1–247.

Mercer, Andrew, Andrew Lau, and Courtney Kennedy. "For Weighting Online Opt-In Samples, What Matters Most?" *Pew Research Center Methods*. United States of America (2018).

Monson, Eva, and Nicole Arsenault. “Effects of Enactment of Legislative (Public) Smoking Bans on Voluntary Home Smoking Restrictions: A Review.” *Nicotine & Tobacco Research* 19, no. 2 (2017): 141–48.

Nguyen, Hai V, and Stephen Bornstein. “Changes in Adults’ Vaping and Smoking Behaviours Associated with Aerosol-Free Laws.” *Tobacco Control* 30, no. 6 (2021): 644–52.

Penn, Jerrod M., and Wuyang Hu. "Understanding hypothetical bias: An enhanced meta-analysis." *American Journal of Agricultural Economics* 100, no. 4 (2018): 1186-1206.

Pettigrew, Simone, Joseph Alvin Santos, Mia Miller, Thout Sudhir Raj, Min Jun, Georgia Morelli, and Alexandra Jones. “E-Cigarettes: A Continuing Public Health Challenge in India despite Comprehensive Bans.” *Preventive Medicine Reports* 31 (2023): 102108.

Polosa, Riccardo, Brad Rodu, Pasquale Caponnetto, Marilena Maglia, and Cirino Raciti. "A Fresh Look at Tobacco Harm Reduction: The Case for the Electronic Cigarette." *Harm Reduction Journal* 10, no. 1 (2013): 19. https://doi.org/10.1186/1477-7517-10-19.

Posner, Heather, Katelyn F Romm, Lisa Henriksen, Debra Bernat, and Carla J Berg. "Reactions to Sales Restrictions on Flavored Vape Products or All Vape Products among Young Adults in the United States." *Nicotine & Tobacco Research* 24, no. 3 (2022): 333–41.

Saffer, Henry, Selçuk Özdogan, Michael Grossman, Daniel L. Dench, and Dhaval M. Dave. "Comprehensive E-Cigarette Flavor Bans and Tobacco Use among Youth and Adults." Working Paper No. 32534. *National Bureau of Economic Research*, (2024).

Samet, Jonathan M., and Jessica Barrington-Trimis. "E-Cigarettes and Harm Reduction: An Artificial Controversy Instead of Evidence and a Well-Framed Decision Context." *American Journal of Public Health* 111, no. 9 (2021): 1572–74.

Siegel, Michael, and Amanda Katchmar. "Effect of Flavored E-Cigarette Bans in the United States: What Does the Evidence Show?" *Preventive Medicine* 165 (2022): 107063.

Soneji, Samir, Jessica L. Barrington-Trimis, Thomas A. Wills, Adam M. Leventhal, Jennifer B. Unger, Laura A. Gibson, JaeWon Yang, et al. "Association between Initial Use of E-Cigarettes and Subsequent Cigarette Smoking among Adolescents and Young Adults." *JAMA Pediatrics* 171, no. 8 (2017): 788.

Sostek, Katrina. "Evaluating the accuracy of Google surveys." (2019)

Tam, Jamie, Evelyn Jimenez-Mendoza, John Buckell, Jody Sindelar, and Rafael Meza. "Responses to Real-World and Hypothetical e-Cigarette Flavor Bans among Us Young Adults Who Use Flavored e-Cigarettes." *Nicotine and Tobacco Research* 26, no. 8 (2024): 1113–17.

Tepav. "TEPAV Monitoring Newsletter on Tobacco Control Policies September 2023" https://www.tepav-he.org/en/publications/newsletters/ (2023)

Train, Kenneth. *Discrete choice methods with simulation*. Cambridge: Cambridge University Press, 2009.

TurkStat. *Turkish Health Research, 2022*. Accessed July 14, 2024. https://data.tuik.gov.tr/Bulten/Index?p=Turkiye-Saglik-Arastirmasi-2022-49747.

Wackowski, O. A., M. T. Manderski, and C. D. Delnevo. "Young Adults' Behavioral Intentions Surrounding a Potential Menthol Cigarette Ban." *Nicotine & Tobacco Research* 16, no. 6 (2014): 876–80.

World Health Organization (WHO). *WHO Report on the Global Tobacco Epidemic, 2023: Protect People from Tobacco Smoke*. 2023.

Yang, Yong, Eric N. Lindblom, Ramzi G. Salloum, and Kenneth D. Ward. “The Impact of a Comprehensive Tobacco Product Flavor Ban in San Francisco among Young Adults.” *Addictive Behaviors Reports* 11 (2020): 100273.

Yingst, Jessica M, Courtney Lester, Susan Veldheer, Sophia I Allen, Ping Du, and Jonathan Foulds. “E-Cigarette Users Commonly Stealth Vape in Places Where e-Cigarette Use Is Prohibited.” *Tobacco Control* 28, no. 5 (2018): 493–97.

Yingst, Jessica M, Courtney Lester, Susan Veldheer, Sophia I Allen, Ping Du, and Jonathan Foulds. “E-Cigarette Users Commonly Stealth Vape in Places Where e-Cigarette Use Is Prohibited.” *Tobacco Control* 28, no. 5 (2019): 493–97.