# Gambling and Substance Use: A Cross-Consumption Analysis of Tobacco Smoking, Alcohol Drinking and Gambling

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# Gambling and Substance Use: A Cross-Consumption Analysis of Tobacco Smoking, Alcohol Drinking and Gambling

**Abstract** *Background*: Gambling has never been as popular and widely available as it is today. Despite the widespread normalization of gambling as just another form of leisure consumption, its potential interaction with some substance use (e.g., smoking and drinking) is nowadays an issue of social concern. In fact, empirical research has found both substances to have strong interdependencies with gambling through multiple factors. *Methods*: Gambling is a two-step decision: potential gamblers first decide whether to participate and then their expenditure. Using data from the Spanish gambling prevalence survey, a double-hurdle model is proposed to estimate the effect of tobacco smoking and alcohol drinking on gambling participation and expenditure decisions using binary consumption and frequency of consumption approaches. *Results*: In line with previous research, results showed that people who smoked tobacco and/or drank alcohol were more likely to gamble and to have a greater expenditure. Each additional level of frequency of consumption of both products was found to likely increase the prevalence of gambling. *Conclusions*: The frequency of consumption of tobacco and/or alcohol was positively associated with the likelihood of gambling and spending more on gambling products. Findings may assist gambling stakeholders to prevent potential gambling-related harm.

**Keywords** gambling; substance use; cross-consumption; correlation; double-hurdle

# Gambling and Substance Use: A Cross-Consumption Analysis of Tobacco Smoking, Alcohol Drinking and Gambling

## 1. Introduction

In most worldwide jurisdictions, gambling has become an alternative form of leisure and entertainment within an increasingly crowded and highly competitive supply. Its global market value is reportedly expected to exceed $565 billion by 2022, growing at annual rates of 5.9%.[1] In fact, gambling has never been as widely available and as accessible as it is today. For instance, online gambling—whose market value worldwide is estimated to exceed $100 billion in 2025[2]—allows anyone to gamble at anytime from anywhere on a large variety of games that are usually brief, always available, require low wagers and deliver immediate results.[3] Notwithstanding, as the expansion of gambling opportunities continues, there is substantial public controversy linked to social affairs, and associated with likely harms and disordered gambling. Actually, potential interaction of gambling consumption with substance use (e.g., smoking and drinking) is nowadays an issue of social concern.

Existing research has shown on a constant basis that tobacco smoking and drinking alcohol are two already established addictive activities that have strong interdependencies with gambling through biological and social factors. In fact, individuals are believed to have a personal underlying factor (such as social norms, expectancies or exposure) that strongly influences their behavior towards potentially addictive activities, including gambling, tobacco and alcohol.[4] Previous literature also

suggests that smoking and gambling might share similar neurobiological, genetic and/or common environmental influences[5] that might enhance gambling behavior and reinforcement. In addition, further research provided some evidence for cross-cue reactivity between a substance and a behavioral addiction when comparing smoking gamblers to individuals who only smoked or only gambled.[6]

Literature regarding this cross-consumption is quite large and consistent. Gambling, cigarette smoking and alcohol consumption are found to be co-occurring behaviors[7], and so there are interdependencies among smoking, drinking and gambling.[8] Gamblers are significantly more likely to drink alcohol and smoke heavily compared to non-gamblers,[9] while smokers are more likely to gamble on most forms of gambling.[7] Also, alcohol drinking is associated with greater gambling persistence.[10]

Moreover, men and women do not engage in addictive activities, including gambling, in the same way. Gender perspective research showed that there is "a highly significant association in males" between gambling and alcohol drinking, but none whatsoever in females; furthermore, males are found to be more likely to engage in a wide variety of potentially addictive behaviors than females.[7] In short, gambling prevalence is higher among males than females.[9]

Finally, adolescents are being particularly researched as they are considered especially vulnerable to gambling and other potentially addictive behaviors. Alcohol and tobacco are strong predictors of gambling among young people.[11] Prior explanatory factors are common to adolescent problem behavior, suggesting that gambling, alcohol drinking, and cigarette smoking might indeed be heavily intertwined.

On the other hand, existing research has not found a solid, consistent relationship between income, and gambling participation and expenditure. Although people with the lowest income were found to have the highest average of gambling days, some other

studies showed that gambling prevalence increases with household income,[9] and that a higher weekly income was positively associated with gambling, alcohol drinking and smoking.[11]

Using data from the study on prevalence, behavior and characteristics of gambling users in Spain,[15] this paper aims to better understand the drivers of consumer gambling by contributing to the study of determinants of gambling consumption focusing on how tobacco smoking and alcohol drinking, as the only legal substances in Spain, affect the likelihood of participation and expenditure in gambling.

