



FINAL REPORT

EXCISE TAX POLICY IN THE BALTIC COUNTRIES:

alcoholic beverages, soft
drinks and tobacco products

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LIST OF ABBREVIATIONS

APC	Average per capita consumption of alcohol among adults (age 15+ years)
C&C	Counterfeit and contraband
CSD	Carbonated soft drinks
ES	European Union
FDA	U.S. Food and Drug Administration
GDP	Gross Domestic Product
IKP	iekšzemes kopprodukts
Kg	Kilogram
L	Litre
LDC	Legal domestic consumption, defined as Legal Domestic Sales (LDS) net of outflows
ml	Millilitre
ND(L)	Legal non-domestic cigarettes, defined as a product that is brought into the market legally by consumers, such as during a cross-border trip
OECD	The Organisation for Economic Co-operation and Development
PPP	Purchasing Power Parity
SRS	State Revenue Service of Latvia
Thsd	Thousand
VAT	Value Added Tax
WHO	World Health Organization
WAP	Weighted average retail price

EXECUTIVE SUMMARY

The aim of this report is to analyse excise tax policies in the Baltic countries from the point of view of revenues to the state, consumer welfare (including public health) and other policy goals, e.g., creating incentives for product reformulation, and to develop recommendations on excise tax policy. The study covers the following excise goods: alcoholic beverages, tobacco products and soft drinks with added sugar, other sweeteners or flavouring.

- For the Baltic countries, excise taxes represent a more important source of tax revenues compared to richer EU member states and EU countries on average.
- In the Baltics, the shares of revenues from excise tax on alcoholic beverages and tobacco products are almost equal (about 20% of total excise tax revenues for each type of products). The largest contribution to total revenues from excise duties comes from taxation of energy products.
- Compared to the EU average, the share of revenues from excise tax on alcohol in the Baltics is about twice as high.
- Latvia is the only Baltic country taxing consumption of non-alcoholic beverages with added sugar, other sweeteners or flavouring. There are 7 other EU countries and Spain's region Catalonia that tax sugar-sweetened non-alcoholic beverages.
- Comparison of excise duties in the Baltic countries (as of March 2020) suggests that Estonia has the highest excise duty on beer and cigarettes. Lithuania taxes wine (with alcohol content exceeding 8.5%) and vodka more than the two other Baltic countries, while Latvia applies the lowest excise duty on these alcoholic beverages.
- PPP-adjusted prices of alcohol in Latvia and Estonia in 2018 were above the EU average (8.5% higher in Latvia and 26.3% higher in Estonia), while prices in Lithuania were on average 6% lower than in EU-28. PPP-adjusted prices of tobacco products in the Baltic countries are below the EU-28 average (by 35.2% in Latvia, by 37.4% in Lithuania and by 32.3% in Estonia).
- Purchasing power can be also compared among the Baltic countries when evaluating average working time that required to buy an excise good. Despite the average retail price for beer in Estonia is the highest, it takes on average approximately the same amount of time for an Estonian to earn money necessary to buy a 0.5-litre bottle of beer as for a Latvian or a Lithuanian. In Estonia, a person on average needs to work less to buy 1-litre bottle of vodka, a 2-litre bottle of Coca-Cola and a 20-cigarette pack than in the other Baltic countries. A Latvian on average needs to work more to buy a 1-litre bottle of vodka and a 2-litre bottle of Coca-Cola than in the other Baltic countries, while it takes approximately the same amount of time for a Latvian and Lithuanian to earn money to buy a 20-cigarette pack.

- In Northern Europe, the Baltic countries are known for cheaper excise goods than in the Nordic countries, thus tourists from the Nordic countries visit the Baltic countries to purchase alcoholic beverages and tobacco. The search for cheaper alcoholic beverages and cigarettes exists even within the Baltic countries. A substantial cross-border trade between Estonia and Latvia, driven by a price differential, has a sizeable effect on government budgets. In 2017, 13% of total revenues from excise duty on alcoholic beverages in Latvia were collected due to cross-border trade between Latvia and Estonia, according to estimates by the State Revenue Service. In 2019, the volume of alcoholic beverages sold by Latvian retailers located close to the Latvian-Estonian border decreased as both Estonia and Latvia decreased the excise duty on alcoholic beverages reducing the differential between the duty rates. In 2019 compared to 2018, the share of strong alcoholic beverages sold in the respective border region in total sales of strong alcoholic beverages in Latvia decreased from 16.5% to 13.6%, while the share of beer sold in the same region decreased from 15.1% to 12.9%.
- Cigarettes are also subject to cross-border trade. In the Baltics, legal non-domestic cigarettes accounted for 2 to 4 % of total domestic consumption (total domestic sales minus outflows to other countries), while outflows of cigarettes to other countries comprised 15% of total legal domestic sales in Estonia, 8% in Lithuania and 5% in Latvia. A high share of cigarette outflows to other countries in Estonia is driven by a substantial cross-border trade between Estonia and Finland.¹
- There is no evidence so far that people in the Baltics are going to neighbouring countries to purchase soft drinks. However, experience from Norway and Denmark shows that consumers are prepared to cross borders in order to buy sugary food and soft drinks where a significant price difference exists. Given high volumes of cross-border trade, the true effect on consumption of the taxed goods is hard to estimate. The experience of these two countries also highlights the importance of excise tax policy coordination across neighbouring countries as a tool for reducing cross-border trade and improving efficiency of excise tax.
- In 2016-2018, per capita amounts of pure alcohol (APC) consumed in Lithuania and Latvia were among the highest in the EU. By contrast, in Estonia the level of APC was relatively low. However, Estonia stood out with the largest amount of alcohol associated with tourist consumption, and, as the result, the highest level of recorded per capita total legal sales of alcohol in the EU. Almost half of all accommodated foreign tourists in Estonia are coming from Finland, and one of the most popular reasons for coming to Estonia are cheaper excise goods.

¹ Legal domestic consumption (LDC) is defined as legal domestic sales net of outflows from the country. Illicit products (C&C) - Counterfeit and Contraband, including Illicit Whites. Non-Domestic (Legal) (ND(L) – product that is brought into the market legally by consumers, such as during a cross-border trip. For more details see KPMG (2020).

- In 2010, per capita cigarette consumption was significantly higher in Estonia than in Latvia and Lithuania, but the gap narrowed over time so that as of 2018, cigarette consumption per capita is broadly similar in each of the Baltic countries.
- The shares of C&C (Counterfeit and Contraband) cigarettes in total cigarette consumption in the Baltic countries are among the largest in the EU. In 2019, Lithuania ranked second among the EU countries in terms of C&C share in total cigarette consumption (18%). In Latvia this share was 14% (down from 19% the year before), while in Estonia the share of C&C was 7% of total cigarette consumption. It is worth noticing that the 5 percentage points decline (2019 vs 2018) in C&C share in Latvia was the largest among the EU countries.
- According to data on consumption of non-alcoholic drinks in 2017 published by UNESDA (2020), per capita sales of non-alcoholic drinks² in the Baltic countries accounts to about half (49.0-55.6%) of the EU average level, while per capita sales of soft drinks accounts to 61.2-67.3% of the average level

across EU countries. In 2018, Latvia had the highest per capita sales of soft drinks among the Baltic countries (126.1 litres per capita), followed by Estonia (118.7 litres) and Lithuania (112.9 litres). Sales of water accounts for the largest share (approximately half) of total sales of soft drinks. The second largest category is carbonated soft drinks (hereafter – CSD), accounting for 24 to 31 % of total sales of soft drinks. Juices are the third largest category, being more important in Estonia (with 18% of total sales in 2018) than in other two Baltic countries (11-13 %). The total share of kvass, ice tea and energy drinks does not exceed 10% of total soft drinks sales in any of the Baltic countries.

- Experience of other countries suggests that a sugar tax is effective in reducing sugar and calorie intake when imposed on a wide range of products, as opposed to a tax on a few products, which induces consumers' switching to other foods with added sugar, salt and fats. Taking this into account we estimate the possible effect of an introduction of an excise tax on yoghurts, flavoured dairy drinks with added sugar or other sweeteners and ice-cream in Latvia, assuming that these products are taxed at the same rate as soft drinks, i.e., EUR 7.40 per 100 l of yoghurt and flavoured dairy products with added sugar or other sweeteners and EUR 7.40 per 100 kg of ice cream. Our estimations show that the application of such excise taxes on these products would generate additional excise tax revenue of about EUR 2.5 mln per year, including EUR 1.25 mln revenues from yoghurts and flavoured dairy drinks and EUR 1.27 mln from ice-cream. Starting from January 2022, when the excise duty on soft drinks will be differentiated according to sugar content, application of the excise tax on these products would generate excise tax revenue equal to EUR 4.8 mln (assuming that the sugar amount in these products exceeds 8 grams per 100 ml and therefore these products would be subject to the excise duty rate of EUR 14 per 100 litres of yoghurt and 100 kg of ice cream).

² UNESDA classifies non-alcoholic drinks into 4 categories: (1) soft drinks (include CSD, still juice drinks, iced tea drinks, iced coffee drinks, sport drinks, energy drinks, flavoured water and enhanced water); (2) packaged water; (3) dilutables; (4) juice & nectars.

- When estimating the overall effect of excise taxes on yoghurts, sweetened dairy drinks and ice-cream, it is important to account for possible negative impacts on profits, output and employment of domestic manufacturers in the short run. In Latvia, if manufacturers will not opt to reformulate their products by reducing sugar content in order to minimise the decline in sales volume, such broadening of the tax base would potentially affect at least 68 firms operating in manufacturing of dairy products with around 3000 employees and total annual turnover close to EUR 416 mln.
- The tax increases reduce the sales and can result in significant job losses for those who manufacture, distribute and sell these products. However, the net impact of excise tax policies on national employment depends on the magnitude of both job losses in the taxed sector and job gains elsewhere in the economy as some consumers reallocate their spending to other goods and services and governments spend the additional tax revenues raised from tax increases. Furthermore, excise taxes on alcohol, tobacco and sugar-rich soft drinks, by reducing consumption of taxed products, lead to a reduction of diseases related to smoking, excessive alcohol consumption and obesity and other noncommunicable diseases and therefore to a decline in health care expenditures attributable to treatment of the respective diseases. Resources

not spent on health care would be ultimately allocated to the consumption of other goods and services and create alternative jobs in other sectors of the economy. Important to note that decreased consumption of heavily taxed products could be at least partially offset by increased consumption of less taxed (relatively cheaper) or untaxed products, which are often produced by the same companies or start to be produced if companies opt to reformulate their products in order to minimise the decline in sales volume (Chaloupka F.J. et.al., 2019).

- A large number of studies consistently find that reductions in consumption of tobacco products due to higher taxes or other tobacco control policies have either no effect or a net positive effect on overall employment (NCI, WHO, 2016). A similar conclusion was reached in the recent studies from the United States regarding alcoholic beverages and sugar-sweetened beverages (Wada R. et.al., 2017; Powell L.M., 2014).

Results of econometric analyses

According to our estimations, demand for regular CSD, flavoured water, kvass and ice tea is price elastic in all Baltic countries³. In contrast, the demand of light CSD and energy drinks is price inelastic.

We estimate the short-term or direct impact of excise tax increase planned to be applied in Latvia to soft drinks with a sugar content above 8 grams per 100 millilitres starting from January 2022. The excise duty on soft drinks (except light CSD and flavoured water) is increased from EUR 7.4 to EUR 14.0 per 100 litres, which is a 89.2% increase in excise duty, while light CSD and flavoured water remains to be subject to tax rate of EUR 7.40 per 100 litres. For Estonia and Lithuania, where there is no excise duty on any soft drinks as of 2020, we simulate introduction of the same excise duty, i.e. EUR 7.40 per 100 litres of light CSD and flavoured water and EUR 14.0 per 100 litres of soft drinks with a sugar content above 8 grams per 100 millilitres.

According to our simulation results⁴, the introduction of excise tax on soft drinks is expected to generate tax revenues of EUR 6.5–7.6 mln in Estonia and EUR 12.6–16.0 mln in Lithuania annually. In Latvia, the increase in the revenue from excise duty is estimated in the amount of EUR 4.7–5.7 mln. The largest fall in sales of soft drinks subject to the excise duty (14.8 to 32.3 %) would take place in Lithuania since the price increase would be the highest. In Estonia sales of soft drinks would fall by 9.3 to 21.0 %. In Latvia, where the excise duty has been applied for more than two decades, the fall in sales of soft drinks would be less pronounced: just 5.5 to 11.3 %.

The econometric evidence suggests that long-term price elasticity of demand for cigarettes in the Baltic countries is low with estimated price elasticities ranging from -0.18 to -0.32. This is consistent with the studies conducted using data from low- and middle-income countries, with the majority of estimates ranging from -0.2 to -0.8, where the price elasticity estimates tend to be lower in countries with low-priced and thus relatively affordable cigarettes.

We estimate the short-term or direct impact of an increase in specific tax rate by 5%, 10%, 15%, 20% and 30% in the three Baltic countries. According to the results of our simulations, an increase in specific component of the excise duty in each Baltic country will result in a relatively small decrease in sales of around 1% if the specific tax rate is increased by 5%; and of around 2 to 4 % if the specific tax rate is increased by 20%. As a result of a 5% increase in the specific tax rate, excise tax revenues from cigarettes are expected to go up by 3% in Latvia (EUR 6 mln per year), 3 to 4 % in Lithuania (EUR 9–10 mln) and 3 to 4 % in Estonia (EUR 7–8 mln). A 20% increase in the specific tax rate is expected to generate additional EUR 26–29 mln in Latvia, EUR 37–40 mln in Lithuania and EUR 29–31 mln in Estonia. A 30% increase in the specific tax rate is expected to generate additional EUR 39–43 mln in Latvia, EUR 54–59 mln in Lithuania and EUR 42–46 mln in Estonia.

³ Estimated price elasticities range from -1.4 to -1.9 for regular CSD and kvass, from -1.1 to -1.4 for flavoured water and from -0.9 to -1.6 for ice tea.

⁴ Note that our results represent a short-term or direct fiscal effect, so that we do not account for any second-round effects that can arise from changes in local production, employment and therefore other tax revenues.

The above forecasts of fiscal effects of increasing excise duties on cigarettes should be treated with care as the underlying data refer to the period 2010–2019, when the volume of Counterfeit & Contraband (C&C) consumed in the Baltic countries as well as the share of C&C in total cigarette consumption was steadily and significantly decreasing⁵. Hence, these forecasts would be too optimistic in situation where a large proportion of consumers switch from legal cigarettes to C&C, as it was the case in the Baltic countries during the financial crisis of 2009. Taking into account the share of C&C in total cigarette consumption as of 2019 and increased efficiency of smuggling prevention measures over the time period 2010–2020, and at the same time positive consumer income trend in 2010–2020, we believe it is highly unlikely that consumption of C&C could return to 2010 levels. We believe that the maximal expected increase in the C&C share caused by a large increase in the excise tax rate in the near future equals 10 percentage points. Assuming the scenario when the specific tax rate will be increased by 20% and at the same time the share of C&C in total cigarette consumption will increase by 10 percentage points (to 24% in Latvia, 28% in Lithuania, and 17% in Estonia), the fiscal effect of the excise tax from cigarettes reform is still positive: up to EUR 3 mln in Lithuania, EUR 0.4 mln in Latvia and up to EUR 7 mln in Estonia. It would take a 15 percentage points increase in the share of C&C (which we consider unrealistic) to make the fiscal effects significantly negative in any of the three countries; in this case, excise tax revenues from cigarettes would fall by EUR 16–19 mln in Lithuania, EUR 14–17 mln in Latvia and EUR 6–8 mln in Estonia.

