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INCOME-RELATED INEQUALITY IN SMOKING HABITS:
A COMPARATIVE ASSESSMENT IN THE EUROPEAN UNION

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Income-related inequality in smoking habits:
A comparative assessment in the European Union[1]

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Abstract

This paper investigates the association between income and the habit of smoking in 30 European countries. Using the European Health Interview Survey carried out between 2013 and 2015, the analysis focuses on the relationship among net monthly equivalised income of the household, the type of smoking behaviour, and the daily average number of cigarettes smoked. Income-related inequalities are estimated using the Erreygers Index. Results show that smoking is a habit which is mainly rooted in the lowest part of the income distribution both at individual and country level, regardless of the average level of per capita income. Considering that tobacco use worsens poverty conditions by diverting household spending from basic needs to tobacco itself, our results give support to a tax increase in order to discourage its use and to the implementation of educational and prevention programs aimed at helping people to quit smoking.

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1. Introduction

According to the World Health Organization (2019), the tobacco epidemic is one of the most relevant public health threats, killing each year directly more than 7 million people and around 1.2 million due to second-hand smoke. Globally, there are around 1.3 billion smokers and 80% of them live in low and middle-income countries. Already in the early nineties, a first important contribution by Mcginnis and Foege (1993) highlighted that tobacco use was responsible for almost a fifth of the overall annual mortality in the United States and the same outcome was more recently confirmed by Mokdad *et al.* (2004, 2005). Even though over time many countries succeeded in reducing smoking prevalence, tobacco consumption remains one of the main causes of ill health and premature death worldwide (Gowing *et al.*, 2015).

Since tobacco consumption is increasing over time mainly in developing countries, an important aspect emerges in relation to the linkage between tobacco consumption and income distribution not only among countries but also within them. In most cases, tobacco use worsens poverty conditions by diverting household spending from basic needs to tobacco, a behaviour that is hard to moderate in the presence of addiction (Hukkanen *et al*., 2005; West, 2017). In any case, the spread of tobacco represents a relevant issue also for developed countries, as the growth of national income allows more person to purchase cigarettes and other related products (Pampel and Denney, 2011). In addition, greater national income is likely to change the balance between the effects of cigarette prices and health costs (Cutler and Glaeser, 2009), which suggests deepening the nature of unhealthy behaviours such as smoking. If tobacco is considered a normal good, then its consumption increases with income. However, good health and appearance may also be considered normal goods, leading an individual to spend more to improve health as income rises (Philipson and Posner, 1999).

A macroeconomic factor that differentiates the European region from the rest of the world is that the process of economic and monetary union has indirectly implied a pressure on countries to harmonize their social policies. Yet, this goal seems far to be reached as cross-European comparative evidence have shown significant income inequalities in relation to health outcomes. In particular, Van Doorslaer and Koolman (2004), taking into consideration 13 European Union member states, underline two main

interesting aspects. The first is that the overall correlation with income inequality is positive but income itself does not represent the only driving factor, despite being the most important one. In any case, the inequality ranking does not reveal the usual North-South or rich-poor characterization as it is usually found for income inequality or poverty rates. This leads to the second aspect, that education and labour force status are the prime other contributors to health inequality; in this sense, for example, Denmark is a country with the lowest income inequality but with a high level of income-related health inequality. This apparently counterintuitive result may be explained by the fact that early retired individuals, who are significantly concentrated among the lower income groups, have worse health conditions, which highlights that socio-economic health inequalities are not only a matter of concern for health policy but also for social policy. The implication is that the analysis of socioeconomic inequalities in health care in the European region within a country-comparative framework is of crucial importance to detect these differences, an argument that finds further support in Costa-Font *et al.* (2014) that have recently investigated income inequalities in unhealthy lifestyles in England and Spain, taking into consideration obesity, smoking and alcohol use. Their conclusion is sharp: income-related inequalities are relevant and persistent, being these behaviours disproportionately concentrated among the poor.

On the same line of analysis, and to deepen the knowledge on the relationship between inequality and risky behaviours, this paper focuses on the habit of smoking considering 30 European countries. To develop the argument, we make use of the European Health Interview Survey (EHIS), which is run every 5 years. To date, there exist two waves of this survey: the first has been conducted between years 2006 and 2009 without any binding legal basis; the second wave has taken place between 2013 and 2015 in all EU Member States, Iceland and Norway (henceforth EU). We will refer to this second wave, which counts more than 220 thousand of observations. We focus our attention on two variables: on the one side, the "SK1" variable, which indicates the type of smoking behaviour (daily smoking, occasional smoking, and no smoking); on the other side, the "SK3" variable, which resumes the daily average number of smoked cigarettes. The latter variable is then a subset of the first one, including only who smoke cigarettes. Results show a large heterogeneity in the prevalence of occasional and daily smokers across countries, with a significantly increase when considering the poorest part of the

population. Smoking is a habit that is mainly rooted in the lowest part of the income distribution both at individual level and at country level. Individual smoking habits are poor-related regardless of the average country-level income and similar evidence are found using the average number of cigarettes instead of a dummy for the smoking habit.

The rest of the paper is structured as follows. Section 2 briefly introduces the economic literature related to socio-economic inequality in health. Section 3 displays the general smoking habits in our sample. Section 4 describes the methodology used to estimate the income inequality in smoking, showing and discussing the main results. Section 5 concludes and provides some policy implications.

2. Setting the issue

Socio-economic inequality in health represents one of the research field for social and economic scientists. Even though health is generally affected by a multitude of factors, including services such as medical care and environmental conditions (*i.e.*, air pollution), health behaviours in industrialized countries are particularly relevant, as morbidity and mortality tend to be related to chronic rather than infectious diseases. This feature contrasts with what happens in poorer nations, where infectious diseases and environmental risks play instead a greater role (Cawley and Ruhm, 2011).

Historically, we may trace back two different explanations of the linkage between income and health inequality.[2] First of all, a direct impact of income on health inequalities appears to be relevant: the greater the gap between incomes, the worse the health status of a society (Marmot *et al.*, 1978). Individual income represents a fundamental factor of individual health, and that this relationship is concave (Subramanian and Kawachi, 2004). This individual concavity obviously affects the aggregate link between income distribution and average health achievement, as firstly noted by Rodgers (1979), justifying the need of a redistribution of income within a society. Gravelle (1998) has described this feature as a 'statistical artifact', questioning the validity of an assumption which is often taken for granted. In any case, the previous conclusion would overturn

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[2] For a deeper analysis of the relationship between income inequality and health, see for example Wagstaff and van Doorslaer (2000) and Macinko *et al.* (2003). In this regard, Pickett and Wilkinson (2015) conduct an interesting literature review trying to infer the likelihood of a causal relationship between the two variables; within an epidemiological framework, the collected evidence suggests that income inequality affects population health and well-being.

when the relationship between individual income and health is linear, making the transfer of income from the rich to the poor totally indifferent to the theoretical improvement of the average health status of a country. In addition to what can be more accurately called 'concavity effect', Wagstaff and van Doorslaer (2000) highlight how income inequality *per se*, regardless of individual incomes, may decrease public health by causing an independent downward shift in the health curve, defined as a 'pollution effect' of income inequality on health. The aforementioned studies mainly refer to an absolute view of the income effects on health, but this influence is not always predominant: Wilkinson (1997) underlines that mortality tends to be associated with relative income, introducing the general idea of a relative-income effect, as well as with the social position in the income distribution. In other words, better health outcomes appear also to be correlated with the equitable distribution of income within a society (Ben-Schlomo, White and Marmot, 1996; Diez-Roux, Link and Northridge, 2000). This conclusion is quite important if we take into consideration the empirical observation that inequality is increasing in most regions of the world, rapidly in the richest countries (Ortiz and Cummins, 2011). The linkage between income and health inequality can also be interpreted in a second way. In particular, the indirect influence of low levels of income on mental health, such as depression, anxiety and work stress seem to be relevant: starting from the work of Durkheim (1951), the economic literature seems to confirm the underlying presence of a social mechanism which creates a psycho-social stress determined by the status and the power differentials deriving from income inequalities (Marmot *et al.*, 1991). More recently, great attention has been addressed to behavioural explanations. If the hypothesis is true that the adoption of poor dietary habits, early smoking or binge drinking are concentrated among the poor, then health inequalities may tend to persist despite any efforts to improve access to health care. From this reasoning, it emerges that education represents the main determinant of such behaviours within the context of income inequalities (Cutler *et al*., 2008; Brunello *et al.*, 2011). In any case, some studies have supported the hypothesis that the individual socioeconomic status has a relevant effect on health (Mackenbach *et al.*, 1997).