Since gambling consumption is a two-step decision—participation and expenditure—, a double-hurdle model is proposed[12] to perform the empirical exercise. Findings are expected to provide useful information to policy makers and game regulators in order to produce educated decision-making.

## 2. Data and Variables

Data were collected from the Spanish prevalence survey,[15] which was conducted in 2015 by the Directorate General for the Regulation of Gambling—the national authority responsible for regulating, authorizing, monitoring, controlling and sanctioning gambling activities in Spain—, as one piece of the Spanish Government's responsible gambling strategy. This responsible gambling strategy was aimed to "minimize the potential harmful effects of gambling addiction" by "raising awareness in society, preventing and protecting the most vulnerable groups, treating and supporting those already affected and studying and researching gambling related problems."[15] The survey was designed using the NODS (National Opinion Research Center DSM Screen for Gambling Problems) based on the DSM-IV criteria (Diagnostic and Statistical Manual of Mental Disorders). Following three other pilot samples, the final sample was collected from a semi-structured questionnaire administered by an interviewer, assisted by a

computer and completed on the street. The survey provides a free, open-access nationally representative database of the Spanish population, consisting of 6816 individuals (a minimum of 6,000 valid questionnaires was required so that the sample was representative of the resident population in Spain) aged 18 and over, as the legal age for gambling in Spain, who answered to personal questions regarding socio-demographic and gambling factors. Gambling participation is defined as placing an economic bet on any of the 15 different gambling activities listed in the survey questionnaire (including lotteries, casino and sports betting, among others). Also, offline gambling activities are distinguished from those taking place online. Further detailed information about participation in the previously mentioned different gambling activities and the survey sampling methodology can be found in the technical report of the study.[13]

In this analysis, dependent variable is the average monthly expenditure on any type of gambling product implying an actual economic bet. The survey provides this information in six increasing categories: "less than €10" (35.44% of self-declared gamblers), "between €10 and €50" (26.78%), "between €50.01 and €100" (5.76%), "between €100.01 and €300" (1.21%), and "more than €300" (0.26%). Non-gamblers obviously had no gambling expenditure at all (30.56%).

In line with recent research,[16] which considered not only the effects of substance consumption on gambling participation, but also intensity of consumption, main independent variables include tobacco smoking and alcohol consumption from both a binary and frequency perspectives. Tobacco smoking frequency is defined by daily number of packs, while alcohol consumption frequency is defined by the frequency of consumption of any type of alcohol drink. Both are broken down into six increasing categories. Other exogenous factors that may affect gambling participation and expenditure are also included: gender, age, marital status, employment status, and

education level. These are common covariates in gambling research, as gambling patterns and behavior are strongly determined by socio-demographic and health conditions.[9,12,14,17-18]

Individuals who failed to respond to our key variables were removed from the sample, as were observations with encoding errors. All in all, 199 individuals were dismissed (2.92% of the sample), so 6617 remained.

**3. Econometric Modelling**

Since gambling expenditure is actually a two-step process (individuals first decide whether to participate or not; then if they do, they decide their optimal spending by maximizing their utility function), a double-hurdle model approximation is proposed for this empirical research. Furthermore, existing literature evidenced that double-hurdle models are more appropriate[12] than common, conventional tobit or Heckman models for this type of data, since a large number of observations are truncated to zero because of people decided not to participate. Those models are also found to be too restrictive; double-hurdle modeling allows covariates to have a different effect on both participation and expenditure decisions, which is actually to be expected.

A double-hurdle model is a combination of two equations known as hurdles. The first hurdle (Equation 1) models the participation decision; the second hurdle (Equation 2) models the expenditure decision. Individuals must cross both hurdles to contribute to gambling expenditure.

$$d_i^* = z_i'\alpha + \varepsilon_{1i} \quad (1)$$

$$y_i^{**} = x_i'\beta + \varepsilon_{2i} \quad (2)$$

When Equation 1 is positive, individuals decide to participate and therefore cross the first hurdle; they now are considered potential contributors (Equation 3). However, even if individuals are willing to participate, their spending decisions may still be zero if that is what maximizes their utility function. Therefore, the second hurdle is crossed only when the optimal expenditure is greater than zero (Equation 4).

