

**Viktor Trasberg**

University of Tartu  
Faculty of Social Sciences  
School of Economics and Business Administration  
Estonia  
E-mail: viktor.trasberg@ut.ee

**Karmen Trasberg**

University of Tartu  
Faculty of Social Sciences  
Institute of Education  
Estonia  
E-mail: karmen.trasberg@ut.ee

## ECONOMIC AND SOCIAL IMPACT OF ALCOHOL TAXATION IN THE BALTIC COUNTRIES

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***Abstract***

*This paper is focusing on alcohol taxation in the Baltic countries. The purpose of the study is to demonstrate alcohol taxes regressive characteristics across various income groups. Alcohol taxation is rather sensitive issue in the Baltic countries – alcohol consumption level is relatively high and public sector revenue depends significantly from alcohol related taxes. Therefore, a system of alcohol taxation in the Baltic countries should consider multiple aspects, such as taxation's social impact, public sector revenue and other theoretical foundations for allocating alcohol taxes over different income groups. Paper's statistical analyses is conducted on the basis of a consumer survey, carried out in all three Baltic countries during 2015-2016. As the study results demonstrate, alcohol taxation is regressive in the Baltic countries and the future tax policy should consider the above-mentioned taxation principles.*

**Keywords:** *alcohol taxation, tax burden, tax progressivity*

## 1. INTRODUCTION

Alcohol related issues are emotional matters in most of societies. There are many different layers related with alcohol consumption – cultural, healthcare, anti-social behavior, and many other.

This paper analyses alcohol related taxation in the Baltic countries. Namely, the study focuses on alcohol excises and VAT burden allocation over different income groups in the Baltic societies. Expectedly, the alcohol taxes are regressive - lower income earners spend relatively more on their income on alcohol and accordingly, pay relatively more alcohol taxes. Differently, alcohol taxes cover slighter share in the higher income earners' budgets.

Why is regressive nature of alcohol taxation an important issue for societies? It is important because the tax allocation has an impact on consumption structure, consumer's behavior, social fairness, public budget revenue and society's wellbeing.

Generally, there are several type of taxes levied on alcohol production and consumption. In large, a system of alcohol taxation combines *per unit* and *ad valorem* taxation principles. In the first case, a tax is imposed on a specific amount for each unit of product (*e.g.* per hectoliter). In the second case, the tax is levied based on the value (price) of the product.

In this paper, we study alcohol excise duties and value added tax (VAT) burden in the Baltic societies. Alcohol excise duties are used in all European Union countries; even more, alcohol excise duties are harmonized by rate and calculation methods over the EU. Same applies to the VAT – the EU has established minimum levels and other aspects related with that tax.

Alcohol taxation is a sensitive and important issue in the Baltic countries. To design efficient alcohol taxation system should be considered different taxation effects on consumption, social behavior and fiscal situation. This paper evaluates alcohol related taxes regressivity to understand what is tax policy impact on economy and society.

The paper is structured in a following manner. In the first part will be given a short theoretical overview of the excise taxation. Then will be given an overview of alcohol consumption and markets in the Baltic countries. In the second part of the paper will be carried out statistical analyses to estimate alcohol taxes regressivity.

The statistical data and correlation analyses relies on ICAP(IARD) survey results, which was carried on in the Baltic countries during 2015-2016. The US based institution ICAP (International Centre for Alcohol Policy, now renamed IARD (International Association for Responsible Drinking), conducted a survey of alcohol consumption pattern in the Baltic countries. There was altogether 3777 respondents, distributed over all three Baltic countries. The survey sample represents the Baltic societies social and demographic structure (by age groups, nationality, income, other).

## 2. ALCOHOL MARKETS AND TAXATION IN THE BALTIC COUNTRIES

### 2.1. Alcohol Excise Duties: Some Theoretical Aspects

There are several important issues, why alcohol consumption is heavily taxed in most of countries. By alcohol taxes here are considered excise duties as specific form of alcohol taxation and value added tax (VAT).

Three important components related with alcohol taxes could be emphasized. First, alcohol excise duty is a kind of compensation, which partly covers the cost caused by excessive alcohol consumption. Alcohol excise duty is a kind of Pigouvian tax, levied on the activity, which generates negative externalities and is harmful for the society. For example, negative externalities related with alcohol consumption are various accidents, health problems, anti-social behavior and decrease of economic productivity.