3. Smoking habits in European countries

The EHIS consists of four modules on health status, health care use, health determinants and socio-economic background variables, targeting the population aged at least 15 and living in private households. Our analysis is based on the second wave of the survey, which took place between the 2013 and the 2015. This section shows evidence of the prevalence of smoking habits across countries (section 2.1), the prevalence of smoking habits within different income quintiles (section 2.2), and it highlights gender differences in those percentages (section 2.3).

3.1. Overall, daily, and occasional smokers

Generally, 23.9 per cent of the responders is a smoker (4.7 per cent occasional, and 19.3 daily), while the remaining 76.1 per cent is a no smoker (Table 1).

Table 1 – Descriptive statistics of smoking habits over the whole sample

Net total observations	Daily smoking	Occasional smoking	Overall smoking	No Smoking
284,717	54,894	13,250	68,144	216,573
	19.3%	*4.7%*	*23.9%*	*76.1%*

Note: net total observations exclude missing data in relation to the variable of our interest.
Source: elaborations on *EHIS (2015)* data

These average levels show a large heterogeneity across countries.[3] *Overall smokers* are not less than 28 per cent of responders in Bulgaria, Greece, Austria, and Slovakia, while this percentage falls below 20 per cent in the United Kingdom, Sweden, Finland, Iceland, Ireland, Portugal, and Norway. *Daily smokers*, instead, are more than 25 per cent in Bulgaria, Hungary, and Greece, and less than 13 per cent in Sweden, Iceland, Finland, Norway. Finally, *Occasional smokers* are at least 6.5 per cent of responders in Sweden, Norway, and Iceland, and close to 30 per cent in Hungary, Spain, the United Kingdom, and Portugal.

3.2. Overall, daily, and occasional smokers among the poor

When considering the poorest part of the population, *i.e.*, people below the first quintile of income distribution, the average country-level of smokers significantly increases (27.8 per cent compared with 23.9 per cent in the whole sample). This increase is mainly due

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[3] Extended results are reported in the Appendix (Table A.1).

to a higher percentage of daily smokers (23.1 per cent), while the average percentage of occasional smokers is the same (4.7 per cent).[4]

Also in this case, there is a considerable heterogeneity among countries: in Slovakia, Greece, Bulgaria, and Netherlands more than 34 per cent of the poorest people are smokers, while in Sweden and Portugal this percentage falls below 20 per cent. *Daily smokers* are more than the 30 per cent in Hungary, Poland, and Greece, while the percentages are significantly lower in Sweden, Iceland, Finland, and Norway. Finally, *Occasional smokers* are more than 8 per cent in Netherlands, Sweden, Iceland, and Norway, while they are less than 3 per cent in Hungary, Croatia, Malta, Portugal, the United Kingdom, and Spain.

As before, an interesting point is to analyse the correlations among countries with respect to the different kinds of smokers. Focusing on responders below the first quintile of income distribution does not modify the positive correlation between country-level percentages of *Overall smokers* and country-level percentages of *Daily smokers* (0.94). In the same vein, the correlation between the percentages of *Occasional smokers* and those of *Overall smokers* is negative (-0.11). Also, the strong negative correlation between the percentages of responders who are *Daily smokers* and those who are *Occasional smokers* is confirmed (-0.45), as it is also confirmed the weak positive correlation between *Occasional smokers* and no smokers (0.12).

As a general finding, the percentage of responders who are *Overall smokers* among people below the first quintile of income distribution is greater for 27 out of 30 countries (with the maximum of 10.8 percentage points in Netherlands). As a complement, a decrease is found only in three countries (Slovenia, Romania, and Malta). Relatedly, the percentage of *Daily smokers* among the poorest increases in 27 out of 30 countries (of more than 8 percentage points in Poland and Luxembourg), while it decreases in Malta, Sweden, and Romania. Finally, the percentage of *Occasional smokers* below the first quintile increases for 11 countries (with a maximum of 3.6 percentage points in Netherlands), while it decreases for 17 countries (with a minimum of -1.8 percentage points in Slovenia), and it is in line with the percentage on the whole sample for two countries (the United Kingdom and Ireland). To some extent, these outcomes suggest that smoking habits are more widespread among the poorest than among the whole

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[4] Extended results are reported in the Appendix (Table A.2).

population. On average, the prevalence of overall smokers is 5.4 percentage point higher within the first quintile and this difference is positive for all countries, with the exceptions of Bulgaria, Romania, Malta, Czech Republic, and Portugal. This result is somewhat expected, rather it is subject to some qualifications that will be discussed in the next section.

3.3. Gender differences

Before moving to income-related inequalities, it is worth exploring whether gender differences may emerge from smoking habits. The general finding is that smoking is more widespread among males, but a high heterogeneity can be observed also in this case. In terms of *Overall smoking*, the country level averages show that the prevalence of smoking is about 10 percentage points higher among males than among females. This difference is at the maximum level (27.5 percentage points) in Lithuania and in Romania, and at the minimum level (1 percentage point) in Norway. When considering *Daily smoking*, the difference is also relevant on average (8.5 percentage points), with positive peaks in Cyprus, Romania, and Lithuania (more than 23 percentage points) and negative in Sweden (the percentage of daily smokers is 1.3 percentage points lower among males). Smaller differences between males and females can be observed in the country-level prevalence of *Occasional smokers*. On average, there are more occasional male smokers (1.4 percentage points); in Lithuania and Romania this difference jumps to more than 3 percentage points, while in Croatia and Denmark this difference is negative (-0.8 and -0.3 percentage points respectively).

As before, one can now consider the lowest part of the income distribution, *i.e.*, people below the first quintile. In terms of *Overall smoking*, there are about 36.4 per cent of males and 21.5 per cent of females, which gives a difference of 14.9 percentage points, greater than the difference (9.9 percentage points). This average difference, as usual, shows a high variability across countries: in Cyprus, Latvia, and Romania it peaks to more than 28 percentage points, while in the United Kingdom, Iceland, and Ireland it is smaller than 3 percentage points. Regarding *Daily smokers* the difference between males and females is 13 percentage points on average, whit a maximum of 27.9 again in Cyprus and Latvia, and a negative value in Iceland (-0.9 percentage points). Finally, when considering *Occasional smokers*, the difference is 1.8 percentage points on average, with the highest

values in Romania (6 percentage points) and negative values in Finland, Denmark, Lithuania, and Malta (-1.6, -0.9, -0.6, and -0.5 percentage points respectively).

4. Income-related inequalities

4.1. Methodology

To investigate how smoking habits are distributed across income levels, we used the net monthly equivalised income of the household. Income-related inequalities for the smoking habits is estimated by the Erreygers Index (EI) (Erreygers, 2009), which is a rank-dependent inequality measure for bounded dependent variables and differs from other common inequality measures that are used in all cases where at least one bound is open. In our case, the variable of interest is binary and bounded between 0 (no smoking) and 1 (smoking). According to this framework, one possible representation is as follows:

$$EI(S) = \frac{8}{b-a} cov(S_i, R_i) \tag{1}$$

where *b* and *a* are the upper and the lower bounds, respectively, of the dependent variable S_i, which identifies the individual unmet need for health care. R_i is the cumulative distribution function of net monthly equivalised income of the household, ranging from 0 (the poorest) to 1 (the richest). Positive (negative) values of the index indicate that the levels of S are more concentrated among those with higher (lower) rank in the income distribution, with the sign of $EI(S)$ depending on the sign of the covariance (Carrieri and Wübker, 2013). *EI* can be expressed in an alternative and more convenient way, when considering the general formulation of the standard concentration index, given by

$$CI(S) = \frac{2cov(S_i, R_i)}{\mu_S} \tag{2}$$

where μ_S is the average of S_i in the sample. By solving (2) for the covariance and replacing the outcome in (1), one can thus obtain:

$$EI(S) = GCI(S) \left[\frac{4}{b-a} \right] \tag{3}$$

where $GCI(S) = \mu_S\, CI(S)$ is the generalized version of the concentration index. In other words, *EI* can always be obtained by calculating the generalised concentration index and multiplying it by the coefficient in the square bracket of (3). In both cases, the sign will be determined by the sign of the covariance. However, the advantage of the Erreygers index is that the normalization of the generalized concentration coefficient provided by $(b - a)$ allows *EI* to be scale invariant beyond being translation invariant, a property that is not shared by the common formulation of the generalized concentration coefficient, as its value is not invariant to equiproportionate changes, a feature that suggests not to use common inequality measures in the presence of bounded variables. A further advantage of the Erreygers index is that it satisfies the mirror property, i.e., that the absolute value of the index does not change when inverting the values of the variable (e.g., by changing zeros to ones and vice versa). In the opposite case, the measured inequality would depend on how the variable is defined, which is an undesirable characteristic of other common inequality measures.