Findings from studies in the literature and our own analysis for Latvia suggest that demand for alcohol in general is inelastic, but spirits feature larger demand elasticity than beer or wine. This implies that raising excise duties on ethyl alcohol would result in a larger decrease of ethyl alcohol consumption, whereas raising taxes for beer or wine would have a smaller effect on consumer behaviour.

We estimate the short-term or direct impact of an increase in excise tax per one litre of each type of alcoholic beverages by 10%, 15%, and 20% in the three Baltic countries. Our results suggest that a 20% increase in the excise tax per one litre of each type of alcoholic beverages leads to increase in excise tax revenues as follows: (i) from wine by 18 to 20 % in Latvia (EUR 3–4 mln), 16 to 20 % in Estonia (EUR 4–5 mln) and 16 to 20 % in Lithuania (EUR 6–8 mln) (ii) from vodka⁶ by 10 to 17 % in Latvia, 11 to 17 % in Estonia, 6 to 16 % in Lithuania; (iii) from beer by 18 to 19 % in Latvia (EUR 9–10 mln), 18 to 19 % in Estonia (EUR 11–12 mln) and Lithuania (EUR 15–16 mln). The fall in sales would be the largest for vodka (2 to 10 % in Latvia, 2 to 8 % in Estonia, 3 to 11 % in Lithuania), while the fall in beer and wine sales are expected to not exceed 2% and 4%, respectively.

A 10% increase in the excise tax per one litre of each type of alcoholic beverages leads to increase in excise tax revenues which are roughly by half smaller than the above mentioned.

⁵ In 2019 compared to 2010, the C&C share in total cigarette consumption decreased by 23 percentage points in Latvia and Lithuania and by 14 percentage points in Estonia. In Lithuania, the share was stable in 2016–2019.

⁶ We are not able to estimate potential additional revenues from taxation of vodka, since disaggregated data on excise duty revenues by type of ethyl alcohol is not available.

Policy recommendations

General recommendations:

Excise tax rates could be coordinated and harmonised between the three Baltic countries in order to reduce incentives for cross-border shopping. Excise tax policy coordination can lead to potential Pareto improvement that is mutually beneficial for all participating parties. Due to similar market and geographical situation the Baltic countries could also coordinate their positions regarding excise tax policy proposals at the EU level, especially in the area of setting minimum rates.

Government could implement more determined smuggling prevention measures by commitment to allocate the fixed portion of additional excise tax revenues to financing smuggling prevention measures such as purchasing of new modern equipment, investing in modern IT solutions, increasing the number of service dogs involved in contraband detection.

When setting rates, a balance could be struck between economic aspects and human health. When the price increases are relatively small, consumers are gradually adjusting to price changes, therefore such excise tax policy does not generate incentives for consumers to switch to untaxed substitutes. At the same time, small tax rate increases are less effective in changing consumers' behaviour and reducing overall consumption, while more effective in raising tax revenue, large price increases will lead to a larger reduction in consumption and therefore better health outcomes.

Recommendations regarding excise duties on alcohol:

We find that demand for alcohol is inelastic, which ceteris paribus makes alcohol a suitable base for raising additional tax revenues. At the same time, the scope for increasing the tax burden on alcohol is limited by cross-border trade, smuggling and home brewing. Therefore, any increase in excise duties on alcohol could be coordinated between the three Baltic countries and accompanied by determined measures against smuggling and illegal home production.

In all three Baltic countries, spirits and beer constitute almost equal shares of total recorded alcohol consumption (measured in litres of pure alcohol), while wine and other alcoholic beverages constitute a much smaller share. Over the period 2010-2018, per capita consumption of spirits was growing much faster than that of beer in Latvia. In Lithuania per capita consumption of spirits has not changed, and consumption of beer has declined by about 18%. In Estonia, per capita consumption of beer has declined more than that of spirits. This suggests that from the perspective of public health, increases in excise tax duties on ethyl alcohol (spirits) could be the first priority of coordinated excise tax policy in the Baltics in the near term. This conclusion is further reinforced by the finding that the price elasticity of demand for

spirits is higher than for beer and wine, which means that raising excise taxes on ethyl alcohol will have a stronger impact on consumption of legally sold alcohol than raising excise tax on beer and wine.

While the market share of wine is still relatively small in the Baltic countries; per capita sales of wine have been increasing in Latvia over last 10 years, which may be indicative of changing consumer tastes. Among the Baltic countries, Latvia has the lowest excise duty on wine (with alcohol content exceeding 8.5%), and at the same time we found that demand for wine is price inelastic. Thus, in order to raise additional budget revenues, policymakers can consider substantially increasing excise duty on wine⁷, by setting it closer to the excise duty rates on wine in two other Baltic countries.

Policymakers might consider introducing greater differentiation of excise duty on alcohol with respect to the alcohol content (alcoholic beverages with higher alcohol content could be taxed more than beverages with less alcohol). This would incentivise producers to diversify the alcoholic beverages in terms of alcohol content and likely lead to lower alcohol consumption measured in litres of pure alcohol.

Recommendations regarding excise duties on tobacco products:

The low responsiveness of demand to price change in the Baltic countries makes the excise tax on cigarettes less effective in reducing cigarette consumption, but at the same time ceteris paribus it makes cigarettes a suitable base for raising additional tax revenues. Taking into account inelastic demand, and relatively low (PPP-adjusted) price levels of cigarettes in the Baltics, there is a scope for increasing excise duties on cigarettes. Policymakers could consider further increases in the specific rate since it is especially appropriate to protect public health, while ad valorem could be decreased. An increase in the specific tax rate would lead to smaller price differences across brands, reducing incentives to switch to cheaper products and would result in reduced tobacco use.

Policymakers could decide on the optimal size of the excise tax increase taking into account the current phase of economic cycle. The experience of the Baltic countries shows that during the economic downturn, the share of C&C in total cigarette consumption could significantly increase.

⁷ A substantial increase in excise duty on wine occurred in Lithuania in March 2017 when Lithuania more than doubled the excise duties on wine. As the result, in 2017 compared to 2016, sales volume of wine decreased by 22%, but revenues from the excise duty on wine still increased by 57%. Source: data on budget revenues published by State Tax Inspectorate under the Ministry of Finance of the Republic of Lithuania and data on sale of alcoholic beverages in trade and catering enterprises published by Official Statistics Portal of Lithuania.

According to KPMG (2014), in 2010 compared to 2008, the share of C&C in total consumption increased by 32 percentage points in Latvia, 25 percentage points in Lithuania and 15 percentage points in Estonia. During rapid economic downturns, policymakers could consider to implement small gradual increases in excise duties on cigarettes (annual increase of 5-10%) thus not significantly increasing incentives for consumers to switch to illicit cigarettes. During economic booms, the tax can be increased more without the risk of a sharp increase in C&C cigarette consumption, while large price increases are expected to lead to a larger reduction in the amount of product consumed.

There is a mixed existing evidence on health harms of heated tobacco products compared to conventional cigarettes and on the effectiveness of e-cigarettes as a smoking cessation aid. Although there is growing amount of evidence that smokeless products are less harmful comparing to the cigarette smoking, there are concerns about potential of smokeless products to attract new tobacco users, especially youth, and to discourage smoking cessation. On the one hand, there is a rationale for differential taxation of tobacco products and the alternative products according to the health risks that they present, to encourage less harmful consumption. On the other hand, government could closely monitor (by amending regular existing surveys and studies such as those carried out regularly by the Center for Disease Prevention and Control in Latvia) how these products are used by consumers to ensure that these products do not cause increased use among people, especially youth. Similar approach (with regard to marketing of heated tobacco) was recently announced by the US Food and Drug Administration (U.S. FDA, 2020).

○ Recommendations regarding excise duties on soft drinks:

The evidence on the effectiveness of taxes on soft drinks in reducing sugar intake is inconclusive. At the same time, the experience of other countries suggests that a sugar tax is effective in reducing sugar and calorie intake when imposed on a wide range of products, as opposed to a tax on a few products, which induces consumers' switching to other foods with added sugar, salt and fats. In order to address the problem of growing obesity and other noncommunicable diseases via application of excise duties on soft drinks, it is important to carry out a public health study assessing the changes in sugar intake caused by the soft drinks tax taking into account possible substitution with other sugar-rich products. The results of the study may justify the need to broaden the tax base to sugar-rich products.

Policymakers could consider a comprehensive policy approach to reducing overweight and obesity of population. Excise taxation should not be the only tool used to reduce the consumption of the excise products. According to The McKinsey Global Institute (MGI, 2014), the most effective tools to reduce obesity include reformulation of the products in manufacturing and switching to smaller packages in retail.

Policymakers could consider different ways to draw consumers' attention to the sugar content in food products and beverages. For example, products and beverages can be divided into 3 groups according to sugar content – rich, medium and low sugar content – and each group can be labelled in a uniform way. Research evidence indicates that interpretative labelling can encourage reformulation (WHO, 2017; Vyth E.L. et.al., 2010; Mhurchu C.N., 2017). At the same time, it is necessary to check that the packaging of all products and beverages contains information on the sugar content and that the information provided by producers is correct and written in clear and easily readable text formats. Easy-to-access information about the sugar content would increase the incentives of companies for reformulation.

Policymakers in Latvia could learn from Lithuania's and Estonia's experience that agreed with manufacturers of soft drinks and sugary products on reformulation of their products.

Importers and some domestic manufacturers of food and soft drinks may not be covered by the agreements reached between the government and manufacturers, and they also may not voluntarily commit to reducing sugar in their food products and soft drinks and/or reducing portion sizes. Because of this, and taking into account, that a sugar tax is shown to be effective in reducing sugar and calorie intake when imposed on a wide range of products, policymakers could consider introducing the an excise duty on a broad range of sugar-rich food products and soft drinks, while differentiating the duty rate according to sugar content in a product. Policymakers could consider to apply more than two rates and to provide a 100% relief for innovative products such as light soft drinks, water with natural flavouring, sugar-free or low-sugar snacks. Differentiated tax rate would stimulate the industry to take actions and to drive down sugar content. Application of such excise taxes may bring additional resources to the state budget.

INTRODUCTION

The main rationale for levying excise duties is to discourage excessive consumption of products that would occur in the absence of the duties to compensate for negative externalities and internalities imposed by consumption of such products. There are strong public health reasons to take measures to discourage excessive consumption of alcoholic beverages, tobacco products, as well as caloric food products and beverages in the Baltic countries. First of all, Lithuania and Latvia are among the EU countries with one of the highest per capita amounts of pure alcohol consumed. Smoking incidence in the Baltic countries has remained very high in the last two decades. Finally, there is a need to address the problem of growing overweight and obesity in the Baltic countries.

- **The aim of this report is to analyse excise tax policies in the Baltic countries from the point of view of revenues to the state, consumer welfare and other policy goals, e.g., creating incentives for product reformulation, and to develop recommendations on excise tax policy. This study covers the following excise goods: alcoholic beverages, tobacco products and soft drinks.**

The study consists of two parts. The **first part** of the study (sections 1-5) provides a thorough analysis of excise tax legislation in the Baltic countries, focusing on the existing rules and policy changes that took place in recent years. It also contains a comparative analysis with selected EU benchmark countries and reflects on the European context, focusing on EU-wide rules concerning excise taxation. This part presents a cross-country analysis of recent trends in excise tax revenues, as well as prices and consumption patterns of excise goods by type of product in the Baltics. This part also discusses cross-border trade in the Baltics, based on the publicly available data and other evidence.

The **second part** of the study (section 6) presents econometric analyses of the demand for excise goods and is based on macro-level data. It analyses the determinants of demand for certain excise goods and estimates price elasticities of demand for these products, which allows predicting the responsiveness of consumption of these products to possible changes in their prices. The focus is on the three Baltic countries.

The study concludes with developing excise tax policy recommendations for the three Baltic countries.

1. TAXING EXCISE GOODS IN THE EU

Excise duties are indirect taxes that are levied on a sale or use of specific products. There are two main reasons for levying excise duties. The first is levying excise duties to raise additional budget revenues. The second reason is that consumption of excise goods imposes negative externalities (the costs imposed by consumption of an excise good on others) and also internalities (costs imposed on the consumer of excise good). Excise duties levied on products are aimed to discourage excessive consumption that would occur in the absence of the tax, and to compensate for negative externalities and internalities.

According to the Council Directive 2008/118/EC the consumption of the following products is subject to excise duties in all EU countries:

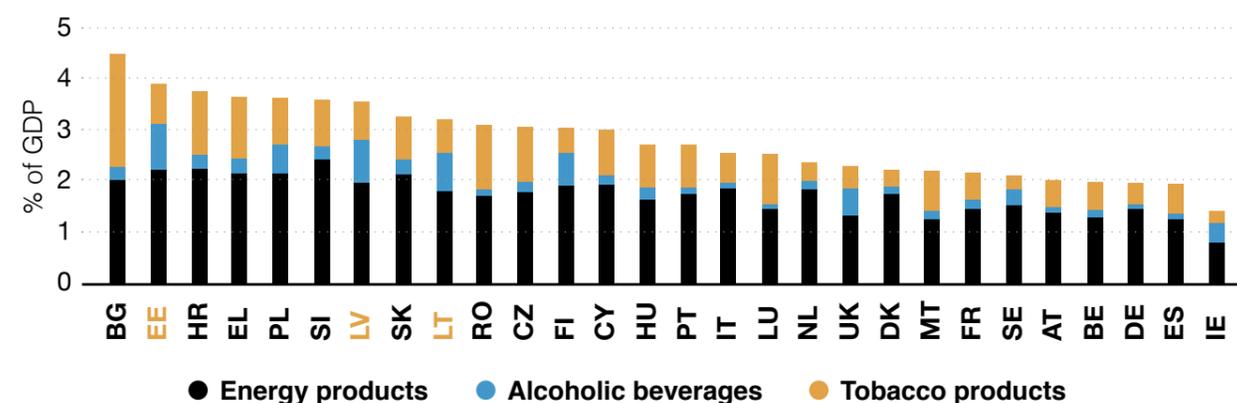
-  **energy products used for heating and transport, as well as electricity;**
-  **alcoholic beverages – beer, wine, intermediate products and spirits;**
-  **manufactured tobacco – cigarettes, fine-cut smoking tobacco, cigars and cigarillos, and other smoking tobaccos.**

Besides the EU Member States are free to levy excise taxes on consumption or use of other products. Examples of such products in the EU countries include soft drinks, food products with high levels of sugar, salt and saturated fats, coffee, packaging and waste.

1.1 REVENUES FROM EXCISE DUTIES ON PRODUCTS UNDER EU LAW

In 2018, revenues from excise duties on three types of excise goods under EU law (alcoholic beverages, tobacco products and energy products) in the EU countries⁸ on average amounted to 2.8% of GDP⁹. In Estonia, revenues from excise duties stood at 3.9% of GDP (2nd highest position among all EU countries), in Latvia and Lithuania the revenues from excise duties were 3.5% and 3.2% of GDP, respectively (see Figure 1.1).