$$\begin{aligned} d_i &= 0 \qquad if \quad d_i^* \leq 0 \\ d_i &= 1 \qquad if \quad d_i^* > 0 \end{aligned} \tag{3}$$

$$\begin{aligned} y_i^* &= \max(0, y_i^{**}) \\ y_i &= y_i^{**} * d_i \end{aligned} \tag{4}$$

Hence, the following double-hurdle specification is estimated. Equation 5 models the participation decision, while Equation 6 models the expenditure decision. Same covariates are used in both in order to observe their effects on both hurdles, which will be particularly interesting if either of these shows opposite signs in both stages.

$$\begin{aligned} GamblingParticipation = {} & \alpha_0 + \alpha_1 Age + \alpha_2 Age^2 + \alpha_3 Gender + \\ & \alpha_4 EducationLevel + \alpha_5 EmployedStatus + \alpha_6 Tobacco + \alpha_7 Alcohol + \varepsilon_1 \end{aligned} \tag{5}$$

$$\begin{aligned} GamblingExpenditure = {} & \beta_0 + \beta_1 Age + \beta_2 Age^2 + \beta_3 Gender + \\ & \beta_4 EducationLevel + \beta_5 EmployedStatus + \beta_6 Tobacco + \beta_7 Alcohol + \varepsilon_2 \end{aligned} \tag{6}$$

From Equations 5 and 6, *GamblingParticipation* is whether the individual is a gambler or not; *GamblingExpenditure* is the average monthly expenditure on gambling; *Age* and $Age^2$ are the linear and quadratic age; *Gender* is each individual's gender; *EducationLevel*

accounts for the highest education level reached (no education, primary, secondary and higher education); *EmployedStatus* is a dummy that controls whether the individual is employed or not; and *Tobacco* and *Alcohol* are categorical variables controlling for tobacco smoking and alcohol consumption from the binary and frequency perspective previously discussed. Please note that the double-hurdle model is estimated for both the binary and the frequency consumption specifications. Covariates remained all the same in both cases.

## 4. Results

Descriptive statistics showed that about 76% of respondents gambled at least once in their lifetime, while about 70% did so in the previous year. Modal gambling expenditure was "less than €10 a month" (35.44%). About 72% and 34% of participants claimed to be alcohol and tobacco users, respectively. Modal alcohol consumption was both "sporadically" and "only on week-ends" (each total about 19.8% of individuals). Modal tobacco consumption was "between half and a pack of cigarettes a day" (16.64%). Although the original study collected data from gamblers for 2015, it also included questions about lifetime gambling consumption, and specifically for the previous year (that is, 2014). However, questions on alcohol and tobacco consumption only referred to 2015, so no further information on alcohol and tobacco was used in this empirical analysis. Summary statistics are shown in Table 1.

INSERT TABLE 1 HERE.

Table 2 shows the double-hurdle estimate coefficients for both the binary and the frequency consumption model specifications. Overall, coefficients were statistically

significant. Even though coefficients sizes were not directly interpretable, their signs were consistent across both model specifications and with existing literature.

The binary consumption model specification showed a strong positive relationship between tobacco smoking and alcohol consumption and the likelihood of gambling. Likewise, gambling expenditure was strongly affected by smoking status, although no significant effect of alcohol was found.

In line with previous research,[9] the quadratic age variables plotted a regular parabola in both hurdles, meaning that the likelihood of gambling and having a greater spending increased up until 58 years old in both cases. The gender effect was as expected in both stages according to existing literature: males have a different gambling profile than females,[4] and are more likely to engage in potentially addictive activities.[7,9] All in all, these findings suggest that smokers and drinkers are indeed more likely to gamble, and that smokers are more likely to spend more.

As for the frequency of consumption model specification, there was also a strong positive relationship between the frequency of tobacco smoking and alcohol drinking and the likelihood of gambling. This relationship also applied to gambling expenditure: the more one drinks and/or smokes, the more likely it is to have a greater expense. Quadratic age variables also suggest that both odds increased up until 58 years old. The coefficient for the gender variable was statistically significant and showed the expected positive sign, suggesting that men are still more likely to gamble and spend more.[7,9]

INSERT TABLE 2 HERE.

