2-17-2023

Tax Noncompliance: The Role of Tax Morale in Smokers' Behavior

James Prieger
Pepperdine University, james.prieger@pepperdine.edu

Tax Noncompliance:

The Role of Tax Morale in Smokers' Behavior

James E. Prieger
Pepperdine University
School of Public Policy
24255 Pacific Coast Highway
Malibu, CA 90263-7490
James.Prieger@pepperdine.edu

September 1, 2022

Abstract

Measuring and predicting compliance with tax obligations is important but challenging. Survey data from California smokers are investigated to show that several forms of tax avoidance and evasion were common. About 43% of smokers avoided taxes by purchasing cigarettes outside the state in the previous year, 15% admit to evading taxes through cross-border purchases, and 26% bought likely or certainly untaxed cigarettes in the state in the past month. Attitudinal factors involving tax morale contributed more toward explaining the variance in compliance rates than demographic or law-and-economics factors. The implications for policy are discussed.

JEL Codes: H26, H27, K42

Keywords: Tax compliance; tax avoidance; tax evasion; illicit trade in tobacco products; ITTP; black markets; counterfeit tobacco

This paper is preprint version of the forthcoming article, which should be cited:

Prieger, James E. (2023). Tax Noncompliance: The Role of Tax Morale in Smokers' Behavior. *Contemporary Economic Policy*, forthcoming. https://doi.org/10.1111/coep.12604.

In accordance with the policy of the publisher, this version is the initial submission to *CEP*, and does not include changes made to the final published version.

I. Introduction

A common question in the tax-evasion literature is why there is so little cheating on taxes (Alm & Sanchez, 1995). For the well-studied case of income taxation, there is far too much compliance compared to any reasonable expectation based on economic incentives alone. Many people try to obey the law, pay their taxes, and purchase fully taxed goods even when alternatives are readily available, regardless of how low the risk from enforcement may be. Models of taxpayer behavior taking the Beckerian economics-of-crime approach, based on expected utility, deterrence, and incentives, predict for income tax law "too little compliance and far too much tax evasion" (Torgler, 2007). These facts raise two questions: 1) are there areas in which people cheat more readily on taxes, to enable researchers to study more of the phenomenon, and 2) how much do non-price behavioral factors affect people's decisions to evade taxes?

This study addresses both questions with survey data from smokers in California that allows estimation of the levels of cigarette tax avoidance and evasion and their determinants. The answers to the questions posed above are 1) yes, tobacco excise taxes, and 2) apparently a lot—more than Beckerian factors. After a recent increase in cigarette excise taxes in California, many smokers avoided or evaded taxes, which creates an opportunity to examine empirically which factors are associated with the extent of tax avoidance and the economic crimes of tax evasion and illicit trade in tobacco products (ITTP). The novel exploration in the study concerns how *tax morale*, measured by non-price attitudinal factors, is associated with ITTP. Most of the morale factors studied involve moral sentiments such as perceptions of fairness, the strong emotions of guilt and shame, and whether the individual views smoking or illicit activity as social norms. Such sentiments are increasingly seen as important to the understanding of behavior in the economics of taxation (Alm & Torgler, 2011) and crime (van Winden & Asch, 2012).

Cigarette excise taxes increased by $2 per pack in California in April 2017. The tax hike raised prices in California above those in neighboring states, Mexico, and Native American reservations, increasing the possibilities for cross-border tax avoidance, whether directly by consumers or on the supply side through illicit trade in tobacco products (ITTP). Cigarette tax avoidance and evasion is widespread in the U.S. (Reuter & Majmundar, 2015; Aziani et al., 2017) and in California in particular (Prieger, 2022; Prieger & Kulick, 2019). Estimates of illicit sales in the U.S. range from 4% to 21% market share of cigarettes (Reuter & Majmundar, 2015; Kulick, Prieger, & Kleiman, 2016).

The present work is related to the literature concerning why individuals avoid or evade taxes and why consumers turn to black markets for retail goods. Few studies examine directly individuals' participation in tobacco-tax evasion and ITTP (Cantrell et al., 2008; Joossens et al., 2014; Prieger, 2022); there is more work on cross-state tobacco-tax avoidance by individuals (Stehr, 2005; Chiou & Muehlegger, 2008; Goel, 2008; Lovenheim, 2008; DeCicca et al., 2013; Agaku et al., 2016). Most of that literature focuses on whether price differentials caused by tobacco excise taxes stimulate tax avoidance, tax evasion, and ITTP. Whether the travel time to the nearest cross-border retail location, or Native American reservation or casino, is related to several measures of tax avoidance and evasion is studied here. The evidence is mixed, but nearness to other states and Mexico is associated with some measures of tax avoidance, evasion, and ITTP.

Income-tax evasion has been studied much more (Advani, 2021; Allingham & Sandmo, 1972; Andreoni, Erard, & Feinstein, 1998; Slemrod, 2007). The original approach in this strand focused on deterrence and expected utility, but newer work, prompted by the poor performance of Beckerian factors in predicting actual compliance, focuses on tax morale, a catch-all term for nonpecuniary factors and decision-making not based on expected utility maximization. Tax morale, acting through the mechanisms of intrinsic motivation, reciprocity, peer effects and

social influences, culture, the moral sentiments studied here, and others has been found to have a "sizable role" in the choice to comply with taxes, and (Luttmer & Singhal, 2014).

There is also literature on why consumers turn to black markets (Eisend & Schuchert-Güler, 2006; Bian & Moutinho, 2009; Casola, Kemp, & Mackenzie, 2009; Bian, Wang, Smith, & Yannopoulou, 2016). As in that literature, many individual, economic, and attitudinal factors associated with purchase of counterfeits and other forms of ITTP are examined below. Men, younger smokers, Blacks, Hispanics, Native Americans, individuals who smoke more intensively, and vapers (e-cigarette users) are found to be more likely to report having purchased suspected untaxed or counterfeit cigarettes in the past month (two of the eight measures of compliance studied).

The present study has several novel features. First, it is relatively rare to study tax compliance in a setting with high levels of noncompliance. In contrast with cheating on income taxes (Alm & Sanchez, 1995), the results here show that cigarette tax avoidance and ITTP are relatively common. An estimated 43% of smokers in California avoided taxes in the year after the tax increase by bringing cigarettes into the state from elsewhere and 14% admit directly to not paying taxes due on out-of-state purchases. Furthermore, 22% think they may have consumed counterfeit cigarettes and 26% know or suspect that they bought untaxed cigarettes in the past month. Second, most studies of tax morale involve highly aggregated data, only indirect evidence of compliance, and difficulty in measuring untaxed economic activity (Luttmer & Singhal, 2014). In the survey data analyzed here, statements about individual behavior and specific acts of noncompliance are available to examine. Third, nearly all of the compliance literature focuses on progressive income taxes, instead of the regressive "sin tax" studied here, which many smokers view as unfair. From the survey, it is estimated that 64.5% (95% CI =

[62.4, 66.4])[1] of California adult smokers agree or strongly agree with the statement that tobacco taxes are unfair to smokers, a sentiment found in the regression analysis to be associated with noncompliance. Finally, the relative importance of nonprice factors is compared directly with that of demographic and price-related factors, with the finding that tax morale explains much more of the variation in compliance-related behavior than factors suggested by standard law and economics theory.

The estimates of the prevalence of tax avoidance and evasion and the associations between these behaviors and demographic, economic, and tax morale factors are descriptive in nature. The study has policy relevance nonetheless. The scale of tax avoidance and evasion—as well as being eye-opening for policymakers—uncovers implications for both public finance and the need for vigilance regarding ITTP. The results below regarding the association between social norms and illegal behavior lead to interesting questions whether positive norms can be reinforced through policy, e.g. through targeted tobacco ad campaigns, to combat ITTP. Finally, the results below could be used to identify communities with low predicted compliance with current or proposed excise tax laws, and emphasize that tax morale has much more predictive value for that purpose than standard economic variables.

The next section discusses the literature on which individual and economic factors are related to tax evasion and ITTP. Section III describes the survey instrument and data. Section IV presents the empirical results. A final section reviews those results and discusses policy implications.

[1] All confidence intervals for descriptive statistics are for the population estimates, include the survey design effects, and are calculated with the logit transform method.

II. Theory and hypotheses

Compliance with excise taxes may be lessened after a large and conspicuous tax increase. After the tax, retail prices for premium cigarette brands such as Marlboro and Newport rose by about $2.25, or one-third (Henriksen et al., 2019). Research has shown that taxes included in posted purchase prices of goods have more salience for consumers than sales taxes added at the point of sale.[2] The survey indicates a high degree of awareness of the tax increase, further evidence of its salience: an estimated 91.0% (95% CI = [89.7%,92.1]) of smokers knew that there had been a cigarette tax increase. For all these reasons, the large increase in the price of cigarettes in 2017 creates a promising hunting ground for tax evasion and avoidance.

The economic analysis of compliance with tobacco excise taxes faces difficulties similar to those that afflict the study of tax compliance in general: there is far too much compliance compared to any reasonable expectation based on economic incentives alone. Even linking behavior to observed demographic characteristics is difficult: "within any group defined by income, age, or other demographic category, there are some who evade, some who do not, and even some who overstate tax liability" (Slemrod, 2007). With regard to tobacco-related tax evasion, Joossens et al. (2014) and Cantrell et al. (2008) found that few if any individual characteristics were significant determinants of smoking an illicit pack of cigarettes or otherwise trying to avoid cigarette taxes. The empiricist therefore faces a difficult task attempting to predict noncompliance, which may be one reason that strong empirical evidence on the determinants of tax compliance is relatively scarce (Slemrod, 2007). Several sets of hypotheses regarding individual participation in tax avoidance and ITTP are investigated: the likely relationship between demographics and compliance, the impact of economic factors, and the role of tax morale.

[2] Chetty et al., (2009); see also Finkelstein (2009) on price visibility and salience.

A. Risk aversion and demographics

Risk aversion is usually expected to be negatively associated with lawbreaking in the economics-of-crime literature (Polinsky & Shavell, 2007). There are three direct measures of risk aversion in our data. The first is the willingness to pay for a 10% chance to win $1000 in a lottery, a measure found to correlate well with actual decision-making under uncertainty (Ding et al., 2010). Second are two indices of behavioral attitudes toward risk. The first index, *Law$Cautious*, is a composite of attitudes toward risk-taking regarding the law and money, while the second index, *CigCautious*, pertains directly to risk in buying suspect cigarettes (see Table 1 for details and Table A - 1 in the online appendix for summary statistics on these and the other variables used in the regressions). The behavioral risk indices are composed from respondents' self-assessment of whether they prefer to avoid risk when buying cigarettes (e.g., when encountering suspiciously cheap product that might be counterfeit).

Risk aversion may differ on average over observable demographic characteristics, and so demographic correlates of tax avoidance are reviewed next. Since little work has been performed on compliance with excise taxes in general or tobacco taxes in particular, the review of the empirical evidence here is mainly from the income-tax compliance literature. Men are less risk averse on average than women (Hartog et al., 2002) and evade taxes more (Baldry, 1987; Torgler, 2007, p.34). The elderly are least likely to evade (Slemrod, 2007; Torgler, 2007). People with lower income are more likely to evade income taxes while higher income households are more likely to engage in legal avoidance (Christian, 1994; Slemrod, 2007). For tobacco-tax evasion, Shelley et al. (2007) found that purchasers of illicit tobacco in Harlem (in New York City) viewed buying such cheap cigarettes as justifiable and a natural response in their "economically depressed" neighborhoods. On the other hand, risk aversion likely decreases with income (Hartog et al., 2002). Thus, the overall expected association between income levels and tax compliance is unclear.

Similarly, the theoretical and empirical predictions for how education affects tax compliance are equivocal. Higher educational attainment may correspond to more knowledge of the social good provided by tax revenue but also more awareness of inefficiency in the administration of public funds (Torgler, 2007). Regarding race and ethnicity, at least in some contexts Blacks and Hispanics are more likely than others to support anti-smoking policies (Unger et al., 1999), but race and ethnicity are likely also to be correlated with many other relevant factors related to tax evasion.

B. Other economic determinants

The sales-tax rate pertaining to the ZIP code of residence is included as a regressor, and is expected to be positively related to noncompliance by encouraging substitution toward cigarettes purchased in ways that avoid or evade local taxes.[3] The price differential with cigarettes in bordering states and the distance to lower-taxed product are have been found to be important factors in studies of tobacco-tax evasion (Chiou & Muehlegger, 2008; DeCicca et al., 2013; Goel, 2008; Lovenheim, 2008; Prieger & Kulick, 2018; Stehr, 2005). After California's tax increase, the neighboring states of Oregon, Nevada, and Arizona all had higher taxes and prices.[4] Whether the driving time from the respondent's ZIP code to the nearest retail location in a bordering state or Mexico affects behavior is examined. Cigarettes are generally much cheaper in Mexico than in California,[5] and limited amounts may be brought across the border legally. However, the taste of many Mexican cigarettes (including Marlboro, the world's most popular brand) differs from their domestic counterparts. Mexico may also provide convenient access to

[3] The sales tax data are those in effect 3Q2017 through 1Q2018, collected from the California Board of Equalization website. The regressor is the sum of any county and city sales taxes pertaining to the ZIP code of the respondent.
[4] Data on typical cigarette prices from numbeo.com show that, in June 2018, smokers would expect to pay $8.75 for a pack of Marlboro brand cigarettes in San Francisco, and $8.00 in Los Angeles, compared to $7.58 in Phoenix (Arizona), $7.30 in Las Vegas (Nevada), and $6.65 in Portland (Oregon) (the largest cities in the neighboring states).
[5] The average price of cigarettes in the US is 2.6 times the average price in Mexico (data from Euromonitor's Passport database for 2015).

ITTP. By similar logic, also examined is the driving time to the nearest reservation, since sales on reservations are often not taxed, the (non-tribal) buyer's obligation from the state to pay use taxes is virtually unenforceable, and reservations have been implicated in tax evasion elsewhere (Chernick & Merriman, 2013; DeCicca et al., 2014; Kelton & Givel, 2008).

Also explored is whether the ready availability of legal, fully taxed cigarettes affects intended tax compliance and ITTP. Tobacco-retailer density is limited by law in some cities in California (Coxe et al., 2014) as a tobacco control measure, under the assumption that making access less convenient lowers demand for cigarettes. The same reasoning carried a step further dictates that untaxed or illicit cigarettes sold on the street, which are substitutes to fully taxed product, would also become relatively more attractive, so that density of tobacco outlets would be negatively associated with intended tax evasion and ITTP.

C. Tax morale

This study focuses on how social norms, feelings of guilt and shame, and attitudes towards fairness affect smokers' behavior. The more prevalent smoking is in a community, the less social disapprobation may be felt by individuals seeking to avoid excise taxes, which lowers the psychic cost of violation. Shelley et al. (2007) found that in an area in New York City where smoking was seen as a prevailing community norm, smokers' attitudes toward tax evasion and ITTP were softened by the perception that a majority of people in the community smoke. Smoking as a norm is measured with an index of how common the smoker perceives smoking to be among their friends, peers, and community; see Table 1 for the definition.

Similarly, other research suggests that in areas with substantial illegal markets in consumer goods a consumer norm is created that furthers illicit behavior. Bian et al. (2016) suggest that a "pervasive norm" (of counterfeit luxury goods, in their context) makes it easier for consumers to rationalize and justify participation in the black market. Similarly, pervasive tax evasion following a new tax can persist due to the reinforcing peer effects (Besley et al., 2019).

Illicit activity as a norm is measured with an index of the respondent's perceived local prevalence of and positive attitudes toward ITTP and tobacco-tax evasion, buying counterfeit luxury goods, and income-tax evasion.

Social norms are also closely related to the impact of the intrinsic motivations of shame and guilt on behavior, since normalization of tax avoidance and evasion in a community would lower the intensity of such negative emotions. The behavioral literature has shown that shame and guilt are powerful emotions relevant to economic behavior in general (Frank, 1988; Kandel and Lazear, 1992; Becker, 1996) and tax morale in particular (Andreoni et al., 1998; Erard & Feinstein, 1994). Research by Hopfensitz and Reuben (2009) shows that the social emotions of shame and guilt may be necessary for successful enforcement of cooperative norms. In addition to the indices about smoking and illicit activity as norms, the self-perceived susceptibility to shame and guilt is therefore measured with an index some of whose components are validated in the psychology literature.[6] For these reasons, it is expected that the incidence of tax avoidance and ITTP would rise with each of these indices.

Perceptions of fairness or social justice can also affect economic behavior (Biel & Thøgersen, 2007; Rabin, 1993) and tax compliance (Bordignon, 1993; Braithwaite, 2003; Cowell, 1992; Torgler, 2007). Where individuals feel that society in general or specific laws or taxes in particular are unfair or unjust, individual compliance with social norms and laws may decline. The reciprocity mechanism of tax morale postulates that compliance may break down if the tax payments demanded by the state are not exchanged for fair and equal treatment by government and society (Luttmer & Singhal, 1994). Thus, it is explored whether the smoker's perception of income inequality being a problem in the neighborhood and the nation is related to compliance.

[6] The question about receiving too much change at a store is from the Dimensions of Conscience questionnaire (Gore & Harvey, 1995).

Another aspect of fairness is whether the individual thinks that tobacco policies unfairly target smokers and whether smoking should be a purely personal choice. A measure of libertarian attitudes toward smoking covering these sentiments is constructed. It is hypothesized that the indices for income inequality and libertarian attitudes are positively related to tax avoidance and ITTP.

III. Description of the survey

To measure smokers' behavior regarding tax evasion, tax avoidance, and ITTP, 5,001 adult smokers were surveyed about a year after the tax increase on April 1, 2017.[7] Respondents were drawn from online panels put together by SSI, Inc. The written online survey was sent to panel members residing in California who stated they were smokers.[8] Initial screening verified that respondents were California residents between the ages of 18 and 74 (inclusive) and that they were current smokers who had smoked at least 100 cigarettes in their lifetime. Respondents who considered themselves ex-smokers or who said they smoked cigarettes on fewer than 12 of the past 30 days were excluded. The target population of the surveys is therefore current smokers in California aged 18 to 74 who are literate in English.

The respondents were geographically diverse, representing 55 of California's 58 counties. Survey weights were constructed to align the distribution of the sample with that of the target population, as described in the appendix. All estimates of means and proportions presented here employ the survey weights, while the regression estimates do not. Compared to the target population, our survey respondents are more likely to be female, younger, white, and more

[7] The survey was commission by BOTEC Analysis, which contracted with SSI, Inc. to administer the survey. Survey responses were collected from March 12 to April 13, 2018. The survey was issued a certificate of exemption by the Western Institutional Review Board due to the anonymity of the respondents to the researchers. The survey script is available in the online appendix.

[8] The survey was designed to be "mobile phone friendly," and apparently was; while 41.2% of respondents used a PC or laptop, 47.6% used a smartphone (the remainder used a tablet device of some sort).

educated. After weighting, the survey demographics highly similar to the population (appendix Table A-2).

Whether weighted or not, if tobacco users do not report their behavior truthfully or if the online panels of respondents differ systematically in their behavior compared to other smokers, there will be selection bias in the estimate. Self-reports of tobacco use have been shown to be valid in the past (Velicer et al., 1992; Patrick et al., 1994), with the exception that frequency of use is underreported, but there is some evidence that underreporting of tobacco consumption is rising as smoking becomes more stigmatized (Fendrich et al., 2005). Internet-based surveys have several advantages over traditional survey modes, most notably cost, the potential to reach more respondents, and lower bias in response to sensitive questions, but are subject to concerns about self-selection bias. Nevertheless, information on smoking gathered by online surveying has been found to have strong reliability and validity and to be comparable to face-to-face modes of interviewing (Klein, Thomas, & Sutter, 2007), with the exception that in some cases reported frequency of smoking is higher in online surveys (Ramo, Hall, & Prochaska, 2011). One study suggests that "the relative anonymity of online or electronic questionnaires may lessen social desirability bias…, as there are no interviewer effects" (Ramo et al., 2011). Thus, online surveying may be a potent tool to overcome the tendency to underreport tobacco use and other tobacco-related stigmatized behavior such as ITTP.

IV. Empirical results

In this section, results regarding smokers' behavior and the determinants of tax avoidance, tax evasion, and ITTP are reported.

A. The incidence of tax avoidance, tax evasion, and ITTP

Eight measures of tax avoidance, evasion, and ITTP were collected as a set of binary variables, some pertaining to the current pack being smoked and others pertaining to behavior in

the past 30 days or year. Table 2 shows the names, definitions, and estimates of the population proportions of the behaviors investigated with direct survey questions. Measures pertaining to the current cigarettes being smoked include whether the pack has a proper California state tax stamp (variables *NoStamp1* and *NoStamp2*), whether the cigarettes were purchased singly as "loosies" (which is illegal on the part of the seller, regardless whether the proper taxes are paid), and whether the reported price paid for a premium brand was lower than would be likely if taxes were included (variable *PriceTooLow*).[9] The measures pertaining to the past 30 days are *Untaxed* (having possibly bought untaxed cigarettes in the past 30 days)[10] and *Counterfeit* (having possibly bought counterfeit cigarettes in the past 30 days). There are two measures asking about behavior in the prior year. The first, *TaxAvoidance*, is a composite variable, taking value 1 if either of the following hold: the respondent brought into California more than 400 cigarettes in one trip (whether by self, online, or mail order); or the current pack lacks a California tax stamp. As expected, neighboring states and Mexico were the most common locations of out-of-state purchases (appendix Figure A - 2). Under state law, anyone bringing more than 400 cigarettes into the state must pay the state excise taxes directly to the California Department of Tax and Fee Administration (CDTFA) and use tax in lieu of the sales tax must also be paid, which can be done on the state income tax return. Online purchases of tobacco are not illegal per se, but are not a legal means of escaping state or federal tobacco taxes, although it apparently would be

[9] The price threshold was set to $6, which appears to be conservative. Per numbeo.com (visited in 2018), a pack of Marlboro cigarettes costs at least $6 in California in early 2017 *before* the $2 tax increase. However, since there is no minimum price for cigarettes in California, the variable *PriceTooLow* is calculated only respondents who usually smoke a premium brand.