Second, alcohol excise duty is considered an instrument, which shapes consumer behavior and attitudes. High excise duty and, accordingly, higher alcohol price, limits consumers' accessibility to alcohol and harmful over-consumption. Therefore, alcohol excise duties are an instrument to correct and direct social behavior. Too heavy alcohol taxation may force consumers to look for cheaper alternatives, mainly alcohol consisting surrogates. Such a behavior may cause even more damage to persons' health and society's wellbeing.

Third, alcohol excise duties are efficient fiscal instrument to collect public tax revenues. They are simple to administer, products are easy to identify, there are few producers and the product is relatively price inelastic (Cnossen, p. 279). Also, in tax theory well-known Ramsey rule applies rather directly here.

However, there are also important complicated issues associated with alcohol taxation. One of them is alcohol taxes' regressivity. Lower income persons pay relatively bigger share out of their income in case of purchasing alcohol than comparatively wealthier consumers do. Regressively distributed alcohol taxation burden "may bear disproportionately heavily on poorer households" (Crawford, 2010, p. 327). Low-income earners' spending shift towards alcohol products, on the expense of other socially beneficial goods, may cause harm on that social group. A low-income consumer allocates its limited consumer budget over a bundle of goods, which might be not socially optimal. Individual consumers' choices may be in conflict with societal preferences.

Alcohol duties regressivity aspects have been studied by different researchers (e.g. Lowry, 2014, Lyon and Schwab, 1995, Levell, O'Connell and Smith, 2016). Those authors point out, that by their analyses alcohol taxes are generally regressive. Usually authors consider income deciles and share of alcohol consumption over income earners' groups. In accordance with alcohol consumption pattern and levels are calculated alcohol tax obligations over income groups.

However, "studies for the US have found that alcohol taxes appear substantially less regressive when a longer time frame is used for analysis than

when analysed on the basis of current income (Crawford, 2010, p. 328, Potreba 1989, p.12). Similarly, alcohol excise duties are more regressive in comparison with income, but less regressive in comparison with actual spending (Levell, O'Connell and Smith, 2016). Therefore, it is rather important to describe the conditions, under which regressivity of alcohol taxes is estimated. In the current study, alcohol tax burden distribution across the income groups covers the same period in all three Baltic countries.

## 2.2. Overview of Baltic States alcohol market and consumption pattern

Alcohol consumption and taxation has some particularities in the Baltic countries. First, alcohol consumption is relatively intensive and massive in the Baltic countries. By the WHO data, the Baltic nations are drinking heavily; both in the European and global context (see Table 1). Such a situation, with all its negative consequences, is definitely a troubling issue for the societies. Therefore, the alcohol taxation system should be designed in a way, which limits harmful over-consumption and supports compensation of social cost, caused by the excessive alcohol consumption.

Second, the healthcare situation, traffic accidents and anti-social behavior are strongly related with alcohol consumption in the Baltic countries.

Table 1

Alcohol market and consumption, 2016

	Estonia	Latvia	Lithuania	Finland	Sweden
Recorded alcohol consumption, liters <i>per capita</i> (age+15)	10.3	10.8	14.0	8.5	7.2
Share of alcohol excise duties revenue in general government total revenue, %	2.5	2.0	1.8	1.2	0.7
Total government alcohol revenue per capita, EUR	158	78	90	249	152
Total number of registered retail shops selling alcohol, per 100000 habitants	218	442	n/a	105	76
Opening hours of alcohol shops, per week	84	98	98	64	55
Alcohol beverages imported by travelers	About 10% (Latvia, Russia)	Not available	Not available	1,8 litres*	1,2 litres**

Notes:

\* in pure alcohol content (mainly from Estonia and Russia)

\*\* in pure alcohol content (Baltic countries, Denmark, Germany)

Source: *Alcohol Market, consumption and harms in Estonia Yearbook (2016)*.

Third, alcohol production and alcohol-related economic activities cover relatively large part of the countries' economy. Alcohol price differences generate an intensive "vodka tourism" from affluent Nordic countries' to the Baltic States. For example, in Estonia about a half of the total strong alcohol (spirits) sales has made by foreign tourists (Alcohol market, 2016, p. 37). Therefore, alcohol taxation has a direct impact on the Baltic economy and state budget.