Although the education level was not found to have any effect on the likelihood of gambling, those with higher education appear to be more likely to spend less. This is

not unexpected at all, but actually consistent with existing research.[12-13] When addressing interdependencies and time preferences for smoking, drinking, and gambling, research founds that the more education, the less time preference for gambling and therefore likelihood of addiction.[8] In fact, it is concluded that "governments might consider education as an effective countermeasure for stopping addictions."[8]

Since estimate coefficients were not directly interpretable, their average marginal effects were calculated—that is, the predicted average change in the likelihood of gambling and gambling expenditure for a one-unit change in the corresponding covariate. These are shown in Table 3 for the binary consumption specification.

INSERT TABLE 3 HERE.

On average, being a tobacco smoker increased the odds of gambling by 4.36 points; it increased the odds of having a greater expenditure by 15.32 points, regardless of gambler status; and gamblers who smoked were 12.15 points more likely to have a greater gambling expenditure than non-smokers.

Likewise, alcohol drinking increased the odds of gambling by 14.21 points; and, regardless of gambler status, it increased the odds of having a greater expenditure by 22.44 points. No statistical differences on gambling expenditure were found for drinking and non-drinking gamblers.

INSERT TABLE 4 HERE.

Table 4 displays the marginal effects for the frequency of consumption specification. On average, each additional level of tobacco consumption increased the

odds of gambling by 1.74 points; they increased the odds of having a greater expenditure by 5.85 points, regardless of gambler status; and gamblers who smoked were 4.48 points more likely to have a greater gambling expenditure than non-smokers.

Also, each additional level of alcohol consumption increased the odds of gambling by 2.69 points; they increased the odds of having a greater expenditure by 6.17 points, regardless of gambler status; and drinking gamblers were 2.82 points more likely to have a greater gambling expenditure than non-drinkers.

Intuitively, each frequency of tobacco and alcohol consumption is likely to have a different effect on all three probabilities. Although not shown here (details of these calculations are available in Annex 1), each increase in the frequency of consumption of both products was found to increase those probabilities to some extent. Each additional level of consumption increased the likelihood of gambling in a decreasing progression, while it increased that of spending more on gambling conditioned on being a gambler in an increasing progression. Moreover, the likelihood of having a greater expenditure on gambling regardless of gambler status increased with each additional level of smoking in an increasing progression, but in a decreasing progression with each additional level of drinking. All effects were statistically significant. In short, the more an individual smoked or drank, the more likely he/she was to gamble; to have a greater expenditure on gambling given that he/she was a gambler; and to have a greater expenditure in general.

## 5. Discussion

As gambling has never been as accessible and widely available as it is today, it has become—and is commonly perceived as—an alternative form of entertainment. Gambling seems to be so normalized that the global industry is expected to grow at annual rates close to 6% and to exceed $565 billion by 2022, driven primarily by online gambling. However, gambling widespread adoption is not risk-free, as it is usually

associated with serious gambling-related disorders. Thus, gambling regulation involves balancing out benefits and negative aspects.

Previous research has consistently found that gambling shares solid interdependencies with other potentially addictive behaviors, like tobacco smoking and alcohol drinking. In this regard, empirical findings suggest that this cross-consumption might actually have similar social, environmental, neurobiological and genetic features. Further research has also pointed to large differences in terms of gender, age, and other social and health conditions. Smoking and drinking are therefore consistently identified as having an impact to some extent on both gambling participation and expenditure decisions.

Since gambling is expected to keep growing in the coming years, policy makers need clear, factual information in order to deliver educated decision-making, prevent problem gambling from worsening, and protect vulnerable groups.

This paper attempted to contribute to the ever-growing literature by following a frequency of consumption approach. As gambling expenditure is a two-step decision, a double-hurdle model was proposed to estimate how tobacco smoking and alcohol consumption affected the odds of gambling participation and expenditure by focusing not only on consumption from a binary perspective, but also from a frequency of consumption one. Double-hurdle models are established in the econometric literature to be the most appropriate methodology for this type of data and empirical exercise. Standard, common socio-demographics covariates in gambling literature were also included as controls.

Overall, smoking and drinking were found to be positively correlated with both gambling participation and spending decisions. These findings suggest, as confirmed by existing research, that tobacco and alcohol users are indeed more likely to gamble and spend more on gambling products. Additionally, since estimated coefficients are not

directly interpretable, some marginal effects for both products were provided. In short, these substances are associated with a significant increase in the odds of gambling and having a greater expenditure for both gamblers and non-gamblers alike. Reportedly, each additional level of frequency of consumption increases those odds to some extent. This means that the more an individual smokes and/or drinks, the more likely he/she is to gamble, to spend more on gambling products given that he/she is a gambler, and to have a greater expenditure in general, regardless of gambler status.