[10] The survey question was: "Sometimes businesses or individuals sell cigarettes at lower prices because they don't pay the state tobacco tax. Such sales can be low-price cigarettes from legitimate retailers, from an individual selling cigarettes independently (door-to-door or just in the street), or online over the Internet. Have you purchased any untaxed cigarettes in the past month?" The response options were yes, no, "I'm not sure, but I suspect that some cigarettes I bought were not taxed," and don't know/can't say. If the first or third of these was chosen, variable *Untaxed* takes value 1.

relatively easy to do so.[11] Furthermore, under federal law it has been illegal since 2010 for cigarettes to be delivered through the mail by USPS; UPS and FedEx also state that they decline to mail tobacco to parties other than licensed dealers. The other prior-year measure is *TaxEvasion*, which takes value 1 if the respondent brought into California more than 400 cigarettes in one trip and reports that he or she did not pay use tax to the Franchise Tax Board on the packs.

The prevalence of the suspect or illicit behaviors reported in Table 2 ranges from 1.5% (for the currently smoked cigarettes being purchased as loosies) to 42.8% for tax avoidance in the past year. The latter figure is more than twice as high as seen in New York City after a tax increase of $1.25 (Coady et al., 2013). The other measures with high proportions include 26.3% for *Untaxed* and 21.8% for *Counterfeit*. While the latter figure may seem at first to be implausibly large, the implied probability that any one pack is counterfeit is only 1.51% (95% CI: [1.36, 1.66]).[12] It is also important to remember that in most cases the estimated prevalences pertain to an event happening at least once, and so the measured prevalence of tax avoidance or evasion is not meant to quantify the market shares of those activities.

[11] Under the federal Jenkins (PACT) Act, the CDTFA receives information from out-of-state sellers who ship cigarettes to California customers, including the buyer's name, address, and quantity purchased (cdtfa.ca.gov/taxes-and-fees/pact.htm). Of course, this process assumes that out-of-state sellers follow the requirements of the Jenkins Act. Evidence indicates that in fact it is relatively easy even for minors to obtain untaxed cigarettes online, often from overseas vendors (Hall et al., 2016; Williams et al., 2017).

[12] Let the probability that a pack is counterfeit be p, let the number of packs consumed per month by respondent i by n_i, and let y_i be 1 if at least one pack consumed in the month is counterfeit (y_i = 0 otherwise). Then the probability that y_i = 1, based on the binomial distribution, is $[1-(1-p)^{n_i}]$. From this expression we calculated the weighted maximum likelihood estimate of p from the data, which is 0.0151 (SE = 0.0008, 95% CI = [0.0136, 0.0166]). This calculation assumes that counterfeits are equally available across the state and that consumers purchase them randomly and unintentionally instead of seeking them out. Counterfeit cigarettes are typically low quality, have poor taste, and are usually shunned by buyers (Kulick, 2017; von Lampe et al., 2016).

B. Determinants of tax avoidance, tax evasion, and ITTP

To link the eight binary measures of tax avoidance, evasion, and ITTP to the demographics and attitudes of the smoker, characteristics of the area, and measures of access to out-of-state cigarettes, logit regression models are estimated. The model for the probability that a binary dependent variable y_{ij} equals one is

$$g\left(\Pr(y_{ij} = 1|x_i, z_j, u_j)\right) = \beta_1{}'x_i + \beta_2{}'z_j + u_j$$

where individual i lives in ZIP code j, g is the logit link, x_i is a vector of individual-level regressors, z_j is a vector of area-specific regressors, and u_j is a normally distributed random effect with mean zero and variance σ^2. For the logit model, coefficients β are log odds ratios. The random effect captures unobserved heterogeneity at the area level due to behavior-relevant factors not directly controlled with the regressors in z.[13]

Diagnostic procedures revealed no potential problems from near multicollinearity.[14] As in some other studies of tax morale or illicit tobacco markets, many factors potentially associated with compliance are not found to have measurable links to suspect behavior in the various regressions, and the discussion covers statistically significant factors only.

1. Smoking behavior

In an initial set of estimations, reported in Table 3, only individual-level regressors are included. There are three control variables regarding reported smoking behavior.[15] Users of e-cigarette devices (vapers)[16] were more likely to have paid a suspiciously low price

[13] While the random effects model requires the assumption that u_j is independent of the regressors, a fixed effects model is unavailable because it would absorb the many area-specific regressors.

[14] In the regression with all variables added, the variance inflation factors (VIFs) for the regressors were checked and none were found to be above 5 (a conservative threshold for near multicollinearity).

[15] There is no causal interpretation to the coefficients on these behavioral variables, of course, since each reflects another choice made by the smoker.

[16] In addition to smoking regular cigarettes (dual use), that is (respondents who used e-cigarettes only were excluded from the survey sample).

(*PriceTooLow*), avoided cigarette taxes in the past year (*TaxAvoidance*) and the past 30 days (*Untaxed*), and bought counterfeit product recently (*Counterfeit*). Smokers who rolled their own cigarettes were more likely to buy single cigarettes (*Loosies*) and to have avoided taxes in the past 30 days. These alternative smoking behaviors may be prompted by the same desire to lower the cost of smoking that prompts tax avoidance (although both loose tobacco and e-cigarettes have excise taxes roughly equivalent to the cigarette tax).[17] More intensive smoking (as measured by the log of the number of cigarettes smoked per day) is negatively related to *Loosies*; given the convenience of a pack when purchasing larger quantities of cigarettes, it is not surprising that more frequent smokers are less likely to buy loosies.[18] Heavier smoking is also negatively associated with admitting to evading taxes in the past year (*TaxEvasion*; an unexpected result), but is positively associated with *TaxAvoidance*, *Untaxed*, and *Counterfeit*. These positive associations may reflect reverse price effect: avoiding taxes and buying untaxed or counterfeit cigarettes lowers the cost of smoking, which may induce greater intensity of smoking. Also included are indicator variables for four brand categories: one each for the top three brands (Marlboro, Camel, and Newport), and one for not having a regular brand of choice or for usually smoking roll-your own (RYO) cigarettes; the excluded fifth category is smoking some brand other than the top three. Many of the associations between the "big three" brands and the suspect activities are negative, suggesting that smokers of premium brands are less likely to take chances with buying under suspicious circumstances. Another finding of note is that smoking Newports is strongly positively associated with *Counterfeit*. While Marlboro is the most

[17] Both products are taxed as non-cigarette tobacco products, with rates determined by law to be comparable to the cigarette tax rate (as a ratio of wholesale prices)(Cal. Rev. & Tax. Code § 30123(b)).

[18] Whether loosies are cheaper per unit than a pack likely depends on whether the source of the single cigarettes is taxed. In New York City loosies often come from bootlegged packs and they cost less per unit than fully taxed packs (von Lampe et al., 2018). If loosies are instead sourced from taxed packs their unit price would be higher. In California in the 1990s loosies sold for 20 cents each in Los Angeles, about twice as much per unit as taxed cigarettes (Landrine et al., 1998; Orzechowski & Walker, 2021; Woodruff et al., 1995).

counterfeited brand in the world (WCO, 2014), there are many reports of counterfeit Newports in the US.[19]

2. Demographics

While many of the demographic characteristics are significant in many of the regressions, many are not. Given the difficulties in linking demographics to compliance discussed in section II above, this is to be expected. Some research on determinants of individual participation in black markets for tobacco and other goods also finds no or little influence of demographic variables (Bian & Moutinho, 2009; Joossens et al., 2014). Nevertheless, in many of the regressions the sets of coefficients for income, education, and race/ethnicity are jointly significant. In accord with expectations, but in contrast to other studies failing to link gender to cigarette tax evasion (Coady et al., 2013; Joossens et al., 2014), male smokers are more likely to pay suspiciously low prices, avoid taxes in the past year, and buy untaxed and counterfeit cigarettes recently. Older smokers[20] are more likely to report that their current pack did not have a proper tax stamp (*NoStamp1* and *NoStamp2*).[21] Older smokers are less likely to avoid taxes (*TaxAvoidance*), in contrast to DeCicca et al.'s (2013) finding that older people are more likely to cross a border to buy cigarettes.[22] They are also less likely to buy untaxed packs (*Untaxed*), in

[19] See, for example, USDOJ (2016).

[20] While the age variable in the survey is categorical, for the sake of parsimony we treated it as a continuous variable in the regression specification by using the midpoint age of each of the 7 age categories.

[21] However, it may also be that it was more difficult for older respondents in our survey to see the stamps. In the survey we showed an enlarged picture of a California tax stamp. The actual stamps on the packs are relatively small (22mm by 13 mm) and those with poorer vision may have incorrectly stated that their pack did not have a matching stamp.

[22] The difference in findings may be due to the greater distances that most California residents would have to travel to purchase from another state. DeCicca et al (2013) use data from across the nation, and much of their cross-border purchasing is likely from Chicago and New York City (the two locations with the highest tobacco taxes), both of which are fairly close to a neighboring state. In contrast, the mean time for a smoker to drive to the nearest other state in our survey is 3.2 hours.

accord with the income-tax evasion literature discussed above and Coady et al.'s (2013) study of purchasing cigarettes on the street. Older smokers are also less likely to have bought counterfeits.

Income was insignificantly related to evasion in many of the estimations—perhaps unsurprisingly so, given the discussion above about the unclear theoretical impact of income on compliance and the similar finding in Joossen et al.'s (2014) study of smoking illicit cigarettes. The exceptions were for *TaxAvoidance*, *TaxEvasion*, and *Untaxed*, where higher incomes generally engaged in more such behavior. DeCicca et al. (2013) had a similar result for border-crossing to buy cigarettes. It thus appears that the adage "the poor evade but the rich avoid" income taxes does not apply to tobacco taxes. Regarding education, the log odds of activities *PriceTooLow*, *TaxAvoidance*, *Counterfeit*, and *TaxEvasion* rise with educational attainment, although for the latter the coefficient on the highest education group is slightly (and insignificantly) lower than for the college-degree group.

Regarding race and ethnicity, Asians were more likely than whites not to have a proper tax stamp (*NoStamp1* and *NoStamp2*) and—probably related—to evade taxes. Native Americans were the most likely to buy untaxed packs (*Untaxed*), perhaps because tribal members are entitled to buy untaxed cigarettes on tribal land in California,[23] and also had a high odds ratio for buying counterfeits. Blacks have the highest odds ratios for *NoStamp1* and *NoStamp2* and higher coefficients than whites for buying counterfeit product. The latter result is most likely related to the positive coefficient for the Newport brand, since that brand is popular with black smokers. Hispanic ethnicity has negative association with *TaxAvoidance* and positive association with

[23] However, in our survey, Native Americans who said they were members of a federally recognized tribe (a precondition for being allowed under state law to buy untaxed cigarettes on a reservation) were actually less likely than others claiming Native American as their primary race to buy untaxed cigarettes (per variable *Untaxed*). On the other hand, of the seven Native Americans living on reservations in our survey, four said they bought untaxed cigarettes.

Untaxed and *Counterfeit*. Coady et al. (2013) also found that black and Hispanic smokers were more likely than other to purchase cigarettes on the street in New York City.

3. Economic determinants

The impact of regressors motivated by the law and economics approach to tax avoidance or crime is explored in Table 4. While all the regressors from the previous set of estimations are also included, their coefficients are omitted from Table 4. The newly added regressors include all the area-specific economic variables, all of which pertain to the cost of accessing cigarettes, and the lottery-based measure of risk aversion. The coefficient for the sales tax rate is positive as expected and significant for *TaxAvoidance, Untaxed*, and *Counterfeit*. This implies that higher prices are associated with more tax avoidance and evasion.[24] The impact of log driving time to the nearest domestic cross-border location (*Time2nearSt*)[25] is negative as expected and significant for *PriceTooLow*, *TaxAvoidance*, and *Untaxed*: a decrease in driving time is associated with less tax compliance. The impact of log driving time to Mexico (*Time2Mex*)[26] is negative and significant for *TaxAvoidance* and *TaxEvasion*. Thus, the expectations regarding prices and access to cheaper cigarettes outside the state are borne out for tax evasion and avoidance.

The driving time to the nearest Native American reservation (*Time2Res*)[27] is not significant, except for *Untaxed* and *Counterfeit*, for which its coefficient is positive. In

[24] Higher sales taxes should imply higher cigarette prices, since demand for cigarettes is inelastic (Chaloupka & Warner, 2000). The iterature generally finds tax pass-through for cigarettes to be not only positive but greater than 100% (Sullivan and Dutkowsky, 2012; Wang et al. 2015), although such studies typically focus on excise taxes and not sales taxes.

[25] The driving times are the minimums over routes calculated from the ZIP code of the respondent to many addresses just across the state borders along major border crossings. Travel times were taken from Google Maps in 2018 via Google's Distance Matrix API.

[26] The driving times are calculated as in the previous footnote, but with addresses just across the Mexican border.

[27] The driving times are for the closest Indian reservation, rancheria, or land held in trust for a tribe; travel time is calculated via Google's Distance Matrix API. GIS data on the location of native lands are from the Bureau of Indian Affairs.

regressions not reported, this regressor was replaced with the log time to the nearest Indian casino; in that case the coefficient is insignificant in each regression. These results may indicate that reservations are not a significant source of tax evasion in California. The local density of licensed cigarette retailers (*CigRetailDen*)[28] is insignificant in all regressions.

The final Beckerian regressor is the willingness to pay for a lottery. Its coefficient is positive and significant for *TaxAvoidance, Untaxed*, and *Counterfeit*. Given that people with less risk aversion would have higher willingness to pay, this is the expected outcome. For the other measures of compliance, it may be that general risk aversion has little to do with consumers' engagement with some forms of ITTP because the risks involved are very low.[29]

4. Risk attitudes and tax morale

In the next set of regressions (Table 5) the regressors pertaining to attitudes regarding risk and tax morale replace the economic regressors. The new set of regressors generally performs better than the "hard" law-and-economics regressors, in the sense that apart from the regression of *NoStamp1*, the log likelihood and chi-square statistics are larger.

Of the two attitudinal risk indices, it is unsurprising that *CigCautious*, the one specifically related to risk in purchasing cigarettes, is more consistently negatively associated with the suspect behaviors than *Law$Cautious*. *CigCautious* is negatively associated with each dependent variable, significantly so for all but *Loosies* and *TaxAvoidance*, and its log-odds ratios are among the lowest in the entire table. The other risk index, *Law$Cautious*, has lower log-odds ratios and

[28] Data on retail businesses of any type licensed to sell cigarettes were provided upon request from the California Board of Equalization, and pertain to May 2017. Due to obligations to protect confidentiality, the BOE list does not include licenses issued to individuals. Density is calculated as the number of licensed retailers in the ZIP code divided by the square mileage of the associated census ZCTA. Note that local population density (*PopDen*) is included in the regression as a control variable to ensure that the retailer density does not merely serve as a proxy for population.

[29] There is virtually no enforcement against ITTP that is aimed at consumers; nearly all enforcement action is aimed at the supply side.

is negatively and significantly related to *TaxEvasion* only. *Law$Cautious* is positively related to *Untaxed*, and in a regression with that index replaced with its constituent parts (not shown in the table) it can be seen that the positive coefficient is entirely due to *MoneyCautious* (refer to Table 1).[30] Given the wording of the question behind *Untaxed*, the positive association between *MoneyCautious* and *Untaxed* may reflect that smokers who are careful with their money are also more likely to *suspect* being sold illicit tobacco, even though they do not seek to evade taxes. Regardless, once all covariates are added in the same regression (Table A-7, discussed below), this positive coefficient on *Law$Cautious* disappears.

Smoking as a norm is, as expected, positively associated with *PriceTooLow*, *TaxAvoidance*, *Untaxed*, and *Counterfeit*. However, it is negatively associated with *TaxEvasion* which is unexpected. Illicit activity as a norm is, as hypothesized, positively associated with *Loosies*, *PriceTooLow*, *TaxAvoidance*, *Untaxed*, and *Counterfeit*. The shame and guilt index is negatively associated with *TaxAvoidance* and *Untaxed*. Individuals who consider that income inequality is a problem or who hold libertarian attitudes toward smoking are no more likely to engage in suspect behaviors than others.

5. Omnibus and alternative regressions

In a final set of regressions, all variables discussed above are added to the same regressions. The results, in appendix Table A-7, show few material differences from the conclusions reached before. There are no sign changes on coefficients that were significant at the 5% level or better in Tables 3–5. However, there are a few changes in significance level. In the regression for *TaxAvoidance*, the significance on the coefficient for sales tax falls to the 10% level. The regression for *Untaxed* changes the most: the log-odds ratios for the sales tax, driving

[30] In the unreported regression of *Untaxed* on *MoneyCautious*, *LawCautious*, and all the other regressors as in Table 5, the log-odds ratio for *MoneyCautious* is 0.106 (s.e. = 0.046, p = 0.02) while for *LawCautious* it is 0.0006 (s.e. = 0.046, p = 0.99)

time to nearest other state, lottery willingness to pay, *Law$Caution*, and the shame and guilt index all lose significance. Note that the new result for *Law$Caution* removes an anomalous finding from the regression in Table 5.

Two alternative econometric models were estimated to check the robustness of the results. For comparison with the random-effects logit model, a standard logit model was also estimated for each of the regressions above (results are in the appendix). With the exception of a few more significance stars, the results change little. For a second alternative model, the ZIP-code level random effects were replaced with fixed effects at the metropolitan statistical area (MSA) level (results are in the appendix). This model is robust to unobserved confounding factors specific to the MSA, even if they are correlated with the included regressors. For coefficients that were significant in Tables 3–5, there were no sign changes in the fixed effects regressions, with the exception that the log odds for local sales taxes turns insignificantly negative.

6. Which variables are the best predictors of tax evasion and ITTP?

It is interesting to consider which among the various sets of regressors form the best predictors of tax avoidance, evasion, and ITTP. Table 6 shows the R^2 from OLS regressions (i.e., the linear probability model instead of logit, to yield readily interpretable R^2 statistics). Three measures of suspicious activity are included: *TaxAvoidance*, *Untaxed*, and *Counterfeit*.[31] For each dependent variable, five regressions are performed. In the baseline regression specification, only the control variables related to smoking behavior (those discussed in subsection 1 above) are included. In the other regressions for each dependent variable, the increase in the R^2 is reported in the table. The second regression adds the demographic predictor variables (those

[31] Regressions of the other measures of noncompliance have such low R^2 that the percentage changes in when adding regressors are highly variable. Nevertheless, for all but the tax stamp regressions the moral sentiments regressors increase the baseline measure of fit more than the Beckerian regressors, as with the results shown in Table 6.

from Table 3). The third regression does not include the demographics, but instead adds the law and economics style variables pertaining to the cost of avoiding or evading taxes: the driving time variables and cigarette retailer density. The fourth regression includes the smoking controls and the three predictors related to risk aversion: the lottery question, *Law$Cautious*, and *CigCautious*. The unique regressors in the final regression are the indices related to tax morale: *SmkNorm*, *IllActNorm*, *ShameGuilt*, *IncIneq*, and *MYOB*.

The results show that the predictors from the traditional law and economics approach (in rows 3 and 4 of Table 6) increase the baseline measure of fit the least. This is so even though the non-standard attitudinal variables *Law$Cautious* and *CigCautious* are included in the set of regressions with the risk aversion regressors. For *TaxAvoidance*, the demographics are the best predictors, while for *Untaxed* and *Counterfeit* the predictors measuring tax morale improve the fit of the regression the most. These results suggest that morale can be a powerful motivator of economic behavior as well as a highly useful predictor for researchers seeking to forecast which individuals are most disposed toward noncompliance.

C. Assessing sensitivity bias

As with any survey with potentially sensitive questions, one may wonder whether the answers are prone to social desirability bias or other types of sensitivity bias (Blair et al., 2020). The survey data offer a way to test for sensitivity bias in reported tax avoidance and purchase of untaxed cigarettes. These questions were asked both directly, as analyzed above, and indirectly with the *item count technique* (ICT). The ICT is designed to elicit truthful responses, and has generally been found to reduce sensitivity bias (Coutts & Jann, 2011; Droitcour et al., 1991). In the ICT, a control sample of half the respondents are presented with a short list of non-threatening behaviors and asked to count how many they did recently.[32] The other half of

[32] For the list of behaviors presented in the survey, see questions Q3 and Q4 in the survey script in the online appendix.

respondents are shown the same list but with the sensitive behavior of interest added, and asked the same question. Since respondents are not asked to admit to doing any particular one of the items on the list, they should feel more able to answer truthfully even if some items are sensitive. The difference in the mean counts between the groups is an estimate of the prevalence of the sensitive behavior.

The results are shown in Figure 1. Panel A shows the estimated population prevalence of having purchased cigarettes outside California in the past 30 days, split by tertile of the shame and guilt index (*ShameGuilt*). Smokers who score highly on the shame and guilt scale may be both less likely to do and more loath to admit to tax avoidance and evasion. The point estimates show that whether questioned directly or indirectly, admitting to buying out of state declines markedly with shame and guilt, but there is no systematic or significant underreporting of out-of-state purchasing. There is a greater difference in the estimates in panel B for the prevalence of purchasing untaxed cigarettes (defined as in footnote 10), but only for the highest tertile of *ShameGuilt*, and the difference between the estimates from the direct and indirect methods is not significant. There is thus no strong evidence against the veracity of the respondents' answers to these sensitive questions.