Fourth, Baltic countries public budgets' are depending considerably on alcohol taxes revenue. Alcohol excise revenues in the state budgets' are the highest in the European Union (Table 1). In Estonia, the general government collects about 3 % of all budget revenues from alcohol excise duties. On average, the same ratio in the EU countries is considerably lower.

Fifth, there are significantly more alcohol-selling shops in the Baltic states, if compared with the Nordic countries. The shops are opened during the long hours and easily accessible every single day of a week. High dependency of the state budget from alcohol taxes actually limits the governments "degree of freedom" on alcohol policy.

### 2.3. Alcohol tax rates and consumption pattern

Alcohol excise duties and VAT rates in the Baltic States are significantly lower than in the neighboring Nordic countries. The excise duties in the Nordic countries are 4-5 times higher than in the Baltic countries (Table 2). Also, VAT rates are higher in the Nordic countries.

Table 2

#### Alcohol excise duties, EUR

	Beer, <i>per hl/degree of alcohol</i>	Wine, <i>per hectoliter</i>	Ethyl alcohol, <i>per hectoliter of pure alcohol</i>	Standardized VAT rate, %
Estonia	8.3	111	2172	20
Latvia	4.2	74	1400	21
Lithuania	3.4	78	1353	21
Finland	32.0	339	4555	24
Sweden	20.7	269	5456	25
EU minimal level	1.87	0	550	15

Source: European Commission. (2016). *Excise Duty Tables*

However, there is considerably high amplitude among Baltic states excise taxes as well – e.g. Estonian excise rates are substantially higher than in neighboring Latvia and Lithuania. Lower excise duties are accordingly correlating with lower retail prices. Such a situation generates foundations for intensive "vodka tourism" from Nordic countries to the Baltic. Particularly large-scale alcohol shopping flow takes place from Finland to Estonia.

Table 3 depicts general drinking pattern in the Baltic countries, based on consumption intensity. The drinking intensity is measured by frequency of drinking days. In the Table 3, the drinkers have distributed into 3 categories as explained in the notes' section.

Table 3

Distribution of consumers by drinking intensity, during last 12 months, %

	Estonia	Latvia	Lithuania
Intense	10.9	10.2	11.9
Moderate	42.8	43.9	43.0
Rare	46.3	45.8	45.2
Share of alcohol consumers in adult population	84.5	83.1	89.1

Notes: intense - every day; moderate - at least once a week; rare - once a month or less

*Source: author's calculations*

As Table 3 depicts, over 83% of all Baltic adult population has consumed alcohol during the year. However, alcohol consumption intensity is uneven over the population. About 10% of all drinkers consume alcohol every day. Consumers, defined as moderate drinkers (consumption intensity several times a week), are covering 43% of Baltic population. Once a month or less consume alcohol about 45% of consumers. Otherwise, about 60% of population drinks alcohol rather infrequently.

Following two tables characterize alcohol consumption structure by types of alcohol.

Table 4

Most consumed alcohol during last 12 month, percentage of consumers

	Estonia	Latvia	Lithuania
Genuine, branded beer	37.7	41.0	40,2
Genuine, branded wine	37.1	30.9	26.7
Genuine, branded spirits	23.6	26,7	32.4
Don't know	1.6	1.4	0.7
Total*	100.0	100.0	100.0

Note: \*alcohol consumers only; non-consumers are excluded

*Source: authors calculations*

As Table 4 depicts, the most consumed alcohol drink in the Baltic countries is beer, which is mostly consumed by 40% of all drinkers. Estonians and Latvians drink after that more wine than strong alcohol; Lithuanians drink

more strong alcohol than wine.

Table 5 explains alcohol consumption structure from another angle. The respondents were asked to assess their usual daily drinking by type of alcohol, container size and amount of containers. The table depicts amount of so-called first drink (another type of drink follows only in 12% of cases); what the respondent consumes in a typical day of alcohol consumption. On that basis is assessed annual alcohol consumption level in all three Baltic countries.