Figure 1.1: Revenues from excise duties on alcoholic beverages, tobacco products and energy products in the EU countries by type of excise good, in 2018, as % of GDP

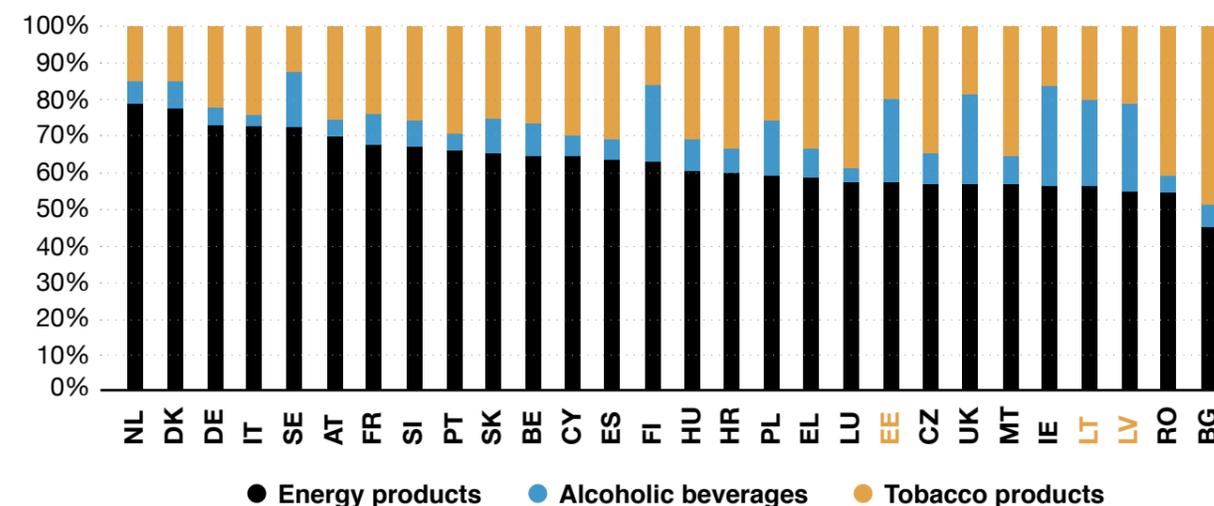


Note: Two-letter country codes refer to country codes used by Eurostat.
Source: Taxes in Europe Database

Figure 1.2 shows that in all EU countries the largest contribution to total revenues from excise duties comes from taxation of energy products. Excise tax on energy products generated on average 62.8% of revenues from excise duties (considering only excise goods under EU law). Excise duty on alcoholic beverages and tobacco products made up on average 10.9% and 26.3%, respectively.

In the Baltic countries, the share of revenues from excise tax on energy products is lower than on average in the EU (57.3% in Estonia, 56.0% in Lithuania and 55.1% in Latvia). The shares of revenues from excise tax on alcoholic beverages and tobacco products were almost equal (about 20% of total excise tax revenues for each type of products). Accordingly, the share of revenues from excise tax on alcohol in the Baltic countries is around twice as high as on average in the EU countries.

Figure 1.2: Composition of revenues from excise duties under EU law in the EU countries, in 2018, %



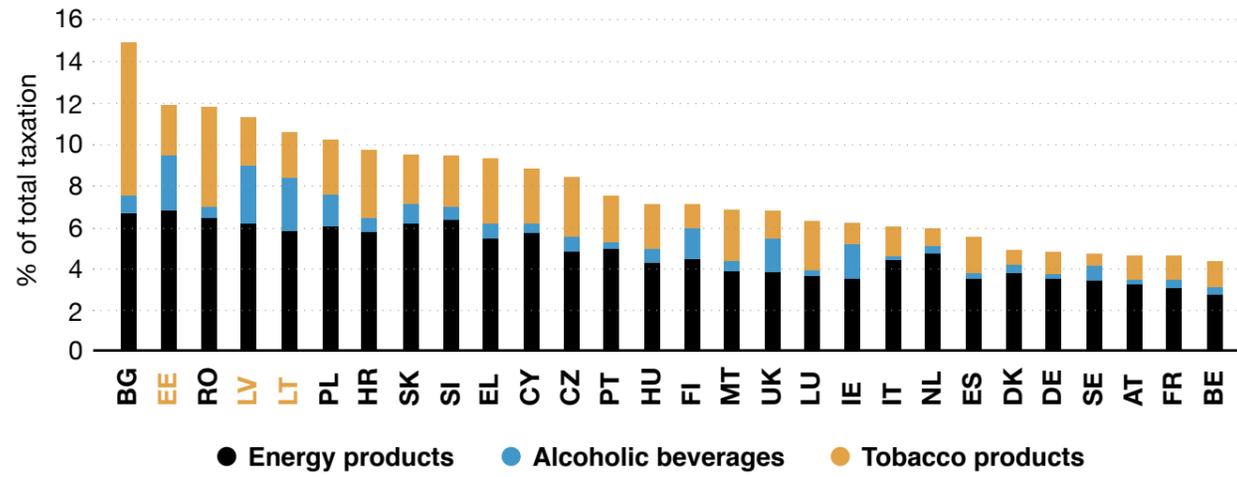
Note: Two-letter country codes refer to country codes used by Eurostat.
Source: Taxes in Europe Database

For the Baltic countries, excise tax represents a more important source of tax revenues compared to richer EU member states and EU countries on average (see Figure 1.3). In 2018, excise duties on alcohol, tobacco and energy products in the EU generated on average 7.9% of total tax revenues, while in the Baltic countries the respective ratios were 11.9% in Estonia (2nd highest in the EU), 11.3% in Latvia (4th highest in the EU) and 10.6% in Lithuania (5th highest in the EU).

⁸ In this section we analyse revenues from excise duties collected in 28 countries, which were EU Member States in 2018, i.e. including the United Kingdom.

⁹ Here we calculate the average across EU countries, not GDP-weighted average.

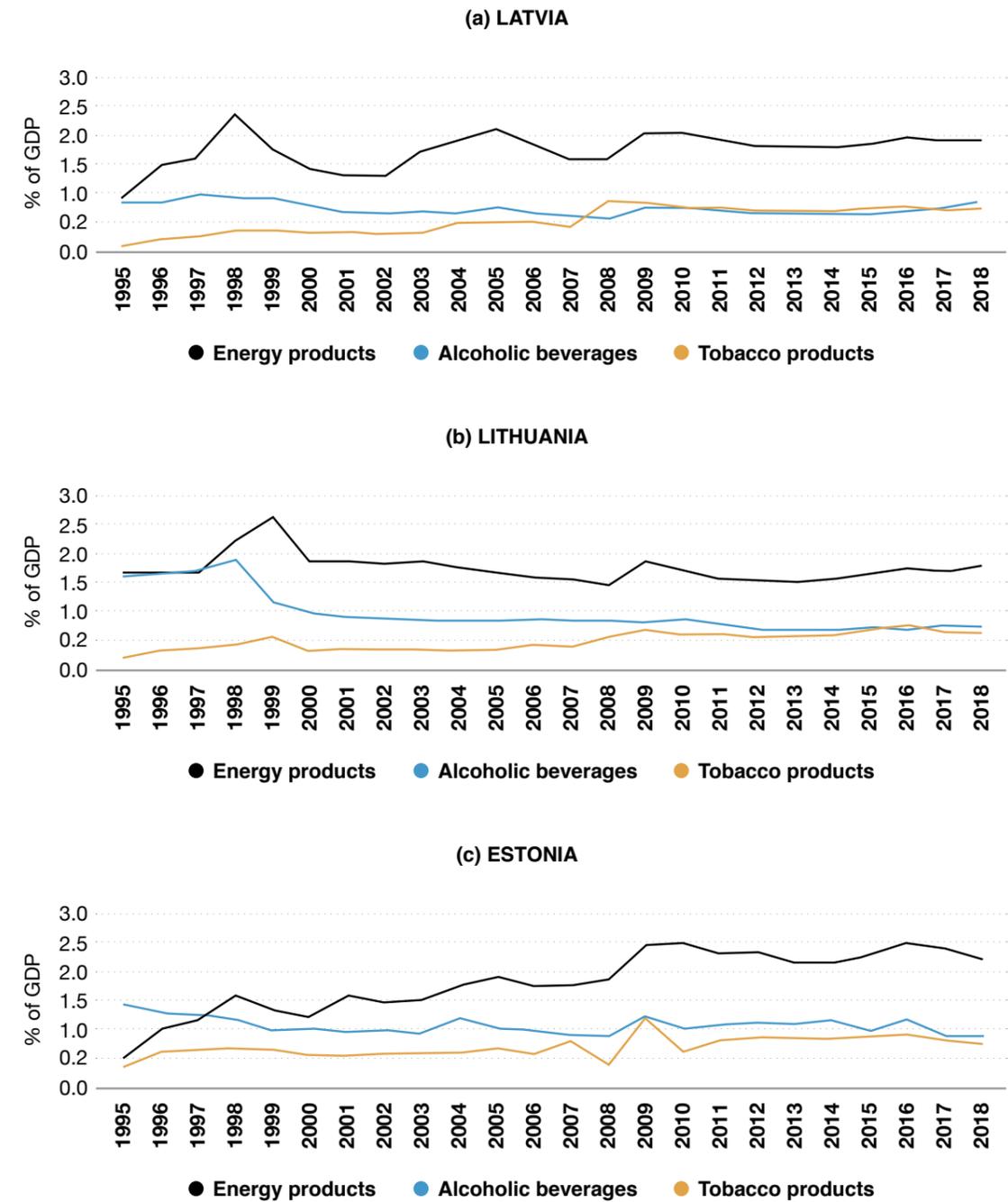
Figure 1.3: Revenues from excise tax on alcoholic beverages, tobacco products and energy in the EU countries, in 2018, as % of total taxation



Note: Two-letter country codes refer to country codes used by Eurostat.
Source: Taxes in Europe Database

Looking at changes in excise tax revenues over time, three main remarks are in place. First, the ratio of revenues from excise tax on energy products to GDP increased in all three Baltic countries from mid-nineties, but especially in Estonia (see Figure 1.4). The ratio of revenues from alcohol declined in Estonia and Lithuania, but remained almost unchanged in Latvia. The ratio of revenues from tobacco grew in all three countries.

Figure 1.4: Revenues from excise duties on alcoholic beverages, tobacco products and energy products, % of GDP, in the Baltic countries, 1995-2018



Source: Taxes in Europe Database

1.2 COMMON EXCISE DUTY PROVISIONS FOR THE EU COUNTRIES

EU legislation on excise duties defines the product categories subject to excise duties, sets out the principles of taxation (i.e., the structures of excise duties and basis on which the excise duty is calculated), minimum rates that must be applied, defines the scope for possible exemptions and includes the provisions allowing the EU countries to apply reduced rates for small breweries and small distilleries, certain products and geographical regions. EU legislation also includes general rules for producing, storing and moving these goods around the EU.

EU legislation sets harmonised minimum tax rates for all products subject to excise duties under EU law, however, the EU Member States are free to apply the excise duty rates higher than the required minimum, as well as levy additional excise duties on consumption or use of other products. How much the actual tax rate differs from the minimum rate depends on such factors as government financing needs, national excise product consumption traditions, national production and government policy priorities with respect to environmental and health issues.

Excise duties can be calculated depending on sales value, product volume or excise product's content in the final product. Two main structures are used to tax excise products in the EU: ad valorem and ad quantum. Ad valorem excise is levied on the retail price of a product and thus is a tax on the value of sales. Ad quantum excise, also called a specific excise, is levied per unit of product, thus this is a tax on the volume of sales. Ad quantum and ad valorem taxes might be used depending on the policy aims. For example, ad valorem is better at targeting inequality. Richer taxpayers are more likely to choose expensive excise products than lower income consumers, which results in a higher tax burden on high-income consumers. The redistribution outcome is, of course, dependent on overall consumption patterns, which might imply that high-income taxpayers pay less relative to their income if compared to low-income taxpayers. Some products can be taxed with a mixture of the two structures: within the EU, such mixture of ad valorem and ad quantum is imposed on tobacco products. A combination of ad quantum and ad valorem is often used to discourage consumption and maximise revenue from both high and low-price products. According to OECD (2018), ad valorem is better than ad quantum at reducing demand for a product, because ad quantum would usually account for an only small part of a high-price product, while ad valorem increases with price. High ad valorem, in turn, could lead to consumers switching to less expensive products.

Table 1.1 depicts the EU harmonised minimum rates for alcoholic beverages and manufactured tobacco products. There are also minimum excise duty rates that the EU Member States must apply to energy products for fuel and transport, and electricity, but these products are outside the scope of this study.

Table 1.1: Harmonised minimum rates for alcoholic beverages and manufactured tobacco products

EXCISE PRODUCT	RATE EXPRESSED PER	MINIMUM RATE
Alcoholic beverages		
Beer	Hectolitre per degree of alcohol	EUR 1,87
Wine	Hectolitre of product	EUR 0
Intermediate Products	Hectolitre of product	EUR 45
Spirits	Hectolitre of pure alcohol	EUR 550
Tobacco products		
Cigarettes*	Specific rate as a fixed amount per 1000 cigarettes	EUR 90
	Ad valorem component as % of the maximum retail price	-
<i>*Cigarettes should be taxed with specific rate and ad valorem component so that total excise duty comprises at least 60% of the weighted average retail selling price. Member States that have set an excise duty above EUR 115 per 1000 cigarettes do not need to comply with the 60% criterion.</i>		
Fine-cut smoking tobacco		50% of the weighted average retail selling price or EUR 60 per kg
Cigars and cigarillos		5% of the retail selling price or EUR 12 per 1000 items or per kg
Other smoking tobaccos		20% of the retail selling price or EUR 22 per kg

Source: Directives of the EU Council: Directive 92/84/EEC (sets out minimum excise duty rates that must be applied to each category of alcoholic beverage); Directive 2011/64/EU (sets out minimum excise duty rates that must be applied to each category of manufactured tobacco products).

1.3 EXCISE DUTIES LEVIED ON OTHER PRODUCTS (NON EU-HARMONISED)

In addition to energy products, alcohol and tobacco products, the EU Member States can levy excise duties on consumption or use of other products. Examples of such products include soft drinks, food products with high levels of sugar, salt and saturated fats, coffee, packaging and waste.

Finland was one of the first countries in the world that in 1926 started to tax chocolate and candies, and non-alcoholic beverages in 1940. In 2000, however, the tax on sweets was abolished. Later, in 2011, the sweets tax was reinstated and was applied to confectionery, chocolate and ice-cream, while excluding bakery products, yoghurt, puddings and other such products (WHO, 2015). As of 2017, the sweets tax was abolished because of a warning from the European Commission that the tax is incompatible with EU State aid rules (Confectionery News, 2016), while excise tax on non-alcoholic beverages remains to be in force. Today, application of excise duties on sweets and non-alcoholic beverages with added sugar is nothing extraordinary. As of end of 2019, apart from Finland, the excise duty on non-alcoholic drinks with added sugar, other sweeteners or flavouring is applied in Latvia, France, Hungary, the UK, Ireland, Portugal, Spain (Catalonia) and Belgium (NYC Food Policy Center, 2020). Belgium, as well as Latvia and Denmark, tax coffee with the main aim to raise government revenue rather than discourage consumption of coffee.

