

Alcohol Consumption among the Member States of the European Union in Relationship to Taxation

HORÁKOVÁ, M., BEJTKOVSKÝ J., BAREŠOVÁ, P., URBÁNEK, T.

Tomas Bata University in Zlín, Faculty of Management and Economics,
Zlín, Czech Republic

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BACKGROUND: Alcohol is one of the main economic commodities, which represents a significant amount of government tax revenues and consumer spending. Alcohol is associated with health, economic and social impacts on people's lives. The task of national governments is not only to address the effects of alcohol but also to address the causes that help eliminate alcohol dependence. Tools that governments can use include price policy through alcohol taxation rates (excise duties, VAT), reduce accessibility to purchase alcohol beverages, raising awareness of the harmful effects of drinking for driving or among teenagers, etc. **AIM:** The main goal of the research was to examine dependencies between the amount of alcohol consumption and VAT rate for alcohol in EU Member States from 2010–2018. Selected data for the years 2010, 2012, 2014, 2016 and 2018 correspond to the published reports of the European Commission and the OECD. **DESIGN AND MEASUREMENTS (METHODS):** Secondary data for the research were obtained from available international statistics, which include databases from European Commission, the

OECD, the WHO and Eurostat. Statistical methods as Kruskal-Wallis test were used for data analysis. **SAMPLE:** The sample consisted of complete data of 23 European Union Member States. **RESULTS:** The results of the research did not show a significant difference in the median alcohol consumption in the period 2010–2018 in the measured 23 EU countries. While the study of the dependence of VAT and alcohol consumption has shown a significant dependence. The highest base of alcohol consumption was recorded in Lithuania, Austria and Estonia, while the lowest base was recorded in Italy and Sweden. The VAT rate has been shown to have the highest impact on reducing alcohol consumption in Lithuania, Greece and Estonia. **CONCLUSIONS:** Among other things, it is possible to formulate a clear and concrete conclusion that increasing VAT on alcohol beverages will reduce the amount of alcohol consumption. This research finding would undoubtedly support the field of population health and prevention of alcoholism, but would have a negative effect on the economic functioning of individual EU Member States.

Keywords | Alcohol – Alcohol Policy – Consumption – European Union – Taxation

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Corresponding author | Monika Horáková, PhD, Tomas Bata University in Zlín, Faculty of Management and Economics, Mostní 5139, 760 01 Zlín, Czech Republic

mhorakova@utb.cz

● 1 INTRODUCTION

The harmful use of alcohol is a problem area worldwide, especially for people of working age. About 20% of heavy drinkers drink most alcohol (OECD, 2015). The lethal effects of alcohol were pointed out by Forouzanfer et al. (2016), according to whom alcohol was among the top ten causes of death in OECD countries. According to the statistics of OECD (2017), 2.3 million deaths were caused by alcohol in 2015, while a few years later, according to the World Health Organization (2020), three million deaths every year result from the harmful use of alcohol worldwide. This represents 5.3% of all deaths. The harmful use of alcohol is a causal factor in more than 200 disease and injury conditions. Overall, 5.1% of the global burden of disease and injury is attributable to alcohol, as measured in disability-adjusted life years. Alcohol consumption causes death and disability relatively early in life. In the age group between 20 and 39 years, approximately 13.5% of the total deaths are attributable to alcohol. There is a causal relationship between the harmful use of alcohol and a range of mental and behavioural disorders and other non-communicable conditions, as well as injuries. According to the overall OECD study report from 2010–2015 (OECD, 2017), the average recorded alcohol consumption decreased in the years that were monitored from 9.5 litres per capita per year to 9 litres of pure alcohol per capita each year (9 litres of pure alcohol would be equivalent to 96 bottles of wine).

The Global Burden of Diseases, Injuries, and Risk Factors Study 2016 was a large study about the burden of alcohol use for 195 countries and territories from 1990 to 2016. The results were presented in 2018 with the following findings: alcohol use was the seventh leading risk factor for death and DALYs (Disability-Adjusted Life Years). Alcohol-attributable deaths in standardized age account for 2.2% of female and 6.8% of male deaths globally. For the population aged 15–49 years, deaths caused by alcohol account for 3.8% of females and 12.2% of males. DALYs caused by alcohol use, for the same age population, were 2.3% for females and 6.8% for males. This age group reveals three main causes leading to alcohol-attributable deaths: tuberculosis, road injuries, and self-harm. (GBD, 2016)

Alcohol is a dominant economic commodity that is associated with large government tax revenues and significant consumer spending. Alcohol has been produced and drunk in European countries for thousands of years and is mostly made from any raw material that has been available in the country. Europe plays a dominant role in the global alcohol market, accounting for a quarter of the world's alcohol production and more than half of the world's wine production. Trade is even more focused on European countries, with 70% of alcohol exports and almost half of world imports involving the European Union. Thus, the economic role of the alcoholic beverage industry is significant in many European countries (Anderson & Baumberg, 2006).

This research paper focuses on alcohol consumption among the Member States of the European Union in relation to val-

ue added tax (VAT). The purpose of this paper is to determine whether there is a link between the set amount of VAT and the level of alcohol consumption per capita in individual EU countries. VAT on alcohol is set by individual EU countries themselves in consensus with EU legislation. In addition to VAT, the price of alcohol is also affected by the excise duty on alcohol, which individual countries must again set in accordance with EU legislation. The rest of the article is organized as follows: the second section presents alcohol and its impact on humans, as well as macroeconomic data related to alcohol consumption. The third section presents the research objective, methodology, and data. The fourth section focuses on the presentation of the research data and subsequent discussion. The last section presents the conclusions of the research paper.