V. Discussion and conclusions

This research offers a look at how demographic, economic, and attitudinal factors relate to the tax compliance of smokers in response to a large tax increase. The suspect behaviors and outcomes examined here show that many smokers engage in tax avoidance and evasion to reduce expenditure on cigarettes. Almost one in seven packs currently being smoked lacked a proper tax stamp. Significant proportions of the smoking population engaged in tax avoidance (43% in the past year) but fewer admitted to outright tax evasion by procuring cigarettes outside the state, bringing them home, and failing to pay use tax (14% in the past year). When asked in a more

neutral fashion—asking whether they had purchased from *sellers* who did not pay taxes—many more thought that they were exposed to tax evasion (27% in the past month). Some forms of ITTP appear to be relatively rare: fewer than 2% of cigarettes currently being smoked were purchased as illegal single cigarettes, and the implied probability that a randomly selected pack is counterfeit is estimated to be only 1.5%. In summary, there were apparently many ways that California smokers used to reduce the cost of smoking, and not all of them were licit.

It appears that compared to ITTP hotspots in the US such as Chicago and New York, tax evasion and avoidance is much lower in California. Aziani et al. (2017) estimate that, in recent years, over half the packs discarded in Buffalo, NY, were not tax paid and that about 70–73% of packs were not fully tax paid (including state and local taxes) in New York City and Chicago while Kurti et al. (2013) found that more than 80% of packs discarded in the South Bronx of New York City in 2011 were not tax paid. On the other hand, it was noted above that the prevalence of tax avoidance estimated here is more than twice as high as estimated for New York City from a similar survey (Coady et al., 2013). Furthermore, the incidence of tax avoidance found herein is higher than it was two decades ago after California's previous tobacco tax increase in 1999. Emery et al. (2002) concluded that only about 5% of California smokers avoided the excise tax by usually purchasing cigarettes from untaxed or lower-taxed sources such as out-of-state outlets, reservations, and the internet.

No single economic or morale factor was a consistent correlate of suspect behavior across all regressions, but with some exceptions the coefficients were either significant and of the sign suggested by theory or were insignificant. This result is common in the literatures on tax morale (Slemrod, 2007) and tobacco tax evasion Cantrell et al., 2008; Joossens et al., 2014), however, and the novel data do allow many significant associations to be identified. Perhaps most interesting is that there is evidence that factors pertaining to tax morale and behavioral considerations appear to matter—and strongly so—in many of the estimations. In fact, tax

morale goes farther than law-and-economics type variables toward predicting noncompliance. In the case of counterfeit cigarettes, the tax moral factors have more explanatory power than even the demographic variables.

As with other studies of tax morale, the associations uncovered between the various potential determinants and the measures of tax compliance are mainly descriptive. Sentiments, attitudes toward risk, and behavior are intertwined in ways that preclude simple unidirectional paths of causation. For example, being highly cautious about buying cigarettes under suspicious circumstance may reflect past instances of disappointment with the quality of tobacco obtained from the black market. Stating that illicit activity is a norm among one's community or peers may be a lawbreaker's ex post rationalizing belief.

Apart from potential codetermination, the associations related to tax morale factors uncovered in the regressions are not causal effects for another reason. Even if shame and guilt (for example) could be manipulated by policy to change smokers' behavior in desired ways, since these variables' associations with tax compliance were not identified from variation in the data produced directly by such policy manipulation, the impacts of such interventions remain unknown. Smokers' internal ability to counterargue against persuasive messaging and campaigns is well documented (Liu et al., 2021). Furthermore, even if such manipulation would increase compliance with policy-makers' desired ends, it is important to note that, apart from antismoking policy, current drug policy has moved away from stigmatizing the behavior of individuals.[33] Stigma can create its own harms, even if directed against illegal or smoking-related behavior (Evans-Polce et al., 2015; Mak et al., 2007; Ramstedt, 2021).

What then are other practical implications of the results? The results pertaining to social norms are promising. As smoking rates continue to decline and smoking becomes less of a norm,

[33] Bell et al. (2010) note that, while in recent years "addictions policy has stressed the need to counteract stigmatization in order to promote public health," on the other hand "tobacco control advocates appear to have embraced the use of stigma as an explicit policy tool."

illegal behavior such as selling single, untaxed, or counterfeit cigarettes may find fewer takers. The results could also be used to identify communities with low predicted compliance with future tax increases, in order to target effectively measures to reduce demand for ITTP or increase supply-side enforcement against it. While enforcement against suppliers involved in ITTP can be effective, it is just as challenging as enforcement against illicit drug markets and can create its own social harms (Kleiman et al., 2016; Tosza & Vervaele, 2022) and can drive the remaining illicit market further underground (Woodruff et al., 1995), which raises important questions on how best to target enforcement most effectively (Kulick et al., 2016).

References

Advani, A. (2021). Who does and doesn't pay taxes? *Fiscal Studies*. Online advance version. https://doi.org/10.1111/1475-5890.12257

Agaku, I. T., Blecher, E., Filippidis, F.T., Omaduvie, U. T., Vozikis, A., & Vardavas, C. I. (2016). Impact of cigarette price differences across the entire European Union on cross-border purchase of tobacco products among adult cigarette smokers. *Tobacco Control, 25*(3), 333–340.

Allingham, M. G., & Sandmo, A. (1972). Income tax evasion: A theoretical analysis. *Journal of Public Economics, 1*(3–4), 323–338.

Alm, J., & Sanchez, I. (1995). Economic and noneconomic factors in tax compliance. *Kyklos*, *48*(1), 3–18.

Alm, J., & Torgler, B. (2011). Do ethics matter? Tax compliance and morality. *Journal of Business Ethics*, 101(4), 635-651.

Andreoni, J., Erard, B., & Feinstein, J. (1998). Tax compliance. *Journal of Economic Literature*, 36(2), 818–860.

Aziani, A., Kulick, J., Norman, N., & Prieger, J. E. (2017). Empty discarded pack data and the prevalence of illicit trade in cigarettes. Retrieved from ssrn.com/abstract=2906015 on June 18, 2018.

Baldry, J. (1987). Income tax evasion and the tax schedule: Some experimental results. *Public Finance, 42*(3), 357–383.

Becker, G.S. (1996). *Accounting for tastes*. Cambridge, MA: Harvard University.

Bell, K., Salmon, A., Bowers, M., Bell, J, & McCullough, L. (2010). Smoking, stigma and tobacco "denormalization": Further reflections on the use of stigma as a public health tool. *Social Science & Medicine*, *70*(6), 795–799.

Berinsky, A. J., Margolis, M. F., & Sances, M. W. (2016). Can we turn shirkers into workers? *Journal of Experimental Social Psychology*, 66, 20-28.

Besley, T., Jensen, A., & Persson, T. (2019). Norms, enforcement, and tax evasion. National Bureau of Economic Research working paper no. w25575.

Bian, X., Wang K.-Y., Smith, A., & Yannopoulou, N. (2016). New insights into unethical counterfeit consumption. *Journal of Business Research*, *69*(10), 4249–4258.

Bian, X., & Moutinho, L. (2009). An investigation of determinants of counterfeit purchase consideration. *Journal of Business Research*, *62*(3), 368–378.

Biel, A., & Thøgersen, J. (2007). Activation of social norms in social dilemmas: A review of the evidence and reflections on the implications for environmental behaviour. *Journal of Economic Psychology, 28* (1): 93–112.

Blair, G., Coppock, A., & Moor, M. (2020). When to worry about sensitivity bias: A social reference theory and evidence from 30 years of list experiments. *American Political Science Review*, 114(4), 1297-1315.

Bordignon, M. (1993). A fairness approach to income tax evasion. *Journal of Public Economics, 52* (3): 345–362.

Braithwaite, V. (2003). *Taxing democracy: Understanding tax avoidance and evasion*. Aldershot, UK: Routledge.

Casola, L., Kemp, S., & Mackenzie, A. (2009). Consumer decisions in the black market for stolen or counterfeit goods. *Journal of Economic Psychology*, *30*(2), 162–171.

Chaloupka, F.J.,& Warner, K.E. (2000). The economics of smoking. In *Handbook of Health Economics*, Vol.1B, edited by A.J. Culyer and J.P. Newhouse, Ch. 29, 1539–1627. Amsterdam: Elsevier.

Chernick, H., & Merriman, D. (2013). Using littered pack data to estimate cigarette tax avoidance in NYC. *National Tax Journal*, 66(3), 635-668.

Chetty, R., Looney, A., & Kroft, K. (2009). Salience and taxation: Theory and evidence. *American Economic Review*, 99(4), 1145-77.

Chiou, L., & Muehlegger, E. (2008). Crossing the line: The effect of cross-border cigarette sales on state excise tax revenues. *BE Journal – Economic Analysis and Policy (Contributions)*, *8*(1), Article 48.

Chiou, L., & Muehlegger, E. (2014). Consumer response to cigarette excise tax changes. *National Tax Journal, 67*(3), 621–650.

Christian, C.W. (1993/1994). Voluntary compliance with the individual income tax: Results from the 1988 TCMP Study. *The IRS Research Bulletin*, Publication 1500 (Rev. 9-94), 35–42.

Coady, M. H., Chan, C. A., Sacks, R., Mbamalu, I. G., & Kansagra, S. M. (2013). The impact of cigarette excise tax increases on purchasing behaviors among New York City smokers. *American Journal of Public Health*, 103(6), e54-e60.

Coutts, E., & Jann, B. (2011). Sensitive Questions in online surveys: Experimental results for the randomized response technique (RRT) and the Unmatched Count Technique (UCT). *Sociological Methods & Research*, *40*(1), 169–193.

Cowell, F. A. (1992). Tax evasion and equity. *Journal of Economic Psychology, 13* (4): 521–543.

Coxe, N., Webber, W., Burkhart, J., Broderick, B., Yeager, K., Jones, L., & Fenstersheib, M. (2014). Use of tobacco retail permitting to reduce youth access and exposure to tobacco in Santa Clara County, California. *Preventive Medicine, 67*(1), S46–S50.

DeCicca, P., Kenkel, D., & Liu, F. (2013). Excise tax avoidance: the case of state cigarette taxes. *Journal of Health Economics, 32*(6), 1130–1141.

DeCicca, P., Kenkel, D., & Liu, F. (2014). Reservation prices: An economic analysis of cigarette purchases on Indian reservations. *National Tax Journal, 68*(1), 93–118.

Ding, X., Hartog, J., & Sun, Y. (2010). Can we measure individual risk attitudes in a survey? IZA DP No. 4807.

Droitcour, J., Caspar, R. A., Hubbard, M. L., Parsley, T. L., Visscher, W., & Ezzati, T. M. (1991). The Item Count Technique as a method of indirect questioning: A review of its development and a case study application. In *Measurement errors in surveys*, eds. Paul P. Biemer et al., pp. 185–210. John Wiley & Sons.

Eisend, M., & Schuchert-Güler, P. (2006). Explaining counterfeit purchases, a review and preview. *Academy of Marketing Science Review*, *12*, 1–25.

Emery, S., White, M.M., Gilpin, E.A., Pierce, J.P. (2002). Was there significant tax evasion

after the 1999 50 cent per pack cigarette tax increase in California? *Tobacco Control,* 11, 130–134

Erard, B., & Feinstein, J.S. (1994). The role of moral sentiments and audit perceptions in tax compliance. *Public Finance* 49 (supp.): 70–89.

Evans-Polce, R. J., Castaldelli-Maia, J. M., Schomerus, G., & Evans-Lacko, S. E. (2015). The downside of tobacco control? Smoking and self-stigma: A systematic review. *Social Science & Medicine*, *145*, 26-34.

Fendrich, M., Mackesy-Amiti, M.E., Johnson, T.P., Hubbell, A., & Wislar, J.S. (2005). Tobacco-reporting validity in an epidemiological drug-use survey. *Addictive Behaviors*, *30*(1), 175–181.

Finkelstein, A. (2009). E-ztax: Tax salience and tax rates. *The Quarterly Journal of Economics*, 124(3), 969-1010.

Frank, R. H. (1988). Passions within reason: The strategic role of the emotions. New York: WW Norton.

Goel, R. K. (2008). Cigarette smuggling: Price vs. nonprice incentives. *Applied Economics Letters, 15*(8), 587–592.

Gore, E.J., & Harvey, O.J. (1995). A factor analysis of a scale of shame and guilt: dimensions of conscience questionnaire. *Personality and Individual Differences*, *19*(5) 769–771.

Hall, M.G., Williams, R.S., Gammon, D.G., & Ribisl, K.M. (2016). Internet cigarette vendors make tax-free claims and sell cigarettes cheaper than retail outlets. *Tobacco Control, 25*(6)*,* 616–618.

Hartog, J., Ferrer-i-Carbonell, A., & Jonker, N. (2002). Linking measured risk aversion to individual characteristics. *Kyklos, 55*(1), 3–26.

Henriksen, L., Schleicher, N. C., Johnson, T. O., Andersen-Rodgers, E., Zhang, X., & Williams, R. J. (2019). Mind the gap: Changes in cigarette prices after California's tax increase. *Tobacco Regulatory Science*, 5(6), 532-541.

Hopfensitz, A., & Reuben, E. (2009). The importance of emotions for the effectiveness of social punishment. *The Economic Journal, 119* (540): 1534–1559.

Joossens, L., Lugo, A., La Vecchia, C., Gilmore, A.B., Clancy, L., & Gallus, S. (2014). Illicit cigarettes and hand-rolled tobacco in 18 European Countries: A cross-sectional survey. *Tobacco Control, 23*(e1)*,* e17–e23.

Kandel, E., & Lazear, E. P. (1992). Peer pressure and partnerships. *Journal of Political Economy, 100*(4), 801–817.

Kelton Jr, M. H., & Givel, M. S. (2008). Public policy implications of tobacco industry smuggling through Native American reservations into Canada. *International Journal of Health Services*, 38(3), 471-487.

Kleiman, M., Prieger, J., & Kulick, J. (2016). Illicit trade as a countervailing effect: What the FDA would have to know to evaluate tobacco regulations. *Journal of Drug Policy Analysis*, 9(1), 1-30.

Klein, J.D., Thomas, R.K., & Sutter, E.J. (2007). Self-reported smoking in online surveys: prevalence estimate validity and item format effects. *Medical Care*, *45*(7), 691–695.

Kulick, J. (2017). Cigarette taxation, regulation, and illicit trade in the United States. In E. Savona et al. (Eds.), *Dual Markets* (pp. 249-266). Springer, Cham.

Kulick, J., Prieger, J., & Kleiman, M.A. (2016). Unintended consequences of cigarette prohibition, regulation, and taxation. *International Journal of Law, Crime and Justice, 46*, 69–85.

Kulick, J., Prieger, J., & Kleiman, M.A. (2016). Targeted enforcement against illicit trade in tobacco products. SSRN. http://dx.doi.org/10.2139/ssrn.2883415

Kurti, M. K., von Lampe, K., & Thompkins, D. E. (2013). The illegal cigarette market in a socioeconomically deprived inner-city area: The case of the South Bronx. *Tobacco Control*, *22*(2), 138-140.

Landrine, H., Klonoff, E. A., & Alcaraz, R. (1998). Minors' access to single cigarettes in California. *Preventive Medicine*, *27*(4), 503-505.

Liu, J., O'Donnell, M. B., & Falk, E. B. (2021). Deliberation and valence as dissociable components of counterarguing among smokers: evidence from neuroimaging and quantitative linguistic analysis. *Health Communication*, 36(6), 752-763.

Lovenheim, M. F. (2008). How far to the border?: The extent and impact of cross-border casual cigarette smuggling. *National Tax Journal, 61*(1), 7–33.

Luttmer, E. F., & Singhal, M. (2014). Tax morale. *Journal of Economic Perspectives*, *28*(4), 149-68.

Mak, W. W., Poon, C. Y., Pun, L. Y., & Cheung, S. F. (2007). Meta-analysis of stigma and mental health. *Social Science & Medicine*, *65*(2), 245-261.

O'Connor, R. J., Bansal-Travers, M., Carter, L. P., & Cummings, K. M. (2012). What would menthol smokers do if menthol in cigarettes were banned? Behavioral intentions and simulated demand. *Addiction*, 107(7), 1330-1338.

Orzechowski and Walker Consulting (2021). *The Tax Burden on Tobacco-Historical Compilation*. Retrieved from Centers for Disease Control and Prevention, State Tobacco Activities Tracking and Evaluation (STATE) System. http://www.cdc.gov/statesystem.

Patrick, D.L., Cheadle, A. Thompson, D.C., Diehr, P., Koepsell, T., & Kinne, S. (1994). The validity of self-reported smoking: A review and meta-analysis. *American Journal of Public Health, 84*(7), 1086–1093.

Polinsky, M.A., & Shavell, S. (2007). The theory of public enforcement of law. In M.A. Polinsksy & S. Shavell, eds., *Handbook of Law and Economics, 1*, pp. 403–454. Amsterdam: North Holland.

Prieger, J.E. (2022). Tax evasion and illicit cigarettes in California: Prevalence and demand-side correlates. *Crime, Law and Social Change*. https://doi.org/10.1007/s10611-022-10030-5

Prieger, J.E., & Kulick, J. (2018a). Cigarette taxes and illicit trade in Europe. *Economic Inquiry*, *56*(3): 1706–1723.

Prieger, J.E., & Kulick, J. (2019). Empty discarded pack data and the prevalence of illicit trade in cigarettes in California. dx.doi.org/10.2139/ssrn.3320922 .

Rabin, M. (1993). Incorporating fairness into game theory and economics. *The American Economic Review, 83* (5): 1281–1302.

Ramo, D.E., Hall, S.M., & Prochaska, J.J. (2011). Reliability and validity of self-reported smoking in an anonymous online survey with young adults. *Health Psychology*, *30*(6), 693–701.

Ramstedt, M. (2021). Studying harm from others' illicit drug use—can stigma really be avoided? *Addiction*, 116, 1948-1949.

Reuter, P., & Majmundar, M. (Eds.). (2015). Understanding the U.S. illicit tobacco market: Characteristics, policy context, and lessons from international experiences. Washington: The National Academies Press.

Shelley, D., Cantrell, M.J., Moon-Howard, J., Ramjohn, D.Q., & VanDevanter, N. (2007). The $5 man: The underground economic response to a large cigarette tax increase in New York City. *American Journal of Public Health*, *97*(8), 1483–1488.

Slemrod, J. (2007). Cheating ourselves: The economics of tax evasion. *Journal of Economic Perspectives, 21*(1), 25–48.

Stehr, M. (2005). Cigarette tax avoidance and evasion. *Journal of Health Economics*, *24*(2), 277–297.

Sullivan, R.S. and Dutkowsky, D.H. (2012). The effect of cigarette taxation on prices: An empirical analysis using local-level data. *Public Finance Review, 40*(6), 687–711.

Torgler, B. (2007). *Tax Compliance and Tax Morale: A Theoretical and Empirical Analysis*. Northampton, MA: Edward Elgar.

Tosza, S., & Vervaele, J.A.E. (Eds.). (2022). Combatting illicit trade in tobacco products: In search of optimal enforcement. Springer.

U.S. Department of Justice (USDOJ). (2016). Counterfeit cigarette smuggler receives jail sentence. Press release dated January 22. Retrieved from fda.gov/ICECI/CriminalInvestigations/ucm484450.htm on June 19, 2018.

Unger, J.B., Rohrbach, L.A., Howard, K.A., Boley Cruz, T., Johnson, C.A., & Chen, X. (1999). Attitudes toward anti-tobacco policy among California youth: Associations with smoking status, psychosocial variables and advocacy actions. *Health Education Research, 14*(6), 751–763.

Van Winden, F., & Ash, E. (2012). On the behavioral economics of crime. *Review of Law and Economics, 8*(1), 181–213.

Velicer, W.F., Prochaska, J.O., Rossi, J.S., & Snow, M.G. (1992). Assessing outcome in smoking cessation studies. *Psychological Bulletin*, *111*(1), 23–41.

von Lampe, K., Kurti, M., & Johnson, J. (2018). "I'm gonna get me a loosie" Understanding single cigarette purchases by adult smokers in a disadvantaged section of New York City. *Preventive Medicine Reports*, 12, 182-185.

von Lampe, K., Kurti, M., Johnson, J., & Rengifo, A. F. (2016). "I wouldn't take my chances on the street": Navigating illegal cigarette purchases in the South Bronx. *Journal of Research in Crime and Delinquency*, 53(5), 654-680.

Wang, X., Zheng, Y., Reed, M. R., & Zhen, C. (2015). Cigarette tax pass-through by product characteristics: Evidence from Nielsen retail scanner data. Available at SSRN: https://ssrn.com/abstract=2686274

Williams, R.S., Derrick, J., & Phillips, K.J. (2017). Cigarette sales to minors via the internet: How the story has changed in the wake of federal regulation. *Tobacco Control*, *26*(4), 415–420.

Woodruff, S. I., Wildey, M. B., Conway, T. L., & Clapp, E. J. (1995). Effect of a brief retailer intervention to reduce the sale of single cigarettes. *American Journal of Health Promotion*, *9*(3), 172-174.

World Customs Organization (WCO). (2014). Illicit Trade Report 2013. Brussels: World Customs Organization.