Table 5  
Structure of alcohol consumption by type of alcohol, percent of total drinkers

	Estonia	Latvia	Lithuania
Beer	42.4	39.5	35.0
Wine	37.1	31.5	31.5
Spirit	18.2	27.1	30.9
Cocktails	2.2	1.5	2.6
Surrogate alcohol	0.2	0.5	0.1
Total	100.0	100.0	100.0

Source: author's calculations

The structure of drinks is more detailed in the Table 5 (e.g. includes also surrogate liquids). Similarly, the first type of drink consumed is beer; the second is wine and strong alcohol follow. In Lithuania, all main types of drinks (defined as first drink) distributed about evenly; in Estonia and Latvia drinking starts in most cases with beer (40–42 % of cases) and only in 18% with strong alcohol (Estonia). In Lithuania, about 31% of consumer' cases the first drink is strong alcohol, e.g. vodka. A small part of alcohol consumption in the Baltic countries is presented by various other liquids (so called surrogates), which consists certain amount of drinkable ethyl.

## 2.4. Income and alcohol consumption

How are the drinking behavior and person's income related in the Baltic countries? Table 6 relates society's income level with consumption pattern. Consumer groups' structure is described in the Table 6 note's section.

As Table 6 depicts, across all income levels, heavily drinking respondents' are in minor position – cover about 10% of all consumers only. However, the various income groups demonstrate different consumption intensity patterns. Respondents, who belong to the lowest income group in all countries, drink mostly rarely. In accordance with income growth, intensity of drinking increases in middle-income group of consumers. In the highest income group, intensity of drinking is significantly higher than in low income group; in Lithuania even up to 19% of richest people drinks every day.

Table 6

## Intensity of drinking and income level, %

Income level, EUR**	Drinking intensity*	Estonia	Latvia	Lithuania
Low (up to 800 EUR)	Intense	10.0	11.5	9.2
	Moderate	37.9	40.9	41.0
	Rare	52.2	47.6	49.8
	Total	100.0	100.0	100.0
Middle (800-1200 EUR)	Intense	9.8	6.2	14.5
	Moderate	44.9	50.2	42.9
	Rare	45.3	43.6	42.6
	Total	100.0	100.0	100.0
High (up from 1200 EUR)	Intense	14.7	8.6	18.9
	Moderate	49.1	51.6	52.2
	Rare	36.2	39.8	28.9
	Total	100.0	100.0	100.0

Notes:

\*Drinking intensity: intense - every day; moderate - at least once a week; rare - once a month or less

\*\*Disposable income level (after income taxes and social transfers): low income – up to 800 EUR per month; middle income – 801-1200 EUR per month; high – 1201 and up EUR per month

Sources: authors' calculations'

How much different income groups' consumers spend on alcohol?  
Table 7 provides overview of income groups' spending levels in euros.

Table 7

## Alcohol purchase by income groups, percent of total

Income level, EUR*	Monthly spending on alcohol, EUR	Estonia	Latvia	Lithuania
Low	0-20 EUR	72.2	74.5	67.0
	21-50 EUR	17.7	18.2	26.1
	51-1000 EUR	10.0	7.2	6.9
	Total	100.0	100.0	100.0
Middle	0-20 EUR	60.1	73.1	56.4
	21-50 EUR	24.1	18.9	28.8
	51-1000 EUR	15.8	8.0	14.8
	Total	100.0	100.0	100.0
High	0-20 EUR	47.8	66.7	41.7
	21-50 EUR	31.6	26.7	38.4
	51-1000 EUR	20.6	6.7	19.9
	Total	100.0	100.0	100.0

Note:

\*Disposable income level (after income taxes and social transfers): low income – up to 800 EUR per month; middle income – 801-1200 EUR per month; high – 1201 and up EUR per month

Source: authors' calculations



As Table 7 presents, highest share of persons from all income groups spend on alcohol less than 20 EUR *per* month. 67-75% persons in lower income group spend less than 20 euros. Expectedly, with higher income correlates average higher spending on alcohol. One fifth of Estonian and Lithuanian consumers, belonging to the highest income group, spend 51-1000 euros on alcohol *per* month.

Do the different income groups consume different alcoholic drinks? Table 8 gives information about consumption structure by income groups.