● 2 THEORETICAL BACKGROUND

Mohapatra et al. (2010) emphasize that in today's rapidly changing society, alcohol consumption has become a serious public health problem worldwide. According to Kolářová et al. (2019), excessive alcohol consumption is one of the most serious economic and social problems of today's world. The level of health of the population is significant for the economic and social development of a country. A low level of health of the population can impair the stability of the entire national community. In this context, Hoke and Cotti (2014) state that excessive alcohol consumption is a big problem not only for the authorities but also for society. According to Fillmore (2007), excessive alcohol consumption can impair the ability to perform most cognitive and psychomotor tasks. Anderson and Baumberg (2006) state that alcohol consumption increases the risk of numerous problems or social harms, generally in a dose-dependent manner, i.e. the higher the alcohol consumption, the greater the risk. The damage or problems caused by someone else's drinking range from social hardship to more serious consequences, such as damage to marriages, child abuse, theft, crime, violence, or murder.

The results of excessive alcohol consumption, when it occurs more than three times a week, have effects at the work level, expressed in frequent delays in attendance at work, reduced work performance, absenteeism from work, slowness, clumsiness, low efficiency, or causing accidents at work (Meneses-La-Riva et al., 2020). According to Baliunas et al. (2010) and Parry et al. (2011), other possible consequences of frequent alcohol consumption besides poor work performance include neuropsychiatric disorder, stroke, hepatitis, liver cirrhosis, traffic accidents, suicide, and high-risk sexual behaviours. The volume of alcohol consumption, the frequency of drinking, and the frequency and volume of episodic heavy drinking all independently increase the risk of violence. It can be said that the higher the level of alcohol consumption, the more serious the crime or injury (Anderson & Baumberg, 2006).

Alcohol consumption has become one of the areas of focus of the OECD and the European Commission. As part

of the protection of the public health of the EU population, a progress report is published every two years from 2010 on key health indicators and the health system for 35 European countries. One of the key parameters marked as a risk factor is alcohol consumption. Already in the first reports from 2010 and 2012, the following are identified as effective measures to reduce alcohol consumption: curbs on advertising, taxation, and sales restrictions. These reports also highlight the decline in alcohol consumption in traditional wine-growing countries such as France, Italy, and Spain. (OECD, 2010; OECD, 2012), while adult alcohol consumption in countries such as Cyprus, Finland, and Ireland has grown significantly. In 2014, the OECD report highlights the fact that the EU region has the highest alcohol consumption in the world, especially in countries such as Lithuania, Estonia, and Austria, with alcohol consumption rates above 12 litres per capita. At the other end of the ranking the Nordic countries (Norway, Iceland, and Sweden) and southern European countries (Cyprus, Greece, Italy, and Malta) have low levels of alcohol consumption with 6-8 litres of pure alcohol per adult. (OECD, 2014) In 2016 the report (OECD/EU, 2016) states that more than one in five adults in EU countries reported heavy drinking of alcohol. The last report from the European Commission and the OECD (2018) identifies heavy alcohol consumption among adolescents and adults as an important public health issue. Published data indicates that 40% of adolescents reported binge drinking at least once in the previous month, and more than 40% in the 20-29 age group also reported heavy episodic drinking.

2.1 Macroeconomic data about alcohol consumption

The importance of alcohol consumption can be assessed from an individual and social point of view; however, the economic aspect also helps to quantify the financial impact and benefits of alcohol consumption. The products containing alcohol themselves are one of the basic components of the consumer basket of households in the European Union Member States, specifically category 2 – Alcoholic Beverages, Tobacco, and Narcotics. The consumer basket is a methodological tool for calculating the HICP (Harmonized Index of Consumer Prices). The HICP is a measure of price changes for goods and services in the economies of all EU Member States (Eurostat, 2019c).

Alcohol consumption is important not only in terms of monitoring the price level in European Union member states, but also in terms of household consumption expenditure. With a higher frequency of consumption of alcoholic beverages, there is also a rise in household expenses, which burdens family budgets. This is a particularly negative impact for lower-income groups across all the countries of the European Union. As illustrated in *Figure 1*, in the European Union in 2017, the highest share of consumer spending on alcoholic beverages was in households in the Baltic states (Estonia – 5.2%, Latvia – 4.9%, and Lithuania – 4.0%), followed by Poland (3.5%), the Czech Republic (3.3%), and Hungary (3.0%), while households in Spain (0.8%), Italy, and Greece (both 0.9%) spent the least money on alcoholic drinks.

