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Review Paper

Killing two birds with one stone? Association between tobacco and alcohol consumption

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ABSTRACT

Objectives: Tobacco and excessive alcohol consumption are addictive behaviours, listed among the 10 leading risk factors that cause death and disability in the world, and health consequences are greater if their consumption is combined. There is sparse empirical evidence on the variables that influence the simultaneous consumption of tobacco and alcohol. This study aims to identify the variables that influence the joint decision to consume alcohol and tobacco, and that encourage drinkers to smoke.

Study design: The sample includes Portuguese adults, mainly aged 50 years and over, extracted from the Survey of Health, Ageing and Retirement in Europe, covering the year 2011.

Methods: We propose a bivariate probit model, which allows us to model simultaneously the two goods, accounting for potential correlation between smoking and drinking decisions.

Results: We identified the variables that influence joint consumption, and tobacco consumption among drinkers, which could be used as policy instruments to develop concerted policies. Prevention policies should focus on males, younger and more educated individuals, as well as on individuals with unhealthy eating habits, because these variables were statistically significant and increased joint consumption. In addition, these characteristics also should be regarded if we want to control tobacco consumption among alcohol consumers.

Conclusions: The analysis of the interdependence between alcohol and tobacco use presented in this article may allow reducing their consumption with a common intervention, enabling policymakers to 'kill two birds with one stone' and to achieve extended health and economic gains.

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Introduction

Tobacco and alcohol are both health risk behaviours, related to negative health outcomes,¹ listed among the top 10 leading

causes of death and disability-adjusted life year, in 2004.² Tobacco causes approximately 6 million deaths each year,³ which are projected to increase to 8.3 million in 2030,⁴ and deaths related to alcohol were estimated to achieve 3.3

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million, in 2012.⁵ Moreover, alcohol and tobacco when used together increase the risk of some types of cancer and cardiovascular diseases, more than the use of either drug alone.^{6–10} Therefore, if a combined policy is adopted, the expected health gains will exceed the sum of two separate interventions, focused on each good, which justify a study on the interdependence between goods. Although this is a worldwide problem, Portugal was, in 2012, the 10th country with the highest level of alcohol consumption,¹¹ and the 22nd in percentage of daily smokers.¹²

While tobacco consumption is associated with negative health effects,^{13,14} and a large proportion of smokers become addicted to nicotine,¹⁵ alcohol use is socially acceptable if consumed moderately, and the negative health effects arise from overuse or misuse.¹⁶ The social unacceptability of smoking has increased,¹⁷ combined with smoker-related stigmatization and self-stigma,^{17–19} but alcohol discrimination arise solely from alcohol misuse, which is from heavy drinking.²⁰

Tobacco use is responsible for more than half a trillion dollars of economic losses every year.³ The economic burden of alcohol was estimated to equate between 853.64 million dollars and 234,854 million dollars, considering total costs on 12 selected countries, including Portugal.²¹ These behaviours also include social losses, such as health risks of second-hand tobacco smoke and harm done to their foetuses by pregnant women who smoke and drink excessively,¹⁶ and are related to craving experiences, self-control, anxiety and psychosocial distress.^{22–25}

Manning et al. (1989) estimated the negative externalities that smokers and drinkers impose on others. Considering that non-smokers subsidise smokers' medical care but smokers subsidise non-smokers' pensions and nursing home payments, these authors concluded that, on balance, smokers pay their own way at the current level of excise taxes on cigarettes, but the same is not true for drinkers, whose taxes cover only about half the costs imposed on others.²⁶

These two goods also share a potential addictive nature. The theoretical models focussing on addictive substances' demand—the myopic addiction model and the rational addiction model²⁷—do not account for the possibility of consuming tobacco and alcohol together. However the rational addiction model 'implies the common view that present-oriented individuals are potentially more addicted to harmful goods than future-oriented individuals',²⁸ and more farsighted individuals will be more responsive to perceived future consequences of consuming hazardous goods.²⁹ Considering the myopic individuals, if the individual consumes one harmful good, because he prefers the present benefits rather than avoiding future negative consequences, he is likely to adopt other unhealthy behaviours that will give him a present reward. Therefore, it is important to analyse the potential connection between health-related behaviours.

The literature that considers the inter-relationship between alcohol and tobacco consumption is mainly focused on the price as the central variable and tests the complementarity between them based on cross-price elasticities. Various authors concluded that tobacco and alcohol are complements.^{30–36} This complementarity between goods involves that greater utility is achieved when used together, associated

with a combined 'reward effect' that is qualitatively different from the effects of either good consumed alone.^{37,38}

On the other hand, there is an extensive body of literature analysing the consumption of tobacco and alcohol separately. In a case study that was previously developed, the prevalence of smoking among alcohol dependants was 88%.³⁹ The importance of analysing the interdependence between goods was also discussed concerning smoking and obesity, leading to the conclusion that a single policy tool can reduce both.⁴⁰

The existing evidence supports the role of socioeconomic variables explaining alcohol and tobacco consumption.^{32,41–44} Manrique and Jensen (2004) applied a bivariate probit to estimate the joint use of alcohol and tobacco, in Spain, and concluded that there is a correlation between smoking and drinking.⁴³ Zhao and Harris' (2004)³³ results indicate a strong correlation between consumption of tobacco, alcohol and marijuana. Finally, Bussu and Detotto (2015), considering a sample of gamblers with a mean age of 35 years, in Sardinia, estimated a multivariate probit model that did not show a bidirectional effect between gambling, alcohol and drugs, but revealed a unidirectional effect between gambling and smoking.⁴⁵ Although these authors have analysed the variables that influence alcohol and tobacco consumption, they estimate neither the determinants of joint consumption nor the probabilities of consuming tobacco conditional on being a drinker.

In sum, few studies control for potential correlation between the disturbance terms of the tobacco and alcohol equations, which can bias the obtained results. In addition, as far as we know, the effects of socioeconomic factors that influence the decision to use both alcohol and tobacco, and that encourage drinkers to smoke were not the focus of previous studies. In Portugal, there is no empirical evidence on this topic, besides some descriptive statistics applied to tobacco and alcohol consumption,⁴⁶ and we wanted also to fill this gap.

Following this line, the aim of this study is to identify the variables that influence the joint decision to consume alcohol and tobacco, and that encourage drinkers to smoke, accounting for potential correlation between the decisions of smoking and hazardous drinking. We propose a bivariate probit model to analyse the variables that affect alcohol and tobacco consumption. This model presents advantages over other specifications because it allows detecting correlations between the error terms of two equations—in this study between tobacco and alcohol equations—and controls for potential reverse causality problems, given that alcohol can affect tobacco consumption, but alcohol consumption can also influence tobacco consumption. In addition to the estimates of the model, we also computed the joint probabilities and conditional probabilities for identifying the variables that stimulated the consumption of both goods, and the variables that motivated alcohol consumers to smoke.

Considering that alcohol and tobacco consumption are both health risk behaviours that share also an addictive nature, and that health consequences may be greater if their consumption is combined, it is of major relevance to analyse the links between alcohol and tobacco consumption. From the health policy perspective, if these links are neglected, and not studied from a methodological and conceptual point of view, as we propose in our analysis, the policy could be less efficient.

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