In 2011 Denmark was one of the first countries to impose a tax on saturated fat, where the taxable base included all foods containing saturated fat (e.g., meat, dairy, edible oils and fats, margarine and blended spreads), excluding products containing less than 2.3 grams of fat per 100 grams. Nevertheless, the tax was abandoned in 2012 due to adverse effects on cross-border shopping, competition and employment. In 2011, Hungary, faced with the problems of high prevalence of obesity and one of the world's highest levels of salt consumption per capita, introduced a public health product tax that was imposed on food products with a high saturation of fats, salt and sugars.

Apart from excise duties on energy products, governments have advanced excise duties to other products and activities that have an impact on global warming. For example, Estonia applies an excise duty on all packaging which is brought to the Estonian market, acquired in another Member State or imported. Similarly, Lithuania applies a pollution tax (not classified under excise duties) that is applied besides packaging to all sorts of emissions from stationary and mobile sources, certain products (e.g. batteries, mercury lamps, etc.) and waste that is discarded into landfills. Denmark is another example of a country that applies an excise duty on certain packaging, disposable tableware, PVC film wrapping and certain bags of paper or plastic, etc. Poland, as well as some other EU countries, have imposed an excise duty on passenger vehicles, taxing their first registration on the territory of the state.

Taxation of soft drinks in the EU

In a number of EU countries and also across the world, governments tax sugar-sweetened beverage consumption with so-called "sugar taxes" or "soda taxes". Such taxes seek to encourage reduced consumption of sugar-sweetened drinks by increasing the retail price of the drink and also to improve nutrition, reduce obesity and chronic diseases. The beverages that are typically taxed include non-diet sodas, fruit drinks, sports drinks and energy drinks. Types of beverages subject to the tax vary across countries, and the tax can be specific to the country or municipality ruling. In Europe as of 2020, taxes on sugar-sweetened non-alcoholic beverages are implemented in a number of countries (see Table 0.1 in Annex):

- UK (as of 2018 there is a soft drinks industry levy (not classified under excise taxes) up to GBP 0.24 per litre depending on the sugar contents of the soft drink),
- Finland (excise duty was introduced in 1940, currently up to EUR 0.27 per litre, depending on the sugar content of the soft drink);
- Latvia (as of December 1999; excise duty is levied on non-alcoholic beverages with added sugar, other sweeteners or flavouring, the tax rate is EUR 0.74 per litre);
- Ireland (as of May 2018, excise duty - sugar-sweetened drinks tax, the tax rate is up to EUR 0.24 per litre);
- France (as of 2012, excise duty on all non-alcoholic beverages with added sugar or sweeteners, the tax rate is EUR 0.0716 per litre);
- Hungary (as of 2011, excise tax, a public health product tax, is applied to food products containing unhealthy levels of sugar, salt and other ingredients. The tax rate for sugar-sweetened beverages is EUR 0.05 per litre);
- Spain (Catalonia) (as of May 2017, the excise tax on sugar-sweetened beverages, the tax rate is up to EUR 0.12 per litre);
- Portugal (as of February 2017, a sugar tax on soft drinks containing added sugar or artificial sweeteners. (not classified as excise tax), the tax rate up to EUR 0.16 per litre).
- Belgium (as of 1993, the excise tax on non-alcoholic beverages, there are 12 tax rates applied to different types of non-alcoholic beverages, the highest rate applied to sweetened beverages is EUR 11.92 per 100 litres).

A tax on sugar-sweetened soft drinks was introduced in 2017 in the Spanish region of Catalonia. Research that surveyed citizens of Barcelona before and a year after the introduction of the tax suggests that consumption of the taxed beverages fell by 39% in Barcelona when compared to Madrid, where no tax on sugar beverages was applied. Among those who reduced the consumption of taxed drinks two-thirds claimed that it was motivated primarily by the increased retail price, following rising health awareness as a second motive (Royo-Bordonada, M.Á. et.al., 2019). In general, a tax on sweetened drinks is estimated to be effective in reducing consumption; another study by Powell L.M. et.al. (2013) concluded that if an excise duty raises retail price of a soft drink by 20%, consumption of the taxed beverages could also decrease by 20%. Theoretically, imposing a tax on sweetened drinks could help reduce obesity risks and improve health outcomes, but only if consumers do not switch to cheaper substitutes or other products with sugar. Therefore, a sugar tax might be effective when imposed on a wider range of products (see section 5.3 for more extensive discussion of the efficiency of the sugar tax). Meanwhile, revenues collected from taxes on products such as non-alcoholic beverages with added sugar, other sweeteners or flavouring bring comparatively small contribution to the budget.

2. EXCISE DUTY RATES IN THE BALTIC COUNTRIES

2.1 CURRENT EXCISE DUTY RATES

All three Baltic countries levy excise duties on alcoholic beverages, tobacco products and energy products. Alcoholic beverages subject to excise duty include beer, wine and other fermented products, as well as intermediate products and ethyl alcohol. The excise duty on tobacco products is levied on cigarettes, cigars, cigarillos, smoking tobacco and heated tobacco products. Electronic cigarette liquid has been on the list of excise goods in Latvia since 2016, in Estonia since 2018 and in Lithuania since 2019. Selling of heated tobacco is prohibited in Estonia. As of May 2020, ban on heated tobacco products is lifted but the release for consumption is postponed for an undefined period¹⁰. Table 2.1 shows the excise duty rates as of 1st March, 2020 that applied on alcoholic beverages and tobacco products in the Baltic countries.

Among energy products liquid fuels (petrol, diesel fuel and other), gaseous fuels (natural gas, liquid petroleum gas and other) and solid fuels (coal, coke and other) are subject to excise taxation. The Baltic countries also tax electricity. However, while Estonia and Lithuania consider electricity tax to be an excise duty, Latvia records it separately as an electricity tax.

To fight environmental pollution Estonia has introduced an excise duty on packaging which is imposed on all packaging brought to the Estonian market, acquired in another Member State of the EU or imported. Tax is levied on glass, plastic, metal, paper, cardboard and wood, where the subject of the tax is a person who brings the packaged goods to the market for the first time. The rate of excise duty depends on the packaging material, and is ranging from EUR 0.6 per kg for glass packaging to EUR 2.5 per kg for plastic and metal packaging (Estonian Tax and Custom Board, 2020a). Lithuania applies the pollution tax that is levied on all sorts of emissions from stationary and mobile sources, on certain products (e.g. batteries, mercury lamps, etc.), as well as on packaging and waste that is discarded into

¹⁰ Ban on novel heated and smokeless tobacco products is lifted but the release for consumption is postponed for an undefined period (News ERR, 2020). If heated tobacco products are classified under smoking tobacco subgroup, they will be subject to the tax rate of EUR 89.63 per kg.

landfills. The amount of tax is discharged according to pollutants' harmfulness and damage caused to environment (EY, 2019). For example, tax rate for packaging is ranging from EU 0.028 per kg of paper and cardboard packaging to EUR 0.521 per kg of plastic packaging and EUR 0.579 per kg of PET (polyethylene terephthalate) packaging and combined packaging.

Latvia introduced an excise tax on non-alcoholic beverages with added sugar, other sweeteners or flavouring¹¹ and an excise tax on coffee in 1999, which was mostly motivated by the budgetary needs of the government. As of 2020, non-alcoholic beverages are uniformly taxed at EUR 7.40 per 100 litres. In February 2020, Saeima approved amendments to the excise duty law, which foresee that starting from January 2022 the excise duty on soft drinks will be differentiated according to sugar content. The excise duty rate is to be set at EUR 7.4 per 100 litres if the amount of sugar is up to 8 grams per 100 ml and EUR 14 per 100 litres if the amount of sugar exceeds 8 grams per 100 ml. As for sweetened non-alcoholic beverages containing other sweeteners, the excise tax rate will remain unchanged, i.e. EUR 7.4 per 100 litres (Latvijas Vēstnesis, 2020a).

After long debates in the Parliament, Estonia did not reach an agreement on taxing sweetened drinks in 2018. In 2018 Lithuania shelved plans for a sugar tax after signing the agreements with some food and soft drinks producers on voluntary reduction of the contents of sugar, salt and fat in their products (Delfi, 2018). Therefore, Latvia is the only country among the Baltics, which taxes consumption of drinks with added sugar.

¹¹ In Latvia the excise tax is applied to water and mineral water with added sugar, other sweetener or flavouring, and other non-alcoholic beverages. The exceptions are fruit and vegetable juice and nectar, beverages which contain not less than 10 per cent of juice (except for fruit juices made of concentrate), not more than 10 per cent of added sugar and which do not contain food additives and flavourings, natural water and mineral water without added sugar, other sweetener or flavouring.

Table 2.1: Excise duty rates for alcoholic beverages and tobacco products in the Baltic countries, EUR, as of 1st March 2020

	ESTONIA	LATVIA	LITHUANIA
Alcohol			
Beer, per hectolitre and alcohol content	12,7	8,2 ^a	7,11
Reduced rate for small breweries, per hectolitre and alcohol content	6,34 ^b	4,1 ^c	-
<i>Wine per hectolitre (depending on degrees of alcohol)</i>			
...not exceeding 6% (8.5% in Lithuania)	63,35	106	65,46
...exceeding 6% (8.5% in Lithuania)	147,82	106	164,67
<i>Fermented products, per hectolitre (depending on degrees of alcohol)</i>			
...not exceeding 6% (8.5% in Lithuania)	63,35	64	65,46
...exceeding 6% (8.5% in Lithuania)	147,82	106	164,67
<i>Intermediate products, per hectolitre (depending on degrees of alcohol)</i>			
...not exceeding 15%	289,33	106	185,82
...exceeding 15%	289,33	176 (virs 15% un līdz 22%)	264,52
Other alcoholic beverages (ethyl alcohol), per hectolitre of pure ethyl alcohol	1881	1642	2025
Tobacco products			
<i>Cigarettes:</i>			
minimum duty level per 1000 cigarettes, EUR	138,65	114,7	108,5
specific tax, per 1000 cigarettes	81,95	78,7	65,7
ad valorem rate	30%	20%	25%
<i>Cigars and cigarillos:</i>			
minimum duty level per 1000 pieces	211	-	-
specific tax,	151 per 1000 pieces	95.2 per 1000 pieces	48 per kg of product
ad valorem rate	10%		
Smoking tobacco, per kg of product	89,63	75	78,5
Heated tobacco products, per kg of product	Selling is prohibited ¹²	75	113,2
Electronic cigarette liquid, per millilitre of liquid	0,2	0.01 per ml of liquid; 0.0005 per mg of nicotine	0,12

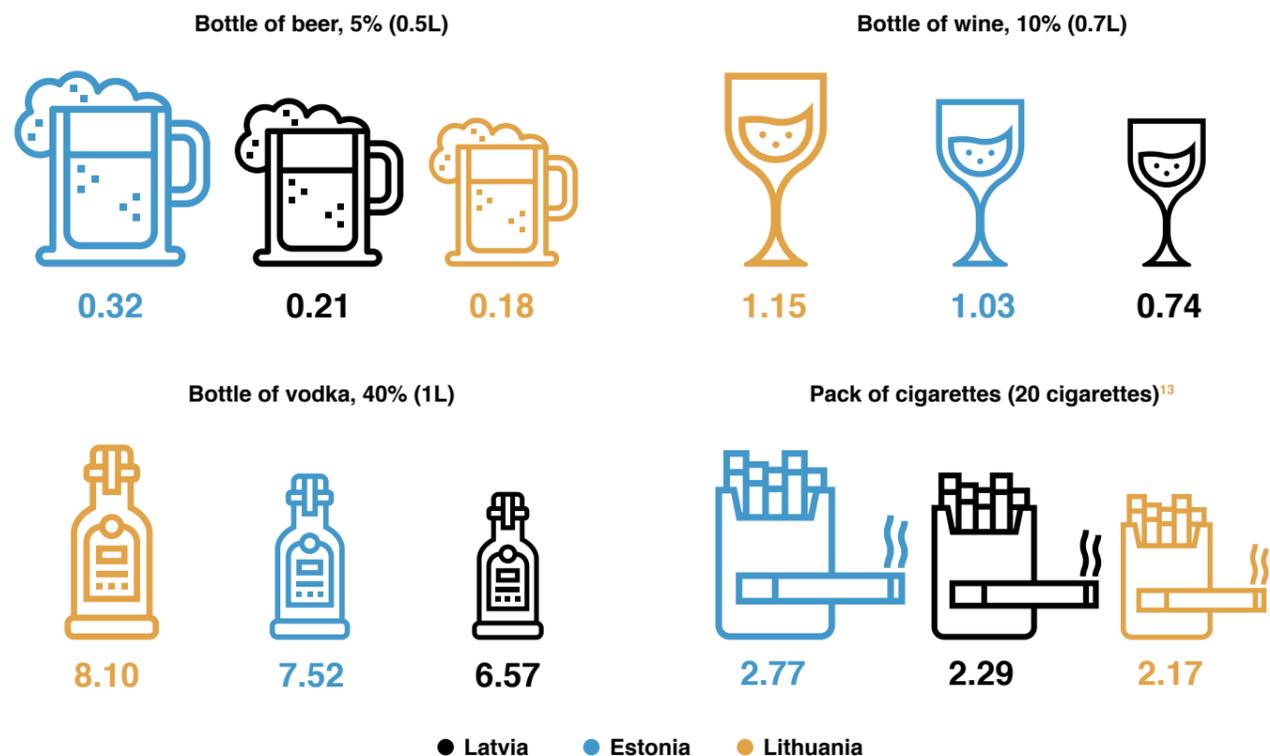
a no less than EUR 15.2 per 100 litres of beer;
b for small breweries whose beer production did not exceed 15 000 hectolitres in the previous year;
c for the first 10 000 hectolitres of beer produced in a small brewery in one calendar year (no less than EUR 15.2 per 100 litres).

Source: Taxes in Europe Database, Ministry of Finance of the Republic of Lithuania (2020), Ministry of Finance of the Republic of Latvia (2020), State revenue service of the Republic of Latvia, Tax and custom board of the Republic of Estonia (2020b).

¹² Ban on novel heated and smokeless tobacco products is lifted but the release for consumption is postponed for an undefined period (News ERR, 2020). If heated tobacco products are classified under smoking tobacco subgroup, they will be subject to the tax rate of EUR 89.63 per kg.

Figure 2.1 compares the excise duty applied on selected excise products: a bottle of beer, wine or vodka, and a pack of cigarettes in 2020. Estonia has the highest excise duty for a half-litre bottle of beer and a 20-cigarette pack, while Lithuania taxes a 0.7-litre bottle of wine and 1-litre bottle of vodka more than two other Baltic countries.

Figure 2.1: The amount of excise duties on selected excise products in Estonia, Latvia and Lithuania in 2020, EUR



Source: Ministry of Finance of the Republic of Lithuania (2020), Ministry of Finance of the Republic of Latvia (2020), State revenue service of the Republic of Latvia, Tax and custom board of the Republic of Estonia (2020b).

While Lithuania has struck a deal with producers of sweetened non-alcoholic drinks for a reduction of sugar in their products and Estonia hasn't introduced sugar tax yet, Latvia tries to reduce the consumption of non-alcoholic beverages with added sugar, other sweeteners or flavouring by taxing them. As of now, the rate applicable in Latvia is comparatively low at only EUR 0.02 per 0.33 litres of Coca-Cola drink. In 2022, when Latvia introduces an excise tax on soft drinks differentiated according to sugar content (Latvijas Vēstnesis, 2020b), the tax per 0.33 litres of Coca-Cola will increase to EUR 0.05.