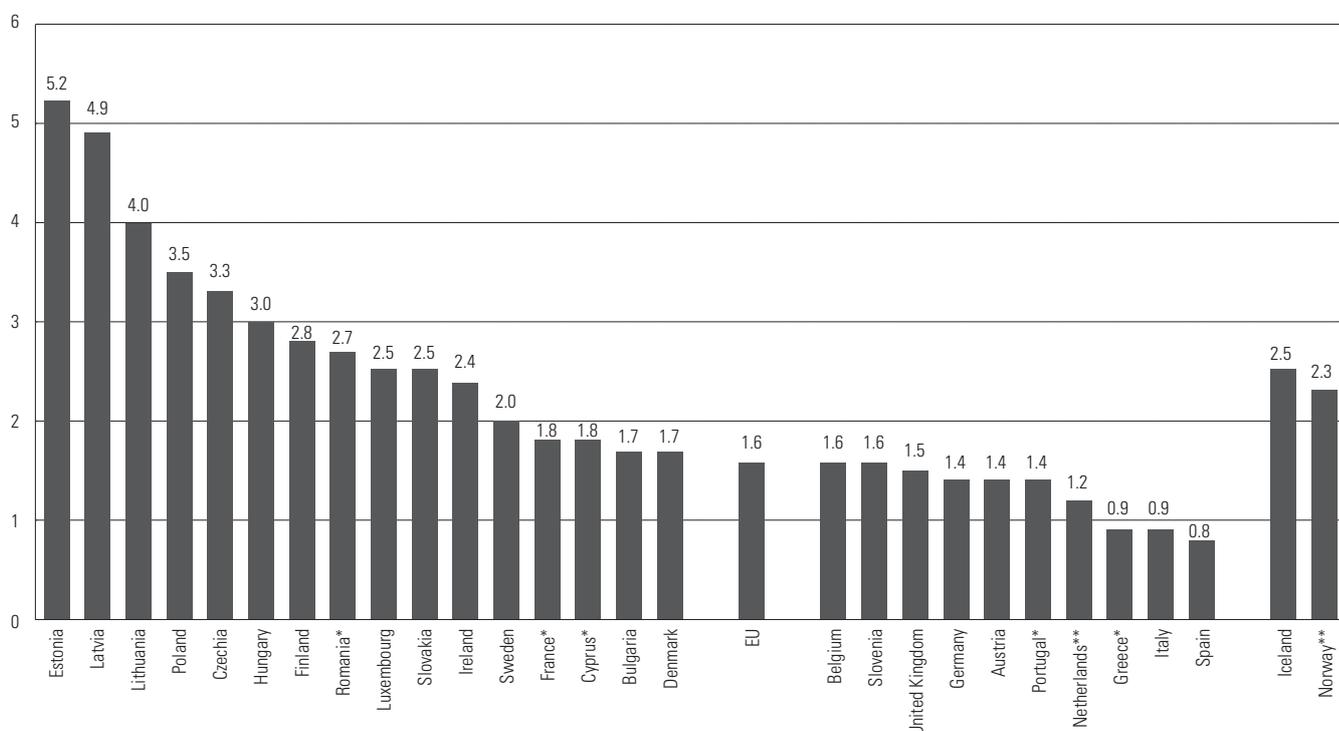


Figure 1 | Total share of household expenditures of alcoholic beverages in the EU member states, 2017 (Source: Eurostat, 2019a)

* Data provisional.

** 2016 data instead of 2017.

Croatia: data not available. Malta: data confidential.

Average household spending across the EU accounts for 1.6% of total consumer spending. In the period from 2007 to 2017, the greatest increase in consumer spending on alcohol was recorded in Romania and Portugal, while the greatest decrease was registered in Bulgaria and Lithuania (Eurostat, 2019a).

The problem of alcohol consumption is faced by all countries in the world. A global map from the World Bank in 2016 shows the dark spots that the countries with the highest alcohol consumption per capita aged 15+ have. Europe as a whole holds the number one position in the world rankings. Lithuania has the highest alcohol consumption per capita (15 litres of pure alcohol), followed by Latvia, the Czech Republic, Germany, and many other European countries. As can be seen in *Figure 2*, the focus on the European continent is for the most part shrouded in a dark blue colour, indicating consumption of more than 9.5 litres of alcohol per capita. The remaining smaller part of Europe highlighted in a somewhat lighter ocean blue colour with an amount of 7–9.5 litres of alcohol per head represents countries such as Albania, Croatia, Iceland, Italy, Montenegro, the Netherlands, Norway, and Sweden. Bosnia and Herzegovina has

the lowest alcohol consumption of European countries, with 6.4 litres per capita. This country is not a member of the EU, but it is a candidate country. The non-European countries that reach high values include Russia, Nigeria, Gabon, Namibia, the USA, and Australia. In contrast, the countries with the lowest amount of alcohol consumed per capita all over the world include South Sudan and Mauritania. In some countries with low alcohol consumption it is often associated with religions such as Islam.

Many countries measure national indicators relating to alcohol consumption. For international comparison among EU Members data provided by the Organization for Economic Co-operation and Development (OECD), Eurostat, and the World Health Organization could be used. The latest data used in this article focused on alcohol consumption is provided by the OECD and is shown in *Figure 3*. This graph shows a comparison of 23 EU Member States and their citizens in terms of annual alcohol consumption for the year 2018. The highest-ranking score, with 12.6 litres per capita (aged 15 and over), belongs to Latvia. Second place is occupied by Austria, with 12.2 litres, and the third highest alcohol consumption is by the citizens of the Czech Republic.