From equation (3), two additional characteristics of $EI(S)$ are worth noting. The first is that $EI(S)$ is not defined when the variable is equidistributed (so that $b = a$), while $GCI(S) = 0$ in the same case; the second is that $EI(S) = GCI(S)$ when $(b - a) = 4$, regardless of the variable being binary, which means that $EI(S) < GCI(S)$ in all cases where $(b - a) > 4$. When considering, as in our case, a binary variable (smoker yes/no) with $a = 0$ and $b = 1$, *EI* collapses to:

$$EI(S) = 4\, GCI(S) \qquad (4)$$

which implies

$$EI(S) > GCI(S) \qquad (5)$$

Since for a dichotomous variable the lower bound of the concentration index is given by $\mu_S - 1$, while its upper bound is given by $1 - \mu_S$ (Wagstaff, 2005), the range of variation of the Erreygers index will be:

$$-4\mu_S(1 - \mu_S) \le EI(S) \le 4\mu_S(1 - \mu_S) \qquad (6)$$

It is worth mentioning that EHIS data do not have a continuous measure of a welfare variable, but the net monthly equivalised income of the household is reported in classes,

i.e., in quintiles. This is a common problem as many health-related surveys questionaires are often not designed to obtain a continuous measure of a welfare variable (Chen and Roy, 2009). In the absence of a continuous measure of welfare, we directly estimate the EI on class values, which means class values are repetitive across individuals within the same quintile. As rank-dependent measure, EI also allows to estimate inequality using the class information instead of continuous information on welfare, and this solution has been adopted in several previous studies (Chen and Roy, 2009; Pulok *et al.*, 2020), also showing a robustness when compared with inequality estimated on continuous income variables (Resce *et al.*, 2019; Carnazza *et al.*, 2021).

4.2. The Erreygers index

The main conclusion from the previous analysis suggests that smoking behaviour may to be linked to the economic conditions of individuals. A first evidence is that the prevalence of smokers is generally higher in the lowest part of the income distribution (Figure 1) for almost all countries. This finding deserves further investigation, which is carried out in by using the Erreygers index previously described. It is worth recalling that the sign of the Erreygers index (as the standard concentration index) gives information on which part of the income distribution is involved by the use of the variable analysed, with a negative value signalling that 'consumption' of the specific variable is more concentrated among the poor. In what follows, the Erreygers index is calculated on the distribution of smokers ranked by income levels. Thus, the sign of the Erreygers index will allow to understand which part of the income distribution is more involved in smoking habits.

Table 2 reports a first evidence of the position of smokers in the income distribution in all countries, distinguishing the total number of smokers by gender. With regard to *Overall smokers*, the first thing to note is that the Erreygers index is negative for a large number of countries (21) even though with different intensity, which means that smoking is an habit that is mainly rooted in the lowest part of the income distribution. This result is amplified when considering male smokers; in this latter case, the number of countries showing a negative Erreygers index grows to 24, while when considering female smokers, the outcome is basically the same as in the case of the total number of smokers in terms of number of countries (20). Yet, there are some cases where female smoking involves more deeply than male smoking the lowest part of the income distribution, and this happens in Denmark, Estonia, Iceland, Ireland, Luxembourg, the Netherlands, the United

Kingdom. Things are not significantly different when addressing *Daily smoking*, as the same paths described above can be found. A clearer visual picture of these outcomes is reported in Figure 1, where for both *Overall* and *Daily smoking* most countries is in the negative quadrant of the Erreygers index, with Italy to the extreme left. Thus, as a matter of fact, Figure 1 drives the main conclusion of this section, that when there are smokers, they are mainly located in the lowest part of the income distribution in many countries.

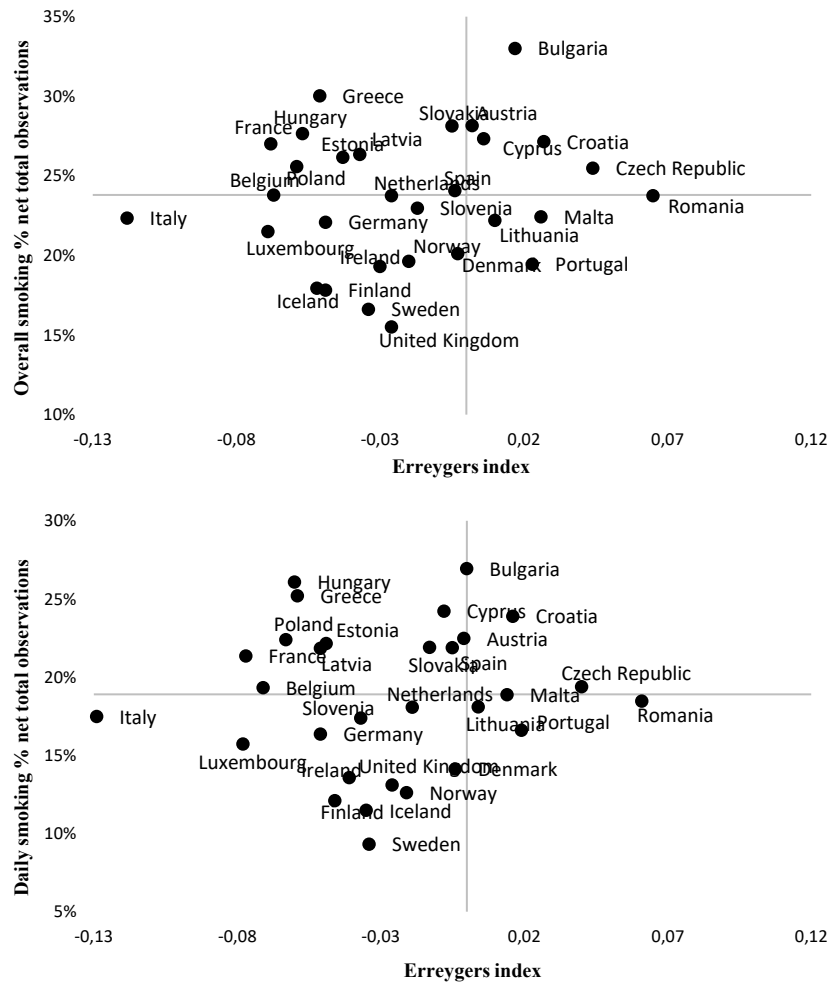Table 2 – Estimates of income-related inequalities (Erreygers index)