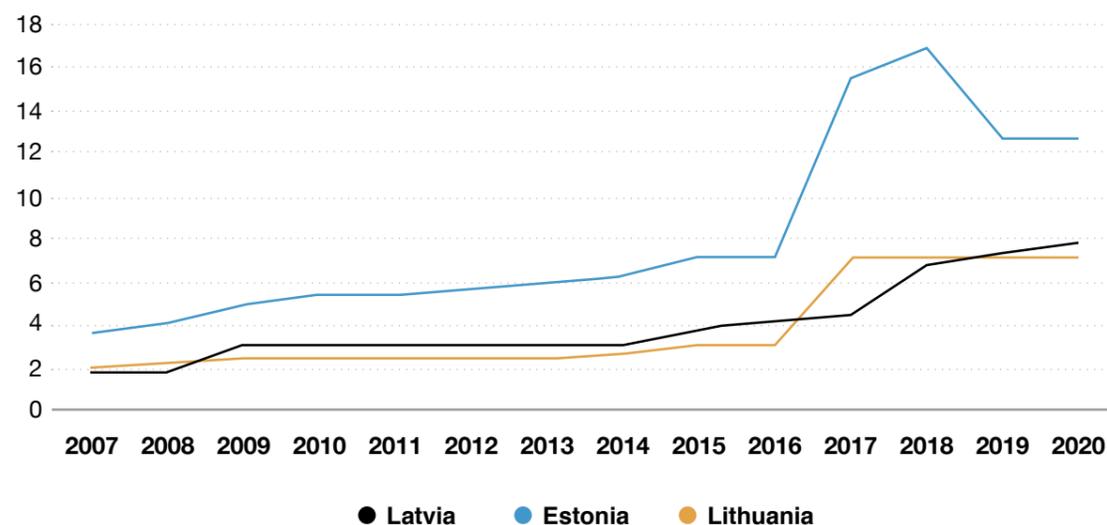
¹³ Calculated from minimum excise duty applicable for 1000 cigarettes in each country.

2.2 CHANGES IN EXCISE DUTY RATES IN 2007-2020

Estonia applies the highest excise duty rate on beer among the Baltic countries (see Figure 2.2 and Figure 2.3). The tax on beer in Estonia was twice as high as in Latvia and Lithuania already in 2007. Starting from March 2020, beer is subject to an excise tax of EUR 12.7 per hectolitre and degree of alcohol of finished product in Estonia, EUR 7.8 in Latvia and EUR 7.11 in Lithuania. In total over 13 years, the excise duty rate increased by a factor of 3.4 in Estonia, 4.2 in Latvia and 3.5 in Lithuania.

As mentioned in section 2.1, Estonia and Latvia apply a reduced rate for beer produced in small breweries. The reduced rate is equal to 50% of the standard rate. However, in Estonia the maximum beer volume which is produced in a current year in one small brewery and is subject to a reduced rate is larger than in Latvia (15 000 and 10 000 hectolitres, respectively). As of 2020, reduced rates on beer applied in Estonia and Latvia are lower than the uniform excise duty rate applicable on beer in Lithuania.

Figure 2.2: Standard excise duty rate on beer per hectolitre and degree of alcohol of finished product in the Baltic countries, 2007-2020, EUR



Note: the excise duty rates refer to the end of the year.
Source: European Commission: Taxes in Europe Database.

Excise duty on strong alcoholic drinks, like vodka, gin and whiskey, is the highest. In 2007, the excise duty rates on ethyl alcohol were very similar in the Baltic countries (see Figure 2.3), but from 2010 until 2019, Estonia applied the highest tax rate. The ratio of the excise duty rate on ethyl alcohol in Estonia and the excise duty on ethyl alcohol in each of the two other Baltic

¹⁴ Igaunijā samazinātu likmi alum piemēro tādām alum, ko ražo mazās alus darītavās, kuru alus produkcija iepriekšējā gadā nepārsniedza 15 tūkst. hektolitrus. Latvijā samazinātu likmi piemēro pirmajiem 10 tūkst. hektolitriem alus, kas vienā kalendāra gadā saražots mazā alus darītavā (bet ne mazāk kā EUR 15,2 par 100 litriem).

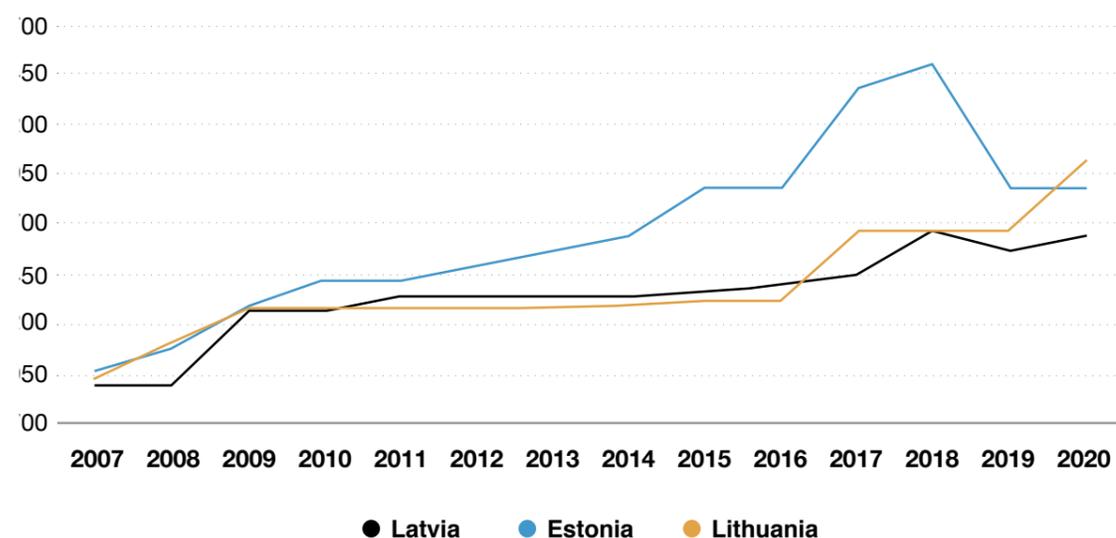
countries gradually increased until 2018, when the duty rate in Estonia was 1.5 times as high as in Latvia and in Lithuania.

In 2019-2020, the Baltic countries applied various changes to their excise duty rates on ethyl alcohol. Starting from July 2019, Estonia cut its rate by 25% (to EUR 1881 per hectolitre of pure ethyl alcohol) to reduce Estonian purchases of alcohol in Latvia. In response to this, in order to prevent a significant fall in sales of alcoholic drinks, especially on the Latvian-Estonian border, Latvia reduced its rate by 15% (to EUR 1564 per hectolitre of pure ethyl alcohol¹⁵) in August 2019. However, as of March 2020, Latvia raised excise duty rates on all alcohol products except fermented beverages with alcohol content not exceeding 6%, but not as much as it had been originally planned.

Starting from March 2020, Lithuania increased the excise duty rate on ethyl alcohol by 21.6% to EUR 2025 per hectolitre of pure ethyl alcohol, which is now the highest rate applied in the Baltic countries.

In 2020, compared to 2007, excise duty rate on ethyl alcohol was increased by 83% in Latvia, 118% in Lithuania and 94% in Estonia.

Figure 2.3: Standard excise duty rate on ethyl alcohol (per hectolitre of pure ethyl alcohol), in the Baltic countries, in 2007-2020, EUR



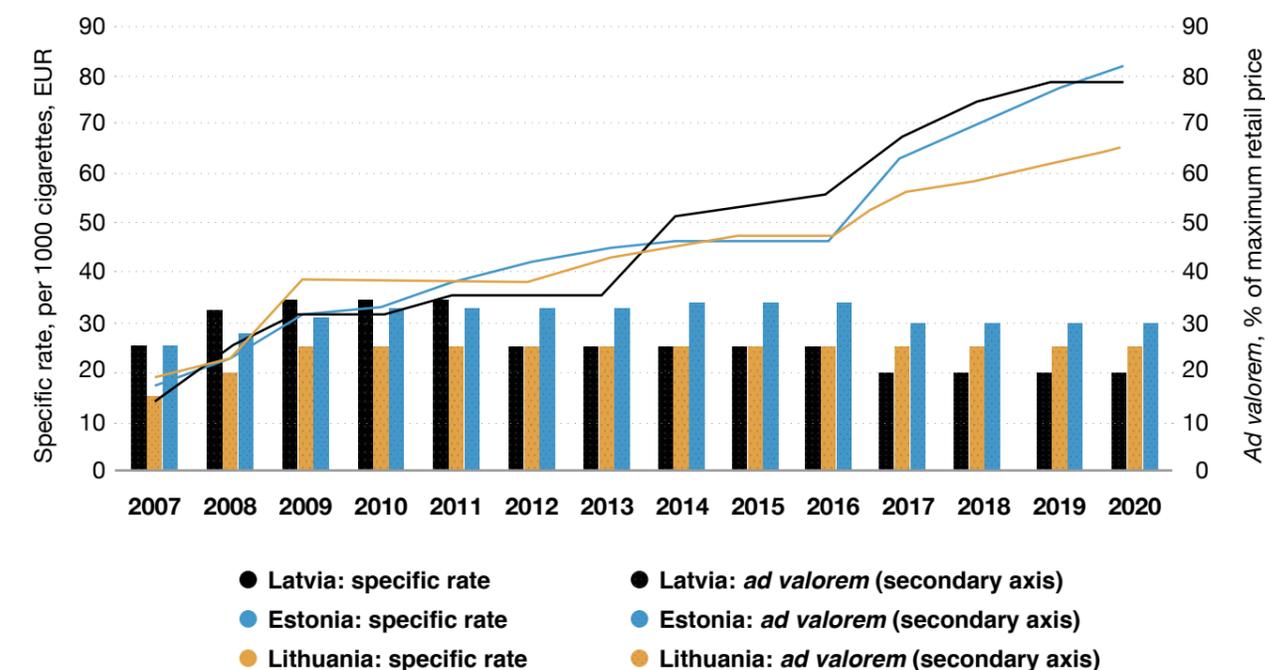
Note: the excise duty rates refer to the end of the year.
Source: European Commission: Taxes in Europe Database.

¹⁵ In 2019, Latvia changed the excise duty rate on ethyl alcohol two times. In March 2019, the rate was increased from EUR 1670 to EUR 1840 per hectolitre of pure ethyl alcohol. In August 2019, in response to Estonia's rate cut, Latvia reduced its rate to EUR 1564 per hectolitre of pure ethyl alcohol. In addition, as of March 2019 Latvia applies a reduced rate on ethyl alcohol produced in small distilleries, equal to 50% of the standard rate.

Cigarettes are taxed with two components, specific tax rate (expressed as a fixed amount per 1000 cigarettes) and ad valorem rate (expressed as a percentage of the maximum retail selling price), and the Baltic countries have been changing rates for both of these components in recent years (Figure 2.4). In 2007-2020 Latvia has had the largest increase in the specific tax rate (by a factor of 5.6) while it also decreased its ad valorem rate the most – from 34.5% in 2009-2010 to 20% in 2017-2020. Lithuania and Estonia increased their specific tax rates by a factor of 3.4 from 15% in 2007 to 25% in 2009-2020, and Estonia from 26% in 2007 to 30% in 2007-2020¹⁶.

As of 2020, Estonia has the highest specific and ad valorem rate on cigarettes among the Baltic countries. The lowest specific rate is applied in Lithuania, but the lowest ad valorem rate is applied in Latvia.

Figure 2.4: Excise duty on cigarettes in the Baltic countries, in 2007-2020, specific tax rate (EUR, primary axis) and ad valorem rate (% of maximum retail price, secondary axis)



Note: the excise duty rates refer to the end of the year.
Source: European Commission: Taxes in Europe Database.

¹⁶ In 2009-2016 ad valorem rate applied to cigarettes in Estonia was even higher: 31% in 2009, 33% in 2010-2013 and 34% in 2014-2016.

3. PRICES OF EXCISE GOODS IN THE BALTIC COUNTRIES

This section is devoted to comparison of prices of excise goods in the Baltic countries and other EU countries. First, we compare average retail prices of selected excise goods in the Baltic countries. Next, we compare the purchasing power of consumers by estimating the average working time that required to buy selected excise goods. And finally, we compare price levels (PPP-adjusted) for alcoholic beverages and tobacco products in the EU countries.

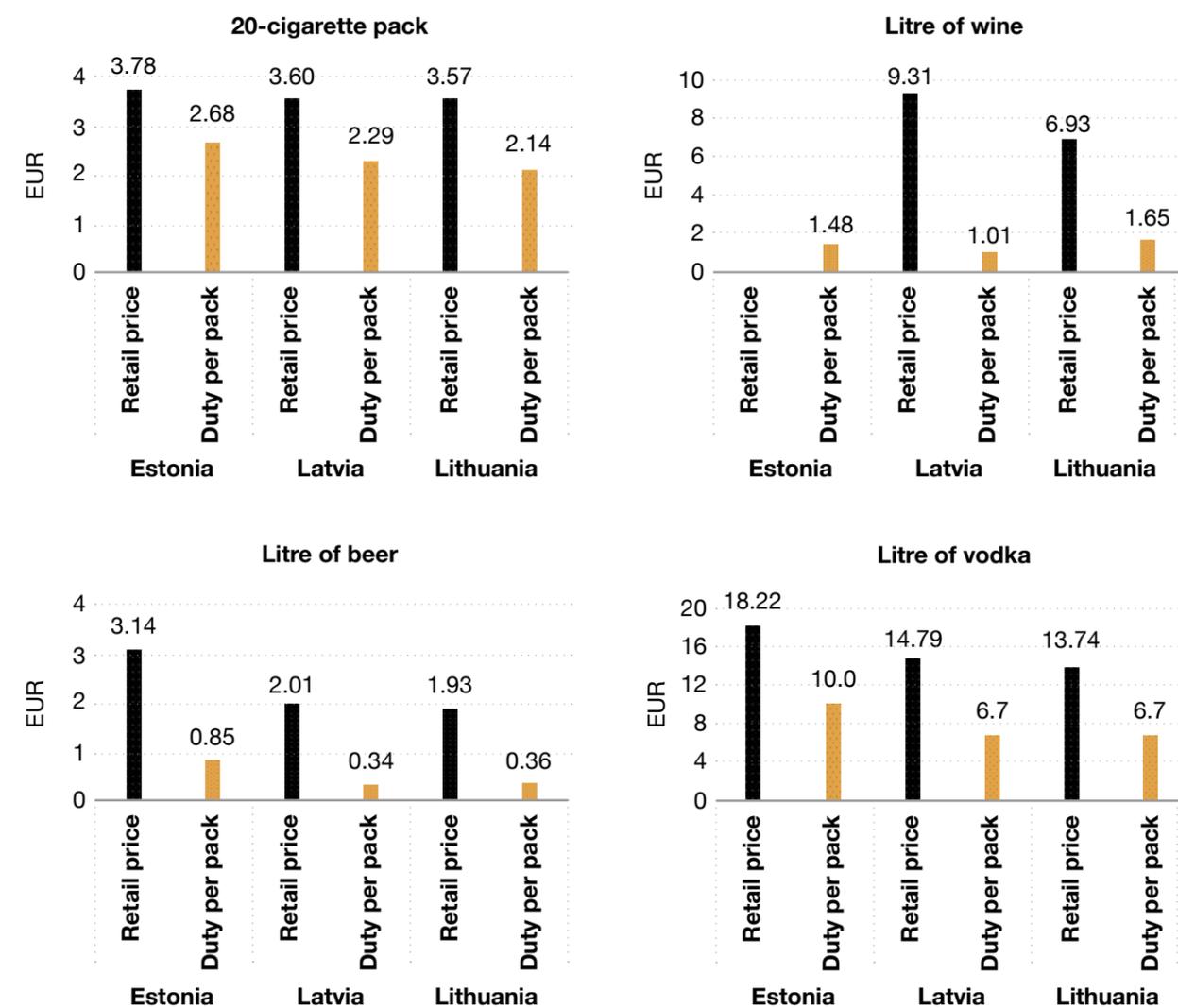
The average retail prices of excise goods and the amount of excise duty levied on excise goods vary between the Baltic countries. Figure 3.1 shows average retail prices of selected excise goods and amount of excise duty collected from these goods in each Baltic country. In 2019, the highest average price of cigarettes was recorded in Estonia, while the lowest in Lithuania. Similarly, the amount of excise duty applied on a 20-cigarette pack at the average retail price value is the highest in Estonia and the lowest in Lithuania. In Estonia, excise duty also accounts for a larger share of the average retail price of a 20-cigarette pack in Estonia (71%); in Latvia and Lithuania these shares are equal to 64% and 60%, respectively.