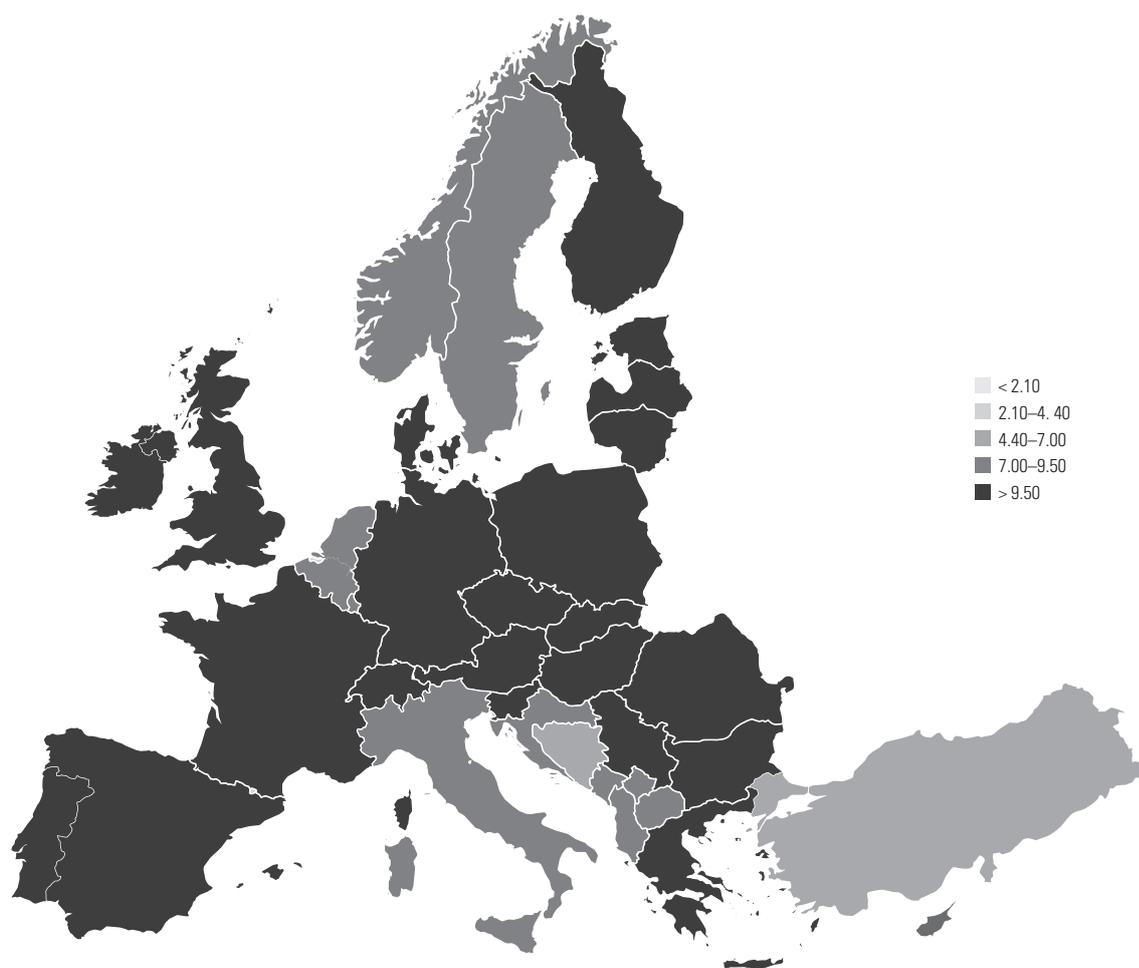


Figure 2 | European part of global map of total alcohol consumption per capita in 2016 (Source: The World Bank)

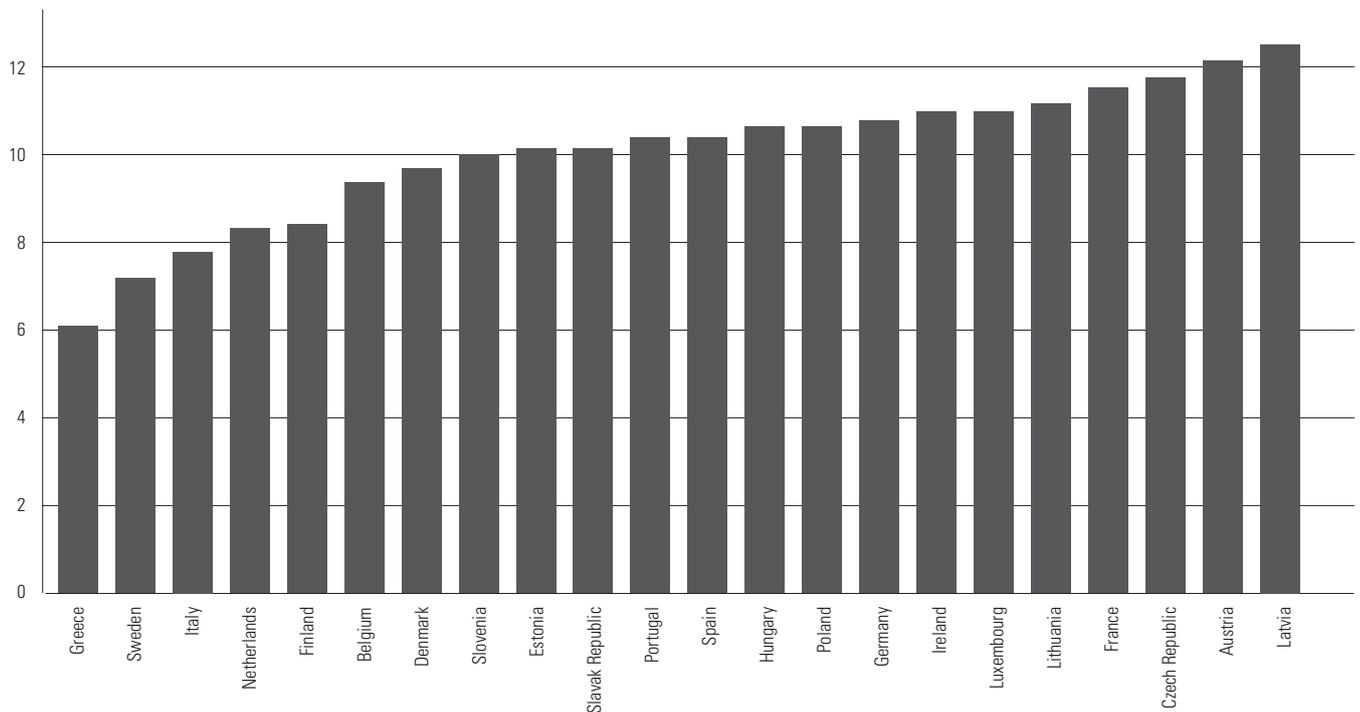


Figure 3 | Alcohol consumption among EU Members in 2018, litres per capita (Source: OECD; 2019)

At the other end of the scale are countries such as Greece, Sweden, or Italy, with consumption between 6 and 8 litres of alcohol per capita.