	Daily Smoking			Overall smoking		
	Total	*Male*	*Female*	**Total**	*Male*	*Female*
Austria	-0.001	-0.001	-0.005	0.002	0.003	-0.003
	-0.005 / 0.003	*-0.007 / 0.005*	*-0.010 / 0.001*	*-0.002 / 0.006*	*-0.003 / 0.008*	*-0.009 / 0.002*
Belgium	**-0.071**	**-0.084**	**-0.063**	**-0.067**	**-0.077**	**-0.062**
	-0.077 / -0.064	*-0.093 / -0.074*	*-0.072 / -0.053*	*-0.073 / -0.060*	*-0.086 / -0.068*	*-0.071 / -0.052*
Bulgaria	0.000	**-0.037**	**0.020**	**0.017**	**-0.030**	**0.046**
	-0.007 / 0.007	*-0.046 / -0.027*	*0.011 / 0.030*	*0.010 / 0.024*	*-0.040 / -0.020*	*0.036 / 0.056*
Croatia	**0.016**	0.009	**0.020**	**0.027**	**0.013**	**0.037**
	0.007 / 0.024	*-0.003 / 0.021*	*0.008 / 0.031*	*0.018 / 0.035*	*0.001 / 0.025*	*0.026 / 0.049*
Cyprus	**-0.008**	**-0.031**	0.006	0.006	**-0.023**	**0.028**
	-0.016 / -0.001	*-0.041 / -0.020*	*-0.004 / 0.017*	*-0.001 / 0.014*	*-0.033 / -0.012*	*0.018 / 0.039*
Czech Republic	0.040	**0.009**	**0.038**	**0.044**	0.002	**0.047**
	0.034 / 0.047	*0.000 / 0.018*	*0.029 / 0.047*	*0.037 / 0.050*	*-0.007 / 0.012*	*0.037 / 0.056*
Denmark	-0.004	**0.040**	**-0.032**	-0.003	**0.038**	**-0.029**
	-0.012 / 0.004	*0.030 / 0.051*	*-0.044 / -0.021*	*-0.011 / 0.005*	*0.028 / 0.049*	*-0.040 / -0.017*
Estonia	**-0.049**	**-0.053**	**-0.060**	**-0.043**	**-0.043**	**-0.058**
	-0.057 / -0.040	*-0.065 / -0.040*	*-0.071 / -0.048*	*-0.052 / -0.035*	*-0.056 / -0.030*	*-0.069 / -0.046*
Finland	**-0.046**	**-0.071**	**-0.030**	**-0.049**	**-0.058**	**-0.046**
	-0.053 / -0.040	*-0.082 / -0.061*	*-0.039 / -0.021*	*-0.056 / -0.043*	*-0.068 / -0.048*	*-0.055 / -0.036*
France	**-0.077**	**-0.083**	**-0.075**	**-0.068**	**-0.079**	**-0.062**
	-0.082 / -0.072	*-0.090 / -0.077*	*-0.068 / -0.055*	*-0.072 / -0.063*	*-0.086 / -0.072*	*-0.068 / -0.055*
Germany	**-0.051**	**-0.065**	**-0.041**	**-0.049**	**-0.062**	**-0.042**
	-0.054 /-0.047	*-0.070 / -0.060*	*-0.045 / -0.036*	*-0.053 / -0.046*	*-0.067 / -0.057*	*-0.047 / -0.037*
Greece	**-0.059**	**-0.077**	**-0.055**	**-0.051**	**-0.075**	**-0.044**
	-0.065 / -0.053	*-0.086 / -0.068*	*-0.063 / -0.036*	*-0.057 / -0.045*	*-0.084 / -0.066*	*-0.052 / -0.036*
Hungary	**-0.060**	**-0.084**	**-0.050**	**-0.057**	**-0.083**	**-0.045**
	-0.067 / -0.053	*-0.093 / -0.074*	*-0.060 / -0.041*	*-0.064 / -0.050*	*-0.093 / -0.073*	*-0.055 / -0.036*
Iceland	**-0.035**	**-0.027**	**-0.043**	**-0.052**	**-0.047**	**-0.057**
	-0.043 / -0.027	*-0.039 / -0.016*	*-0.055 / -0.031*	*-0.060 / -0.043*	*-0.059 / -0.036*	*-0.069 / -0.045*
Ireland	**-0.041**	**-0.040**	**-0.043**	**-0.030**	**-0.020**	**-0.038**
	-0.047 / -0.036	*-0.048 / -0.032*	*-0.050 / -0.036*	*-0.035 / -0.024*	*-0.028 / -0.012*	*-0.046 / -0.031*

Italy	**-0.129**	**-0.149**	**-0.117**	**-0.118**	**-0.136**	**-0.109**
	-0.133 / -0.126	*-0.154 / -0.144*	*-0.122 / -0.112*	*-0.121 / -0.114*	*-0.140 / -0.131*	*-0.114 / -0.105*
Latvia	**-0.051**	**-0.074**	**-0.062**	**-0.037**	**-0.069**	**-0.048**
	-0.057 / -0.044	*-0.084 / -0.065*	*-0.070 / -0.053*	*-0.043 / -0.030*	*-0.078 / -0.060*	*-0.057 / -0.040*
Lithuania	0.004	**-0.063**	**0.015**	**0.010**	**-0.042**	**0.016**
	-0.004 / 0.011	*-0.075 / -0.051*	*0.005 / 0.025*	*0.003 / 0.018*	*-0.053 / -0.030*	*0.006 / 0.026*
Luxembourg	**-0.078**	**-0.079**	**-0.082**	**-0.069**	**-0.064**	**-0.081**
	-0.087 / -0.068	*-0.092 / -0.065*	*-0.096 / -0.067*	*-0.079 / -0.059*	*-0.077 / -0.051*	*-0.096 / -0.066*
Malta	**0.014**	**0.015**	0.009	**0.026**	**0.029**	**0.019**
	0.005 / 0.023	*0.003 / 0.028*	*-0.004 / 0.022*	*0.017 / 0.035*	*0.016 / 0.042*	*0.006 / 0.032*
Netherlands	**-0.019**	**-0.015**	**-0.024**	**-0.026**	**-0.023**	**-0.033**
	-0.024 / -0.014	*-0.023 / -0.008*	*-0.031 / -0.017*	*-0.032 / -0.021*	*-0.030 / -0.015*	*-0.041 / -0.026*
Norway	**-0.021**	**-0.028**	**-0.014**	**-0.020**	**-0.041**	0.001
	-0.027 / -0.015	*-0.036 / -0.020*	*-0.022 / -0.006*	*-0.026 / -0.014*	*-0.049 / -0.033*	*-0.007 / 0.009*
Poland	**-0.063**	**-0.096**	**-0.041**	**-0.059**	**-0.093**	**-0.036**
	-0.067 / -0.059	*-0.102 / -0.091*	*-0.047 / -0.036*	*-0.062 / -0.055*	*-0.099 / -0.088*	*-0.041 / -0.030*
Portugal	**0.019**	**-0.028**	**0.042**	**0.023**	**-0.025**	**0.046**
	0.015 / 0.023	*-0.034 / -0.022*	*0.036 / 0.047*	*0.019 / 0.028*	*-0.031 / -0.019*	*0.041 / 0.052*
Romania	**0.061**	0.055	**0.055**	**0.065**	**0.047**	**0.069**
	0.057 / 0.065	*0.049 / 0.061*	*0.049 / 0.061*	*0.061 / 0.069*	*0.041 / 0.053*	*0.063 / 0.074*
Slovakia	**-0.013**	**-0.039**	**-0.014**	-0.005	**-0.033**	-0.006
	-0.021 / -0.006	*-0.050 / -0.028*	*-0.024 / -0.004*	*-0.012 / 0.003*	*-0.043 / -0.022*	*-0.016 / 0.004*
Slovenia	**-0.037**	**-0.048**	**-0.030**	**-0.017**	**-0.026**	**-0.014**
	-0.044 / -0.029	*-0.059 / -0.037*	*-0.041 / -0.019*	*-0.025 / -0.010*	*-0.037 / -0.015*	*-0.025 / -0.004*
Spain	**-0.005**	**-0.036**	**0.015**	-0.004	**-0.039**	**0.017**
	-0.008 / -0.001	*-0.041 / -0.031*	*0.010 / 0.020*	*-0.008 / 0.000*	*-0.044 / -0.033*	*0.012 / 0.023*
Sweden	**-0.034**	**-0.050**	**-0.018**	**-0.034**	**-0.055**	**-0.016**
	-0.041 / -0.028	*-0.059 / -0.041*	*-0.027 / -0.009*	*-0.041 / -0.027*	*-0.064 / -0.046*	*-0.026 / -0.007*
United Kingdom	**-0.026**	**-0.024**	**-0.032**	**-0.026**	**-0.023**	**-0.033**
	-0.030 / -0.022	*-0.030 / -0.019*	*-0.037 / -0.026*	*-0.030 / -0.022*	*-0.029 / -0.018*	*-0.038 / -0.028*

Note: positive/negative values of the Erreygers Index (EI) indicates that the smoking-related phenomenon is more concentrated among those who are positioned higher/lower in the income distribution. This indicator is estimated taking into consideration the national net total observations which exclude missing data and those who do not smoke. Data in bold are statistically significant at 95%: confidence intervals are reported in italics under the relative EI.
Source: elaborations on *EHIS (2015)* data

Figure 1 – Overall and daily smoking and Erreygers index

4.3. Smoking and real GDP

The next question to understand is about whether the prevalence of smokers may to some extent be linked to the levels of per capita income of the countries analysed. Figure 2 reports this information, by showing rather clearly that a lower percentage of both overall and daily smokers is found in countries with higher levels of per capita GDP.