In terms of policy implications, these results may help decision makers and gambling stakeholders to act against the cross-consumption of alcohol drinking, tobacco smoking and gambling. In addition, these findings are also useful for advertising campaigns, as they may be relevant to the mitigation of potential gambling-related harm.

Notwithstanding, some limitations should be noted. The correlational method used, in addition to the cross-sectional nature of this study, does not allow for causal conclusions or increase the understanding of the underlying process. Hence, no definitive claims about causality can be made. Further longitudinal studies are required to determine whether smoking and drinking are actually leading to higher expenditure on gambling products.

**References**


1. The Business Research Company. *The Growing Gambling Industry: Forecasts, Technologies, and Trends* [Webpage]. Available at https://blog.marketresearch.com/the-gambling-industry-forecasts-and-trends. Accessed October 6, 2020.
2. Grand View Research. *Online Gambling Market Size, Share & Trends Analysis Report by Type (Sports Betting, Casinos, Poker, Bingo), by Device (Desktop, Mobile), by Region (North America, Europe, APAC, Latin America, MEA), and Segment Forecasts, 2020–2027* [Webpage]. Available at https://www.grandviewresearch.com/industry-analysis/online-gambling-market. Accessed October 6, 2020.
3. Gainsbury SM. Online Gambling Addiction: The Relationship Between Internet Gambling and Disordered Gambling. *Curr Addict Rep.* 2015;2(2):185-193.
4. Tackett JL, Krieger H, Neighbors C, Rinker D, Rodriguez L, Edward G. Comorbidity of Alcohol and Gambling Problems in Emerging Adults: A Bifactor Model Conceptualization. *J Gambl Stud*. 2017;33(1):131-147.
5. McGrath DS, Barrett SP. The Comorbidity of Tobacco Smoking and Gambling: A Review of the Literature. *Drug Alcohol Rev.* 2009;28(6):676-681.
6. Wulfert E, Harris K, Broussard J. The Role of Cross-Cue Reactivity in Coexisting Smoking and Gambling Habits. *J Gambl Issues*. 2016;32:28-43.
7. Griffiths M, Wardle H, Orford J, Sproston K, Erens B. Gambling, Alcohol, Consumption, Cigarette Smoking and Health: Findings from the 2007 British Gambling Prevalence Survey. *Addict Res Theory*. 2010;18(2):208-223.

8. Ida T, Goto R. Interdependency Among Addictive Behaviours and Time/Risk Preferences: Discrete Choice Model Analysis of Smoking, Drinking, and Gambling. *J Econ Psychol.* 2009;30(4):608-621.
9. Okunna NC, Rodriguez-Monguio R, Smelson DA, Volberg RA. An Evaluation of Substance Abuse, Mental Health Disorders, and Gambling Correlations: An Opportunity for Early Public Health Interventions. *Int J Ment Health Addict.* 2016;14(4):618-633.
10. Cronce JM, Corbin WR. Effects of Alcohol and Initial Gambling Outcomes on Within-Session Gambling Behavior. *Exp Clin Psychopharmacol.* 2010;18(2):145.
11. Buja A, Mortali C, Mastrobattista L, et al. Pathways Connecting Socioeconomic Variables, Substance Abuse and Gambling Behaviour: A Cross-Sectional Study on a Sample of Italian High-School Students. *BMJ open*, 2019;9(11).
12. Humphreys BR, Lee YS, Soebbing BP. Statistical modeling of consumers' participation in gambling markets and frequency of gambling. *Alberta Gaming Research Institute*. 2009;2-5.
13. Humphreys BR, Pérez L. Network Externalities in Consumer Spending on Lottery Games: Evidence from Spain. *Empir Econ.* 2012;42(3):929-945.
14. Barnes GM, Welte JW, Tidwell MCO, Hoffman JH. Gambling on the Lottery: Sociodemographic Correlates Across the Lifespan. *J Gambl Stud.* 2011;27(4):575-586.
15. DGOJ. *Study on the prevalence, behaviour and characteristics of gamblers in Spain* [Webpage]. Available at https://www.ordenacionjuego.es/en/estudio-prevalencia. Accessed June 15, 2020.

16. Díaz A, Pérez L. Online Gambling-Related Harm: Findings from the Study on the Prevalence, Behavior and Characteristics of Gamblers in Spain. *J Gambl Stud.* 2020;1-9.