Table 1: Indices of risk aversion, attitudes, and moral sentiments

Index	Component	Description
Law$Cautious	moneyCautious	When I think about matters involving money, I am a cautious person and I try to avoid taking risks.
	lawCautious	When I think about following the law, I am a cautious person and I try to avoid taking risks.
CigCautious	buyCigRisk	When I buy cigarettes, I prefer not taking risks.
	riskBuyCheapCigs	Even if offered to me, I wouldn't buy suspiciously cheap cigarettes because they might be counterfeit or taste bad.
Smoking norm (*SmkNorm*)	smkgCommonPeers	How common is smoking among your friends and peers (co-workers, classmates, etc.)? (*see note below*)
	smkgCommonCmty	How common is smoking in your community where you live?
Illicit activity norm (*IllActNorm*)	ittpOKCmtyBuy	Where I live, lots of smokers buy untaxed or suspiciously cheap cigarettes.
	ittpOKCmtyThink	Where I live, people think it is OK to buy untaxed or suspiciously cheap cigarettes.
	ittpEasy2Find	I think it is easy to find and buy untaxed or illegal cigarettes.
	cfeitOKCmty	Where I live, lots of people buy counterfeit goods like purses, wallets, watches, and clothing.
	taxEvadeCmty	Where I live, most people think it is OK to try to avoid paying their income taxes.
Shame and guilt (*ShameGuilt*)	shame1	I care a lot about what others would think of me if I do something I know is wrong.
	shame2	I get angry with myself when I do something I know is wrong
	guilt1	Consider this scenario: You pay cash for something at a store and the clerk gives you too much change. You keep the extra change. How would you feel afterward? *See note.*
	guilt2	I feel guilty when I do something I know is wrong
Income inequality is a problem (*IncIneq*)	incIneqCmty	I think income inequality is a big problem in my community.
	incIneqUS	I think income inequality is a big problem in America.
Libertarian attitude toward smoking (*MYOB*)	cigTaxUnfair	Tobacco taxes are unfair to smokers.
	smokeMyChoice	I don't think other people should try to discourage me from smoking.
	smokeMyChoiceWhere	I think it should be my own choice where I smoke.
	antiSmoke	I support policies designed to discourage people from smoking, like anti-smoking advertising and health warnings on packs. *Scale reversed in the index.*

Notes: Unless otherwise noted, survey respondents selected a response to each statement from a five-point Likert scale (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree, and an option for "don't know/can't say"). For the two *smkgCommon* components, the responses were: 1=Most of them smoke, 2=Many of them smoke, but many don't smoke, 3=Most of them don't smoke, but some do, 4=Hardly any of them smoke. For *guilt1*, the responses were: 1=I'd feel kind of good, 2=I'd feel neither good nor bad, 3=I'd feel a little bad, 4=I'd feel pretty bad, 5=I'd feel very bad. The indices in column one were created by averaging the components and scaling to be on a zero to one scale, with the exceptions of *smoking norm* where the scales were reversed (so that higher numbers pertain to smoking being more of a norm) and *antiSmoke* (which was reversed before adding to the *MYOB* index). Statistics on the concordance of the components and reliability of the indices are presented in section D of the online appendix.

Table 2: Tax evasion, tax avoidance, and ITTP: Definitions and prevalence

Variable	Definition	Population Estimate	95% CI
NoStamp1	Current pack was purchased in CA but lacks any type of CA stamp	12.94	[11.3, 14.7]
NoStamp2	Current pack was purchased in CA but lacks a stamp matching a picture of a valid stamp (as judged by the respondent)	14.48	[12.8, 16.3]
Loosies	Current cigarettes were purchased as singles (loosies)	1.48	[1.0, 2.1]
PriceTooLow	Price paid for current pack was less than $6	15.47	[14.0, 17.1]
TaxAvoidance	Bought cigarettes outside CA and brought them into CA in the past year, or last pack doesn't have a CA stamp of any kind	42.81	[40.7, 44.9]
TaxEvasion	Bought cigarettes outside CA and brought them into CA in the past year and did not pay use tax	13.94	[12.5, 15.5]
Untaxed	Bought untaxed cigarettes in the past 30 days ("yes" or "maybe")	26.31	[24.5, 28.2]
Counterfeit	Bought counterfeit cigarettes in the past 30 days ("yes" or "maybe")	21.77	[20.1, 23.6]

Notes: Figures are expressed as percentages. Estimates use the weights and are for the population of adult smokers in California. *95% CI* is the confidence interval accounting for the survey design effects, calculated with the logit transform method. The subsamples for the statistics exclude answers of "don't know/can't say" in the denominator, the subsample for *NoStamp* variables is packs with intact wrappers, and the subsample for *PriceTooLow* is premium-brand packs with a self-reported purchase price.

Table 3: Random effects logit regressions – smoking behavior and individual demographics only

Y = / X =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Vape/use e-cigs	-0.198	-0.204	0.251	0.546***	0.741***	0.021	1.164***	0.938***
Roll your own (RYO)	0.112	0.047	1.031***	0.025	0.104	0.090	0.314***	0.135
Cigarettes/day, log	-0.130*	-0.089	-0.401**	0.024	0.160***	-0.141***	0.257***	0.235***
Brand: Marlboro	-0.207	-0.247*	1.566**	-0.555***	-0.188**	-0.122	-0.060	0.203*
Brand: Camel	-0.646***	-0.505***	0.350	-0.634***	-0.316***	0.064	-0.321**	0.175
Brand: Newport	-0.763***	-0.579***	2.629***	-0.901***	-0.489***	-0.202	-0.179	0.431**
No regular brand	0.344*	0.370*	2.865***	0.148	0.091	0.194	-0.248	0.246
Male	-0.027	-0.081	0.280	0.390***	0.404***	-0.084	0.379***	0.335***
Age	0.017***	0.015***	0.012	0.004	-0.021***	-0.000	-0.035***	-0.044***
Inc: 25K to 50K	-0.165	-0.176	-0.334	-0.183	0.299***†	0.439***†	0.045†	-0.232*†
Inc: 50K to 75K	-0.179	-0.148	-1.068*	-0.101	0.465***†	0.744***†	0.233*†	-0.045†
Inc: > 75K	-0.392**	-0.288	-0.491	-0.080	0.903***†	0.592***†	0.470***†	0.232*†
Inc: not available	0.096	0.084	0.351	-0.080	-0.004†	0.171†	-0.162†	0.025†
Educ: HS to 2-yr deg.	-0.303	-0.311	-0.314	0.099†	-0.324**†	0.477*†	-0.488***†	-0.453**†
Educ: 4-yr degree	-0.325	-0.240	-0.642	0.318†	0.292*†	0.852***†	-0.280†	-0.202†
Educ: higher/prof	-0.492	-0.396	-0.229	0.672***†	0.777***†	0.655**†	0.418**†	0.594***†
Educ: not available	0.050	0.870	1.657	-0.467†	-0.905†	0.567†	0.199†	-0.364†
Race/eth: Asian	0.591**†	0.462*†	-0.883	0.238	0.108†	0.487***	-0.088†	0.017†
Race/eth: Nat. Am.	0.249†	0.603†	0.328	0.405	0.333†	0.168	0.774**†	0.725*†
Race/eth: Black	0.767***†	0.813***†	0.457	0.130	0.377**†	-0.104	0.396**†	0.683***†
Race/eth: other, NA	-0.008†	0.090†	0.156	-0.022	-0.395***†	0.011	-0.134†	0.158†
Race/eth: Hispanic	0.171†	0.252*†	0.459	0.173	-0.250**†	-0.101	0.273**†	0.255**†
Log(σ^2)	-0.783**	-1.026***	-12.934	-0.755***	-1.643***	-4.343	-1.004***	-1.257***
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Number of clusters	995	995	1,096	1,089	1,090	1,086	1,091	1,082
Log likelihood	-1168	-1281	-256.9	-1960	-2748	-1858	-2244	-2092
Chi-squared statistic	82.09	89.83	142.1	169.3	588.0	103.8	576.8	514.9

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

†Joint significance at the 5% level or lower for the set of categorical coefficients.

Notes: The figures are coefficients (i.e., log-odds ratios); s.e.'s are not shown due to the length of the table. Robust standard errors are clustered on the ZIP code. Parameter σ^2 is the variance of the random effect for the clusters, where the latter are ZIP codes. The constant is included in the estimation but not reported in the table.

Table 4: Random effects logit regressions – economic regressors added

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Local sales tax	-0.066	-0.138	0.148	0.035	0.131**	0.032	0.132**	0.174***
(*salesTax*)	(0.091)	(0.085)	(0.201)	(0.074)	(0.054)	(0.063)	(0.066)	(0.063)
Driving time to nearest	-0.115	-0.071	1.239**	-0.332*	-0.611***	-0.149	-0.342**	-0.221
state, ln (*Time2nearSt*)	(0.201)	(0.196)	(0.620)	(0.176)	(0.161)	(0.140)	(0.167)	(0.173)
Driving time to Mexico,	0.140*	0.129*	-0.273	0.017	-0.141***	-0.146***	-0.001	0.025
log (*Time2Mex*)	(0.082)	(0.077)	(0.234)	(0.062)	(0.048)	(0.055)	(0.055)	(0.056)
Drvg time to nearest res-	-0.075	-0.044	0.003	0.058	0.094	-0.039	0.207**	0.173**
ervation, ln (*Time2Res*)	(0.111)	(0.104)	(0.242)	(0.097)	(0.072)	(0.077)	(0.091)	(0.078)
Cigarette retailer den-	0.119	0.085	0.020	-0.016	0.003	-0.049	0.053	-0.015
sity, log (*CigRetailDen*)	(0.081)	(0.076)	(0.213)	(0.046)	(0.032)	(0.037)	(0.042)	(0.039)
Population density,	-0.182**	-0.107	-0.083	-0.049	0.002	0.047	0.032	0.095*
log (*PopDen*)	(0.088)	(0.085)	(0.253)	(0.055)	(0.042)	(0.047)	(0.055)	(0.052)
Lottery WTP	-0.001	-0.001	0.002	0.000	0.003***	-0.000	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Log(σ^2)	-1.085**	-1.304***	-12.350	-0.792***	-2.020***	-9.607	-1.291***	-1.562***
	(0.455)	(0.461)	(305,686)	(0.255)	(0.449)	(1,115)	(0.308)	(0.345)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Number of clusters	995	995	1,096	1,089	1,090	1,086	1,091	1,082
Log likelihood	-1159	-1274	-252.8	-1955	-2712	-1853	-2220	-2066
Chi-squared statistic	100.1	102.3	151.8	182.7	632.5	117.7	600.4	542.5

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors in parentheses. A constant term is included in the estimations but not reported in the table. Robust standard errors are clustered on the ZIP code. All individual and pack variables from previous table are also included in the estimations. Parameter σ^2 is the variance of the random effect for the clusters, where the latter are ZIP codes.

Table 5: Random effects logit regressions – attitudinal regressors related to risk aversion and moral sentiments added

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Cautious re. law and†	-0.389	-0.369	0.111	0.274	-0.030	-0.614***	0.483**	0.035
money (*Law$Cautious*)	(0.313)	(0.299)	(0.718)	(0.248)	(0.186)	(0.232)	(0.240)	(0.227)
Caution re. buying†	-0.705**	-0.884***	-0.402	-0.627**	-0.316	-0.979***	-1.620***	-0.845***
cigs (*CigCautious*)	(0.334)	(0.307)	(0.753)	(0.256)	(0.196)	(0.230)	(0.237)	(0.239)
Smoking as a norm†	0.070	0.039	-0.722	0.547***	0.568***	-0.644***	1.005***	0.641***
(*SmkNorm*)	(0.240)	(0.228)	(0.505)	(0.173)	(0.136)	(0.160)	(0.167)	(0.165)
Illicit activity as a norm†	0.165	0.301	2.048***	1.130***	2.499***	0.120	4.153***	3.281***
(*IllActNorm*)	(0.296)	(0.292)	(0.722)	(0.244)	(0.200)	(0.234)	(0.262)	(0.254)
Shame and guilt†	0.042	0.356	-0.393	-0.185	-0.594***	-0.016	-0.486**	-0.200
(*ShameGuilt*)	(0.353)	(0.335)	(0.985)	(0.254)	(0.202)	(0.268)	(0.235)	(0.256)
Income inequality is a	0.020	-0.003	-0.150	-0.001	0.035	0.218	-0.103	-0.038
problem† (*IncIneq*)	(0.254)	(0.243)	(0.592)	(0.180)	(0.150)	(0.190)	(0.179)	(0.184)
Libertarian attitude re.	0.358	0.532*	-1.553**	0.168	0.356*	0.285	0.015	-0.455*
smoking† (*MYOB*)	(0.343)	(0.317)	(0.762)	(0.240)	(0.210)	(0.235)	(0.255)	(0.247)
Log(σ^2)	-0.807**	-1.050***	-12.513	-0.817***	-1.557***	-9.889	-1.188***	-1.506***
	(0.362)	(0.380)	(278,253)	(0.256)	(0.359)	(1,480)	(0.295)	(0.357)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Number of clusters	995	995	1,096	1,089	1,090	1,086	1,091	1,082
Log likelihood	-1162	-1273	-251.2	-1933	-2612	-1832	-1986	-1945
Chi-squared statistic	98.28	114.0	176.5	206.3	793.4	149.0	809.5	600.7

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. † Composite index on a zero to one scale (see Table 1).

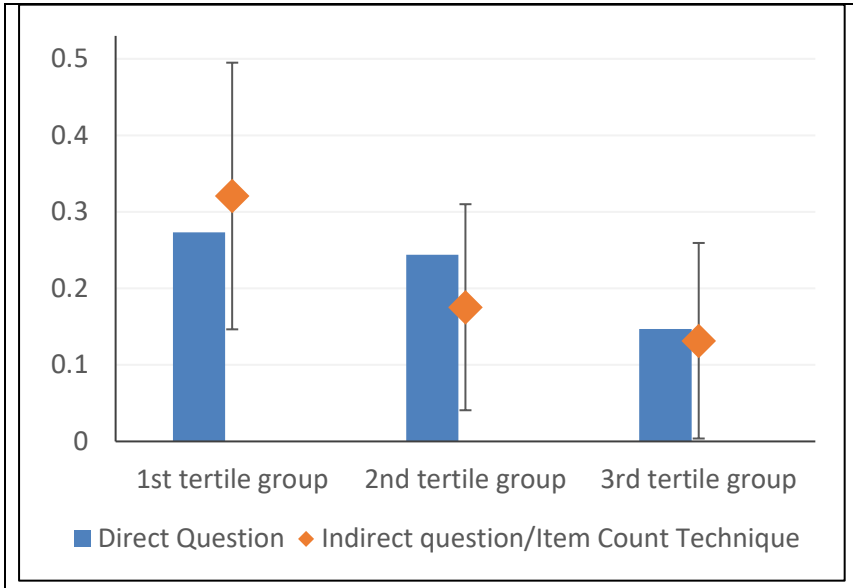
Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors (robust and clustered on ZIP code) in parentheses. A constant term is included in the estimations but not reported in the table. All individual and pack variables from previous table are also included in the estimations, but the economic regressors are not. Robust standard errors are clustered on the ZIP code. Parameter σ^2 is the variance of the random effect for the clusters, where the latter are ZIP codes.

Table 6: Measures of fit from Linear Probability Model (OLS) regressions

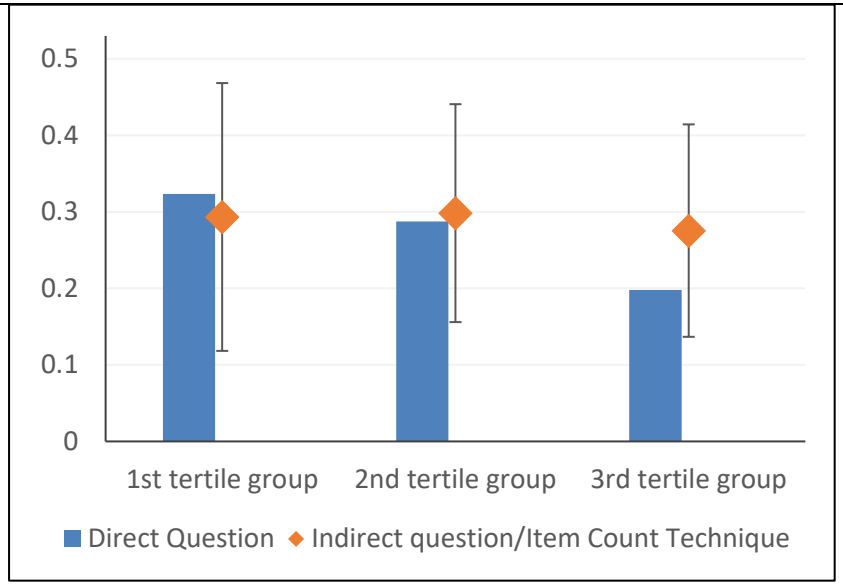
		TaxAvoidance		Untaxed		Counterfeit	
		R^2	Increase in R^2	R^2	Increase in R^2	R^2	Increase in R^2
1	Smoking controls only	0.078		0.129		0.100	
2	Smoking controls + demographics	0.184	134%	0.193	49%	0.170	70%
3	Smoking controls + access cost variables	0.100	28%	0.152	18%	0.123	23%
4	Smoking controls + risk aversion variables	0.095	22%	0.146	13%	0.117	17%
5	Smoking controls + moral sentiments variables	0.160	105%	0.261	102%	0.198	97%
6	All regressors	0.239	206%	0.298	130%	0.239	139%

Note: Percentage increases are with reference to the first row, and are calculated from R^2 statistics that are less rounded than shown in the table. The demographic variables (row 2) are all those shown in Table 3. The access cost variables (row 3) are the sales tax, *Time2nearSt*, *Time2Mex*, *Time2Res*, *CigRetailDen*, and population density. The variables related to risk aversion are the lottery willingness to pay, *Law$Cautious*, and *CigCautious*. The moral sentiment variables (row 5) are *SmkNorm*, *IllActNorm*, *ShameGuilt*, *IncIneq*, and *MYOB*. If adjusted R^2 statistics are examined instead, the rankings do not change.

Figure 1: Direct and indirect measures of tax avoidance and evasion, by tertile of shame and guilt index (*ShameGuilt*)



Panel A: Purchasing cigarettes out of state in past 30 days



Panel B: Purchasing untaxed cigarettes in past 30 days

Note: Tertile groups are for variable *ShameGuilt*; see Table 1. Error bars are 95% confidence intervals. In panel B, untaxed cigarettes are defined as in footnote 10.

Appendix

For the final version of this supplementary material and the data used in the analysis, see the article's site at the OSF repository, which can be cited as DOI 10.17605/OSF.IO/M8RQA.

A. Summary statistics for the data used in the regressions

The following table contains summary statistics and some notes on the definition of the variables used in the regressions. All statistics here are unweighted. The number of observations varies due to varying subsamples used for the measures of compliance and whether the respondents preferred not to answer a given question. The subsamples for all the compliance statistics (i.e., the dependent variables) exclude answers of "don't know/can't say". The subsample for *NoStamp1* and *NoStamp2* is currently smoked packs with intact wrappers and the subsample for *PriceTooLow* is premium-brand packs with a self-reported purchase price.

Table A - 1: Summary statistics for variables used in the regressions

Variable	Obs.	Mean	Std. dev.	Min	Max	Notes
Dependent Variables						
NoStamp1	3,618	0.110	0.313	0.000	1.000	See Table 2 for definition.
NoStamp2	3,618	0.125	0.331	0.000	1.000	See Table 2 for definition.
Loosies	4,965	0.013	0.115	0.000	1.000	See Table 2 for definition.
PriceTooLow	4,740	0.164	0.370	0.000	1.000	See Table 2 for definition.
TaxAvoidance	4,827	0.429	0.495	0.000	1.000	See Table 2 for definition.
TaxEvasion	4,762	0.142	0.349	0.000	1.000	See Table 2 for definition.
Untaxed	4,786	0.270	0.444	0.000	1.000	See Table 2 for definition.
Counterfeit	4,664	0.240	0.427	0.000	1.000	See Table 2 for definition.
Smoking Behavior						
Vape/use e-cigarettes	5,001	0.311	0.463	0.000	1.000	Survey was limited to smokers, so all of these are dual users of cigarettes and e-cigarettes.
Roll your own cigarettes (RYO)	5,001	0.236	0.425	0.000	1.000	Survey excluded smokers who only rolled their own cigarettes, so all of these smoke both pre-packaged cigarettes and RYO.
Cigarettes/day	4,871	10.573	7.973	0.400	40.000	Computed from questions q6, q66, q8_1, and q68_1. For categorical answers, the midpoint was chosen. For answer "36 or more", 40 was chosen. Variable is in logs in the regressions.
Brand: Marlboro	5,001	0.415	0.493	0.000	1.000	Brand smoked "more than any other".
Brand: Camel	5,001	0.159	0.366	0.000	1.000	Brand smoked "more than any other".
Brand: Newport	5,001	0.087	0.282	0.000	1.000	Brand smoked "more than any other".
No regular brand	5,001	0.108	0.310	0.000	1.000	No brand is smoked "more than any other".
Demographics						
Male	5,001	0.372	0.483	0.000	1.000	Excluded categorical variable is female or "prefer not to answer" (19 cases for latter)

Variable	Obs.	Mean	Std. dev.	Min	Max	Notes
Age	5,001	39.296	12.855	19.000	69.500	Answers were categorical (question q2); the midpoint was chosen. Survey was limited to ages 18 to 74.
Race/Ethnicity						
Black non-Hispanic	5,001	0.072	0.259	0.000	1.000	Black or African American
Hispanic	5,001	0.184	0.387	0.000	1.000	Hispanic, Latino, or Spanish Origin
Asian non-Hispanic	5,001	0.056	0.230	0.000	1.000	Asian
Native American non-Hispanic	5,001	0.013	0.114	0.000	1.000	Native American, American Indian, or Alaskan Native
Other race, non-Hispanic	5,001	0.071	0.257	0.000	1.000	Other race/ethnicity or multiracial, or "I prefer not to say"
Educational Attainment						
High school diploma, Some college, or 2-year college degree	5,001	0.646	0.478	0.000	1.000	See question q12.
4-year college degree	5,001	0.191	0.393	0.000	1.000	See question q12.
Higher/professional degree	5,001	0.103	0.304	0.000	1.000	See question q12.
Decline to state	5,001	0.003	0.053	0.000	1.000	See question q12.
Income						
$25,000-50,000	5,001	0.233	0.423	0.000	1.000	Household income in the past 12 months. See question q14.
$50,000-75,000	5,001	0.156	0.363	0.000	1.000	See question q14.
$75,000 and higher	5,001	0.291	0.454	0.000	1.000	See question q14.
Decline to state	5,001	0.035	0.183	0.000	1.000	See question q14.
Area-specific Economic Variables (Cost of Access)						
Local sales tax (*salesTax*)	5,001	8.481	0.843	7.250	10.250	Source: California Board of Equalization. Based on the tax jurisdiction of ZIP code.
Driving time to nearest state, log (*Time2nearSt*)	5,001	9.306	0.324	6.346	10.042	From ZIP code of residence to nearest other-state retail location along major roads (units: seconds), per Google Maps.