Figure 2 – Overall and daily smoking and real GDP per capita
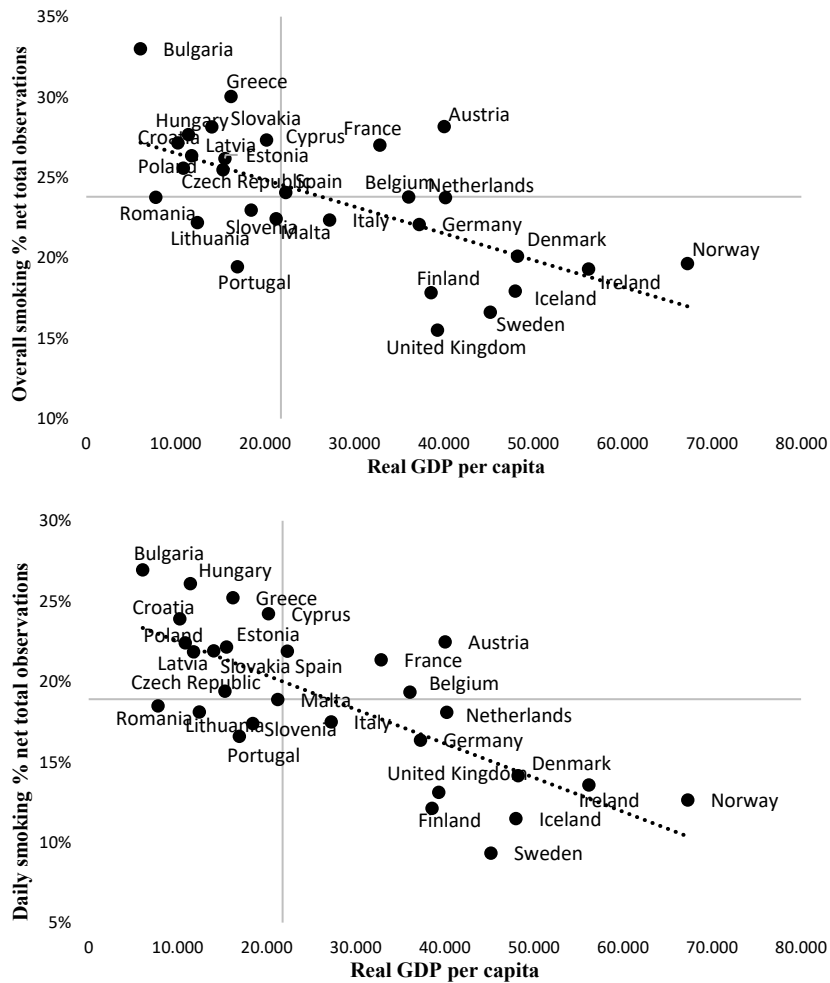
The population of countries in the South-East quadrant clearly reveals this path, as well as the North-West quadrant suggests that the percentage of smokers are usually higher in countries with lower levels of GDP per capita. Only few countries are indeed outside both quadrants. As shown by the line of tendency – and with the exception of Luxembourg – the negative correlation between smoking habits and GDP per capita is rather clear in both cases of overall and daily smokers. Furthermore, Figure 3 – by using a linear interpolation method – shows that the negative correlation between smoking and real GDP is strongly driven by male smokers; on the contrary, it seems that the behaviour of female smokers is rather flat with respect to per capita GDP.

Figure 3 – Overall and daily smoking and real GDP per capita – Total, male and female
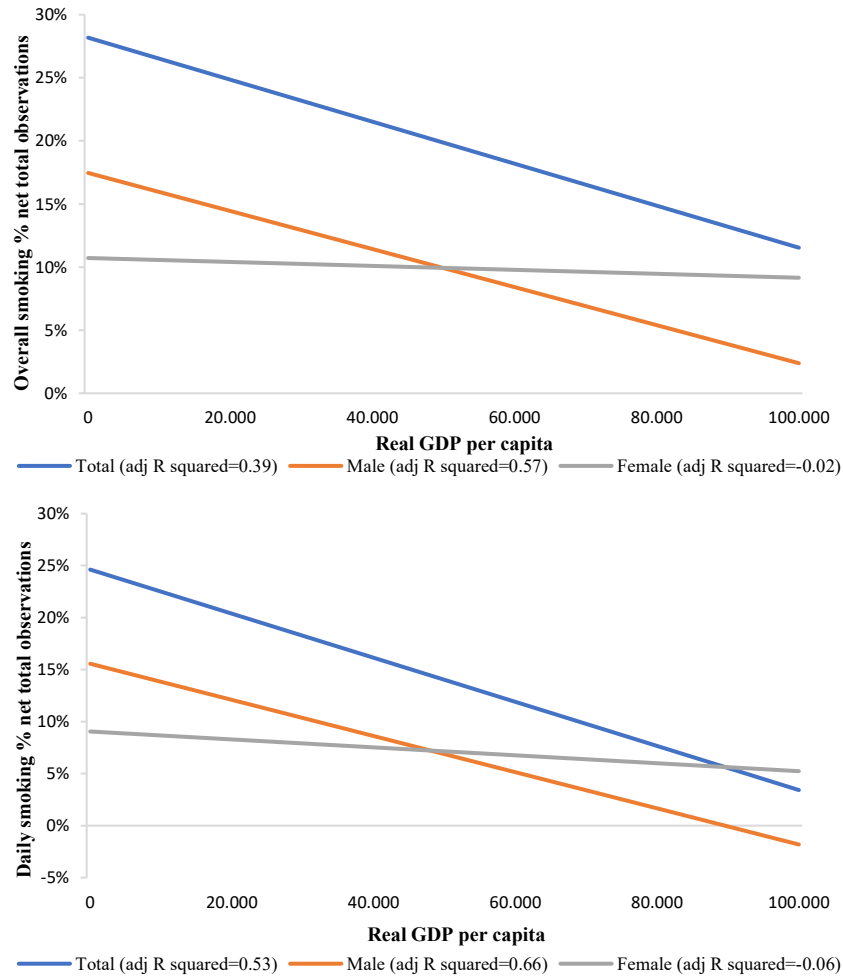
4.4. Matching the outcomes: Erreygers index and real GDP

The two main conclusions so far achieved, that smoking is rooted in the lowest part of the income distribution and that there are less smokers in the richest countries, can be matched to understand whether the countries in which smokers are concentrated in the lowest part of the income distribution are also the poorest countries. This information is reported in Figure 4, with a scatter between the per capita GDP and the Erreygers index.

Figure 4 – Real GDP per capita and Erreygers index
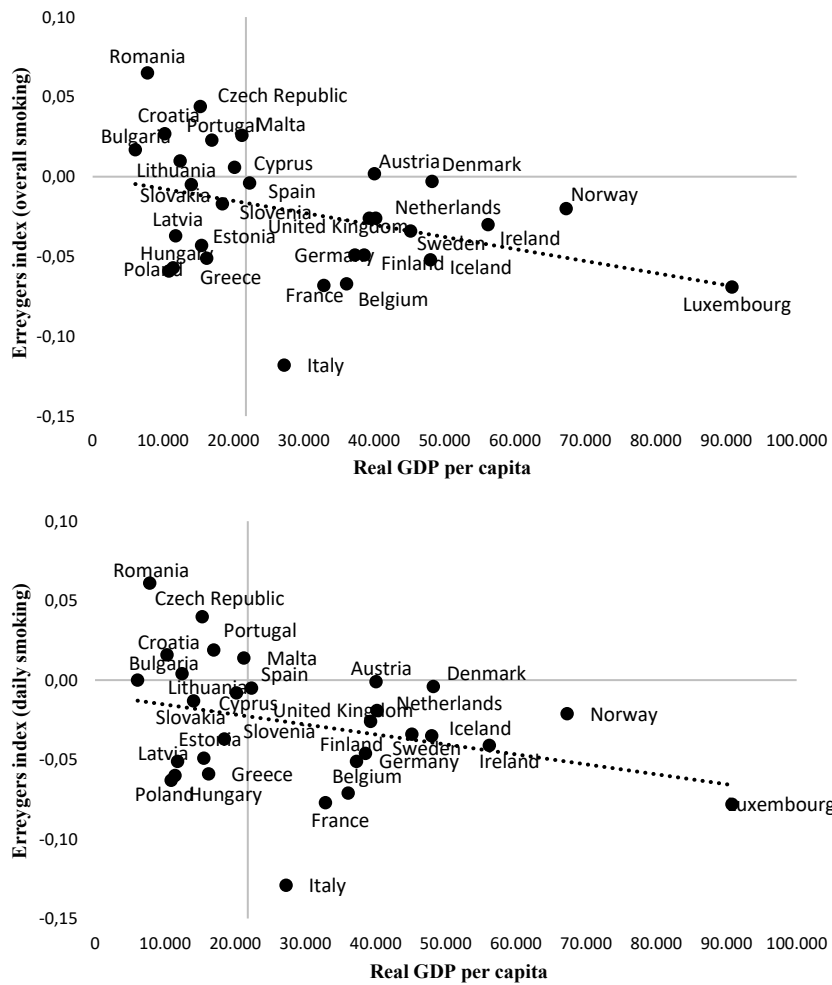
As one can see, this hypothesis is hardly confirmed, as the concentration of smoking among the poor is traceable both in low- and high-income countries. Thus, the outcome that smoking is more concentrated among the poor does not seem to depend on the level of per capita GDP. In other terms, smoking habits are poor related regardless of the average level of income. Furthermore, once again, the driving force of the path is due to male smokers (Figure 5).