Table 8

## Income and alcohol consumption structure, %

Income*	Alcohol type	Estonia	Latvia	Lithuania
Low	Beer	37.8	40.7	32.1
	Wine	37.1	30.1	33.3
	Spirits	21.6	27.1	32.1
Middle	Beer	44.3	39.3	36.6
	Wine	37.4	30.4	28.6
	Spirits	17.8	28.6	32.4
High	Beer	47.6	29.0	40.9
	Wine	37.4	47.3	30.2
	Spirits	13.0	23.7	26.4

Notes: Disposable income level (after income taxes and social transfers): low income – up to 800 EUR *per* month; middle income – 801-1200 EUR *per* month; high – 1201 and up EUR *per* month

Source: author's calculations

As Table 8 depicts, alcohol consumption structure over different income groups is rather similar. In all income groups in Estonia and Lithuania, the most consumed drink is beer, followed by wine and spirits. Beer drinkers share increases and ethyl alcohol (spirits) decreases accordingly to the rise of income. In Latvia, high-income earners drink more wine than beer.

### 3. CORRELATION BETWEEN TAX BURDEN AND INCOME

Are alcohol taxes actually regressive in the Baltic countries? Do low-income people pay relatively more on alcohol compared with richer persons?

There are two types of taxes, which are related with alcohol consumption. The excise duty is *per unit* tax, which levied on volume and strength of particular alcohol. The actual price for the specific alcohol item (*e.g.* price of expensive wine or cognac) does not play any role of defining excise

duty on a unit of alcohol. Differently, actual retail price is a basis for defining level of value added tax, which is *ad valorem* tax. In below, both of those taxes burden allocation over consumer groups' is assessed.

We summarize respondents' total alcohol consumption by quantity and type of alcohol, based on survey data in all Baltic countries. Considering this, we calculated a sum alcohol excise duties, which has imputed to that amount of alcohol in case of retail sale. Excise duties depend on a standardized volume and alcohol content and are irrelevant to actual sale price. In subsequent, the sum of imputed excised duties will be compared with person's annual income level. Such a method is different from techniques used previously by different researchers (see Section 1.1). Earlier studies have compared spending on alcohol over different income groups or proportion of alcohol expenditures in income. In the current study, a different approach is used. There is assessed (calculated) excise tax amount directly, based on volume of consumed alcohol and associated excise burden to that specific alcohol quantity. By our understanding that is more precise method to evaluate tax burden level over different income groups.

Calculation of VAT, related with alcohol consumption has done differently from excise duties calculation. VAT is an *ad valorem* tax and therefore, not the quantity, but consumer price (value) is the integer that defines the amount of tax. To assess the VAT expenditure, consumer spending on alcohol (in euros) was taken as base for tax calculations. The expenditure includes VAT component, which allows distinguishing the amount of value added tax, attributed to that particular spending item. Based on calculated excise duties and VAT, we assessed alcohol tax burden on consumer's annual income.

Table 9 presents alcohol taxes share compared to consumers' income groups.

Table 9

Alcohol tax share in consumers' income (excise duties and VAT), %

	Estonia	Latvia	Lithuania
Low	1.96	1.60	1.03
Middle	1.07	0.57	0.85
High	0.72	0.48	0.70
Total	1.40	1.26	0.93

Notes: Disposable income level (after income taxes and social transfers): low income – up to 800 EUR *per* month; middle income – 801-1200 EUR *per* month; high – 1201 and up EUR *per* month

*Source: authors' calculations*

As Table 9 presents, in Estonia low-income earners spend about 2% of their net income on alcohol related taxes (sum of excise duties and VAT). High-income earners spend on alcohol taxes about 0.7% on their income. Therefore, alcohol taxes are regressive and lower income person bears relatively higher tax burden in comparison with higher income earner. Such a result fully corresponds

with earlier studies mentioned in Subsection 1.1. In absolute terms, the alcohol taxes are not high burden for low-income earners – average monthly spending on alcohol taxes is not more than 15 euros – however, in relative terms their spending is significantly higher than in higher income groups.

In Latvia and Lithuania, the alcohol excise duties are lower and VAT rates are slightly higher than in Estonia. However, also in those countries alcohol taxes regressive burden over income groups is clearly visible.

In the following, we have drawn correlations between respondents' income and imputed alcohol related taxes (Table 10-11). The correlation applies only to those respondents who have actually consumed alcohol during the year (83-89% of all respondents in the Baltic states).