Variable	Obs.	Mean	Std. dev.	Min	Max	Notes
Driving time to Mexico, log (*Time2Mex*)	5,001	9.395	0.810	6.339	10.839	From ZIP code of residence to nearest retail location in Mexico along major roads (units: seconds), per Google Maps.
Driving time to nearest reservation, log (*Time2Res*)	5,001	8.012	0.623	5.043	9.656	From ZIP code of residence to nearest Indian reservation or rancheria (units: seconds), per Google Maps.
Cigarette retailer density, log (*CigRetailDen*)	5,001	15.048	1.932	7.607	19.361	Source: California Board of Equalization. Area unit: ZIP code.
Population density, log (*PopDen*)	5,001	7.847	1.712	-2.101	10.944	Source: U.S. Census Bureau (ACS 2015-2019 5-year estimates for ZCTA population and TIGER 2016 for land area).
Risk Aversion Variables						
Lottery willingness-to-pay	5,001	30.532	76.440	0.000	900.000	For a 10% chance to win $1,000 (see question q95).
Cautious re. law and money (*Law$Cautious*)	5,001	0.679	0.215	0.000	1.000	See Table 1 for definition. Answers of "don't know/can't say" were recoded as "neither agree nor disagree".
Cautious re. buying cigarettes (*CigCautious*)	5,001	0.662	0.201	0.000	1.000	Ditto.
Attitudinal/Moral Sentiments						
Smoking as a norm (*SmkNorm*)	5,001	0.602	0.295	0.000	1.000	See Table 1 for definition.
Illicit activity as a norm (*IllActNorm*)	5,001	0.470	0.215	0.000	1.000	See Table 1 for definition. Answers of "don't know/can't say" were recoded as "neither agree nor disagree".
Shame and guilt (*ShameGuilt*)	5,001	0.654	0.192	0.000	1.000	Ditto.
Income ≠ is a problem (*IncIneq*)	5,001	0.683	0.252	0.000	1.000	Ditto.
Libertarian attitude re. smoking (*MYOB*)	5,001	0.595	0.186	0.000	1.000	Ditto.

Notes: Indices *Law$Cautious*, *CigCautious*, *SmkNorm*, *IllActNorm*, *ShameGuilt*, *IncIneq*, and *MYOB* were computed by averaging the responses to the component questions (reversing the figures if required by the wording of a question) and rescaling to the unit interval.

B. Survey weights

The respondents were geographically diverse, but do not make up a random probability sample. The demographics of respondents differ to varying degrees from the demographics of the target population as estimated from other surveys. The demographic profile of the target population is estimated from the California Health Interview Survey (CHIS) and the Behavioral Risk Factors Surveillance Survey (BRFSS). Data are from the 2017-2018 waves of the CHIS (see healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx) and the BRFSS (see cdc.gov/brfss/annual_data/annual_2016.html) and are limited to survey responses gathered July 2017 through January 2019, about nine months before and after our survey. In both cases estimates are for the subpopulation of English-proficient current smokers in California aged 18 to 74. We took the marginal distributions to be used as controls from the survey (either CHIS or BRFSS) that categorized the demographic variable the same as in our survey (e.g., used the same age bins, or used more detailed bins that could be collapsed into the categories in our survey). When both the CHIS and the BRFSS categories could be exactly matched to our survey categories, then we used the average of the two distributions as the control. See Table in the main text for the resulting population controls.

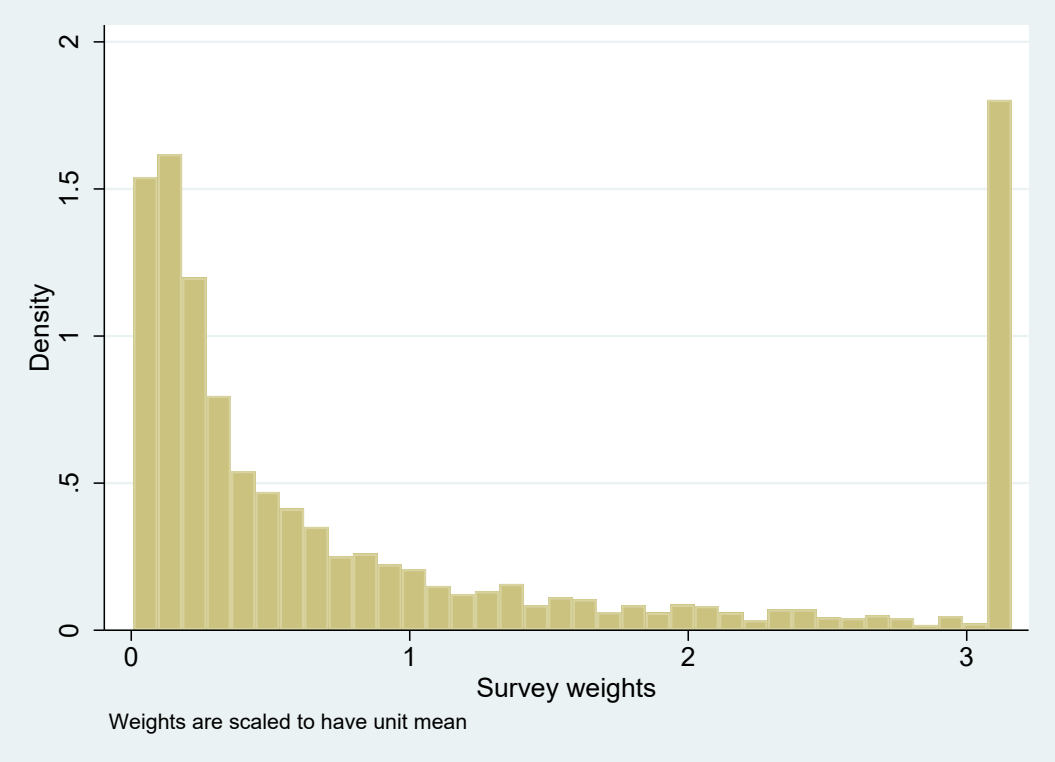
To address overt bias (i.e., bias caused by differences in observed demographic characteristics between the sample and the target population), survey weights are constructed to align the distribution of the sample with that of the target population. The survey weights account for these demographic dimensions: age, gender, household income, educational attainment, race/ethnicity, and the region of residence within the state. The latter is grouped into seven regions, six of which are groups of contiguous urban counties and the final of which comprises all non-urban counties.

The weights are trimmed to reduce the variance of weighted statistics and therefore the MSE of estimates. The weights are computed using the iterative proportional fitting (i.e., raking)

algorithm with the Stata user-contributed command *ipfweight*. The final weights were constrained to be less than 3.16 by the algorithm, the number that is the smallest bound that still results in weights that allow matching the control marginals to four decimal places. Trimming of weights is common practice in survey analysis to improve the mean squared error of estimates, trading variance reduction for increased bias.[34] However, given the construction of the bound for trimming, there is essentially no bias.

See Figure A - 1 for the distribution of the weights. The mean weight is 1.0 by construction.

Figure A - 1: Distribution of the survey weights



[34] Potter, F. J. (1990). A study of procedures to identify and trim extreme sampling weights. In *Proceedings of the Section on Survey Research Methods* (pp. 225-230). American Statistical Association.

After weighting, the survey demographics are much more similar to the population. The population estimates do not exactly match all population control marginals because responses of "decline to state" were imputed to a specific category for the raking computation. Such values were filled in via univariate single-value imputation by multiple logit regression. The imputed data match the control marginals exactly to four decimal places. The imputed values were used only when constructing the weights (and were not used as regressors).

Table A - 2: Comparison of survey sample to population of California smokers

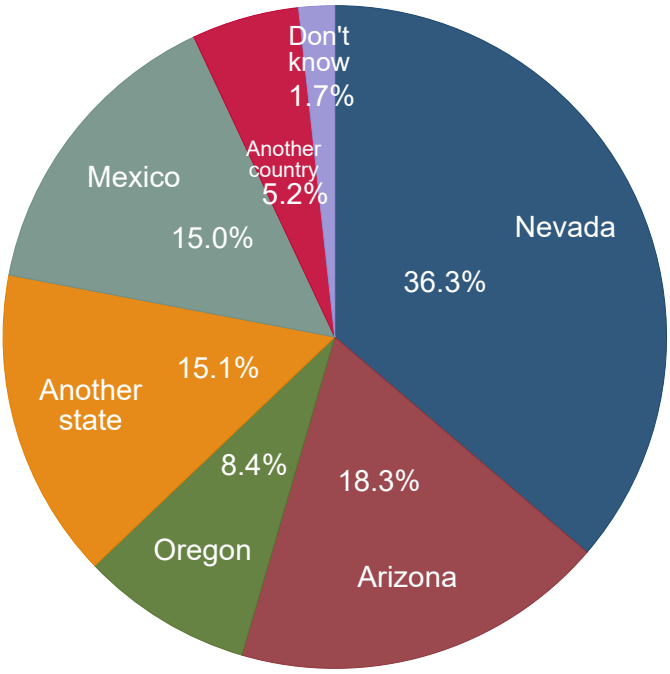
Category	Survey Sample Unweighted Proportion (%)	Population Controls Proportion (%)	Population Estimates Weighted Proportion (%)	Population Estimates 95% Confidence Interval
Sex				
Female	62.4	37.9	37.7	[35.9, 39.6]
Male	37.2	62.1	62.1	[60.2, 63.9]
Decline to state	0.4	n.a.	0.2	[0.1, 0.3]
Age				
18 - 20	2.6	3.3	3.3	[2.6, 4.1]
21 - 24	7.4	6.9	6.9	[5.9, 8.0]
25 - 34	35.0	24.5	24.5	[22.9, 26.2]
35 - 44	23.8	21.9	21.9	[20.2, 23.6]
45 - 54	15.4	17.8	17.8	[16.2, 19.6]
55 - 64	12.0	17.8	17.8	[16.1, 19.6]
65 - 74	3.8	7.8	7.8	[6.6, 9.3]
Race/Ethnicity				
White	60.4	49.7	48.2	[46.1, 50.3]
Black	7.2	8.0	7.7	[6.7, 8.9]
Hispanic	18.4	26.6	26.3	[24.4, 28.3]
Asian	5.6	9.9	9.9	[8.5, 11.5]
Native American	1.3	1.2	1.2	[0.9, 1.7]
Other	3.7	4.6	4.6	[3.7, 5.6]
Decline to state	3.4	n.a.	2.1	[1.7, 2.6]
Educational Attainment				
No high school diploma	5.7	15.1	15.1	[13.3, 17.1]
High school diploma	22.8	30.3	30.1	[28.2, 32.1]
Some college	30.5	23.0	23.0	[21.4, 24.6]
2-year college degree	11.3	7.8	7.8	[6.9, 8.8]
4-year college degree	19.1	16.8	16.7	[15.2, 18.4]
Higher/professional degree	10.3	7.0	7.0	[6.0, 8.0]
Decline to state	0.3	n.a.	0.2	[0.1, 0.4]
Income				
Less than $10,000	11.6	9.6	8.2	[7.3, 9.3]
$10-15,000	6.5	8.9	8.8	[7.6, 10.2]
$15-25,000	10.5	14.6	14.4	[12.9, 16.0]
$25-35,000	11.0	9.5	9.3	[8.2, 10.6]
$35-50,000	12.3	11.0	10.6	[9.5, 11.8]
$50-75,000	15.6	15.1	14.2	[13.0, 15.6]
$75-100,000	14.5	7.6	7.3	[6.6, 8.2]
$100-150,000	10.3	10.8	10.8	[9.6, 12.1]
More than $150,000	4.3	12.9	12.9	[11.2, 14.8]
Decline to state	3.5	n.a.	3.4	[2.7, 4.2]

Notes: Population controls (second column) are used to compute the weights (see footnote **Error! Bookmark not defined.**). Confidence intervals include the survey design effects and are calculated with the logit transform method. "N.a." means not applicable.

C. Out-of-state purchase locations

Neighboring states and Mexico were the most common locations of out-of-state purchases, as shown in the figure below.

Figure A - 2: Places cigarettes were purchased outside California (the main location of purchase)



Note: data are weighted to reflect the population of adult smokers in California.
Subpopulation: people who bought cigarettes out of state.

Notes: The survey question asked "where did you buy the most cigarettes outside California?" (see question 26 in the survey script below).

D. Intra-index concordance and reliability of the attitudinal measures

Two questions arise when combining various measures into an index, as done for the attitudinal measures in the present study. First, how closely *related* are the answers to the various survey questions intended to address a related set of attitudes (e.g., risk aversion or norms regarding smoking)? Second, to the extent that the various components in an index all measure the same latent variable, how *reliable* is the index? Here Kendall's tau-b statistic (τ_B) is presented as a measure of concordance of the components in the various indices formed from the attitudinal measures. See Table 1 for definition of the indices and attitudinal components. The τ_B statistic takes value 1.0 if there is perfect agreement between two ordinal measures, -1.0 if there is perfect inversion between the measures, and 0.0 if there is no association. A related statistic based on Kendall's score is used for a distribution-free test of independence between the two variables.[35] The statistics are computed with command `ktau` in Stata 17. The results show that within each index, the components are positively associated with each other.

Table A - 3: Kendall's τ_B for the components in indices with only two components

Index	Component 1	Component 2	Kendall's τ_B
Law$Cautious	moneyCautious	lawCautious	0.3488
CigCautious	buyCigRisk	riskBuyCheapCigs	0.1818
SmkNorm	smkgCommonPeers	smkgCommonCmty	0.4984
IncIneq	incIneqCmty	incIneqUS	0.5459

Note: The hypothesis test for independence has $p < 0.0001$ in all cases.

Table A - 4: Kendall's τ_B for the components in index *IllActNorm*

Component	ittpOKCmtyBuy	ittpOKCmtyThink	ittpEasy2Find	cfeitOKCmty	taxEvadeCmty

[35] See p.66 of: Kendall, M. G., & Gibbons, J. D. (1990). *Rank Correlation Methods* (5th ed.). Oxford University Press.

ittpOKCmtyBuy	1.0000				
ittpOKCmtyThink	0.5631	1.0000			
ittpEasy2Find	0.3937	0.3237	1.0000		
cfeitOKCmty	0.6953	0.5417	0.3626	1.0000	
taxEvadeCmty	0.3439	0.3714	0.2237	0.3519	1.0000

Note: The hypothesis test for independence has $p < 0.0001$ in all cases.

Table A - 5: Kendall's τ_B for the components in index *ShameGuilt*

Component	shame1	shame2	guilt1	guilt2
shame1	1.0000			
shame2	0.3634	1.0000		
guilt1	0.0501	0.1523	1.0000	
guilt2	0.3359	0.5834	0.2030	1.0000

Note: The hypothesis test for independence has $p < 0.0001$ in all cases.

Table A - 6: Kendall's τ_B for the components in index *MYOB*

Component	cigTaxUnfair	smokeMyChoice	smokeMy-ChoiceWhere	antiSmoke
cigTaxUnfair	1.0000			
smokeMyChoice	0.3381	1.0000		
smokeMyChoiceWhere	0.2909	0.3903	1.0000	
antiSmoke	–0.0435	–0.0845	–0.0672	1.0000

Note: Component *antiSmoke* is reversed before adding to the index. The hypothesis test for independence has $p < 0.0001$ in all cases except for *cigTaxUnfair* and *antiSmoke*, for which $p = 0.0002$.

Alternatively, the internal consistency of a constructed index—its *reliability*—measures how well the combination of components in the index proxy for whatever latent variable they are intended to measure. The standard reliability measure for equally weighted components is Cronbach's alpha, the proportion of the index variance that can be attributed to general and group factors instead of component-specific variance. When it is assumed that there is a single latent variable for which the index serves as a proxy, reliability coefficients below 0.5 are seen as

unreliable, measures between 0.5 and 0.7 are modest, and levels of the Cronbach's alpha above 0.7 indicate acceptable levels.[36]

In the present context, the indices serve as convenient dimension-reduction constructs without intending to be viewed as consistent measures of a univariate latent factor. For example, the shame and guilt index *ShameGuilt* proxies these attitudinal concepts for a respondent in a conceptual way, and is not meant to be viewed literally as composed of two measures of a single factor, for psychologists well know that shame and guilt are not the same and sociologists know that they can play different roles in a society. Thus, the alphas reported in Table A-7 are not meant to be read as literal indicators of reliability in the traditional sense but instead as rough indication of how consistent respondents' answers were to questions relating to the same index. A high alpha (which is bounded between 0 and 1) indicates that respondents answer the questions similarly, which supports including them in a single index (without proving that they measure the same factor). On the other hand, a low alpha indicates that the questions may be measuring different things. By the rule of thumb stated above, all indices have at least modest reliability except *CigCautious*.

Table A - 7: Cronbach's α for the attitudinal indices

Index	Description	Cronbach's alpha
Law$Cautious	Cautious re. law and money	0.5774
CigCautious	Cautious re. buying cigarettes	0.3256
SmkNorm	Smoking as a norm	0.7174
IllActNorm	Illicit activity as a norm	0.8387
ShameGuilt	Shame and guilt	0.6072

[36] This rule of thumb is as stated in: Boermans, M.A. & Kattenberg, M.A.C. (2011). Estimating reliability coefficients with heterogeneous item weightings using Stata: A factor based approach," Working Papers 11-19, Utrecht School of Economics. There is a large literature cautioning against blindly following such rules of thumb, since a reliability threshold for a scale must necessarily depend on how high the stakes are (see). In the present context, there is no high-stakes outcome riding on the reliability of the indices, as there would potentially be for a battery of tests assessing a student's cognitive abilities or a prospective employee's success in a position if hired.

IncIneq	Income inequality is a problem	0.7640
MYOB	Libertarian attitude regarding smoking	0.5670

Given the low alpha for *CigCautious*, the regressions reported in Table 5 were repeated with the separate components of the index serving as separate regressors. With the exception of the regression of *TaxEvasion*, in each regression any significance of the coefficient on index *CigCautious* in Table 5 turns out to have come solely from the second component, *riskBuyCheapCigs* ("Even if offered to me, I wouldn't buy suspiciously cheap cigarettes because they might be counterfeit or taste bad"). For the regression of *TaxEvasion*, both components had significant coefficients; for all other dependent variables the coefficient on the other component, *buyCigRisk*, was insignificant (see Table A-8). Thus it may be that the question pertaining to *buyCigRisk* ("When I buy cigarettes, I prefer not taking risks") was too vague to measure risk attitudes towards ITTP.

Table A - 8: Results from re-estimating the regression from Table 5 with index CigCautious replaced with its constituent components

	From Table 5	From a regression with index CigCautious replaced with its constituent components	
Y = \ *X* =	CigCautious†	buyCigRisk‡	riskBuyCheapCigs‡
NoStamp1	-0.705**	-0.024	-0.129**
NoStamp2	-0.884***	-0.027	-0.163***
Loosies	-0.402	-0.139	0.015
PriceTooLow	-0.627**	-0.075	-0.081*
TaxAvoidance	-0.316	-0.002	-0.064**
TaxEvasion	-0.979***	-0.141***	-0.110***
Untaxed	-1.620***	-0.081	-0.285***
Counterfeit	-0.845***	-0.080	-0.124***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. † Composite index on a zero to one scale (see Table 1). ‡Component measures are on a one to five scale.

Notes: The figures are coefficients (i.e., log-odds ratios). The first column is from the same regression as reported in Table 5 in the main text. The other two columns are from a similar regression in which index *CigCautious* is replaced with variables *buyCigRisk* and *riskBuyCheapCigs* Significance stars are computed from robust standard errors clustered on the ZIP code.

E. Results from the omnibus logit estimation

The results for the random-effects logit with all regressors included discussed in the text are shown here in Table A-7.