Figure 5 – Real GDP per capita and Erreygers index – Total, male and female
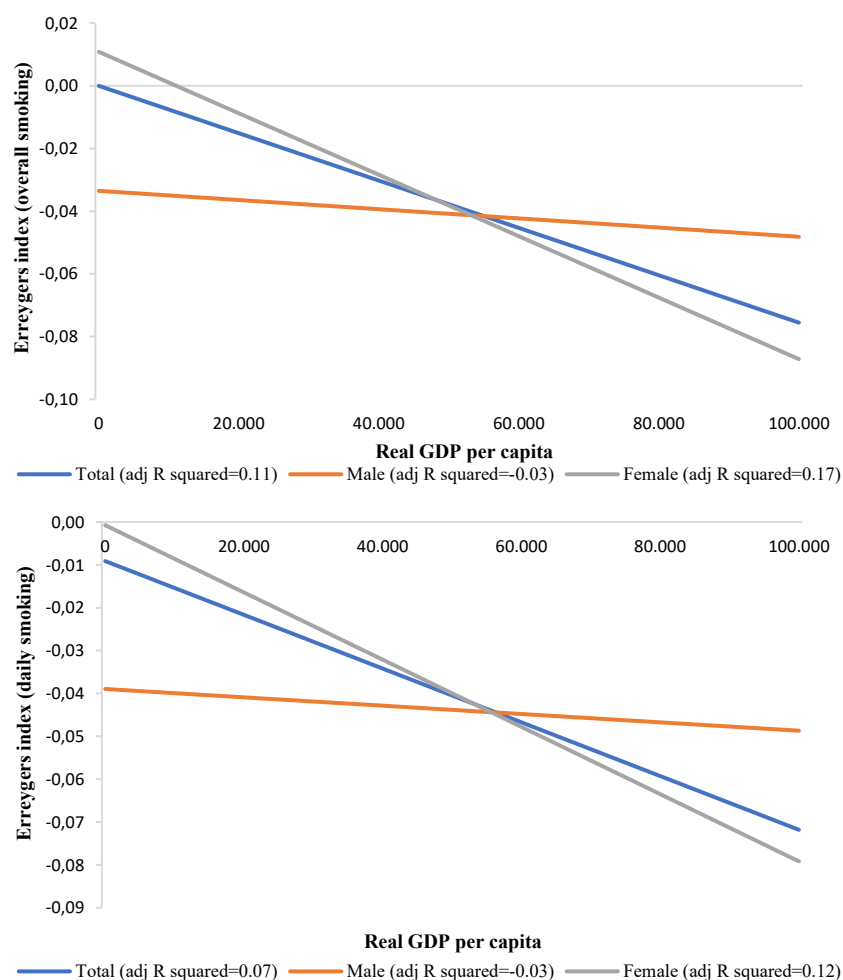
4.5. Further analysis

So far, the analysis has been developed by using the information about the presence of smokers, but nothing has been said about the intensity of smoking. In this section, as a complement to the previous analysis, we consider the average number of cigarettes smoked in order to give robustness to the previous findings. In particular, table 3 reports that the average number of cigarettes smoked calculated over daily smokers is 14.1, while the same average on the total population falls to 2.6.

Table 3 – Average number of cigarettes smoked

Net total observations	Average number of cigarettes (among daily smokers)	Average number of cigarettes (among overall individuals)

52,638	14.1	2.6

Note: net total observations exclude missing data in relation to the variable of our interest. The average number of cigarettes (SK3) smoked is estimated in the following way. First of all, taking into consideration that the previous variable is referred only to the daily smokers, we calculate its average and the relative sample size (the first three columns "daily smokers"). We then refer this amount to the overall observations net of missing data, obtaining an average value which takes into consideration the whole population (the last three columns "overall individuals"). However, we have to underline that this represents a proxy of the real average number of cigarettes smoked within a country. The reason comes from the fact that the SK3 variable implies a positive answer to the previous questions of the survey. In particular, it refers to daily smokers (SK1) and those who smoke cigarettes (manufactured and/or hand-rolled). Unfortunately, it is not possible to estimate occasional and no smokers of cigarettes (SK2) if not at the cost of a significant loss of information. In any case, smokers of other kind of tobacco are very contained in numerical terms and this ensures the reliability of the proxy previous estimated.
Source: elaborations on *EHIS (2015)* data

Taking into consideration the total amount of daily smokers, now the variability across countries is lower than the general habit of smoking previously analysed as shown by the normalized standard deviations (respectively, 0.195 *vs* 0.233); with the exception of Finland (2.5) most countries show values in the range 13 to 18 cigarettes, with peak of Cyprus at 19.2. Again, the most relevant contribution is from males.[5]

As shown in Figure 6, the finding that there are less smokers in the richest countries (as reported in Figure 2) is reinforced by the observation that there is also a lower average number of cigarettes smoked in the same countries, with the path driven almost exclusively by male smokers (Figure 7).

Figure 6 – Average number of cigarettes smoked and real GDP per capita
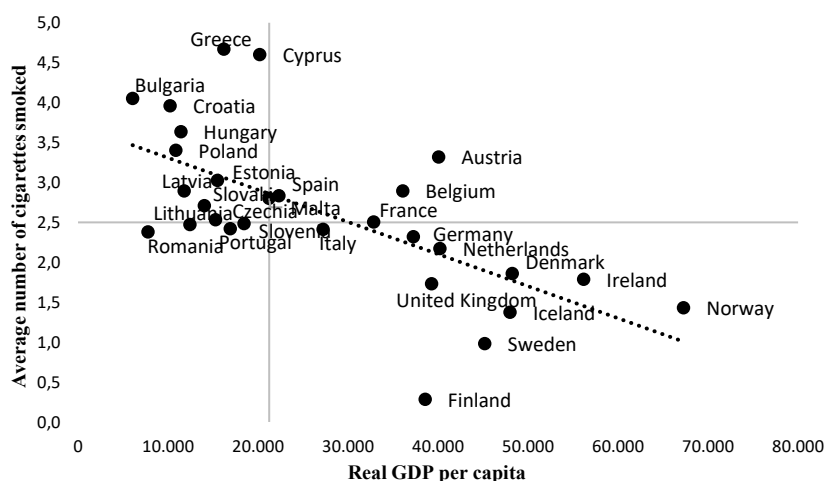
Note: Luxembourg has been considered an outlier, being characterized by a very high real GDP per capita and a smoking tendency slightly below the median (2.1).
Source: elaborations on *EHIS (2015)* data

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[5] Extended results are reported in the Appendix (Table A.3).

Figure 7 – Average number of cigarettes smoked and real GDP per capita by gender

This confirms the qualitative findings previously discussed. In the same vein, Table 4 reports the concentration index of the average number of cigarettes smoked when considering *Daily smokers*. As in the case of the Erreygers index, a negative concentration index indicates that consumption is in the lowest part of the income distribution. The most interesting finding is that, with the only exception of Austria, the analysis performed on the average number of cigarettes gives the same result obtained with the qualitative analysis, i.e., negative values for 21 countries.