In 2018, Estonia had the highest average retail price per litre of beer (EUR 3.14), whereas in Latvia and Lithuania a litre of beer on average could be bought for around EUR 2. The share of excise tax in the price of beer was 27% in Estonia, 19% in Lithuania and 17% in Latvia.

Despite Lithuania had the highest excise duty per litre of wine (with alcohol content 10%), the average retail price of a litre of wine in Lithuania is lower than in Latvia (data on the average retail price of wine in Estonia is not available). The share of excise duty in the average retail price of wine was 24% in Lithuania and 11% in Latvia.

In 2018, the most expensive vodka on average was sold in Estonia, and the amount of excise duty on a litre of vodka was also the highest in Estonia. In Latvia, a litre of vodka on average cost more than in Lithuania, but the amount of excise duty on a litre of vodka was equal, resulting in a higher share of excise duty in the average retail price in Lithuania.

Figure 3.1: Average retail price and excise duty on selected alcoholic beverages in 2018 and average retail price and excise duty on a 20-cigarette pack in 2019 in the Baltic countries, EUR

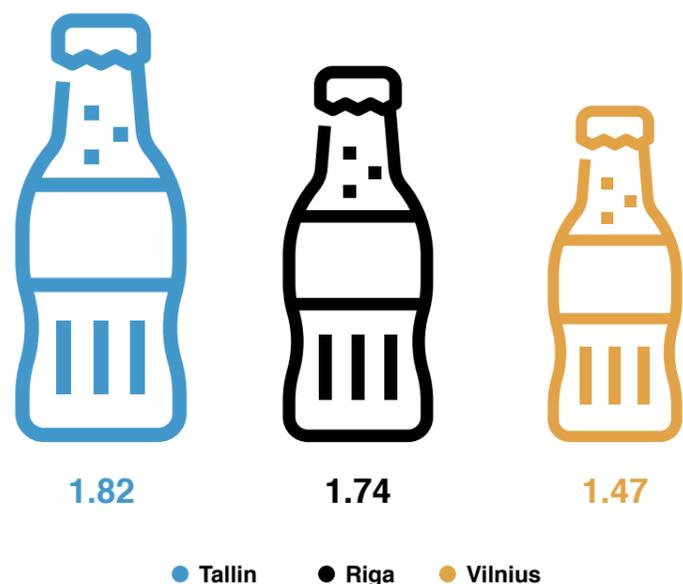


Note: (a) Data on the average retail price of wine in Estonia is not available; (b) Excise duty rates were derived from: European Commission: Taxes in Europe Database. Rates of excise duties on cigarettes refer to end of 2019. Rates of excise duties on selected alcoholic beverages refer to end of 2018.

Source: (i) Central Statistical Bureau of Latvia: PCG030. Atsevišķu produktu vidējās mazumtirdzniecības cenas (engl. – Average retail prices of selected commodities); (ii) The Lithuanian Department of Statistics: Average monthly retail prices for the most popular products; (iii) Tax and Customs Board of Republic of Estonia: Prevailing price of cigarettes in 2019. (iv) Estonian Institute of Economic Research, National Institute for Health Development (2019). Alcohol market, consumption and harms in Estonia. Yearbook 2019. Tallinn: Estonian Institute of Economic Research. Available: <https://dea.digar.ee/cgi-bin/dea?a=d&d=JValkoturg201911.2.9>.

Figure 3.2 shows the average retail price of a 2-litre *Coca-Cola* bottle in Tallinn, Riga and Vilnius as of March 2020. Despite the fact that in Latvia a 2-litre *Coca-Cola* bottle is subject to excise duty of EUR 0.15 (accounts for 9% of the average retail price), the price per product is the highest in Tallinn. In Vilnius, a 2-litre *Coca-Cola* bottle is the cheapest among the capitals of the Baltic countries and its price is 20% lower than in Tallinn.

Figure 3.2: Average retail price of a 2-litre *Coca-Cola* bottle in capital cities of the Baltic countries in March 2020, EUR



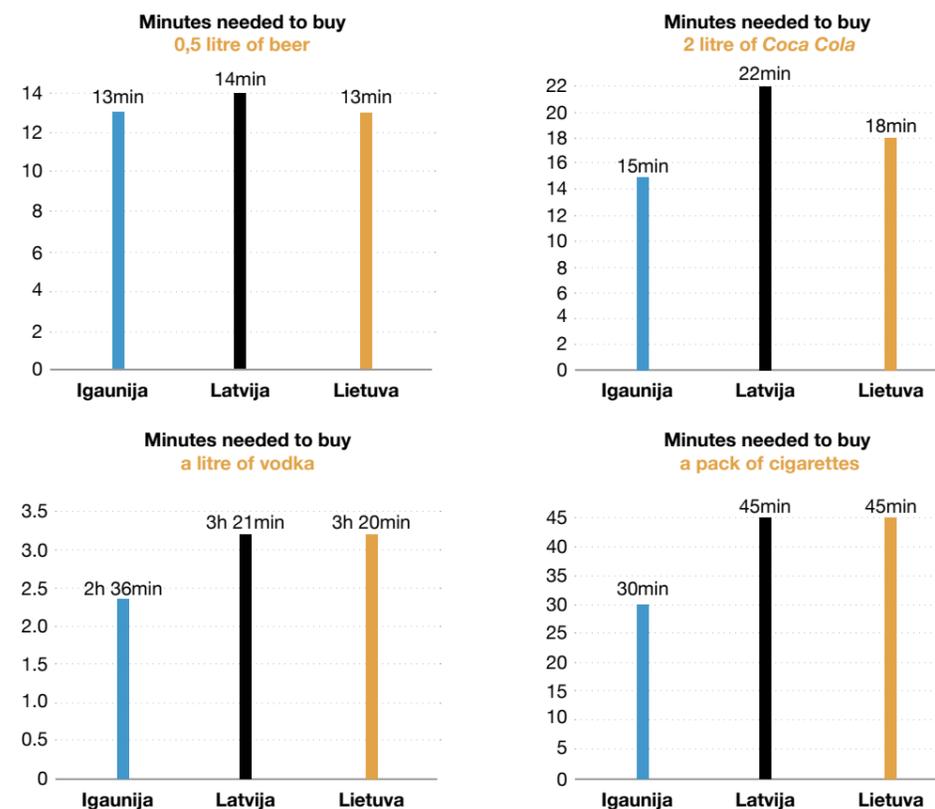
Source: Expatistan. Available: <https://www.expatisitan.com/cost-of-living>

Comparison of the purchasing power of consumers

Purchasing power can be also compared among the Baltic countries when evaluating average working time that required to buy an excise good. We do similar calculations as in Jurušs (2016) to compare how much time it takes to earn money for buying a 0.5-litre bottle of beer, a 1-litre bottle of vodka, a 20-cigarette pack and a 2-litre bottle of *Coca-Cola*.

Despite the average retail price for beer in Estonia is the highest, it takes on average approximately the same amount of time for an Estonian to earn money necessary to buy a 0.5-litre bottle of beer as for a Latvian or a Lithuanian (see Figure 3.3). In Estonia, a person on average needs to work less to buy 1-litre bottle of vodka, a 2-litre bottle of *Coca-Cola* and a 20-cigarette pack than in the other Baltic countries. A Latvian on average needs to work more to buy a 1-litre bottle of vodka and a 2-litre bottle of *Coca-Cola* than in the other Baltic countries, while it takes approximately the same amount of time for a Latvian and Lithuanian to earn money to buy a 20-cigarette pack.

Figure 3.3: How much time a person needs to work to buy a 0.5-litre bottle of beer, a 0.5-litre bottle of vodka in 2018 and a 20-cigarette pack and a 2-litre *Coca-Cola* bottle in 2019



Note: The prices of excise goods -used in Figures 3.1., 3.2. and 3.3 are the same.
 Source: Authors` calculations using data on average retail prices of excise goods, Eurostat data on annual net earnings [earn_nt_net] of a single person without children earning 100% of the average earnings assuming 160 working hours in a month.

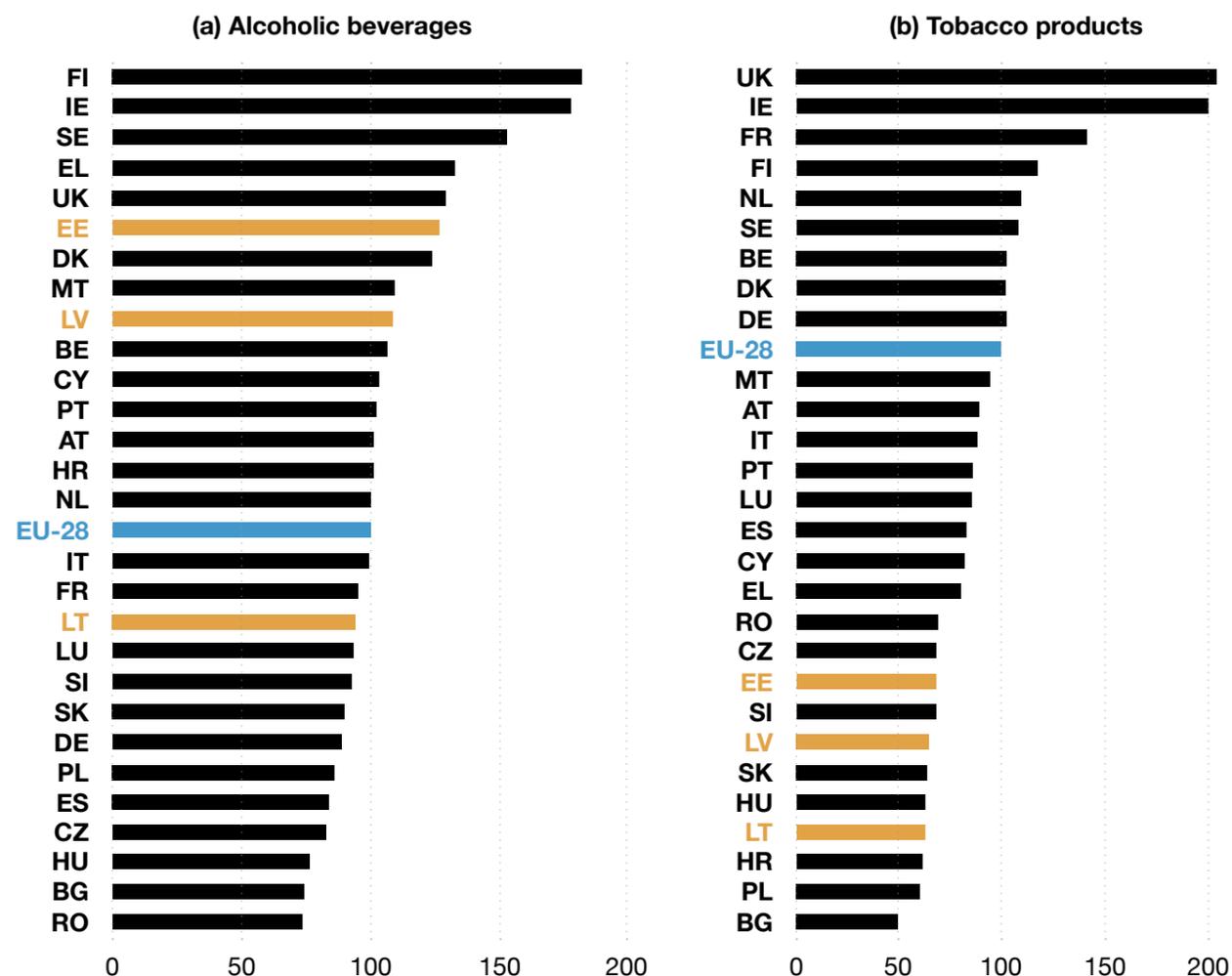
The data on average retail prices of excise goods come from:
 (i) Central Statistical Bureau of Latvia: PCG030. Atsevišķu produktu vidējās mazumtirdzniecības cenas (engl. – Average retail prices of selected commodities); (ii) The Lithuanian Department of Statistics: Average monthly retail prices for the most popular products; (iii) Tax and Customs Board of Republic of Estonia: Prevailing price of cigarettes. (iv) Estonian Institute of Economic Research, National Institute for Health Development (2019). Alcohol market, consumption and harms in Estonia. Yearbook 2019. Tallinn: Estonian Institute of Economic Research. Available: <https://dea.digar.ee/cgi-bin/dea?a=d&d=Jvalkoturg201911.2.9>. (v) Expatistan. Available: <https://www.expatisitan.com/cost-of-living>

Price levels of alcoholic beverages and tobacco products in the EU countries

Finally, we compare PPP-adjusted price levels of alcohol and tobacco products in the EU countries. In 2018, the price level of alcoholic beverages (spirits, wine and beer) was highest in Finland (with a price level index of 181.6), followed by Ireland (177.1) and Sweden (152.3) (see Figure 3.4). The average price of alcoholic beverages in Finland was 2.5 times as high as in Romania, where the average price level of alcoholic drinks is the lowest in the EU. Average prices of alcohol in Latvia and Estonia in 2018 were above the EU average (8.5% higher in Latvia and 26.3% higher in Estonia), while prices in Lithuania were on average 6% lower than in EU-28.

The highest relative price of tobacco products in 2018 were recorded in the UK. Tobacco products in the UK were 4.2 times as expensive as in Bulgaria, the country with the cheapest tobacco products in the EU in 2018. Price level indices for all tobacco products in the Baltic countries score below the EU-28 average (by 35.2% in Latvia, by 37.4% in Lithuania and by 32.3% in Estonia). When comparing the Baltic countries, it can be concluded that on average Estonia has higher price levels for both alcoholic beverages and tobacco than Lithuania and Latvia.