Another key international organization which monitors alcohol consumptions is the World Health Organization. According to their published Status Report on alcohol consumption, harm, and policy responses in 30 European countries from the year 2019, alcohol consumption per capita in the WHO European Region, including the European Union (EU), is the highest in the world. This has an impact on higher alcohol burden levels compared to other regions. From this study, among EU+ countries (i.e. EU Member States, Switzerland, and Norway), there was no statistically significant decrease in total alcohol consumption per capita between 2010 and 2016 and the observed decreases in heavy episodic drinking seem to have come to a halt. The WHO defined the key assessment indicators of alcohol policies in its “European Action Plan to Reduce the Harmful Use of Alcohol 2012–2020” (EAPA). This plan consists of ten action points:

1. leadership, awareness, and commitment;
2. health services’ response;
3. community and workplace action;
4. drink-driving policies and countermeasures;
5. the availability of alcohol;
6. marketing of alcoholic beverages;
7. pricing policies;
8. reducing the negative consequences of drinking and alcohol intoxication;

9. reducing the public health impact of illicit alcohol and informally produced alcohol, and
10. monitoring and surveillance. (World Health Organization, 2012)

The results of the implementation of the EAPA are presented by the WHO in its Status Report on alcohol consumption, harm, and policy responses in 30 European countries in 2019. The European action plan reveals significant disparities between countries, including the implementation of three “best buy” policies set up by the WHO. These policies focus on key areas 5 (Availability), 6 (Marketing), and 7 (Pricing Policy), which focus on reducing non-communicable diseases. The area of Pricing Policy was rated the worst of the “best buy” policies. This area aims to reduce alcohol prices through taxation (excise duties, VAT), or other policies such as a minimum pricing unit and overall reduction of consumption and the associated harm. An increase in the price of cheap alcohol has been highlighted as the most effective way to reduce alcohol consumption. The second effective tool with a demonstrable effect is price controls with an impact on at-risk populations such as young people, “influencing consumers”. The worst ranking of all the action points belongs to (8) negative consequences of drinking and alcohol intoxication. The member states should rather turn their attention to getting a better position (World Health Organization, 2018).

2.2 European Union and Alcohol Taxation

2.2.1 Excise duty

According to EU legislation, the following are included in alcohol and alcoholic beverages and are subject to excise duty:

- beer or mixtures of beer with non-alcoholic drinks;
- wine;
- other fermented drinks, such as cider;
- intermediate products such as sherry or port;
- ethyl alcohol/spirits. (European Commission, 2019a)

Each country applies an excise duty on alcohol beverages according to Directive 92/83/EEC. This directive defines the structures of excise duties on alcohol and alcoholic beverages, the categories of alcohol and alcoholic beverages subject to excise duty, and the basis on which the excise duty is calculated.

A second directive, Directive 92/84/EEC, lays down minimum rates which must be applied to each category of alcoholic beverage, as well as reduced rates for certain Greek, Italian, and Portuguese regions. EU directives set harmonized minimum rates (European Commission, 2019b).

Each EU country may choose to reduce the amount of duty payable or accept exemptions from paying duty. This exception includes:

- small breweries can benefit by up to 50% off the standard duties if they produce a maximum of 200,000 hectolitres (hl) of beer per year, as can distilleries that produce a maximum of 10 hl of pure alcohol per year;
- reduced rates of excise duty could apply for beer (with 2.8% or less by alcohol volume), wine and fermented drinks (with 8.5% or less by alcohol volume), intermediate products (with 15% or less by alcohol volume) and ethyl alcohol (with 10% or less by alcohol volume). (European Commission, 2019a)

Member States	Code	Super-reduced Rate	Reduced Rate	Standard Rate	Parking Rate
Belgium	BE	-	6/12	21	12
Bulgaria	BG	-	9	20	-
Czech Republic	CZ	-	10/15	21	-
Denmark	DK	-	-	25	-
Germany	DE	-	7	19	-
Estonia	EE	-	9	20	-
Ireland	IE	4.8	9/13.5	23	13.5
Greece	EL	-	6/13	24	-
Spain	ES	4	10	21	-
France	FR	2.1	5.5/10	20	-
Croatia	HR	-	5/13	25	-
Italy	IT	4	5/10	22	-
Cyprus	CY	-	5/9	19	-
Latvia	LV	-	5/12	21	-
Lithuania	LT	-	5/9	21	-
Luxembourg	LU	3	8	17	14
Hungary	HU	-	5/18	27	-
Malta	MT	-	5/7	18	-
Netherlands	NL	-	9	21	-
Austria	AT	-	10/13	20	13
Poland	PL	-	5/8	23	-
Portugal	PT	-	6/13	23	13
Romania	RO	-	5/9	19	-
Slovenia	SI	-	5/9.5	22	-
Slovakia	SK	-	10	20	-
Finland	FI	-	10 /14	24	-
Sweden	SE	-	6/12	25	-
United Kingdom	UK	-	5	20	-

Table 1 | VAT rates in member states of the EU (Source: European Commission, 2019d)

	n	mean	sd	median	min	max	range	skew	kurtosis	se
Alcohol Consumption	114	10.25	1.67	10.35	6.1	14.7	8.6	-0.29	0.03	0.16
VAT	115	21.42	2.37	21	15	27	12	0.06	0.5	0.22

Table 2 | Descriptive statistics of analyzed data (Authors' own calculation)

There are exemptions from excise duty, which does not need to be paid on most homemade products that are not produced for commercial purposes, except for spirits or alcohol used to manufacture other products not intended for human consumption or made unfit for human consumption by adding one or more chemicals (denaturants) to them (European Commission, 2019a).

2.2.2 Value Added Tax (VAT)

It applies to almost all goods and services that are bought and sold for use or consumption in all countries in the European Union. EU legislation sets some standard EU rules that have to be implemented in EU Member States. According to EU law, the standard VAT rate must be at least 15% and the reduced rate at least 5% (only for supplies of goods and services referred to in an exhaustive list).

Actual VAT rates vary between EU countries and between certain types of products. In addition, certain EU countries have retained other rates for specific products. *Table 1* shows the VAT rate in each EU Member State, including the standard rate, reduced rate, super-reduced rate, and parking rate. (European Commission, 2019d) The highest standard rate of VAT is in Hungary, with 27%; the lowest standard VAT rate is in Luxembourg, with 17%.

● 3 RESEARCH OBJECTIVE, METHODOLOGY, AND DATA

The main goal of the research was to examine the dependencies between the level of alcohol consumption and VAT rate for alcoholic beverages in EU Member States between 2010 and 2018. The time sequence of the data on alcohol consumption and the amount of VAT in the years 2010, 2012, 2014, 2016, and 2018 corresponds to the published EU and OECD reports focused on the health of the people of Europe (Health at a Glance: Europe). This document analytically compares all EU countries in terms of the health of their population and maps the progress that has been made within the health systems in individual countries. One of the areas that is monitored is alcohol consumption, which is without a doubt related to public health.