Table 10

Correlation between annual income and alcohol taxes (correlation coefficients in respect to annual income)

	Estonia	Latvia	Lithuania
Share of total alcohol taxes in annual income, % (VAT + Excise duties)	-0.213**	-0.232**	-0.100**
Share of excise duties in annual income, %	-0.181**	-0.197**	-0.030
Share of VAT in annual income, %	-0.265**	-0.305**	-0.253**

Notes: \*\* correlation coefficient is significant at the 0.01 level (2 tailed)

*Source: author's calculations*

The Table 10 demonstrates that there is statistically significant (negative) correlation between tax burden and consumers' income in all three Baltic countries. That means – lower the income of the person is, than relatively more that person pays alcohol related taxes to compare with its annual income. Once again, such a result confirms earlier studies about excise duties regressive nature.

We calculated correlation between income and different taxes also separately (excise duties and VAT is compared with income level). As Table 10 demonstrates, VAT is more strongly (negatively) correlated with income than excise duties. In Lithuania, the excise duties burden is not statistically related with consumers' income level. If VAT burden is negatively correlated with income, then alcohol taxes regressive nature comes mainly from VAT and not so much from specific alcohol excise duties.

Share of VAT in the unit of sold alcohol is always bigger than excise duty share in retail price. As was demonstrated above – person's alcohol tax burden is a combination of drinking intensity (drinking days), consumed amount (milliliters) and spending (euros). As correlation coefficient demonstrates, increase in income does not increase alcohol expenditure on the same pace.

Other words, lower income people spend relatively more on alcohol drinks in comparison with their income.

Table 11 provides correlation coefficients between income and share of alcohol excise duties on income, calculated by different types of alcohol drinks.

Table 11

Correlation between annual income and excise duties (correlation coefficients in respect to annual income)

	Estonia	Latvia	Lithuania
Beer excise duty in income,%	-0.285**	-0.328**	-0.164**
Wine excise duty in income, %	-0.193**	-0.153**	-0.034
Spirit excise duty in income, %	-0.149*	-0.243**	-0.001

Notes:

\* Correlation is significant at the 0.05 level (2 tailed)

\*\*Correlation is significant at the 0.01 level (2 tailed)

*Source: author's calculations*

Table 11 demonstrates that beer related excise duties burden correlates negatively with income level in the all three Baltic countries. Beer is the most consumed drink over the countries; however, there is unclear relationship between increase of income and quantity of beer consumed.

In Estonia and Latvia, also other alcoholic drinks' excise duties are negatively correlated with income level. In Lithuania, wine and spirit excise duties' correlations with income are not statistically significant. As Table 8 depicts, in Lithuania increase in income leads to the shift from beer towards more wine and spirits drinking. Differently in Estonia and Latvia, increase of income does not change the structure of alcohol consumption.

### 3. CONCLUSIONS

Theoretical and empirical studies are supporting understanding that alcohol taxes (excise duties) are regressive by their nature. In purchasing alcohol, lower income groups bear relatively higher alcohol tax burden to compare with their income than richer income groups. Such a situation may generate distortions on consumption and spending structure and ultimately reduce social welfare. However, the alcohol taxes are more regressive if we compare income rather than actual spending. In addition, alcohol taxes are less regressive when a lengthier time span is considered rather if a single time point is followed.

The current paper brings out three moments to expose particularities of alcohol taxation in the Baltic countries.

First, the authors have calculated amount of alcohol related taxes, based on the quantity of alcohol consumed and actual spending on alcohol. The calculated tax amount was compared with consumers' income, to assess distribution of alcohol tax burden over income earners' groups. The current analyses confirms the general assumption – the tax burden of VAT and excise duties is regressive! Than lower the income of the person is, than relatively more the person pays alcohol related taxes to compare with his or her annual income. Uniquely, there is also done a correlation analyses between alcohol taxation and income. The results demonstrate statistically significant (negative) correlation between tax burden and consumers' income in the Baltic countries (except Lithuania, there certain correlation coefficients are statistically not significant).

Second, another interesting conclusion is that the value added tax is more strongly (negatively) correlated with its share in income than excise duties. The VAT covers larger share in alcohol retail price than excise duties. There are not existing comparable studies over VAT in alcohol products and its distribution over income groups. Therefore, our study provides an additional aspect to understand consequences of alcohol taxation and its impact on various income groups.

Third, Baltic nations alcohol consumption is relatively high in international context. In addition, their public budgets' rely rather significantly on alcohol taxes. In case of regressive nature of alcohol taxes, optimal alcohol policy and tax system should consider impact of alcohol tax burden on various income groups in the society. Study of the Baltic countries alcohol consumption pattern and related tax burden allocation confirms such a position.

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