17. Gainsbury SM, Russell A, Hing N, Wood R, Blaszczynski A. The Impact of Internet Gambling on Gambling Problems: A Comparison of Moderate-Risk and Problem Internet and Non-Internet Gamblers. *Psychol Addict Behav.* 2013;27(4):1092.

18. Welte JW, Barnes GM, Wieczorek WF, Tidwell MC, Parker J. Gambling Participation in the US—Results from a National Survey. *J Gambl Stud.* 2002;18(4):313-337.

**Table 1.** Summary Statistics.

| Variable | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| **Ever gambled** | 0.759 | 0.427 | 0 | 1 |
| **Gambled last year** | 0.694 | 0.461 | 0 | 1 |
| **Gambling expenditure** | 1.124 | 0.969 | 0 | 5 |
| **Age** | 47.89 | 17.59 | 18 | 95 |
| **Gender** | 0.479 | 0.499 | 0 | 1 |
| **Education level** | 2.81 | 0.85 | 1 | 4 |
| **Employed** | 0.491 | 0.499 | 0 | 1 |
| **Tobacco user** | 0.337 | 0.473 | 0 | 1 |
| **Tobacco frequency** | 0.889 | 1.328 | 0 | 5 |
| **Alcohol user** | 0.721 | 0.449 | 0 | 1 |
| **Alcohol frequency** | 2.198 | 1.913 | 0 | 6 |

**Table 2.** Double-Hurdle Estimate Coefficients.

| | ***Binary consumption*** | | ***Frequency of consumption*** | |
|---|---|---|---|---|
| | **Participation** | **Expenditure** | **Participation** | **Expenditure** |
| **Tobacco** | 0.117 *** | 0.133 *** | 0.047 *** | 0.048 *** |
| **Alcohol** | 0.454 *** | -0.015 | 0.08 *** | 0.028 *** |
| *Other controls* | | | | |
| **Age** | 0.07 *** | 0.021 *** | 0.069 *** | 0.0167 *** |
| **Age$^2$** | -0.0006 *** | -0.00014 *** | -0.0006 *** | -0.0001 |
| **Gender** | 0.125 *** | 0.309 *** | 0.108 *** | 0.265 *** |
| **Education level** | 0.013 | -0.0799 *** | 0.026 | -0.08 *** |
| **Employed** | 0.039 | 0.046 | 0.048 | 0.038 |

***Note:*** **** Significance at 1%; ** significance at 5%.*

**Table 3.** Average Marginal Effects (Binary Consumption Specification).

| | **Participation** | **Expenditure (All)** | **Expenditure (Gamblers)** |
|---|---|---|---|
| **Tobacco** | 4.36 | 15.32 | 12.15 |
| **Alcohol** | 14.21 | 22.44 | -0.0003† |

***Note:*** *Average marginal effects are measured in percentage points.* † *Not statistically significant.*

**Table 4.** Average Marginal Effects (Frequency of Consumption Specification).

| | **Participation** | **Expenditure (All)** | **Expenditure (Gamblers)** |
|---|---|---|---|
| **Tobacco** | 1.74 | 5.85 | 4.48 |
| **Alcohol** | 2.69 | 6.17 | 2.82 |

***Note:*** *Average marginal effects are measured in percentage points. All effects are statistically significant.*

**Annex 1.** Estimate Coefficients (By Level of Consumption)

| | **Participation** | **Expenditure (All)** | **Expenditure (Gamblers)** |
|---|---|---|---|
| **Tobacco** | | | |
| *Frequency level 1* | 0.018 | 0.059 | 0.045 |
| *Frequency level 2* | 0.017 | 0.060 | 0.045 |
| *Frequency level 3* | 0.017 | 0.061 | 0.046 |
| *Frequency level 4* | 0.016 | 0.061 | 0.046 |
| *Frequency level 5* | 0.016 | 0.062 | 0.047 |
| **Alcohol** | | | |
| *Frequency level 1* | 0.028 | 0.063 | 0.028 |
| *Frequency level 2* | 0.027 | 0.063 | 0.028 |
| *Frequency level 3* | 0.026 | 0.062 | 0.028 |
| *Frequency level 4* | 0.025 | 0.062 | 0.028 |
| *Frequency level 5* | 0.024 | 0.061 | 0.028 |

***Note:*** *All estimated average effects are statistically significant.*