Research Question 1: Alcohol consumption varies from year to year between EU countries.

Research Question 2: There is a statistically significant relationship between the amount of alcohol consumed and the VAT rate on alcohol in the period that was monitored, 2010–2018.

The method of quantitative study of secondary data was applied to fulfil the research goals. Secondary data on alcohol consumption was obtained from the OECD (2019) and European Commission (2019d, 2019e). This data was collected for the years 2010, 2012, 2014, 2016, and 2018 with respect to the latest data. A total of 23 complete items are available for all EU Member States, including Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

The data was summarized and checked for extreme and missing values. The following characters will be used for the analysis:

- alcohol consumption in 2010, 2012, 2014, 2016, and 2018;
- VAT in 2010, 2012, 2014, 2016, and 2018.

● 4 RESULTS AND DISCUSSION

Descriptive statistics for the EU countries and for all years are combined in *Table 2*. The table shows that the average alcohol consumption per EU citizen per year is 10.25 litres, with a minimum of 6.1 litres and a maximum of 14.7 litres. The average VAT on alcohol for all EU countries is 21.42%. The minimum for the period that was observed is 15%, in Luxembourg between 2010 and 2016, and the maximum is 27%, in Hungary since 2012.

Research Question 1: Alcohol consumption varies from year to year between EU countries.

In particular, the graph in *Figure 4* shows that the median is relatively constant throughout the period under review. We can therefore conclude that alcohol consumption does not decrease over time for the EU countries. To verify this, the Kruskal-Wallis test was used with the result (chi-squared = 0.57, df = 4, p-value = 0.97). The test results show that we do not have sufficient evidence to reject the null hypothesis of median identity. Further in the text, we will assume that the median is in all the years that were monitored.

Research Question 2: There is a statistically significant relationship between the amount of alcohol consumed and the VAT rate on alcohol in the period that was monitored, 2010–2018.

A linear model (1) was constructed to verify this question.

$$= \beta_0 + \beta_1 \text{VAT}_{ij} + b_0 t_j + \varepsilon_{ij} \quad (1)$$

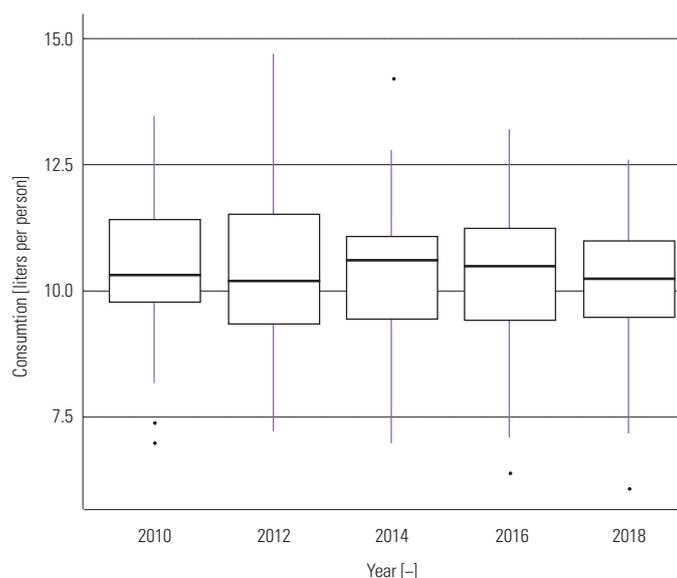


Figure 4 | Boxplot of median development of alcohol consumption between the years 2010 and 2018 (Authors' own calculation)

As shown in *Table 3*, the default value of alcohol consumption in the EU is 14.41 litres per person. With a 0.19 increase in VAT, alcohol consumption will decrease by 0.19 litres. Both coefficients are statistically significant.

	Value	Std. Error	df	t-value	p-value
(Intercept)	14.41	1.50	90	9.58	0.0000
VAT	-0.19	0.07	90	-2.84	0.0056

Table 3 | Results of linear model for all monitored EU countries (Authors' own calculation)

The summary results for individual EU countries in the period 2010-2018 are presented in *Table 4*. The highest basic value of alcohol consumption can be found in Lithuania, i.e. $14.41 + 4.53 = 18.94$ litres per person, and decreases every two years by 0.51 litres. The second highest alcohol consumption base (calculation process above) follows in Austria, with a volume of 16.5 litres per person and over the years, alcohol consumption decreases by 0.08 litres every two years, followed by Estonia, with 15.99 litres per person and each two years a decrease of 0.37 litres with VAT. At the other side of the scale, the lowest base of the EU countries surveyed was recorded in Italy, i.e. $14.41 - 3.43 = 10.98$ litres per capita, and every two years alcohol consumption increases by 0.18 litres. The second place in the lowest base of alcohol consumption belongs to Sweden, with a value of 12.22 litres per person with an almost unchanged value of alcohol consumption, a decrease in consumption by 0.03 litres every two years.

The VAT rate in 14 countries caused a decrease in alcohol consumption, while in nine countries alcohol consumption was higher despite the VAT rate. The VAT rate has been

shown to have the highest impact on reducing alcohol consumption in Lithuania (-0.51 litres/person), Greece (-0.39), and Estonia (-0.37).

Alcohol taxation and pricing measures can be applied to achieve long-term prevention of alcohol-related harm (Sornpaisarn et al., 2015). According to Cnossen (2007), the excise duty on alcohol is a relatively inefficient tool that causes harm to the health of non-harmful users and does not sufficiently control the drinking of harmful users. The use of the excise duty instrument to reduce external costs should therefore be complemented by regulatory measures targeted at specific problem groups, such as young drinkers, and alcohol-dependent drinking.