Table A - 9: Random effects logit regressions – all regressors

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Local sales tax	-0.066	-0.138	0.126	0.016	0.103*	0.029	0.075	0.138**
Time2nearSt	-0.111	-0.068	1.329**	-0.304*	-0.600***	-0.146	-0.308*	-0.166
Time2Mex	0.144*	0.130*	-0.263	0.010	-0.165***	-0.135**	-0.039	-0.000
Time2Res	-0.072	-0.043	-0.043	0.056	0.091	-0.037	0.228**	0.179**
CigRetailDen	0.113	0.080	0.019	-0.021	-0.000	-0.048	0.044	-0.022
Pop. density, log	-0.177**	-0.102	-0.101	-0.053	-0.016	0.050	0.013	0.071
Lottery WTP	-0.001	-0.002	0.002	-0.000	0.003***	-0.000	0.001	0.001**
Law$Cautious†	-0.344	-0.330	0.093	0.291	-0.043	-0.630***	0.452*	0.006
CigCautious†	-0.694**	-0.874***	-0.408	-0.620**	-0.319	-0.980***	-1.598***	-0.832***
Smoking as a norm†	0.008	-0.009	-0.731	0.531***	0.572***	-0.612***	1.028***	0.647***
Illicit activity as a norm†	0.266	0.407	2.005***	1.177***	2.395***	0.111	4.030***	3.147***
Shame and guilt†	-0.038	0.300	-0.342	-0.223	-0.567***	0.022	-0.435*	-0.154
Income ≠ is a problem	0.028	-0.003	-0.092	0.011	0.038	0.214	-0.117	-0.066
Libertarian attitude†	0.321	0.499	-1.657**	0.145	0.394*	0.288	0.063	-0.407*
Smoking and demographic regressors:								
Vape/use e-cigs	-0.161	-0.166	0.166	0.431***	0.499***	0.088	0.866***	0.643***
Roll your own (RYO)	0.060	0.002	1.075***	-0.055	0.001	0.119	0.179	0.031
Cigarettes/day, log	-0.150*	-0.117	-0.349**	-0.049	0.058	-0.118**	0.103*	0.118**
Brand: Marlboro	-0.206	-0.246*	1.586**	-0.557***	-0.190**	-0.139	-0.039	0.236**
Brand: Camel	-0.677***	-0.532***	0.381	-0.635***	-0.317***	0.038	-0.289**	0.255*
Brand: Newport	-0.750***	-0.581***	2.713***	-0.898***	-0.547***	-0.188	-0.214	0.426**
No regular brand	0.312	0.338*	2.915***	0.130	0.077	0.156	-0.256	0.289*
Male	0.003	-0.034	0.261	0.339***	0.242***	-0.081	0.144	0.140

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Age	0.017***	0.015***	0.015	0.009**	-0.012***	-0.003	-0.019***	-0.031***
Inc: 25K to 50K	-0.146	-0.153	-0.394	-0.114	0.371***‡	0.423***‡	0.178‡	-0.134
Inc: 50K to 75K	-0.100	-0.075	-1.239**	-0.027	0.528***‡	0.700***‡	0.316**‡	-0.031
Inc: > 75K	-0.272	-0.175	-0.680	-0.038	0.912***‡	0.580***‡	0.370***‡	0.045
Inc: not available	0.125	0.103	0.346	0.013	0.078‡	0.120‡	0.005‡	0.135
Educ: HS to 2-yr deg.	-0.321	-0.329	-0.344	0.178‡	-0.198‡	0.424*‡	-0.282‡	-0.288‡
Educ: 4-yr degree	-0.265	-0.189	-0.879	0.417*‡	0.392**‡	0.808***‡	-0.179‡	-0.158‡
Educ: higher/prof	-0.414	-0.322	-0.614	0.699***‡	0.769***‡	0.681**‡	0.361‡	0.544**‡
Educ: not available	0.020	0.842	1.492	-0.333‡	-0.617‡	0.417‡	0.173‡	-0.027‡
Race/eth: Asian	0.689***‡	0.545**‡	-0.915	0.349*	0.167‡	0.433**	0.097‡	0.137‡
Race/eth: Nat. Am.	0.157‡	0.548‡	0.183	0.299	0.185‡	0.156	0.843**‡	0.762*‡
Race/eth: Black	0.857***‡	0.911***‡	0.379	0.097	0.184‡	-0.110	0.158‡	0.490***‡
Race/eth: other, NA	-0.003‡	0.098‡	0.084	0.017	-0.358**‡	-0.047	-0.002‡	0.281‡
Race/eth: Hispanic	0.233‡	0.310**‡	0.340	0.250*	-0.233**‡	-0.184	0.428***‡	0.360***‡
Log(σ^2)	-1.117**	-1.332***	-11.798	-0.875***	-1.935***	-11.123	-1.413***	-1.734***
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Number of clusters	995	995	1,096	1,089	1,090	1,086	1,091	1,082
Log likelihood	-1154	-1266	-247.2	-1927	-2585	-1828	-1975	-1932
Chi-squared statistic	114.6	125.6	176.6	224.6	822.1	163.3	828.7	603.5

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. † Composite index on a zero to one scale (see Table 1). ‡Joint significance at the 5% level for the set of categorical coefficients.

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors in parentheses. A constant term is included in the estimations but not reported in the table. Robust standard errors are clustered on the ZIP code. Parameter σ^2 is the variance of the random effect for the clusters, where the latter are ZIP codes.

F. Results from logit estimations without random effects

The estimations without the random effects are presented here.

Table A - 10: Logit regressions – individual demographics only

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Vape/use e-cigs	-0.193	-0.197	0.251	0.513***	0.721***	0.021	1.121***	0.915***
Roll your own (RYO)	0.110	0.042	1.031***	0.064	0.095	0.089	0.315***	0.131
Cigarettes/day, log	-0.117	-0.081	-0.401**	0.034	0.158***	-0.141***	0.252***	0.228***
Brand: Marlboro	-0.209	-0.254*	1.566**	-0.517***	-0.201**	-0.123	-0.056	0.194*
Brand: Camel	-0.637***	-0.505***	0.350	-0.592***	-0.325***	0.064	-0.314**	0.149
Brand: Newport	-0.723***	-0.564***	2.629***	-0.890***	-0.489***	-0.202	-0.216	0.390**
No regular brand	0.320	0.343*	2.865***	0.158	0.084	0.192	-0.238	0.235
Male	-0.035	-0.079	0.280	0.349***	0.408***	-0.083	0.383***	0.335***
Age	0.015***	0.014***	0.012	0.003	-0.021***	-0.000	-0.034***	-0.042***
Inc: 25K to 50K	-0.171	-0.184	-0.334	-0.183	0.280***†	0.438***†	0.026†	-0.239*†
Inc: 50K to 75K	-0.199	-0.165	-1.068*	-0.143	0.427***†	0.743***†	0.212*†	-0.037†
Inc: > 75K	-0.439**	-0.336*	-0.491	-0.083	0.879***†	0.591***†	0.495***†	0.272**†
Inc: not available	0.087	0.073	0.351	-0.049	-0.035†	0.170†	-0.178†	0.018†
Educ: HS to 2-yr deg.	-0.299	-0.311	-0.314	0.080†	-0.339**†	0.477*†	-0.528***†	-0.476***†
Educ: 4-yr degree	-0.330	-0.251	-0.642	0.290†	0.281*†	0.851***†	-0.273†	-0.191†
Educ: higher/prof	-0.501*	-0.419	-0.229	0.625***†	0.734***†	0.654**†	0.345†	0.550***†
Educ: not available	-0.094	0.690	1.657*	-0.569†	-0.970†	0.565†	0.030†	-0.303†
Race/eth: Asian	0.575**†	0.458*†	-0.883	0.194	0.125†	0.488***	-0.096†	0.010†
Race/eth: Nat. Am.	0.242†	0.587†	0.328	0.401	0.321†	0.167	0.733**†	0.707**†
Race/eth: Black	0.676***†	0.740***†	0.457	0.150	0.378***†	-0.104	0.472***†	0.719***†
Race/eth: other, NA	0.006†	0.096†	0.156	-0.035	-0.376**†	0.012	-0.114†	0.157†
Race/eth: Hispanic	0.151†	0.231†	0.459	0.167	-0.252***†	-0.099	0.253**†	0.236**†
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Log likelihood	-1174	-1287	-256.9	-1982	-2756	-1858	-2263	-2104
Pseudo R squared	0.038	0.034	0.159	0.042	0.143	0.029	0.167	0.158
Chi-squared statistic	86.63	93.90	151.2	178.0	609.3	107.2	600.9	544.7

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

†Joint significance at the 5% level for the set of categorical coefficients.

Notes: The figures are coefficients (i.e., log-odds ratios); s.e.'s are not shown due to the length of the table. A constant term is included in the estimations but not reported in the table. Standard errors are clustered on the ZIP code.

Table A - 11: Logit regressions – economic regressors added

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Local sales tax	-0.066	-0.133	0.150	0.033	0.133**	0.030	0.143**	0.183***
(*salesTax*)	(0.088)	(0.082)	(0.202)	(0.069)	(0.052)	(0.063)	(0.063)	(0.061)
Driving time to nearest	-0.117	-0.077	1.266**	-0.348*	-0.598***	-0.152	-0.343**	-0.229
state, ln (*Time2nearSt*)	(0.194)	(0.193)	(0.619)	(0.185)	(0.161)	(0.140)	(0.161)	(0.168)
Driving time to Mexico,	0.136*	0.124*	-0.276	0.027	-0.135***	-0.146***	0.002	0.026
log (*Time2Mex*)	(0.079)	(0.075)	(0.233)	(0.058)	(0.047)	(0.055)	(0.053)	(0.054)
Drvg time to nearest res-	-0.088	-0.057	-0.010	0.062	0.092	-0.040	0.232***	0.192**
ervation, ln (*Time2Res*)	(0.105)	(0.100)	(0.239)	(0.094)	(0.070)	(0.077)	(0.088)	(0.078)
Cigarette retailer den-	0.121	0.091	0.018	-0.018	0.003	-0.052	0.052	-0.016
sity, log (*CigRetailDen*)	(0.080)	(0.077)	(0.208)	(0.042)	(0.032)	(0.036)	(0.040)	(0.037)
Population density,	-0.193**	-0.124	-0.080	-0.035	0.005	0.050	0.040	0.099*
log (*PopDen*)	(0.087)	(0.085)	(0.244)	(0.054)	(0.041)	(0.047)	(0.053)	(0.051)
Lottery WTP	-0.001	-0.002	0.002	0.000	0.003***	-0.000	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Log likelihood	-1162	-1277	-252.8	-1975	-2716	-1853	-2231	-2073
Pseudo R squared	0.0480	0.0418	0.172	0.0457	0.156	0.0317	0.179	0.170
Chi-squared statistic	104.9	105.7	180.0	195.1	658.0	122.3	624.3	570.6

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors in parentheses. A constant term is included in the estimations but not reported in the table. Standard errors are clustered on the ZIP code. All individual and pack variables from previous table are also included in the estimations.

Table A - 12: Logit regressions – individual-specific regressors related to risk aversion and moral sentiments added

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Cautious re. law and money (*Law$Cautious*) †	-0.388	-0.365	0.111	0.212	-0.033	-0.614***	0.435**	0.002
	(0.286)	(0.270)	(0.709)	(0.221)	(0.176)	(0.224)	(0.211)	(0.213)
Caution re. buying cigs (*CigCautious*) †	-0.722**	-0.884***	-0.402	-0.600***	-0.320*	-0.979***	-1.518***	-0.762***
	(0.300)	(0.283)	(0.762)	(0.224)	(0.184)	(0.230)	(0.222)	(0.224)
Smoking as a norm (*SmkNorm*) †	0.049	0.023	-0.722	0.540***	0.527***	-0.644***	0.968***	0.610***
	(0.211)	(0.200)	(0.496)	(0.161)	(0.130)	(0.164)	(0.158)	(0.161)
Illicit activity as a norm (*IllActNorm*) †	0.126	0.263	2.048***	1.107***	2.402***	0.120	4.022***	3.225***
	(0.299)	(0.282)	(0.785)	(0.221)	(0.185)	(0.227)	(0.229)	(0.223)
Shame and guilt (*ShameGuilt*) †	0.052	0.368	-0.393	-0.215	-0.597***	-0.016	-0.470**	-0.200
	(0.327)	(0.311)	(0.803)	(0.242)	(0.194)	(0.252)	(0.232)	(0.237)
Income inequality is a problem† (*IncIneq*)	0.072	0.036	-0.150	-0.005	0.039	0.218	-0.110	-0.053
	(0.232)	(0.218)	(0.598)	(0.174)	(0.139)	(0.180)	(0.169)	(0.174)
Libertarian attitude re. smoking† (*MYOB*)	0.335	0.519*	-1.554*	0.140	0.313*	0.285	-0.023	-0.454*
	(0.309)	(0.293)	(0.807)	(0.236)	(0.186)	(0.237)	(0.233)	(0.237)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Log likelihood	-1168	-1278	-251.2	-1953	-2620	-1832	-1996	-1952
Pseudo R squared	0.0431	0.0407	0.178	0.0562	0.185	0.0423	0.266	0.218
Chi-squared statistic	105.3	108.4	108.5	232.7	1191	162.0	1443	1091

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. † Composite index on a zero to one scale (see Table 1).

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors (robust and clustered on ZIP code) in parentheses. A constant term is included in the estimations but not reported in the table. All individual and pack variables from previous table are also included in the estimations, but the economic regressors are not.

Table A - 13: Logit regressions – all regressors

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Local sales tax	-0.066	-0.133	0.126	0.015	0.100*	0.029	0.083	0.142**
Time2nearSt	-0.113	-0.073	1.329**	-0.323*	-0.600***	-0.146	-0.314**	-0.188
Time2Mex	0.142*	0.127*	-0.263	0.020	-0.163***	-0.135**	-0.039	-0.005
Time2Res	-0.081	-0.052	-0.043	0.059	0.084	-0.037	0.244***	0.188**
CigRetailDen	0.110	0.081	0.019	-0.025	-0.002	-0.048	0.041	-0.023
Pop. density, log	-0.180**	-0.112	-0.101	-0.039	-0.016	0.050	0.013	0.067
Lottery WTP	-0.001	-0.002	0.002	-0.000	0.003***	-0.000	0.001	0.001**
Law$Cautious†	-0.333	-0.319	0.093	0.238	-0.045	-0.630***	0.407*	-0.024
CigCautious†	-0.707**	-0.872***	-0.408	-0.598**	-0.321*	-0.980***	-1.515***	-0.764***
Smoking as a norm†	-0.014	-0.027	-0.731	0.529***	0.550***	-0.612***	1.005***	0.625***
Illicit activity as a norm†	0.253	0.391	2.005***	1.165***	2.324***	0.111	3.906***	3.090***
Shame and guilt†	-0.035	0.307	-0.342	-0.251	-0.566***	0.022	-0.417*	-0.151
Income ≠ is a problem	0.067	0.028	-0.092	0.003	0.040	0.214	-0.127	-0.081
Libertarian attitude toward smoking†	0.306	0.490	-1.657**	0.117	0.364*	0.288	0.040	-0.403*
Smoking and demographic regressors:								
Vape/use e-cigs	-0.146	-0.152	0.166	0.406***	0.490***	0.088	0.843***	0.630***
Roll your own (RYO)	0.052	-0.007	1.075***	-0.022	-0.003	0.119	0.187*	0.034
Cigarettes/day, log	-0.140*	-0.112	-0.349*	-0.037	0.061	-0.118**	0.108**	0.118**
Brand: Marlboro	-0.208	-0.253*	1.586**	-0.521***	-0.202**	-0.139	-0.039	0.228**
Brand: Camel	-0.671***	-0.533***	0.381	-0.595***	-0.324***	0.038	-0.287**	0.236
Brand: Newport	-0.711***	-0.560***	2.713***	-0.888***	-0.547***	-0.188	-0.242	0.393**
No regular brand	0.289	0.316*	2.915***	0.133	0.060	0.156	-0.253	0.274*

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Male	0.005	-0.025	0.261	0.295***	0.242***	-0.081	0.133	0.129
Age	0.016***	0.014***	0.015	0.009**	-0.012***	-0.003	-0.019***	-0.030***
Inc: 25K to 50K	-0.148	-0.158	-0.394	-0.107	0.354***‡	0.423***‡	0.164‡	-0.141
Inc: 50K to 75K	-0.106	-0.081	-1.239**	-0.052	0.498***‡	0.700***‡	0.299**‡	-0.024
Inc: > 75K	-0.293	-0.200	-0.680	-0.031	0.886***‡	0.580***‡	0.373***‡	0.058
Inc: not available	0.125	0.104	0.346	0.050	0.061‡	0.120‡	0.004‡	0.133
Educ: HS to 2-yr deg.	-0.319	-0.329	-0.344	0.160‡	-0.212‡	0.424*‡	-0.290‡	-0.285‡
Educ: 4-yr degree	-0.256	-0.186	-0.879	0.387*‡	0.383**‡	0.808***‡	-0.168‡	-0.149‡
Educ: higher/prof	-0.410	-0.333	-0.614	0.668***‡	0.743***‡	0.681**‡	0.328‡	0.530**‡
Educ: not available	-0.078	0.716	1.492	-0.399‡	-0.687‡	0.417‡	0.023‡	0.004‡
Race/eth: Asian	0.683***‡	0.550**‡	-0.915	0.303	0.180‡	0.433**‡	0.071‡	0.126‡
Race/eth: Nat. Am.	0.134‡	0.524‡	0.183	0.303	0.174‡	0.156‡	0.814**‡	0.747**‡
Race/eth: Black	0.806***‡	0.869***‡	0.379	0.112	0.178‡	-0.110‡	0.191‡	0.501***‡
Race/eth: other, NA	0.001‡	0.098‡	0.084	0.005	-0.347**‡	-0.047‡	0.013‡	0.275‡
Race/eth: Hispanic	0.226‡	0.301**‡	0.340	0.247**	-0.237**‡	-0.184‡	0.407***‡	0.342***‡
Observations	3,552	3,552	4,841	4,613	4,709	4,647	4,674	4,556
Log likelihood	-1157	-1269	-247.2	-1944	-2589	-1828	-1981	-1937
Pseudo R squared	0.0525	0.0480	0.191	0.0603	0.195	0.0447	0.271	0.225
Chi-squared statistic	118.7	129.3	213.5	244.0	846.7	168.8	854.7	655.0

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. † Composite index on a zero to one scale (see Table 1). ‡Joint significance at the 5% level for the set of categorical coefficients.

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors in parentheses. A constant term is included in the estimations but not reported in the table. Standard errors are clustered on the ZIP code. All individual and pack variables from previous table are also included in the estimations.

G. Results from logit estimations with MSA fixed effects

The estimations with the fixed effects at the MSA level are presented here. These models were estimated by including an indicator variable for each of the 35 metropolitan statistical areas (MSAs).

Table A - 14: Logit regressions with MSA fixed effects– individual demographics only

Y = / X =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Vape/use e-cigs	-0.168	-0.174	0.265	0.526***	0.710***	0.014	1.117***	0.903***
Roll your own (RYO)	0.058	-0.005	1.035***	0.040	0.139*	0.135	0.374***	0.171*
Cigarettes/day, log	-0.138*	-0.104	-0.367*	0.028	0.171***	-0.127**	0.275***	0.251***
Brand: Marlboro	-0.185	-0.227*	1.573**	-0.509***	-0.193**	-0.141	-0.059	0.172
Brand: Camel	-0.658***	-0.529***	0.372	-0.611***	-0.349***	0.030	-0.341***	0.135
Brand: Newport	-0.700***	-0.533**	2.666***	-0.852***	-0.480***	-0.242	-0.203	0.350**
No regular brand	0.329	0.348*	2.887***	0.163	0.069	0.151	-0.226	0.247
Male	0.012	-0.027	0.286	0.358***	0.390***	-0.110	0.339***	0.293***
Age	0.017***	0.016***	0.011	0.004	-0.021***	-0.001	-0.034***	-0.043***
Inc: 25K to 50K	-0.142	-0.143	-0.355	-0.186	0.262***†	0.403***†	0.016†	-0.246**†
Inc: 50K to 75K	-0.124	-0.090	-1.109*	-0.099	0.408***†	0.696***†	0.172†	-0.087†
Inc: > 75K	-0.304	-0.192	-0.566	-0.033	0.849***†	0.527***†	0.406***†	0.156†
Inc: not available	0.111	0.110	0.209	-0.078	-0.081†	0.133†	-0.226†	-0.051†
Educ: HS to 2-yr deg.	-0.253	-0.276	-0.379	0.101†	-0.335**†	0.438*†	-0.524***†	-0.478***†
Educ: 4-yr degree	-0.250	-0.178	-0.771	0.356†	0.246†	0.768***†	-0.338*†	-0.258†
Educ: higher/prof	-0.384	-0.317	-0.361	0.713***†	0.730***†	0.579*†	0.300†	0.496**†
Educ: not available	0.123	0.861	1.397	-0.477†	-0.956†	0.422†	-0.069†	-0.401†
Race/eth: Asian	0.667***†	0.558**†	-0.949	0.268	0.087	0.472***	-0.185	-0.095
Race/eth: Nat. Am.	-0.011†	0.346†	0.311	0.252	0.229	0.274	0.749**	0.819**
Race/eth: Black	0.831***†	0.893***†	0.422	0.207	0.366**	-0.130	0.378**	0.594***
Race/eth: other, NA	0.060†	0.154†	0.061	-0.026	-0.416***	-0.025	-0.156	0.116
Race/eth: Hispanic	0.227†	0.308**†	0.466	0.167	-0.284***	-0.087	0.226**	0.193*
Observations	3,552	3,552	4,448	4,609	4,705	4,626	4,670	4,537
Log likelihood	-1139	-1252	-246.7	-1956	-2711	-1828	-2220	-2071
Pseudo R squared	0.0672	0.0606	0.179	0.0544	0.156	0.0392	0.182	0.169
Chi-squared statistic	182.4	188.0	211.8	266.8	703.9	154.0	689.1	573.1

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

†Joint significance at the 5% level for the set of categorical coefficients.

Notes: The figures are coefficients (i.e., log-odds ratios); standard errors are not shown due to the length of the table. Dummy variables for MSAs are included but not shown. Significance stars are based on robust standard errors that are clustered on the ZIP code.