Table 4 – Estimates of income-related inequalities (Erreygers index)

	Average number of cigarettes smoked	
Austria	-0.004	(-0.008 / 0.000)
Belgium	**-0.021**	(-0.027 / -0.015)
Bulgaria	-0.003	(-0.010 / 0.004)
Croatia	**0.016**	(0.008 / 0.024)
Cyprus	**-0.014**	(-0.022 / -0.007)
Czechia	**0.040**	(0.034 / 0.047)
Denmark	**0.010**	(0.002 / 0.018)
Estonia	**-0.048**	(-0.056 / -0.039)
Finland	**-0.044**	(-0.051 / -0.037)
France	**-0.074**	(-0.079 / -0.070)
Germany	**-0.050**	(-0.053 / -0.046)
Greece	**-0.059**	(-0.065 / -0.053)

Hungary	**-0.067**	*(-0.074 / -0.060)*
Iceland	**-0.032**	*(-0.041 / -0.024)*
Ireland	**-0.033**	*(-0.038 / -0.028)*
Italy	**-0.127**	*(-0.131 / -0.124)*
Latvia	**-0.047**	*(-0.053 / -0.040)*
Lithuania	0.003	*(-0.004 / 0.011)*
Luxembourg	**-0.075**	*(-0.085 / -0.065)*
Malta	**0.010**	*(0.001 / 0.019)*
Netherlands	**-0.015**	*(-0.020 / -0.010)*
Norway	**-0.020**	*(-0.026 / -0.014)*
Poland	**-0.062**	*(-0.066 / -0.058)*
Portugal	**0.018**	*(0.014 / 0.022)*
Romania	**0.060**	*(0.056 / 0.065)*
Slovakia	**-0.009**	*(-0.017 / -0.002)*
Slovenia	**-0.037**	*(-0.045 / - 0.029)*
Spain	**-0.007**	*(-0.011 / -0.003)*
Sweden	**-0.033**	*(-0.040 / -0.027)*
United Kingdom	**-0.026**	*(-0.030 / -0.023)*

Note: positive/negative values of the Erreygers Index indicates that the smoking-related phenomenon is more concentrated among those who are positioned higher/lower in the income distribution. Data in bold are statistically significant at 95%: confidence intervals are reported in brackets.
Source: elaborations on *EHIS (2015)* data

5. Concluding remarks

One feature that differentiates the European region from the other countries is the process of economic and monetary union which has pressured Member States to harmonize their social policies. Nevertheless, economic literature has shown that there exist significant income inequalities concerning health outcomes both within and among European countries.

This paper investigates the association between income and risky behaviours, focusing on the habit of smoking in 30 European countries. From a data perspective, we use the European Health Interview Survey (EHIS) carried out between 2013 and 2015 in all EU Member States, Iceland, and Norway. We exploit three main features of the survey: the net monthly equivalised income of the household, the type of smoking behaviour (daily smoking, occasional smoking, and no smoking), and the daily average number of cigarettes smoked. Income-related inequalities are estimated by the Erreygers Index (EI),

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a rank-dependent inequality measure that has been largely used for bounded dependent health outcome variables.

Results show a large heterogeneity in the prevalence of occasional and daily smokers across countries. The prevalence of smokers significantly increases when considering the poorest part of the population, mainly driven by the increase in the percentages of daily smokers. On average, comparing the smoking prevalence within the first (the poorer) and the last (the richer) quintile of the income distribution, the prevalence of overall smokers is 5.4 percentage point higher within the first quintile, and this difference is positive for all countries, with the exceptions of Bulgaria, Romania, Malta, Czech Republic, and Portugal. Smoking is more widespread among males in all countries, and, overall, smoking is a habit that is mainly rooted in the lowest part of the income distribution. This is confirmed both at individual level, since the Erreygers index is negative for most countries (even more negative when considering male smokers), and at country level, as a higher percentage of both overall and daily smokers is found in countries with lower levels of GDP per capita. Individual smoking habits are poor-related regardless of the average income of the countries, as the concentration of smoking among the poor is traceable both in low- and high-income countries. Results are robust to changes in the dependent variable, *i.e.*, similar evidence emerges using the average number of cigarettes smoked instead of a dummy for the smoking habit.

Since the tobacco epidemic is one of the most relevant public health threats responsible for a large share of premature death worldwide, our results suggest that a relevant part of social costs associated with smoking are more likely to be paid by the less-well-off and potentially most vulnerable members of the European Union. To discourage smoking, our results support the literature calling for the increase of the tax-incidence for "sin goods", as well as for educational and prevention programs to quit smoking. As the problem involves both low- and high-income countries, it is suggested to implement, or at least to coordinate, such policies at European level, especially for what regards the level and the structure of taxation for both traditional smoking (cigarettes) and for alternative products. Besides the usefulness in controlling market developments, the additional tax revenue raised could be relevant for financing European social and health programs.

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Appendix

Table A.1 – Descriptive statistics of smoking habits by country

	Daily smoking			Occasional smoking			Overall smoking			No Smoking		
	Total	*Male*	*Female*	**Total**	*Male*	*Female*	**Total**	*Male*	*Female*	**Total**	*Male*	*Female*
Austria	22.5%	24.4%	21.0%	5.7%	6.2%	5.3%	28.2%	30.5%	26.3%	71.8%	69.5%	73.7%
Belgium	19.1%	21.8%	16.6%	4.4%	5.2%	3.6%	23.4%	27.0%	20.2%	76.6%	73.0%	79.8%
Bulgaria	26.9%	35.5%	19.0%	6.2%	6.9%	5.5%	33.1%	42.5%	24.4%	66.9%	57.5%	75.6%
Croatia	23.8%	28.7%	19.5%	3.4%	3.0%	3.8%	27.3%	31.6%	23.4%	72.7%	68.4%	76.6%
Cyprus	24.2%	36.4%	13.0%	3.1%	3.4%	2.9%	27.3%	39.8%	15.8%	72.7%	60.2%	84.2%
Czech Republic	19.4%	25.7%	14.8%	6.1%	6.9%	5.5%	25.5%	32.6%	20.3%	74.5%	67.4%	79.7%
Denmark	14.1%	15.7%	12.8%	6.0%	5.8%	6.1%	20.1%	21.5%	18.9%	79.9%	78.5%	81.1%
Estonia	22.1%	32.3%	14.6%	3.9%	4.2%	3.7%	26.0%	36.5%	18.3%	74.0%	63.5%	81.7%
Finland	12.1%	14.3%	10.5%	5.7%	6.7%	5.0%	17.8%	20.9%	15.5%	82.2%	79.1%	84.5%
France	21.2%	24.3%	18.3%	5.6%	6.4%	5.0%	26.9%	30.7%	23.3%	73.1%	69.3%	76.7%
Germany	16.4%	18.0%	15.0%	5.7%	6.3%	5.3%	22.1%	24.3%	20.3%	77.9%	75.7%	79.7%
Greece	25.2%	31.7%	20.7%	4.8%	5.4%	4.4%	30.0%	37.1%	25.1%	70.0%	62.9%	74.9%
Hungary	26.1%	31.5%	21.4%	1.6%	1.9%	1.3%	27.7%	33.3%	22.8%	72.3%	66.7%	77.2%
Iceland	11.5%	12.1%	10.9%	6.5%	7.0%	5.9%	17.9%	19.1%	16.8%	82.1%	80.9%	83.2%
Ireland	13.6%	14.6%	12.8%	5.7%	6.3%	5.3%	19.3%	20.9%	18.0%	80.7%	79.1%	82.0%
Italy	17.5%	21.8%	13.6%	4.9%	6.0%	3.8%	22.4%	27.8%	17.4%	77.6%	72.2%	82.6%
Latvia	21.9%	34.6%	12.9%	4.5%	5.9%	3.5%	26.4%	40.4%	16.4%	73.6%	59.5%	83.6%
Lithuania	18.1%	32.8%	8.6%	4.1%	6.1%	2.8%	22.2%	38.9%	11.4%	77.8%	61.1%	88.6%
Luxembourg	14.6%	16.4%	13.2%	5.8%	6.5%	5.2%	20.4%	22.8%	18.3%	79.6%	77.2%	81.7%
Malta	18.9%	22.3%	15.8%	3.5%	3.8%	3.3%	22.4%	26.1%	19.1%	77.6%	73.9%	80.9%
Netherlands	18.1%	20.3%	16.0%	5.7%	6.6%	4.7%	23.8%	26.9%	20.7%	76.2%	73.1%	79.3%
Norway	12.6%	12.8%	12.4%	7.0%	7.3%	6.7%	19.6%	20.1%	19.1%	80.4%	79.9%	80.9%
Poland	22.1%	28.3%	17.0%	3.2%	3.6%	2.9%	25.3%	31.9%	19.9%	74.7%	68.1%	80.1%
Portugal	16.6%	24.3%	10.6%	2.9%	3.8%	2.1%	19.5%	28.1%	12.8%	80.5%	71.9%	87.2%
Romania	18.5%	31.1%	7.1%	5.3%	7.1%	3.6%	23.8%	38.3%	10.8%	76.2%	61.7%	89.2%
Slovakia	21.7%	29.7%	15.3%	6.3%	7.3%	5.4%	28.0%	37.0%	20.7%	72.0%	63.0%	79.3%
Slovenia	17.4%	19.6%	15.6%	5.5%	5.7%	5.2%	22.8%	25.3%	20.8%	77.2%	74.7%	79.2%
Spain	22.0%	26.8%	17.9%	2.2%	2.7%	1.7%	24.1%	29.4%	19.6%	75.9%	70.6%	80.4%
Sweden	9.3%	8.7%	10.0%	7.3%	8.6%	5.9%	16.6%	17.3%	15.9%	83.4%	82.7%	84.1%
United Kingdom	13.1%	13.7%	12.6%	2.4%	2.8%	2.1%	15.5%	16.5%	14.7%	84.5%	83.5%	85.3%
Average	19.3%	23.3%	14.8%	4.7%	5.3%	3.9%	23.9%	28.6%	18.7%	76.1%	71.4%	81.3%