The optimal excise duty on alcohol is difficult to determine because the benefits for prosperity of reducing socially costly binge drinking must be balanced against the loss of welfare caused by declining moderate drinking. This suggests that while an increase in excise duty on alcohol may increase efficiency, complementary regulatory measures targeted at specific problem groups should be an important element of the policy package (Cnossen, 2007).

In contrast, Smith's research argues (2005) that the reported price elasticities of alcohol demand are not so low that the inverse elasticity rule seems to justify significantly higher-than-average alcohol taxation. Anderson et

Country	Intercept	t
Austria	2.09	-0.08
Belgium	0.26	-0.21
Czech Republic	0.9	0.12
Denmark	0.37	-0.09
Estonia	1.58	-0.37
Finland	-0.17	-0.24
France	1.81	-0.14
Germany	0.64	-0.1
Greece	-1.63	-0.39
Hungary	1.39	0.12
Ireland	1.38	-0.06
Italy	-3.43	0.18
Latvia	-1.09	0.55
Lithuania	4.53	-0.51
Luxembourg	0.39	-0.08
Netherlands	-1.34	-0.14
Poland	-0.12	0.17
Portugal	0.51	-0.04
Slovakia	-0.54	0.02
Slovenia	0.23	0.01
Spain	-1.4	0.31
Sweden	-2.19	-0.03
United Kingdom	-1	0.02

Table 4 | Results of linear model for each EU country (Authors' own calculation)

al. (2009) argue that with increasing alcohol taxation, the amount of unrecorded alcohol consumption tends to increase, which reduces the effectiveness of alcohol taxation and pricing strategies.

● 5 CONCLUSIONS

The research paper deals with alcohol consumption in the Member States of the European Union in relationship to taxation. The main objective of this research paper was to examine the dependencies between the level of alcohol consumption and the VAT rate for alcoholic beverages in EU Member States between 2010 and 2018. Each second year, 2010, 2012, 2014, 2016, and 2018, corresponds to the published reports of the European Commission and the OECD on the health of the people of Europe: Health at a Glance: Europe.

On the basis of a literature search and analysis and evaluation of the information, two research questions (RQ1, RQ2) were formulated. Descriptive statistics show the average alcohol consumption of the EU Member States at 10.25 litres per capita, with the lowest value recorded at 6.1 litres per capita and the highest measured value at 14.7 litres. The specific amount of VAT on alcohol is determined by individual EU countries individually, but must comply with the basic EU legislative framework. From the results it can be concluded that the VAT rate on alcoholic beverages may be related to the level of alcohol consumption. The issue of VAT is partly regulated according to EU legislation, which stip-

ulates a minimum standardized rate of VAT (15%), but not the maximum. *Table 1* shows that all countries implement VAT on alcohol at the standardized rate of 17%–27% (European Commission, 2019d). The findings of this research also correspond to the conclusions of the report of the European Action Plan to Reduce the Harmful Use of Alcohol 2012-2020 (EAPA) by the WHO (2018), which states that the worst of the “best buy” practices is the pricing policy. This is mostly on the shoulders of individual EU Member States. It can be argued that the VAT pricing policy can be effective in combating alcohol consumption and its implementation can help reduce the negative impact on society.

As our research paper and several international studies show, the issue of alcohol and VAT on alcoholic beverages is a much-discussed and important public health problem, and not only in connection with the prevention of alcohol-related mortality. Therefore, the contribution, value, and originality of our research paper are based on the creation of a debate or open discussion focused on this problem and the possibilities of its solution.

This research has certain limitations, such as: (1) there are social, cultural, and economic differences among the individual member states of the European Union; (2) not all the current members of the European Union were included in the research; (3) the observed time series could be longer in terms of time; (4) the research data does not include unrecorded consumption where there is no government control or monitoring.

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Declaration of interest: The authors declare that they do not have any competing financial, professional, or personal interests from other parties.