Figure 3.4: PPP-adjusted price level indices for tobacco products and alcoholic beverages in the EU countries¹⁷ in 2018 (EU28=100)



Note: Two-letter country codes refer to country codes used by Eurostat.
Source: Eurostat dataset *prc_ppc_ind*

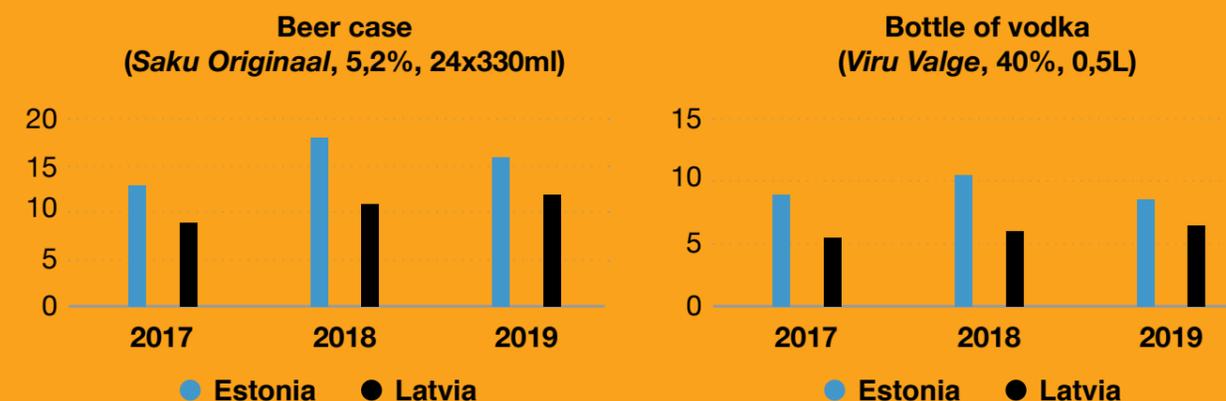
¹⁷ In this section we analyse the price level indices in 2018 in 28 EU countries, which were EU Member States in 2018, i.e. including the United Kingdom.

4. CROSS-BORDER TRADE

EU law sets out the maximum amount of tobacco products and alcoholic beverages that can be brought from one EU country to another by private individuals for own use and not intended for resale, but each EU country can decide on setting the maximum amount at a lower level. There are certain restrictions for other goods as well.

In Northern Europe, the Baltic countries are known for cheaper excise goods than in the Nordic countries, thus tourists from the Nordic countries visit the Baltic countries to purchase alcoholic beverages and tobacco at lower prices. Nevertheless, the search for cheaper alcoholic beverages and cigarettes exist even within the Baltic countries. Therefore, each country's excise tax policy can be influenced by the political decisions in the other two Baltic countries and other neighbours, e.g. Finland, Sweden, Belarus, Poland and Russia. Differences in retail prices of excise goods can motivate citizens to travel to neighbouring countries to buy an excise product for lower prices if the price differential is sufficient to compensate travel expenses (for comparison of prices in Estonian – Latvian border shops see Figure 4.1).

Figure 4.1: Average retail prices of beer and vodka in Estonian-Latvian border shops in June 2017-2019, EUR



Source: Estonian Institute of Economic Research, National Institute for Health Development (2019). Alcohol market, consumption and harms in Estonia. Yearbook 2019. Tallinn: Estonian Institute of Economic Research. Available: <https://dea.digar.ee/cgi-bin/dea?a=d&d=JValkoturg201911.2.9>

4.1 CROSS-BORDER TRADE OF ALCOHOL

Countries where excise duties are higher than in their neighbouring peers risk losing part of their budget revenue due to the cross-border sales. The State Revenue Service of Latvia (hereafter – SRS) estimated that in 2017 13% of total revenues from excise duty on alcoholic beverages in Latvia were collected via cross-border trade between Latvia and Estonia. According to the estimation of SRS, based on the data from a survey of Latvian retailers located close to the Latvian-Estonian border (in Valka, Ainaži, Rūjiena and Ape), sales of strong alcoholic beverages increased from 2 million litres in 2016 to 8 million litres in 2017, while sales of beer increased from 9 million of litres in 2016 to 16 million of litres in 2017 (Ritakafija.lv, 2018). The increase in sales was driven by an increased price differential between Estonia and Latvia as a result of excise tax hike in Estonia¹⁸.

In 2019, as both Estonia and Latvia reduced the excise duty on alcoholic beverages, the difference between the duty rates shrank, and the volume of alcoholic beverages sold by Latvian retailers located close to the Latvian-Estonian border decreased. In 2019 compared to 2018, the share of strong alcoholic beverages sold in the respective region in total sales of strong alcoholic beverages in Latvia decreased from 16.5% to 13.6%, while the share of beer sold in the same region decreased from 15.1% to 12.9% (SRS, 2019; SRS, 2020).

According to Estonia's Inhabitant's Survey, in 2018 14% of Estonia's adult population specifically went to Latvia to buy alcoholic beverages, while 25% of respondents bought alcohol in Latvia while travelling. In 2018, 78% of those who specifically went to Latvia to purchase alcoholic beverages, did so at least 2 times.

4.2 CROSS-BORDER TRADE OF CIGARETTES

Cigarettes, as well as alcohol, are subject to cross-border trade. According to KPMG (2020) data, in 2019 the volume of legal non-domestic cigarettes (hereafter - ND(L), legal inflows of cigarettes into the market, defined as a product that is brought into the market legally by consumers, such as during a cross-border trip) has reached the largest levels recorded since 2007, implying that people are seeking ways to exploit excise taxation differences within the EU. In the Baltics in particular, ND(L) accounted for 2-4% of total domestic consumption (total domestic sales minus outflows to other countries). Outflows of cigarettes to other countries comprised 15% of total legal domestic sales in Estonia, 8% in Lithuania and 5% in Latvia. A high share of cigarette outflows out of the market in Estonia is driven by a substantial cross-border trade between Estonia and Finland.

More important than ND(L) in the Baltics is illicit cigarette trade (counterfeit and contraband (hereafter – C&C)) (KPMG, 2019). For a discussion of C&C, see Section 5.2, which overviews illicit cigarette trade in the Baltic countries.

4.3 CROSS-BORDER SALES OF PRODUCTS AND SOFT DRINKS WITH ADDED SUGAR

So far there is no evidence that people are going to neighbouring countries to purchase soft drinks in the Baltics. However, experience from some other European countries shows that consumers are prepared to cross borders in order to acquire sugary food and soft drinks where a significant price difference exists.

Norway significantly increased the tax rate on sugary food and non-alcoholic beverages in 2018 (an 83% increase for general sugar-containing ready-to-eat products and a 42% increase for non-alcoholic beverages with added sugar (Ministry of Finance of Norway, 2018; The Guardian, 2019). While domestic producers reported their sales falling by almost one third and the Norwegian government claimed a decline in consumption, Norwegians made 8.4 million and 9.6 million trips to Swedish border retail places in 2018 and 2019, respectively. Shopping spending by Norwegian consumers in 2018 increased by 4% and in 2019 by 2% amounting to the total spending of around 3 billion euros for two years (Statistics Norway, 2020). Norwegian local producers have repeatedly expressed concerns that an increase in the tax supports Swedish businesses and harms the local industry. In general, the experience of Norway raises the question whether the reported decline in domestic sales represents a decrease in consumption given a high volume of cross-border sales.

Experience from Denmark shows that an increase in excise taxes for beer, wine, chocolate, candy, sodas, ice-cream, coffee, tea, and light bulbs in 2012 fuelled cross-border trade that enhanced illegal trade and reduced both local jobs and state revenue. Furthermore, the cross-border sales also had a negative impact on social and environmental aspects: it discriminated law-abiding citizens, lead to over-consumption (as people stock-piled the product) and harmed the environment, because of the double transportation (products produced and exported from Denmark to Germany are being brought back to the origin country) and not recollected packaging. For these reasons in 2013 Denmark cancelled an introduction of a new sugar tax on other products with large amount of added sugar and abolished an excise duty on products with high concentrations of fats, reduced the tax rate on beer by 15%, and the tax on soft drinks by 50%, but in 2014 the country cancelled the tax on soft drinks (Danish Brewers's Association, 2017). In 2012 cross-border sales of beer and soft drinks grew by 12%, but after the reduction of the tax sales over the border decreased by 9% and 19%, respectively. At the same time, domestic sales decreased by 8% for beer and 7% for soft drinks in 2012, while in 2013 sales increased by 1% and 8% respectively (Danish Brewers's Association, 2015). Overall, according to the Danish Grocer's Trade Organisation, in 2012 nearly 60% of Danish

¹⁸ In the second half of 2017, an excise duty on beer in Estonia was almost 2.5 times as high as in Latvia and the excise duty on ethyl alcohol was by 65% higher than in Latvia.

households admitted that they travelled to Germany to shop beer and soft drinks, whereas in 2008 60% of households in Denmark reported that they have never travelled to Germany to shop (Euroactiv, 2012).

The experience of Norway and Denmark raises a question whether the tax on sugary food products and non-alcoholic beverages can indeed reduce consumption when there are significant differences in prices of such products between the bordering countries. Given high volumes of cross-border trade the true effect on consumption of the taxed goods is hard to estimate. The experience of the two countries also highlights the importance of excise tax policy coordination across neighbouring countries to discourage the cross-border trade and to improve the efficiency of excise tax.

5. CONSUMPTION OF EXCISE GOODS

5.1 CONSUMPTION OF ALCOHOLIC BEVERAGES

In line with WHO approach, total alcohol consumption can be broadly classified into recorded and unrecorded consumption (WHO, 2020a). Recorded alcohol consumption refers to recorded amount of alcohol consumed over a calendar year in the country according to the official statistics based on production, import, export, and sales or taxation data. In the case of the Baltic countries, this indicator corresponds to the volume of alcohol released for consumption at the time when alcohol is subject to the excise duty. Unrecorded alcohol consumption refers to alcohol which is not taxed and is outside the usual system of governmental control, such as home or informally produced alcohol (legal or illegal), smuggled alcohol, surrogate alcohol (which is alcohol not intended for human consumption), or alcohol obtained through cross-border shopping (which is recorded in a different jurisdiction).

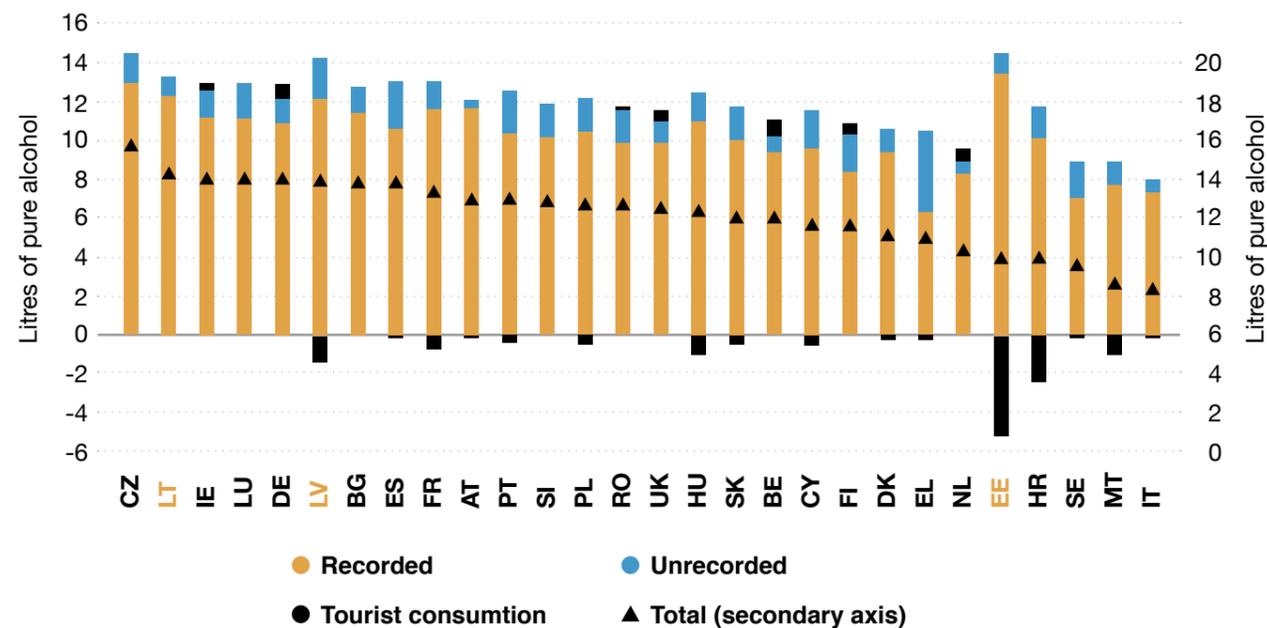
Total alcohol consumption is being adjusted for tourist consumption, i.e., for the alcohol purchased and consumed by tourists, and for the alcohol purchased and consumed when people are visiting other countries. Positive net tourist consumption implies that alcohol consumption by outbound tourists exceeds alcohol consumption by inbound tourists, negative net consumption by tourists implies that inbound tourists consume more than outbound tourists.

Total per capita (age 15+ years) alcohol consumption (hereafter – total APC) in 2016-2018 in Lithuania and Latvia were among the highest in the EU (with 13.2 and 12.8 litres of pure alcohol per capita respectively) (see Figure 5.1). APC in Estonia was relatively low (9.2 litres).

When compared with other EU countries, Greece stands out as a country with a very high share of unrecorded APC in total APC (41%), followed by Sweden with 20% of unrecorded APC. Among the Baltics, Latvia has the highest share of unrecorded alcohol. Unrecorded APC in Latvia is 2 times as high as in Lithuania and Estonia (2 litres of pure alcohol per capita in Latvia and 1 litre – in Lithuania and Estonia).

Among all EU countries Estonia stood out with the highest level of recorded APC (13.5 litres of pure alcohol per capita), and at the same time with the largest amount of alcohol associated with tourist consumption. The negative value of net tourist consumption implies that total amount of alcohol consumed by Estonians visiting foreign countries is smaller than alcohol consumption by tourists visiting Estonia. According to Statistics Estonia, almost half of all accommodated foreign tourists are coming from Finland, while one of the most popular reasons for coming to Estonia are cheaper excise goods (BBC News, 2017).