Table A - 15: Logit regressions with MSA fixed effects – economic regressors added

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Local sales tax	-0.096	-0.115	0.514	0.028	0.058	-0.099	-0.005	0.142
(*salesTax*)	(0.115)	(0.114)	(0.330)	(0.099)	(0.072)	(0.080)	(0.095)	(0.087)
Driving time to nearest	-0.238	-0.177	1.098	-0.544***	-0.844***	-0.018	-0.521**	-0.305
state, ln (*Time2nearSt*)	(0.211)	(0.195)	(1.501)	(0.197)	(0.213)	(0.231)	(0.226)	(0.247)
Driving time to Mexico,	-0.389	-0.121	-1.084	-0.112	-0.221	-0.229	0.089	-0.161
log (*Time2Mex*)	(0.328)	(0.303)	(1.117)	(0.258)	(0.196)	(0.222)	(0.231)	(0.260)
Drvg time to nearest res-	-0.108	-0.061	0.314	-0.035	0.094	-0.057	0.136	0.219*
ervation, ln (*Time2Res*)	(0.147)	(0.141)	(0.388)	(0.130)	(0.099)	(0.116)	(0.125)	(0.115)
Cigarette retailer den-	0.085	0.051	-0.001	-0.041	-0.007	-0.041	0.038	-0.014
sity, log (*CigRetailDen*)	(0.071)	(0.067)	(0.205)	(0.041)	(0.032)	(0.038)	(0.040)	(0.039)
Population density,	-0.085	0.018	-0.098	0.052	0.052	-0.001	0.083	0.076
log (*PopDen*)	(0.085)	(0.083)	(0.261)	(0.060)	(0.044)	(0.055)	(0.057)	(0.057)
Lottery WTP	-0.001	-0.002	0.002	0.000	0.003***	-0.000	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,552	3,552	4,448	4,609	4,705	4,626	4,670	4,537
Log likelihood	-1135	-1247	-243.4	-1950	-2682	-1826	-2204	-2058
Pseudo R squared	0.0705	0.0640	0.190	0.0571	0.165	0.0406	0.188	0.174
Chi-squared statistic	197.5	204.6	268.4	283.6	729.8	163.2	720.6	587.3

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors in parentheses. Dummy variables for MSAs are included but not shown. Standard errors are clustered on the ZIP code. All individual and pack variables from previous table are also included in the estimations.

Table A - 16: Logit regressions with MSA fixed effects – individual-specific regressors related to risk aversion and moral sentiments added

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Cautious re. law and†	-0.335	-0.321	-0.123	0.255	-0.086	-0.667***	0.417*	-0.056
money (*Law$Cautious*)	(0.303)	(0.291)	(0.709)	(0.241)	(0.180)	(0.234)	(0.233)	(0.222)
Caution re. buying†	-0.624*	-0.802***	-0.410	-0.579**	-0.284	-0.974***	-1.548***	-0.799***
cigs (*CigCautious*)	(0.321)	(0.298)	(0.764)	(0.250)	(0.191)	(0.233)	(0.231)	(0.228)
Smoking as a norm†	-0.012	-0.035	-0.812	0.534***	0.596***	-0.585***	1.060***	0.678***
(*SmkNorm*)	(0.234)	(0.225)	(0.513)	(0.165)	(0.133)	(0.164)	(0.165)	(0.163)
Illicit activity as a norm†	0.291	0.437	1.998**	1.134***	2.443***	0.108	4.002***	3.196***
(*IllActNorm*)	(0.289)	(0.287)	(0.777)	(0.236)	(0.194)	(0.235)	(0.254)	(0.245)
Shame and guilt†	-0.140	0.206	-0.225	-0.273	-0.524***	0.074	-0.405*	-0.081
(*ShameGuilt*)	(0.347)	(0.329)	(0.998)	(0.245)	(0.200)	(0.271)	(0.231)	(0.248)
Income inequality is a	0.010	-0.030	-0.076	-0.003	0.024	0.241	-0.131	-0.038
problem† (*IncIneq*)	(0.250)	(0.240)	(0.597)	(0.173)	(0.148)	(0.192)	(0.174)	(0.183)
Libertarian attitude re.	0.262	0.458	-1.545**	0.102	0.353*	0.283	0.027	-0.431*
smoking† (*MYOB*)	(0.333)	(0.308)	(0.732)	(0.232)	(0.206)	(0.237)	(0.247)	(0.241)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,552	3,552	4,448	4,609	4,705	4,626	4,670	4,537
Log likelihood	-1134	-1244	-241.5	-1927	-2574	-1804	-1959	-1925
Pseudo R squared	0.0714	0.0662	0.197	0.0685	0.199	0.0517	0.279	0.228
Chi-squared statistic	201.2	203.6	246.7	320.6	937.5	202.3	938.6	675.8

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. †Composite index on a zero to one scale (see Table 1).

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors in parentheses. Dummy variables for MSAs are included but not shown. Standard errors are clustered on the ZIP code.

Table A - 17: Logit regressions with MSA fixed effects – all regressors

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Local sales tax	-0.092	-0.112	0.483	0.007	0.017	-0.098	-0.103	0.091
Time2nearSt	-0.231	-0.172	1.427	-0.484**	-0.770***	-0.005	-0.345	-0.132
Time2Mex	-0.399	-0.126	-1.095	-0.159	-0.275	-0.145	0.027	-0.261
Time2Res	-0.100	-0.057	0.277	-0.045	0.071	-0.054	0.121	0.214*
CigRetailDen	0.081	0.048	-0.007	-0.044	-0.006	-0.040	0.036	-0.016
Pop. density, log	-0.084	0.020	-0.123	0.036	0.013	0.006	0.024	0.018
Lottery WTP	-0.001	-0.002*	0.002	-0.000	0.003***	-0.000	0.001	0.001**
Law$Cautious†	-0.337	-0.318	-0.068	0.253	-0.078	-0.660***	0.410*	-0.059
CigCautious†	-0.604*	-0.785***	-0.425	-0.558**	-0.277	-0.977***	-1.536***	-0.802***
Smoking as a norm†	-0.006	-0.027	-0.822	0.543***	0.574***	-0.571***	1.042***	0.669***
Illicit activity as a norm†	0.328	0.457	2.024**	1.135***	2.365***	0.141	3.962***	3.141***
Shame and guilt†	-0.111	0.240	-0.251	-0.262	-0.532***	0.080	-0.405*	-0.079
Income ≠ is a problem	0.015	-0.048	-0.059	-0.006	0.023	0.256	-0.138	-0.048
Libertarian attitude toward smoking†	0.267	0.470	-1.573**	0.107	0.393*	0.270	0.045	-0.412*
Vape/use e-cigs	-0.167	-0.167	0.212	0.399***	0.480***	0.092	0.832***	0.617***
Roll your own (RYO)	0.038	-0.024	1.078***	-0.029	0.014	0.142	0.228**	0.051
Cigarettes/day, log	-0.139*	-0.118	-0.340*	-0.036	0.065	-0.107**	0.115**	0.123**
Brand: Marlboro	-0.175	-0.209	1.595**	-0.501***	-0.178*	-0.157	-0.028	0.207*
Brand: Camel	-0.659***	-0.520***	0.383	-0.600***	-0.332***	0.005	-0.307**	0.209
Brand: Newport	-0.707***	-0.548***	2.708***	-0.864***	-0.537***	-0.230	-0.221	0.356**
No regular brand	0.340	0.353*	2.927***	0.160	0.078	0.134	-0.245	0.272

Y = / *X* =	NoStamp1	NoStamp2	Loosies	PriceTooLow	TaxAvoidance	TaxEvasion	Untaxed	Counterfeit
Male	0.007	-0.019	0.276	0.290**	0.241***	-0.096	0.126	0.134
Age	0.018***	0.016***	0.013	0.010**	-0.012***	-0.004	-0.019***	-0.032***
Inc: 25K to 50K	-0.128	-0.129	-0.391	-0.113	0.352***‡	0.406***‡	0.162‡	-0.149
Inc: 50K to 75K	-0.089	-0.053	-1.147**	-0.019	0.513***‡	0.680***‡	0.323**‡	-0.029
Inc: > 75K	-0.259	-0.149	-0.722	-0.007	0.896***‡	0.543***‡	0.384***‡	0.034
Inc: not available	0.097	0.093	0.240	0.009	0.044‡	0.098‡	0.022‡	0.112
Educ: HS to 2-yr deg.	-0.274	-0.300	-0.456	0.183‡	-0.201‡	0.399‡	-0.297‡	-0.288‡
Educ: 4-yr degree	-0.241	-0.182	-0.927	0.417*‡	0.355**‡	0.742***‡	-0.193‡	-0.139‡
Educ: higher/prof	-0.349	-0.287	-0.614	0.722***‡	0.737***‡	0.626**‡	0.307‡	0.534**‡
Educ: not available	0.136	0.874	1.339	-0.354‡	-0.648‡	0.361‡	0.016‡	-0.044‡
Race/eth: Asian	0.671***‡	0.557**‡	-0.987	0.336*	0.154‡	0.427**	0.030‡	0.091‡
Race/eth: Nat. Am.	-0.011‡	0.369‡	-0.187	0.196	0.084‡	0.250	0.766**‡	0.799**‡
Race/eth: Black	0.843***‡	0.905***‡	0.395	0.126	0.208‡	-0.098	0.201‡	0.476***‡
Race/eth: other, NA	0.057‡	0.163‡	0.043	0.011	-0.360**‡	-0.079	0.008‡	0.267‡
Race/eth: Hispanic	0.217‡	0.301**‡	0.409	0.230*	-0.225**‡	-0.137	0.456***‡	0.357***‡
Observations	3,552	3,552	4,448	4,609	4,705	4,626	4,670	4,537
Log likelihood	-1130	-1240	-238.1	-1921	-2554	-1802	-1955	-1920
Pseudo R squared	0.0746	0.0696	0.208	0.0710	0.205	0.0528	0.280	0.230
Chi-squared statistic	212.3	219.5	282.1	338.7	933.6	209.1	951.9	675.7

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. † Composite index on a zero to one scale (see Table 1). ‡Joint significance at the 5% level for the set of categorical coefficients.

Notes: The figures are coefficients (i.e., log-odds ratios), with standard errors in parentheses. A constant term is included in the estimations but not reported in the table. Standard errors are clustered on the ZIP code. All individual and pack variables from previous table are also included in the estimations.

H. Survey details and script

BOTEC Analysis commissioned a survey of 5,001 adult smokers in California from March 12 to April 13, 2018, about a year after the state tobacco excise tax increase on April 1, 2017. The purposes of the survey were to:

- Measure awareness among smokers of the increase in the state excise tax
- Discover consumers' responses to the tax increase.
- Assess levels of tax avoidance, tax evasion, and illicit trade in cigarettes after the tax increase.

BOTEC Analysis contracted with SSI, Inc. to administer the survey. SSI puts together panels of online survey respondents from various sources.[37] Our written online survey was sent to panel members residing in California who had previously indicated to SSI that they were smokers.[38]

In initial survey questions we verified that respondents were California residents between the ages of 18 and 74 (inclusive) and that they were current smokers who had smoked at least 100 cigarettes in their lifetime. Respondents who considered themselves ex-smokers or who said they smoked on fewer than 12 of the past 30 days were excluded. The online survey was available in English only. The survey was issued a certificate of exemption by the Western Institutional Review Board due to the anonymity of the respondents.

[37] SSI does not provide specific information on how the panel members were recruited, but recruitment typically occurs through a variety of online ads, communities, and social networks (Berinsky et al., 2016, fn. 2). The company stated in personal communication to the author that respondents received minor compensation to complete the survey. For example, members recruited through an airline frequent flyer program may be offered miles to take part in surveys.

[38] The survey was designed to be "mobile phone friendly" and apparently was; while 36.1% of respondents used a PC or laptop, 55.6% used a smartphone (the remainder used a tablet device of some sort).

In the survey script below, respondents were not shown any comments in square brackets. The comments indicate the flow of the survey logic and other survey design elements. Also, the headings for the survey sections were not shown to respondents.

Survey Script

qintro - Consent Form

Online Consent Form

You are invited to take part in an online research survey by BOTEC Analysis, LLC about smoking behavior and taxes in California. Your participation will require approximately 20 minutes online. Taking part in this study is completely voluntary. There are no expected risks or discomforts associated with this survey. Your identity will not be known to BOTEC Analysis. Your anonymous responses provided to BOTEC Analysis will also be kept strictly confidential. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified. If you have questions or want a copy of this study's results, you can contact James Prieger by email at james.prieger@botecanalysis.com. If you have questions about your rights as a research participant, you can contact Jeff Markham of the Western Institutional Review Board at (360) 252-2865 or RegulatoryAffairs@wirb.com. Please feel free to print a copy of this consent page.

q1 - Please tell us the ZIP code you live in. Recall that your name and any personally identifying information will not be available to us.

Please tell us the ZIP code you live in. Recall that your name and any personally identifying information will not be available to us.

(Knowing the general area you live in will help us make sure we hear from all Californians on these issues).

Enter 5 digit ZIP. (1) _____

Screenout if not from California.

q2 - How old are you?

How old are you?

❍ Under 18 years old (1)
❍ 18 to 20 years old (2)
❍ 21 to 24 years old (3)
❍ 25 to 34 years old (4)
❍ 35 to 44 years old (5)
❍ 45 to 54 years old (6)
❍ 55 to 64 years old (7)
❍ 65 to 74 years old (8)
❍ 75 years or older (9)
❍ Prefer not to answer (10)

Screenout if '1', '9', or '10'

qconsent - Consent to participate

Clicking to proceed indicates that you are 18 years of age or older, and indicates your consent to participate in this survey.

hidGroup - Randomize to 50/50 chance of seeing the last response (the one about cigarettes) (randomization creates two groups: group 1, who see only three bullet points, and group 2, who sees all four bullet points)

❍ Group 1 (1)
❍ Group 2 (2)

q3 - How many did you do?

Please count how many of the following you have done in the past month. We aren't going to ask you about which of these you did, just how many, to additionally protect your privacy.

- Have brought food into California to eat that was purchased outside the state.
- Have discussed politics with family, friends, or coworkers
- Have stayed in California the entire time.
- *[If 'hidGroup'='2']*
  Have brought cigarettes into California that were purchased outside the state.

How many did you do?

(1)	❍ 0 (0) ❍ 1 (1) ❍ 2 (2) ❍ 3 (3) ❍ 4 (4)

q4 - How many did you do?

Please count how many of the following you have done in the past month. We aren't going to ask you about which of these you did, just how many, to help protect your privacy.

- Have been in a traffic accident
- Have told a lie (including lies that didn't hurt anyone) in the past month.
- Have attended services at a church, synagogue, or mosque in the past month.
- *[If 'hidGroup'='1']*
  Have bought cheap (untaxed) cigarettes from legitimate retailers, online over the Internet, or from an individual selling them independently in the past month.

How many did you do?

(1)	❍ 0 (0) ❍ 1 (1) ❍ 2 (2) ❍ 3 (3) ❍ 4 (4)

q5 - Have you smoked 100 or more cigarettes (including roll-your-own cigarettes) in your lifetime?

Have you smoked 100 or more cigarettes (including roll-your-own cigarettes) in your lifetime?

❍ Yes (1)
❍ No (2)
Screenout if 'q5'='2'

q6 - Do you now smoke cigarettes every day, some days, or not at all?

Do you now smoke cigarettes every day, some days, or not at all?

❍ Every day (1)
❍ Some days (2)
❍ Not at all (3)
❍ (Don't know/Can't say) (4)
Screenout if 'q6'='3' or '4'

*[If **'q6'='2'**]* **q7 - Do you consider yourself a smoker, a social smoker, or an ex-smoker?**

Do you consider yourself a smoker, a social smoker, or an ex-smoker?

❍ Smoker (1)
❍ Social smoker (2)
❍ Ex-smoker (3)
❍ Don't know/can't say (4)
Screenout if 'q7'='3' or '4'

q8 - On how many of the past 30 days did you smoke cigarettes?

On how many of the past 30 days did you smoke cigarettes?

Enter number of days (1) _____

q8x - On how many of the past 30 days did you smoke cigarettes?

❑ None; I didn't smoke at all in the past 30 days (2)
❑ Don't know/can't say/refuse to answer (3)
Screenout if 'q8x'='2'

*[If **'q8x ='3']*** **q9 - Would you say you smoked on AT LEAST 12 DAYS in the past 30 days?**

Would you say you smoked on AT LEAST 12 DAYS in the past 30 days?

❍ Yes (1)
❍ No (2)
❍ Don't know/can't say (3)
Screenout if 'q9'='2' or '3'

q10 - Do you currently smoke...

Do you currently smoke...

❍ Pre-packaged factory-made cigarettes only? (1)
❍ Roll-your-own cigarettes only? (2)
❍ Or both? (3)
❍ Or neither of these? (4)
Screenout if 'q10'='2' or '4'

q11 - q11

You qualify to participate! This survey will ask questions about smoking. It will take most people about 15-20 minutes. All information you give us will be strictly confidential. In addition, we (the researchers) will not find out your name.

qDemoIntro - qDemoIntro

Please tell us a little bit about yourself first so that we can be sure we hear from all sorts of Californians.

q12 - Education

How much education have you completed?

❍ I didn't finish high school and I don't have a GED. (1)
❍ High school diploma or equivalent (GED). (2)
❍ Some college but no degree. (3)
❍ Two year (Associate) college degree (including occupational and academic degrees) (4)
❍ Four year (Bachelor) undergraduate college degree (5)
❍ Higher academic degree (M.A., M.S., Ph.D, Ed.D, or similar) (6)
❍ Professional school degree (M.D., D.D.S., J.D., D.C. , or similar) (7)
❍ I prefer not to say (8)

q13 - Gender

What is your gender?

❍ Female (1)
❍ Male (2)
❍ Prefer Not to Answer (3)

q14 - Household Income

What was your household income in the past 12 months? Include income from everyone in the household, and include all wages, self-employment income, interest and dividends, welfare payments, Social Security, pension, and any other regular source of income such as unemployment compensation, child support/alimony, or VA payments. Don't include capital gains, food stamps, or public housing subsidies.

❍ Less than $10,000 (1)
❍ $10,000 to $14,999 (2)
❍ $15,000 to $24,999 (3)
❍ $25,000 to $34,999 (4)
❍ $35,000 to $49,999 (5)
❍ $50,000 to $74,999 (6)
❍ $75,000 to $99,999 (7)
❍ $100,000 to $149,999 (8)
❍ $150,000 or more (9)
❍ I prefer not to say (10)

q15 - Ethnicity

Select all that apply. I am...

❑ Asian (1)
❑ Black or African American (2)
❑ Hispanic, Latino, or Spanish Origin (3)
❑ Native American, American Indian, or Alaskan Native (4)
❑ White or Caucasian (5)
❑ Other race/ethnicity or Multiracial (6)
❍ I prefer not to say (7)

[If 'q15'='4'] **q16 - Are you a member of a federally recognized Indian tribe based in California?**

Are you a member of a federally-recognized Indian tribe based in California?

(A tribe is federally recognized if its members are eligible to receive services from the U.S government's Bureau of Indian Affairs)

❍ Yes (1)
❍ No, but I am a member of a federally-recognized Indian tribe that isn't based in California. (2)
❍ No, but I am a member of an Indian tribe based in California that isn't federally recognized. (3)
❍ Other/Don't know/prefer not to say (4)

[If 'q15'='4'] **q17 - Do you live on a reservation, a rancheria, or land held in trust by the government for a tribe?**

Do you live on a reservation, a rancheria, or land held in trust by the government for a tribe?

❍ Yes (1)
❍ No (2)

❍ Don’t know/prefer not to say (3)

q18 - Do you recall any cigarette tax increases in California last year?

Do you recall any cigarette tax increases in California last year?

❍ Yes (1)
❍ No (2)

q19 - The cigarette tax rose in California on April 1 last year. Do you know how much the cigarette tax went up?

The cigarette tax rose in California on April 1 last year.
Do you know how much the cigarette tax went up?

❍ Yes (1)
❍ No (2)

[If 'q19'='1'] **q20 - By how much did the cigarette tax increase?**

By how much did the cigarette tax increase?

Enter your figure in dollars and cents; no dollar sign is needed.

	q20a - (Enter amount in dollars and cents)	q20b -
$ (1)	_____	❍ pack (1) ❍ carton (2) ❍ cigarette (3)

q21 - Before the tax increase last April, did you stock up on cigarettes?

Last year, the cigarette tax rose by $2 in California (before April the tax was $0.87 per pack; starting in April it became $2.87 per pack).

Before the tax increase last April, did you stock up on cigarettes?

❍ Yes (1)
❍ No (2)
❍ I don't remember (3)

[If 'q21'='1'] **q22 - About how many cigarettes did you buy to stock up before the tax increase last April? Include only the amount beyond what you would have normally bought.**

About how many cigarettes did you buy to stock up before the tax increase last April?

Include only the amount beyond what you would have normally bought.

❍ None (1)
❍ More than one pack but no more than one carton (2)
❍ More than one carton but no more than 5 cartons (3)
❍ More than 5 cartons but no more than 10 cartons (4)
❍ More than 10 cartons (5)
❍ I don't remember (6)

[If 'q21'='1' and 'q22'='5'] **q23 - About how many cartons of cigarettes did you buy to stock up before the tax increase last April?**

About how many cartons of cigarettes did you buy to stock up before the tax increase last April?

q24 - Since the tax increase in April 2017, have you:

Since the tax increase in April 2017, have you:

(check all that apply)

❑ Found ways to get less expensive cigarettes (1)
❑ Tried to quit smoking (2)
❑ Smoked less than you did before the tax went up (3)
❑ Switched to/started using more e-cigarettes or vaping (4)
❑ Switched to/started smoking more roll-your-own cigarettes (5)
❑ Switched to/started smoking more small cigars or cigarillos (6)
❍ None of these (7)

Question q25-q27: only if 'q24'='1'

q25 - How did you get less expensive cigarettes?

How did you get less expensive cigarettes?

Check all that apply.

❑ Started buying larger quantities or bought from a "warehouse" (for example, Sam's Club) type of store. (1)
❑ Switched to a cheaper brand (2)
❑ Bought cigarettes while I was out of California (3)
❑ Bought cigarettes on the Internet or through the mail (4)
❑ Bought cigarettes at a duty free shop (5)
❑ Bought untaxed cigarettes somewhere in California (not on an Indian reservation) (6)
❑ Bought untaxed cigarettes on an Indian reservation in California (7)
❑ Bought single cigarettes (loosies) from someone (8)
❑ Other (9)_____
❍ Don't remember/can't say (10)

***[If 'q25'='3']* q26 - Where did you buy the most cigarettes outside California?**

Where did you buy the most cigarettes outside California?