REFERENCES

- Anderson, P., Baumberg, B. (2006). *Alcohol in Europe: A public health perspective. A report for the European Commission*. London: Institute of Alcohol Studies.
- Anderson, P., Chisholm, D., Fuhr, D. (2009). Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol. *Lancet*, 373(01), 2234-2246.
- Baliunas, D., Rehm, J., Irving, H., Shuper, P. (2010). Alcohol Consumption and Risk of Incident Human Immunodeficiency Virus Infection: A Meta-analysis. *International Journal of Public Health*, 55(01), 159-166.
- Bilgic, A., Yen, S. T. (2015). Household Alcohol and Tobacco Expenditures in Turkey: A Sample-Selection System Approach. *Contemporary Economic Policy, Western Economic Association International*, 33(03), 571-585.
- Cheah, Y. K. (2015). Socioeconomic determinants of alcohol consumption among non-Malays in Malaysia. *Hitotsubashi Journal of Economics*, 56(01), 55-72.
- Cnossen, S. (2007). Alcohol taxation and regulation in the European Union. *International Tax and Public Finance*, 14(01), 699-732; <https://doi.org/10.1007/s10797-007-9035-y>.
- European Commission. (2020). *VAT rates. Tables on VAT rates in individual EU Member States*. https://ec.europa.eu/taxation_customs/business/vat/eu-vat-rules-topic/vat-rates_en
- European Commission. (2019a) *Business>Taxation>Excise duties*; https://europa.eu/youreurope/business/taxation/excise-duties-eu/product-excise-duties/index_en.htm#alcohol.
- European Commission. (2019b). Taxation and Customs Union>Business>Excise duties on alcohol, tobacco and energy>Excise Duty on Alcohol https://ec.europa.eu/taxation_customs/business/excise-duties-alcohol-tobacco-energy/excise-duties-alcohol_en.
- European Commission. (2019c) *Excise Duty Tables. Part I Alcoholic Beverages*; https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/alcoholic_beverages/rates/excise_duties-part_i_alcohol_en.pdf.
- European Commission. (2019d). Taxation and Customs Union>Business>VAT. https://ec.europa.eu/taxation_customs/business/vat/what-is-vat_en
- European Commission. (2019e). Taxation and Customs Union>Business>EU VAT rules by topic>VAT rates. https://ec.europa.eu/taxation_customs/business/vat/eu-vat-rules-topic/vat-rates_en
- Eurostat. (2019a). *Products Eurostat News > Household spending on alcohol close to €130 billion*; <https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/DDN-20190101-1>.
- Eurostat. (2019b). *Products Datasets > Frequency of alcohol consumption by sex, age and educational attainment level*; https://ec.europa.eu/eurostat/web/products-datasets/-/hlth_ehis_all1e.
- Eurostat (2019c). *HICP methodology*; https://ec.europa.eu/eurostat/statistics-explained/index.php?title=HICP_methodology#Household_final_monetary_consumption_expenditure_28HFMCE.29.
- Fillmore, M. T. (2007). Acute alcohol-induced impairment of cognitive functions: Past and present findings. *International Journal on Disability and Human Development*, 06(02), 115-126; <https://doi.org/10.1515/IJDHD.2007.6.2.115>.
- Forouzanfar, M. H., et al. (2016), "Global, Regional, and National Comparative Risk Assessment of 79 Behavioural, Environmental and Occupational, and Metabolic Risks or Clusters of Risks, 1990–2015: A Systematic Analysis for the Global Burden of Disease Study 2015", *The Lancet*, Vol. 388, pp. 1659-1724.
- Gavurová, B., Tóth, P., Barták, M., Petruželka, B. (2018). Preventable Mortality Caused by the Use of Alcohol in Slovakia – a Regional and Socio-economic Perspective. *Adiktologie*, 18(02), 73-80; https://www.addictology.cz/wp-content/uploads/2019/02/02_gavurova.pdf.
- GBD 2016 Alcohol Collaborators. (2018). *Alcohol use and burden for 195 countries and territories, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016*, 392(10152), 1015-1035; [http://dx.doi.org/10.1016/S0140-6736\(18\)31310-2](http://dx.doi.org/10.1016/S0140-6736(18)31310-2).
- Hoke, O., Cotti, C. (2015). The Impact of Large Container Beer Purchases on Alcohol-Related Fatal Vehicle Accidents. *Contemporary Economic Policy, Western Economic Association International*, 33(03), 477-487.
- Kolářová, E., Homola, D., Kolářová, V., Kramná, E. (2019). Analysis of Substance Use and its Relation to the Tax Policy of the Czech Republic. *Adiktologie*, 19(01), 27-34; <https://doi.org/10.35198/01-2019-001-0003>.
- Meneses-La-Riva, M. E., Suyó-Vega, J. A., Flores-Rodríguez, N. C., Fernández-Bedoya, V. H. (2020). Alcohol and Soccer: Better Not to Mix Them! A Study Revealing That Alcohol Reduces Physical Activity in Athletes. *International Journal of Scientific & Technology Research*, 09(01), 438-442.
- Mohapatra, S., Patra, J., Popova, S., Duhig, A., Rehm, J. (2010). Social Cost of Heavy Drinking and Alcohol Dependence in High-income Countries. *International Journal of Public Health* 55(01), 149-157.
- OECD (2019). *Alcohol consumption (indicator). Total, Litres/capita (aged 15 and over)*; <https://data.oecd.org/chart/64Y8>; doi: <https://doi.org/10.1787/e6895909-en>.
- OECD (2018). *Consumption Tax Trends 2018: VAT/GST and Excise Rates, Trends and Policy Issues*, OECD Publishing, Paris, <https://doi.org/10.1787/ctt-2018-en>.
- OECD/EU (2018). *Health at a Glance: Europe 2018: State of Health in the EU Cycle*, OECD Publishing, Paris. https://doi.org/10.1787/health_glance_eur-2018-en
- OECD (2017). "Alcohol consumption among adults", in *Health at a Glance 2017: OECD Indicators*, OECD Publishing, Paris. DOI: https://doi.org/10.1787/health_glance-2017-17-en
- OECD/EU (2016). *Health at a Glance: Europe 2016 – State of Health in the EU Cycle*, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264265592-en>
- OECD (2015). *Tackling Harmful Alcohol Use: Economics and Public Health Policy*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264181069-en>
- OECD (2014). *Health at a Glance: Europe 2014*, OECD Publishing. http://dx.doi.org/10.1787/health_glance_eur-2014-en
- OECD (2012). *Health at a Glance: Europe 2012*, OECD Publishing. <http://dx.doi.org/10.1787/9789264183896-en>
- OECD (2010). *Health at a Glance: Europe 2010*, OECD Publishing. http://dx.doi.org/10.1787/health_glance-2010-en
- Parry, C. D., Patra, J., Rehm, J. (2011). Alcohol Consumption and Non-communicable Diseases: Epidemiology and Policy Implications. *Addiction*, 106(01), 1718-1724.
- World Bank (2019). *Global Map: Total alcohol consumption per capita in 2016 (liters of pure alcohol, projected estimates, 15+ years of age)*. Global Health Observatory Data Repository of WHO. <https://data.worldbank.org/indicator/SH.ALC.PCAP.LI?end=2016&start=2010&view=map>.
- World Health Organization (2020). *Alcohol – Key facts*; <https://www.who.int/news-room/fact-sheets/detail/alcohol>.
- World Health Organization. Regional Office for Europe. (2018). *Alcohol consumption, harm and policy response fact sheets for 30 European countries. Copenhagen: WHO Regional Office for Europe; 2018*; https://www.euro.who.int/__data/assets/pdf_file/0019/411418/Alcohol-consumption-harm-policy-responses-30-European-countries-2019.pdf
- World Health Organization. Regional Office for Europe. (2012). *European action plan to reduce the harmful use of alcohol 2012-2020. Copenhagen: WHO Regional Office for Europe*; <https://apps.who.int/iris/handle/10665/107307>.