Source: elaborations on EHIS (2015) data

Table A.2 – Descriptive statistics of smoking habits within the first quintile of income distribution by country

	Daily smoking			Occasional smoking			Overall smoking			No Smoking		
	Total	*Male*	*Female*	Total	*Male*	*Female*	Total	*Male*	*Female*	Total	*Male*	*Female*
Austria	24.1%	26.8%	22.4%	5.4%	7.0%	4.5%	29.5%	33.7%	26.8%	70.5%	66.3%	73.2%
Belgium	27.1%	30.2%	24.7%	4.8%	6.2%	3.7%	31.8%	36.4%	28.4%	68.2%	63.6%	71.6%
Bulgaria	29.1%	40.8%	19.4%	5.5%	6.5%	4.7%	34.6%	47.3%	24.1%	65.4%	52.7%	75.9%
Croatia	28.0%	33.1%	23.7%	1.9%	2.8%	1.1%	29.9%	36.0%	24.8%	70.1%	64.0%	75.2%
Cyprus	25.5%	40.4%	12.5%	3.0%	3.3%	2.7%	28.4%	43.7%	15.2%	71.6%	56.3%	84.8%
Czech Republic	21.4%	32.5%	16.4%	5.8%	7.8%	4.9%	27.2%	40.3%	21.2%	72.8%	59.7%	78.8%
Denmark	19.4%	23.7%	16.6%	5.7%	5.2%	6.1%	25.2%	28.9%	22.7%	74.8%	71.1%	77.3%
Estonia	27.3%	36.8%	20.5%	4.6%	5.3%	4.2%	31.9%	42.1%	24.7%	68.1%	57.9%	75.3%
Finland	15.4%	20.5%	12.2%	6.6%	5.6%	7.2%	21.9%	26.1%	19.4%	78.1%	73.9%	80.6%
France	29.2%	33.7%	25.4%	4.8%	5.7%	4.1%	34.0%	39.5%	29.5%	66.0%	60.5%	70.5%
Germany	20.7%	23.4%	18.9%	6.1%	6.9%	5.5%	26.8%	30.3%	24.4%	73.2%	69.7%	75.6%
Greece	30.4%	40.8%	23.8%	4.6%	4.9%	4.4%	35.0%	45.7%	28.2%	65.0%	54.3%	71.8%
Hungary	31.4%	44.5%	23.1%	1.5%	2.2%	1.1%	33.0%	46.7%	24.2%	67.0%	53.3%	75.8%
Iceland	15.2%	14.7%	15.6%	8.3%	10.1%	6.8%	23.5%	24.9%	22.4%	76.5%	75.1%	77.6%
Ireland	16.0%	17.1%	15.1%	5.7%	6.2%	5.3%	21.7%	23.3%	20.4%	78.3%	76.7%	79.6%
Italy	20.3%	26.9%	14.7%	5.3%	6.7%	4.2%	25.6%	33.6%	18.9%	74.4%	66.4%	81.1%
Latvia	27.2%	45.1%	17.2%	4.2%	5.9%	3.3%	31.4%	51.1%	20.5%	68.6%	48.9%	79.5%
Lithuania	23.9%	39.3%	12.8%	3.7%	3.4%	4.0%	27.6%	42.7%	16.8%	72.4%	57.3%	83.2%
Luxembourg	22.7%	24.7%	21.5%	5.1%	5.3%	5.0%	27.9%	30.0%	26.5%	72.1%	70.0%	73.5%
Malta	18.0%	24.1%	13.8%	2.2%	1.9%	2.4%	20.2%	26.0%	16.1%	79.8%	74.0%	83.9%
Netherlands	25.3%	29.9%	21.3%	9.3%	10.1%	8.6%	34.6%	40.0%	30.0%	65.4%	60.0%	70.0%
Norway	15.8%	17.5%	14.3%	8.3%	10.9%	6.1%	24.1%	28.4%	20.3%	75.9%	71.6%	79.7%
Poland	30.4%	39.7%	23.1%	3.0%	3.6%	2.5%	33.4%	43.3%	25.6%	66.6%	56.7%	74.4%
Portugal	17.6%	29.6%	10.1%	2.3%	2.8%	2.0%	19.9%	32.4%	12.1%	80.1%	67.6%	87.9%
Romania	16.5%	31.1%	5.0%	5.4%	8.7%	2.7%	21.8%	39.8%	7.7%	78.2%	60.2%	92.3%
Slovakia	29.7%	39.1%	23.0%	5.8%	6.8%	5.1%	35.5%	45.9%	28.1%	64.5%	54.1%	71.9%
Slovenia	18.5%	23.9%	15.5%	3.7%	5.7%	2.6%	22.2%	29.6%	18.2%	77.8%	70.4%	81.8%
Spain	28.1%	34.4%	22.7%	2.8%	4.0%	1.8%	30.9%	38.4%	24.6%	69.1%	61.6%	75.4%
Sweden	8.3%	9.4%	7.1%	8.6%	9.4%	7.7%	16.9%	18.8%	14.8%	83.1%	81.2%	85.2%
United Kingdom	20.3%	21.4%	19.6%	2.4%	2.5%	2.3%	22.7%	23.9%	21.9%	77.3%	76.1%	78.1%
Average	23.1%	30.6%	17.6%	4.7%	5.8%	4.0%	27.8%	36.4%	21.5%	72.2%	63.6%	78.5%

Source: elaborations on EHIS (2015) data

Table A.3 – Average number of cigarettes smoked

	Among daily smokers			Among overall individuals		
	Total	*Male*	*Female*	**Total**	*Male*	*Female*
Austria	15.0	17.1	13.1	3.3	4.1	2.7
Belgium	16.1	16.9	15.1	2.8	3.4	2.4
Bulgaria	15.5	16.7	13.4	4.0	5.8	2.4
Croatia	16.8	19.0	13.8	3.9	5.4	2.7
Cyprus	19.2	21.1	14.4	4.6	7.6	1.9
Czech Republic	13.2	14.5	11.5	2.5	3.7	1.7
Denmark	14.9	17.0	13.2	1.9	2.2	1.6
Estonia	14.1	16.0	11.0	3.0	5.0	1.6
Finland	2.5	2.3	2.7	0.3	0.3	0.3
France	12.8	13.7	11.7	2.5	3.0	2.0
Germany	15.0	16.8	13.3	2.3	2.8	1.9
Greece	18.7	21.2	16.1	4.7	6.6	3.3
Hungary	13.9	15.5	11.9	3.6	4.9	2.6
Iceland	13.0	14.7	11.3	1.4	1.6	1.2
Ireland	14.8	16.6	13.2	1.8	2.1	1.6
Italy	14.1	15.3	12.2	2.4	3.3	1.7
Latvia	13.5	15.2	10.4	2.9	5.1	1.3
Lithuania	13.8	15.3	9.9	2.5	5.0	0.8
Luxembourg	15.2	16.5	14.0	2.1	2.5	1.8
Malta	15.7	17.7	13.4	2.8	3.7	2.1
Netherlands	13.1	13.8	12.4	2.2	2.5	1.9
Norway	11.7	13.2	10.2	1.4	1.6	1.2
Poland	15.5	17.1	13.3	3.3	4.7	2.2
Portugal	14.9	16.6	12.0	2.4	3.9	1.3
Romania	12.9	13.4	10.9	2.4	4.2	0.8
Slovakia	12.5	13.9	10.3	2.7	4.1	1.6
Slovenia	14.6	16.6	12.6	2.4	3.1	1.9
Spain	13.3	14.5	11.8	2.8	3.7	2.1
Sweden	11.7	12.2	11.3	1.0	0.9	1.1
United Kingdom	13.7	14.8	12.8	1.7	1.9	1.6

Source: elaborations on *EHIS (2015)* data