❍ Nevada (1)
❍ Arizona (2)
❍ Oregon (3)
❍ Some other state in the U.S. (4)
❍ Mexico (5)
❍ In another country (besides Mexico) (6)
❍ Don't know/can't say (7)

***[If 'q25'='3' and 'q26'='4' or '6']* q27 - Where would that be?**

Where would that be?

q28 - How many cigarettes were in the pack you are CURRENTLY smoking when it was new?

How many cigarettes were in the pack you are CURRENTLY smoking when it was new?

If you aren't currently smoking a pack, answer for the last pack you smoked.

❍ 20 (1)
❍ Other size (2)_____
❍ I only smoke other people's cigarettes (3)
❍ I buy single cigarettes (loosies). (4)
❍ Don't know/can't say (5)

q29 - If you have your current pack handy, please look at it. Is the clear plastic wrapper still on it?

If you have your current pack handy, please look at it. Is the clear plastic wrapper still on it?

❍ Yes (1)
❍ No (2)
❍ I don't know/I don't have my current pack. (3)

Questions q30 through q35: If 'q29'='1'

q30 - Does your current pack have a tax stamp on it?

Does your current pack have a tax stamp on it?

❍ Yes, a California tax stamp that looks like this:  (1)
❍ Yes, a California tax stamp that looks different than this picture (2)
❍ Yes, some other tax stamp. (3)
❍ No (4)

Questions q31 through q33: If 'q30'='2'

q31 - Please look again at the tax stamp on your pack and compare it with the pictures.

Please look again at the tax stamp on your pack and compare it with the pictures.

A genuine tax stamp has these features: It is much smaller than the picture. It is a bit less than an inch wide. The color is red-orange, except that on the left side (where it looks black in the picture on the left) the color shifts from green to blue when tilted slightly. The code printed on the right side will have 6 characters, but the code won't be the same as in these pictures.

❍ My pack's stamp seems like a genuine California stamp (1)
❍ My pack's stamp doesn't look like a genuine California stamp (2)

***[If 'q31'='2']* q32 - How is your pack's stamp different than these pictures?**

How is your pack's stamp different than these pictures?

Check all that apply.

❑ It doesn't have the green-to-blue color shifting ink on the left side (1)
❑ It doesn't have a serial number on the right side (2)
❑ It has the number 25 instead of 20 (3)
❑ The stamp also looks different in some other way (4)

***[If 'q31'='2' and 'q32'='4']* q33 - Please explain how your pack's stamp looks different that the picture.**

Please explain how your pack's stamp looks different that the picture.

[If 'q30'='3'] **q34 - Which state or tribe is the tax stamp from?**

Which state or tribe is the tax stamp from?

❍ Arizona (1)
❍ Nevada (2)
❍ Texas (3)
❍ Virginia (4)
❍ Other (including packs with more than one stamp or a combined stamp) (5)_____
❍ I don't know/cannot tell from the stamp (but if you can read the stamp, enter what it says in the previous option) (6)

[If 'q30')=('3','4') or 'q31'='2')] **q35 - Did you buy that pack in California?**

Did you buy that pack in California?

❍ Yes (1)
❍ No (2)

q36 - Thinking again about the cigarettes you are currently smoking: Did you buy these cigarettes by the pack, the carton, or another way?

Thinking again about the cigarettes you are currently smoking: Did you buy these cigarettes by the pack, the carton, or another way?

(If someone bought them for you, say how they bought them.)

❍ Pack (1)
❍ Carton (2)
❍ Multipack (two or more packs bundled together, but less than a carton) (3)
❍ Individual cigarettes, loosies, or another amount less than a full pack. (4)
❍ Don't know/refuse to answer (5)

[If 'q36' ≠ '4')] **q37 - How much did you pay for your current pack/multipack/carton?**

How much did you pay for your current pack/multipack/carton?

(If someone bought it for you, say how much they paid for it.)

	q37a - (Enter amount in dollars and cents)	q37b -
$ (1)	_____	❍ pack (1) ❍ multipack (2) ❍ carton (3) ❍ cigarette (4)

[If 'q36' ≠ '4'] **q37x**

❑ Don't know (1)

q38 - Have you purchased cigarettes outside the state and brought them back to smoke within California?

Have you purchased cigarettes outside the state and brought them back to smoke within California?

Include any online or mail-order purchases in your answer.

❍ Yes, within the past 30 days. (1)
❍ Yes, within the past year but longer ago than 30 days. (2)
❍ Not at all within the past year. (3)
❍ Don't know/Can't say (4)

[If 'q38'='1' or '2'] **q39 - In the past year, did you ever bring into California more than 400 cigarettes in one trip (whether yourself or by an online or mail order)?**

In the past year, did you ever bring into California more than 400 cigarettes in one trip (whether yourself or by an online or mail order)?

That's 20 packs or 2 cartons.

❍ Yes (1)
❍ No (2)
❍ Don't know/can't say (3)

[If 'q38'='1' or '2' and 'q39'='1'] **q40 - Use taxes are payments sometimes collected by states to replace the sales taxes not collected on items purchased out of state.**

Use taxes are payments sometimes collected by states to replace the sales taxes not collected on items purchased out of state. When you brought into California more than 400 cigarettes in one trip or shipment, did you make a payment for use taxes?

(You would have made this payment by adding it to your state income tax form or by making a special payment to the state Board of Equalization).

❍ Yes (1)
❍ No (2)
❍ Don't know/can't say (3)

q41 - Sometimes businesses or individuals sell cigarettes at lower prices because they don't pay the state tobacco tax.

Sometimes businesses or individuals sell cigarettes at lower prices because they don't pay the state tobacco tax. Such sales can be low-price cigarettes from legitimate retailers, from an individual selling cigarettes independently (door-to-door or just in the street), or online over the Internet. Have you purchased any untaxed cigarettes in the past month?

❍ Yes (1)
❍ No (2)
❍ I'm not sure, but I suspect that some cigarettes I bought were not taxed. (3)
❍ Don't know/Can't say (4)

[If 'q41'='1' or '3')] **q42 - Where did you buy the cigarettes you think may have been untaxed?**

Where did you buy the cigarettes you think may have been untaxed? (Answer for the most recent such purchase).

❍ A smoke shop or liquor store that also sells fully taxed cigarettes. (1)
❍ Some other mainstream store that also sells fully taxed cigarettes. (2)
❍ Someone selling independently (not at a store or other mainstream establishment, but perhaps at local street markets, door-to-door, from a delivery service, in a bar, or just in the street). (3)
❍ Online/Internet. (4)
❍ On an Indian reservation. (5)
❍ On a military base (6)
❍ A friend or relative (7)
❍ Other (8)_____
❍ Don't know/can't say (9)

q43 - Sometimes cigarettes turn out to be counterfeit: they aren't the genuine brand listed on the package.

Sometimes cigarettes turn out to be counterfeit: they aren't the genuine brand listed on the package. Counterfeit cigarettes often have a bad or unusual taste. Have you purchased any cigarettes in the past month that turned out to be counterfeit?

❍ Yes (1)
❍ No (2)
❍ I'm not sure, but I suspect that some cigarettes I bought were counterfeit. (3)
❍ Don't know/Can't say (4)

[If 'q43'='1' or '3')] **q44 - Where did you buy the cigarettes you think may have been counterfeit?**

Where did you buy the cigarettes you think may have been counterfeit? (Answer for the most recent such purchase).

❍ A smoke shop or liquor store that also sells fully taxed cigarettes. (1)
❍ Some other mainstream store that also sells fully taxed cigarettes. (2)
❍ Someone selling independently (not at a store or other mainstream establishment, but perhaps at local markets, delivery service, door-to-door, in a bar or just in the street). (3)
❍ Online/Internet. (4)
❍ On an Indian reservation. (5)
❍ On a military base (6)
❍ A friend or relative (7)
❍ Other (8)_____
❍ Don't know/Can't say (9)

q45 - How often in the past year did you buy cigarettes on American Indian reservations or in an Indian casino?

How often in the past year did you buy cigarettes on American Indian reservations or in an Indian casino?

❍ Never (1)
❍ Infrequently (2)
❍ Frequently (3)
❍ All the time (4)
❍ Don't know/Can't say (5)

q46info - In this next set of questions, we ask about your smoking behavior.

In this next set of questions, we ask about your smoking behavior.

[If 'q10'='3'] **q46 - You said that you smoke pre-packaged factory-made cigarettes AND roll-your-own cigarettes. Which of those are you smoking more of at the moment?**

You said that you smoke pre-packaged factory-made cigarettes AND roll-your-own cigarettes. Which of those are you smoking more of at the moment?

❍ Factory-made cigarettes (1)
❍ Roll-your-own cigarettes (2)
❍ Both about equally (3)

Questions q47 through q59: If 'q10'='1' or 'q46'='1' or '3'

q47 - Do you have a regular brand and variety of cigarettes that you smoke more than any other?

Do you have a regular brand and variety of cigarettes that you smoke more than any other?

❍ Yes (1)
❍ No (2)

Questions q48 through q59: If 'q47'='1'

q48 - What brand is it?

What brand is it?

❍ Marlboro (1)
❍ American Spirit (2)
❍ Camel (3)
❍ Maverick (4)
❍ Newport (5)
❍ Pall Mall (6)
❍ Parliament (7)
❍ Timeless Time (8)
❍ Some other brand (9)

[If 'q48'='9']] **q49 - OK, is it one of these brands?**

OK, is it one of these brands?

❍ Basic (1)
❍ Benson & Hedges (2)
❍ Capri (3)
❍ Djarum (4)

❍ Fortuna (5)
❍ Grand Prix (6)
❍ Kool (7)
❍ L&M (8)
❍ Misty (9)
❍ Montego (10)
❍ Pyramid (11)
❍ Rave (12)
❍ Seneca (13)
❍ Virginia Slims (14)
❍ Wave (15)
❍ Winston (16)
❍ No, it isn't any of the brands listed. (17)

[If 'q48'='9' and 'q48'='9')] **q50 - Please tell us the brand of cigarettes that you smoke more than any other.**

Please tell us the brand of cigarettes that you smoke more than any other.

Questions q51 through q58 are asked depending on the brand selected above.

q51 - What variety of Marlboro do you usually smoke?

What variety of Marlboro do you usually smoke?

❍ Marlboro Blue (1)
❍ Marlboro Gold Special Blend (2)
❍ Marlboro Green (Menthol) (3)
❍ Marlboro Red (4)
❍ Marlboro Red Special Blend (5)
❍ Some other Marlboro variety (6)

q52 - What variety of Natural American Spirit do you usually smoke?

What variety of Natural American Spirit do you usually smoke?

❍ American Spirit Full Bodied Taste Kings (1)
❍ American Spirit Light Mellow Kings (2)
❍ American Spirit Balanced Taste Kings (3)
❍ American Spirit Smooth Mellow Kings (4)
❍ American Spirit Perique Blend Kings (5)
❍ American Spirit Organic Tobacco Mellow Kings (6)
❍ American Spirit Organic Tobacco Full-Bodied Taste Kings (7)
❍ American Spirit Menthol Kings (8)
❍ American Spirit Menthol Light Kings (9)
❍ Some other variety of American Spirit. (10)

q53 - What variety of Camel do you usually smoke?

What variety of Camel do you usually smoke?

❍ Camel 99s (1)
❍ Camel Blue (2)
❍ Camel Crush (3)
❍ Camel Filter (4)
❍ Camel Menthol (5)
❍ Camel No. 9 (Non-Menthol) (6)
❍ Camel No. 9 Menthe/Menthol (7)
❍ Camel Regular Non-filter (8)
❍ Camel Silver (9)
❍ Camel Turkish (10)
❍ Camel Wides (Non-Menthol) (11)
❍ Camel Wides Menthol (12)
❍ Some other variety of Camel. (13)

q54 - What variety of Maverick do you usually smoke?

What variety of Maverick do you usually smoke?

❍ Full Flavor (1)
❍ Gold (2)
❍ Silver (3)
❍ Menthol (4)
❍ Menthol Gold (5)
❍ Menthol Silver (6)
❍ Some other variety of Maverick (7)

q55 - What variety of Newport do you usually smoke?

What variety of Newport do you usually smoke?

❍ Newport (85s, 100s, or Kings) (1)
❍ Newport Menthol Blue (2)
❍ Newport Menthol Gold (3)
❍ Newport Non-Menthol (4)
❍ Newport Non-Menthol Gold (5)
❍ Newport Smooth Select (6)
❍ Some other variety of Newport (7)

q56 - What variety of Pall Mall do you usually smoke?

What variety of Pall Mall do you usually smoke?

❍ Pall Mall Red (1)
❍ Pall Mall Blue (2)
❍ Pall Mall Orange (3)
❍ Pall Mall Menthol (4)
❍ Pall Mall Menthol Black (5)
❍ Pall Mall Menthol White (6)
❍ Pall Mall Non-Filter (7)
❍ Pall Mall Gold (8)
❍ Some other variety of Pall Mall. (9)

q57 - What variety of Parliament do you usually smoke?

What variety of Parliament do you usually smoke?

❍ Blue Pack (1)
❍ White Pack (Non-menthol) (2)
❍ Silver Pack (Non-menthol) (3)
❍ Green Pack (Menthol) (4)
❍ White Pack (Menthol) (5)
❍ Silver Pack (Menthol) (6)
❍ Some other variety of Parliament. (7)

q58 - What variety of Timeless Time do you usually smoke?

What variety of Timeless Time do you usually smoke?

❍ Timeless Time Red (1)
❍ Timeless Time Menthol Green (2)
❍ Timeless Time Silver (3)
❍ Timeless Time Blue (4)
❍ Some other variety of Timeless Time (5)

[If answered "some other brand" to q51 through q58] **q59 - What variety of that brand do you usually smoke? (Gold, Blue, Green, Menthol, non-filter, etc.)**

What variety of that brand do you usually smoke? (Gold, Blue, Green, Menthol, non-filter, etc.)

q60 - Do you usually smoke non-menthol, menthol, or some other flavor cigarettes?

Do you usually smoke non-menthol, menthol, or some other flavor cigarettes?

❍ Non-menthol (regular) tobacco. (1)
❍ Menthol (2)
❍ Non-menthol and menthol about equally (3)
❍ Some other flavor (4)

[If 'q60'='4'] **q61 - What other flavor do you usually smoke?**

What other flavor do you usually smoke?

q62 - Do you currently smoke any other form of tobacco (don't include vaping)?

Do you currently smoke any other form of tobacco (don't include vaping)?

❍ No (1)
❍ Yes (2)

[If 'q62'='2')] **q63 - What other type of tobacco do you smoke?**

What other type of tobacco do you smoke?

❑ full-size cigars (1)
❑ pipe (2)
❑ waterpipe or hookah (3)
❑ little cigars or cigarillos (4)
❑ Other: (5)_____

q64 - Do you currently vape or use an e-cigarette product regularly?

Do you currently vape or use an e-cigarette product regularly?

❍ Yes (1)
❍ No (2)

[If 'q64'='1'] **q65 - Do you vape or use e-cigarette products more now than before the tax increase in April last year?**

Do you vape or use e-cigarette products more now than before the tax increase in April last year?

❍ Yes (1)
❍ No (2)
❍ Don't know/Can't say (3)

[If 'q6'='1'] **q66 - On average how many cigarettes do you smoke each day (including roll your own cigarettes, if any)?**

On average how many cigarettes do you smoke each day (including roll your own cigarettes, if any)? As you answer, keep in mind that a typical pack has 20 cigarettes in it.

❍ 1 to 5 cigarettes a day (1)
❍ 6 to 10 cigarettes a day (2)
❍ 11 to 15 cigarettes a day (3)
❍ 16 to 24 cigarettes a day (4)
❍ 25 to 35 cigarettes a day (5)
❍ 36 or more cigarettes a day (6)
❍ Don't know/Can't say (7)

[If 'q6'='1' and 'q66'='7'] **q67 - Would you say that, on average, you now smoke more or less than 20 cigarettes each day?**

Would you say that, on average, you now smoke more or less than 20 cigarettes each day?

❍ More (1)
❍ Less (2)
❍ About 20 (one pack) (3)
❍ Don't Know (4)

[If 'q6'='2'] **q68 - On the average, on those days you smoked, how many cigarettes did you usually smoke each day?**

On the average, on those days you smoked, how many cigarettes did you usually smoke each day?

Enter number of cigarettes (1) _____

q68x - On the average, on those days you smoked, how many cigarettes did you usually smoke each day? - 68.2. Don't know/can't say/refuse to answer

❑ Don't know/can't say/refuse to answer (2)

q68a - Do you smoke less or more now than before the tax increase in April last year?

Do you smoke less or more now than before the tax increase in April last year?

❍ Less (1)

❍ More (2)
❍ About the same (3)
❍ Don't know/Can't say (4)

q69 - How common is smoking among your friends and peers (co-workers, classmates, etc.)?

How common is smoking among your friends and peers (co-workers, classmates, etc.)?

❍ Most of them smoke (1)
❍ Many of them smoke, but many don't smoke (2)
❍ Most of them don't smoke, but some do (3)
❍ Hardly any of them smoke (4)

q70 - How common is smoking in your community where you live?

How common is smoking in your community where you live?

❍ Most of the people in my neighborhood smoke (1)
❍ Many of the people in my neighborhood smoke, but many don't smoke (2)
❍ Most of the people in my neighborhood don't smoke, but some do (3)
❍ Hardly any of the people in my neighborhood smoke (4)

q71info - In this final part of the survey, we are interested in various attitudes and opinions you hold.

In this final part of the survey, we are interested in various attitudes and opinions you hold.

q71 - In general, are you willing to take risks or do you try to avoid taking risks?

In general, are you willing to take risks or do you try to avoid taking risks?

Please tick a box on the scale, where 0 means: "completely unwilling to take risks" and 10 means: "fully willing and prepared to take risks".

(1)	❍ 0 - Completely unwilling to take risks (0) ❍ 1 (1) ❍ 2 (2) ❍ 3 (3) ❍ 4 (4) ❍ 5 (5) ❍ 6 (6) ❍ 7 (7) ❍ 8 (8) ❍ 9 (9) ❍ 10 - Fully willing and prepared to take risks (10)

q72 - Consider this scenario: You pay cash for something at a store and the clerk gives you too much change. You keep the extra change. How would you feel afterward?

Consider this scenario: You pay cash for something at a store and the clerk gives you too much change. You keep the extra change. How would you feel afterward?

❍ I'd feel kind of good (1)
❍ I'd feel neither good nor bad (2)

❍ I'd feel a little bad (3)
❍ I'd feel pretty bad (4)
❍ I'd feel very bad (5)

q73to94 - For each of the following statements, select the answer closest to how you feel about it. Please look at the choices carefully before answering.

For each of the following statements, select the answer closest to how you feel about it. Please look at the choices carefully before answering.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Don't know/Can't say (6)
I think society in America is fair and just (73)	❍	❍	❍	❍	❍	❍
I think income inequality is a big problem in my community (74)	❍	❍	❍	❍	❍	❍
I think income inequality is a big problem in America (75)	❍	❍	❍	❍	❍	❍
When I think about matters involving money, I am a cautious person and I try to avoid taking risks (76)	❍	❍	❍	❍	❍	❍

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Don't know/Can't say (6)
When I think about following the law, I am a cautious person and I try to avoid taking risks (77)	❍	❍	❍	❍	❍	❍
Where I live, most people think it is OK to try to avoid paying their income taxes (78)	❍	❍	❍	❍	❍	❍
I think it is OK to try to avoid paying my income taxes (79)	❍	❍	❍	❍	❍	❍
I care a lot about what others would think of me if I do something I know is wrong (80)	❍	❍	❍	❍	❍	❍
I get angry with myself when I do something I know is wrong (81)	❍	❍	❍	❍	❍	❍

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Don't know/Can't say (6)
I feel guilty when I do something I know is wrong (82)	❍	❍	❍	❍	❍	❍
I support policies designed to discourage people from smoking, like anti-smoking advertising and health warnings on packs (83)	❍	❍	❍	❍	❍	❍
Tobacco taxes are unfair to smokers (84)	❍	❍	❍	❍	❍	❍
I don't think other people should try to discourage me from smoking (85)	❍	❍	❍	❍	❍	❍
I think it should be my own choice where I smoke (86)	❍	❍	❍	❍	❍	❍
When I buy cigarettes, I prefer not taking risks (87)	❍	❍	❍	❍	❍	❍

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Don't know/Can't say (6)
Where I live, people think it is OK to buy untaxed or suspiciously cheap cigarettes (88)	❍	❍	❍	❍	❍	❍
Where I live, lots of people buy counterfeit goods like purses, wallets, watches, and clothing (89)	❍	❍	❍	❍	❍	❍
Where I live, lots of smokers buy untaxed or suspiciously cheap cigarettes (90)	❍	❍	❍	❍	❍	❍
I think it is OK to make smoking cheaper by buying untaxed or suspiciously cheap cigarettes (91)	❍	❍	❍	❍	❍	❍

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)	Don't know/Can't say (6)
Even if offered to me, I wouldn't buy suspiciously cheap cigarettes because they might be counterfeit or taste bad (92)	❍	❍	❍	❍	❍	❍
I think last year's tax increase on cigarettes encouraged smokers to buy untaxed or illegal cigarettes (93)	❍	❍	❍	❍	❍	❍
I think it is easy to find and buy untaxed or illegal cigarettes (94)	❍	❍	❍	❍	❍	❍

q95 - Suppose in a lottery, each ticket has a 10% chance to win $1,000.

Now for the last question:

Suppose in a lottery, each ticket has a 10% chance to win $1,000. Think carefully—what is the most you would you be willing to pay to buy a lottery ticket?

q96 - Do you have any final comments for us about the survey?

That's all!

Do you have any final comments for us about the survey?

Please do not give your name, to preserve your anonymity.

q97 - q97

Thank you for your time!