Figure 5.1: Total recorded and unrecorded per capita (age 15+ years) alcohol consumption (in litres of pure alcohol over a calendar year) in the EU countries, 2016-2018, calculated as three-year average of sum of recorded and unrecorded APC, adjusted for tourist consumption

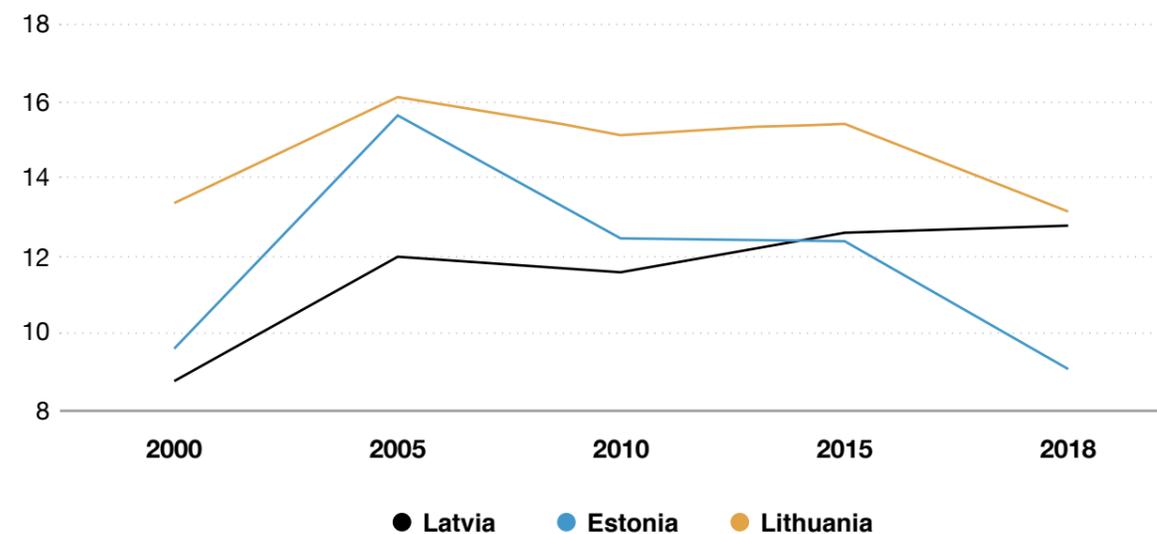


Note: Total alcohol per capita consumption (APC) is defined as the total (sum of recorded and unrecorded alcohol) amount of alcohol consumed per person (15years of age or older) over a calendar year, in litres of pure alcohol, adjusted for tourist consumption.

Source:
 WHO (2020b). "Alcohol, total per capita (15+) consumption (in litres of pure alcohol) with 95%CI."
 Available: <https://apps.who.int/gho/data/node.main.A1036?lang=en>
 WHO (2020c). "Alcohol, recorded per capita (15+) consumption (in litres of pure alcohol), three-year average with 95%CI.". Available: <https://apps.who.int/gho/data/node.main.A1029?lang=en>
 WHO (2020d). "Alcohol, unrecorded per capita (15+) consumption (in litres of pure alcohol) with 95%CI.". Available: <https://apps.who.int/gho/data/node.main.A1027?lang=en>
 WHO (2020e). "Alcohol, tourist consumption (in litres of pure alcohol)." Available: <https://apps.who.int/gho/data/node.main.A1033?lang=en>

Throughout the period of 2000-2018 total APC in Lithuania was higher than in the other two Baltic countries (see Figure 5.2). Both in Estonia and Lithuania APC in 2018 was roughly the same as in 2000, while in Latvia it increased by about 4 litres of pure alcohol per capita or 45%. The exact reason for such an increase in APC in Latvia is unfortunately impossible to identify, because the disaggregated data on APC by components (recorded, unrecorded and tourists' consumption) is available only for 2016-2018.

Figure 5.2: Total per capita (age 15+ years) alcohol consumption (in litres of pure alcohol over a calendar year) in the EU countries, 2000-2018



Note: Total alcohol per capita consumption (APC) is defined as the total (sum of recorded and unrecorded alcohol) amount of alcohol consumed per person (15years of age or older) over a calendar year, in litres of pure alcohol, adjusted for tourist consumption. Tourist consumption takes into account tourists visiting the country and inhabitants visiting other countries.

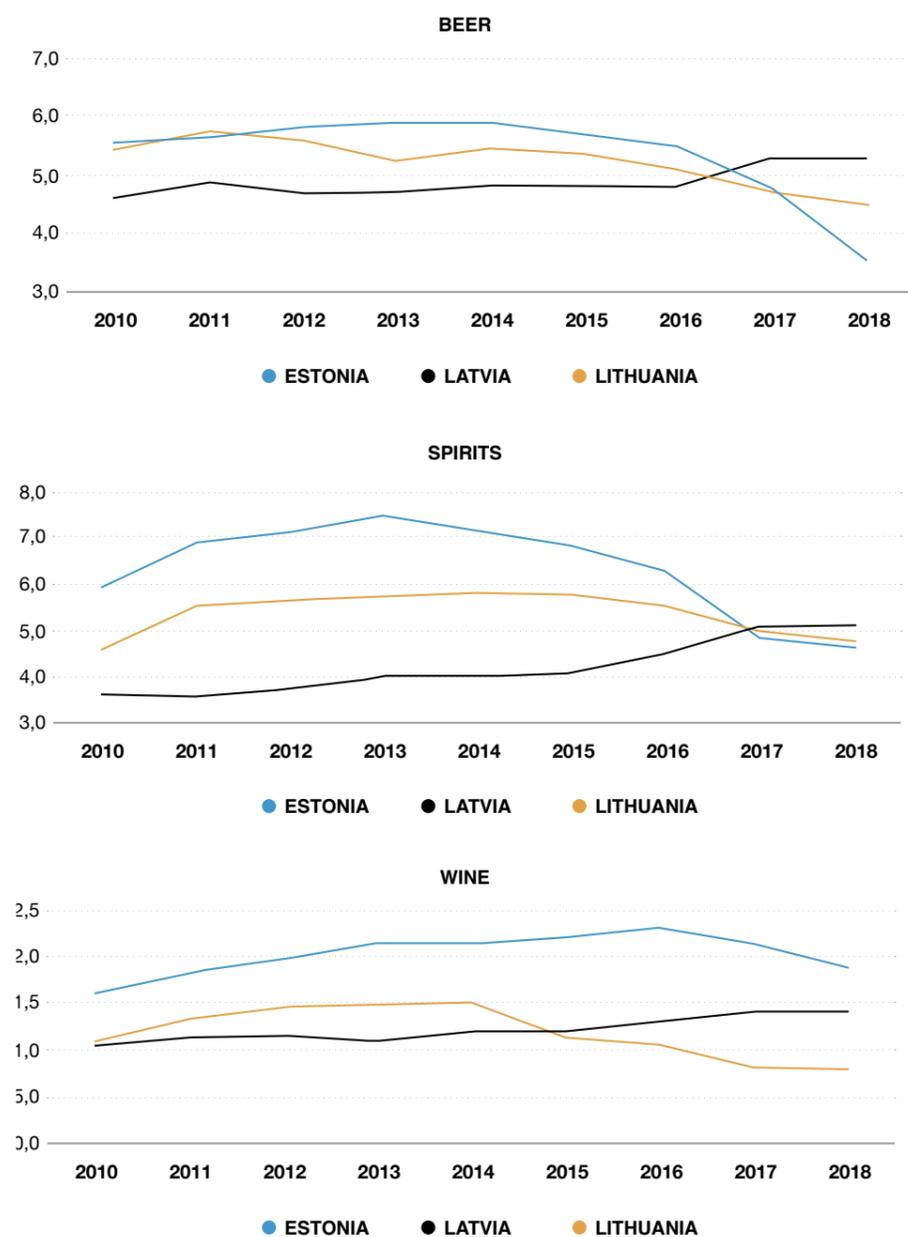
The total alcohol consumption is calculated as three-year average of sum of per capita recorded alcohol consumption and an estimate of per capita (15+) unrecorded APC for a calendar year. E.g., the total APC of 2018 was calculated from a three-year average (for 2017, 2018, and 2019) of recorded per capita consumption and applying unrecorded proportion (for 2018) and tourist consumption (for 2018).
 Source: WHO (2020f). "Total (recorded+unrecorded) alcohol per capita (15+) consumption".
 Available: <https://apps.who.int/gho/data/node.main.A1029SDG3?lang=en>

The composition of recorded APC is very similar in the Baltic countries and did not change much over time period of 2010-2018 (see Figure 0.1 in Annex). Beer and spirits (measured in litres of pure alcohol) are the two largest categories in total structure of recorded APC, in total accounting for more than 70% of recorded APC. Over the period 2010-2018, per capita consumption of spirits was growing much faster than that of beer in Latvia, while in Lithuania per capita consumption of spirits has not changed, and consumption of beer has declined by about 18%. In Estonia, per capita consumption of beer has declined more than that of spirits (see Figure 0.2 in Annex). In Estonia, the share of wine has increased over the time, but in Lithuania and Latvia remained relatively unchanged. Other alcoholic beverages include fermented alcoholic beverages other than wine and beer, and their share in recorded APC in Estonia and Lithuania is about 2 times as high as in Latvia.

Since 2016, recorded APC of beer and spirits (measured in litres of pure alcohol) has sharply declined in Estonia, but increased in Latvia, which is likely to be due to cross-border trade between Latvia and Estonia caused by increased price differential as a result of excise tax hike in Estonia (see Figure 5.3). Per capita consumption of beer and spirits is also declining in

Lithuania, but the decline is more moderate than in Estonia. In contrast to the other Baltic countries, per capita consumption of wine is increasing in Latvia over last 10 years, while in Lithuania and Estonia the upward trend was reversed to a downward trend in mid-2010s.

Figure 5.3: Recorded per capita (age 15+ years) consumption of selected alcoholic beverages in the Baltic countries, litres of pure alcohol, 2010-2018



Note: Recorded APC is defined as the recorded amount of alcohol consumed per capita (15+ years) over a calendar year in a country, in litres of pure alcohol. The indicator only takes into account the consumption which is recorded from production, import, export, and sales data often via taxation.

Source: WHO (2020g). „Consumption by type of alcoholic beverages by country.” Available: <https://apps.who.int/gho/data/node.main.A1023?lang=en&showonly=GISAH>

5.2 CONSUMPTION OF TOBACCO PRODUCTS AND E-CIGARETTES

Consumption of tobacco products is one of the biggest public health threats. Healthcare costs for treating diseases caused by smoking or passive smoking poses economic costs for the entire population. According to the WHO (2019) excise duties on tobacco products is an effective tool that curbs smoking: a 10% increase in the price of tobacco reduced consumption by 4% in high-income countries and by 5% in low- and middle-income countries.

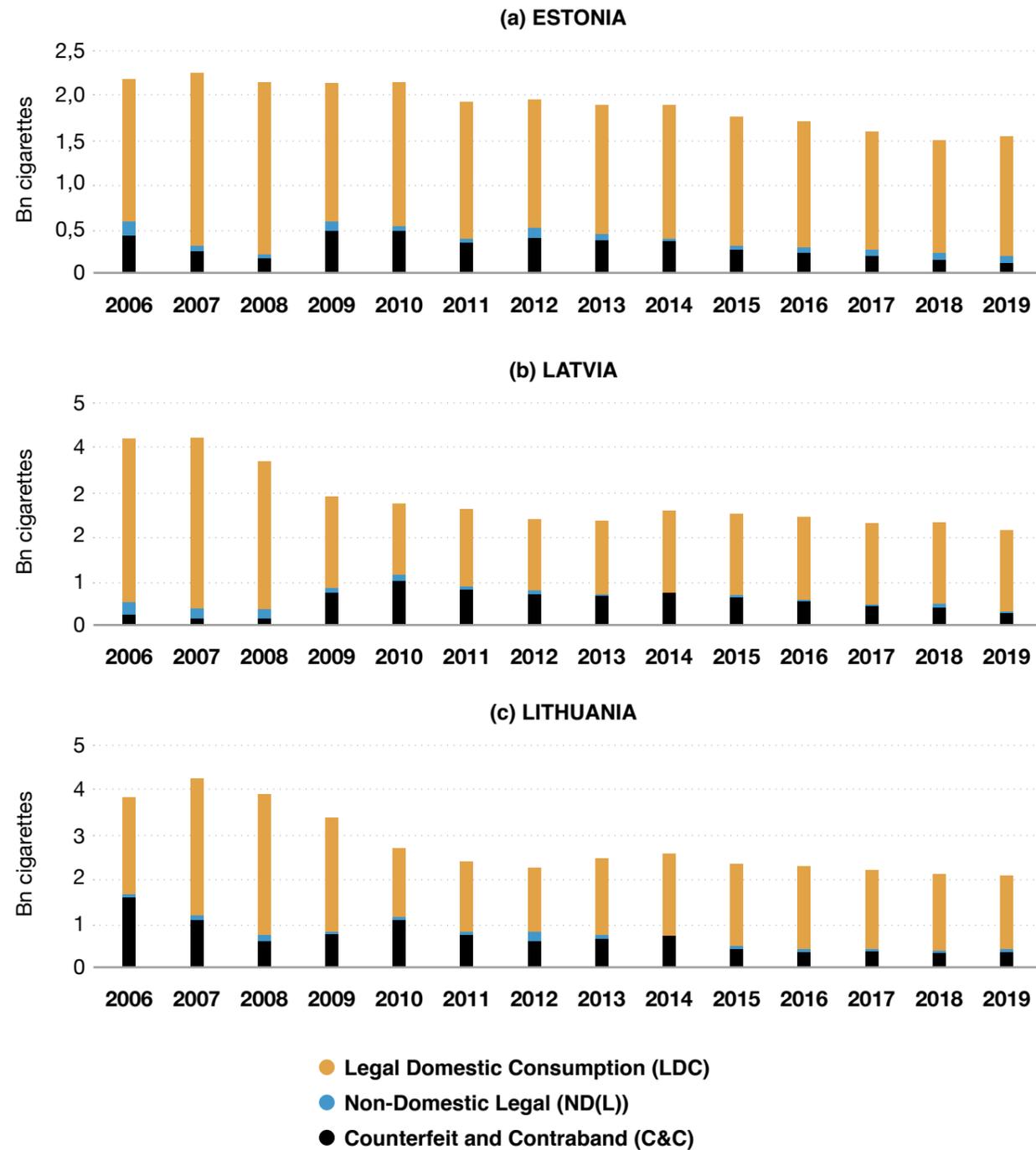
5.2.1 CONSUMPTION OF CIGARETTES

KPMG (2020) analyses three components of total cigarette consumption: legal domestic consumption, consumption of illicit products and consumption of cigarettes legally purchased abroad¹⁹. The largest share of consumption in the Baltics comes from domestic legal sales (see Figure 5.4). At the same time, the Baltic countries stand out by having one of the largest shares of C&C cigarettes in the EU. In 2019, Lithuania occupied the second highest position among the EU countries in terms of C&C share in total cigarette consumption (18%). In 2019, compared to 2018, C&C share in Latvia declined by 5 percentage points, which was the largest decline in the EU. Despite the decline, Latvia continued to have one of the highest C&C shares in the EU (14%). In Estonia the share of C&C amounted to 7% of total cigarette consumption. In Latvia and Lithuania illicit flows mainly originate from neighbouring Belarus. In Estonia, the largest sources of C&C are Belarus and Russia, where Belarusian cigarettes can be legally imported as long as they are not sold.

Overall, in 2019 C&C accounted for 7.9% of total cigarettes consumption in the EU countries, representing a tax loss of EUR 9.5 billion. According to the estimation of KPMG, if C&C cigarettes were sold via legal sales it would generate additional government revenues of EUR 18 mln in Estonia, EUR 41 mln in Latvia, and EUR 68 mln in Lithuania.

¹⁹ Legal domestic consumption (LDC) is defined as legal domestic sales net of outflows from the country. Illicit products (C&C) - Counterfeit and Contraband, including Illicit Whites. Non-Domestic (Legal) (ND(L) – product that is brought into the market legally by consumers, such as during a cross-border trip. For more details see KPMG (2020).

Figure 5.4: Composition of total consumption of cigarettes in the Baltic countries, 2006-2019, billions of cigarettes

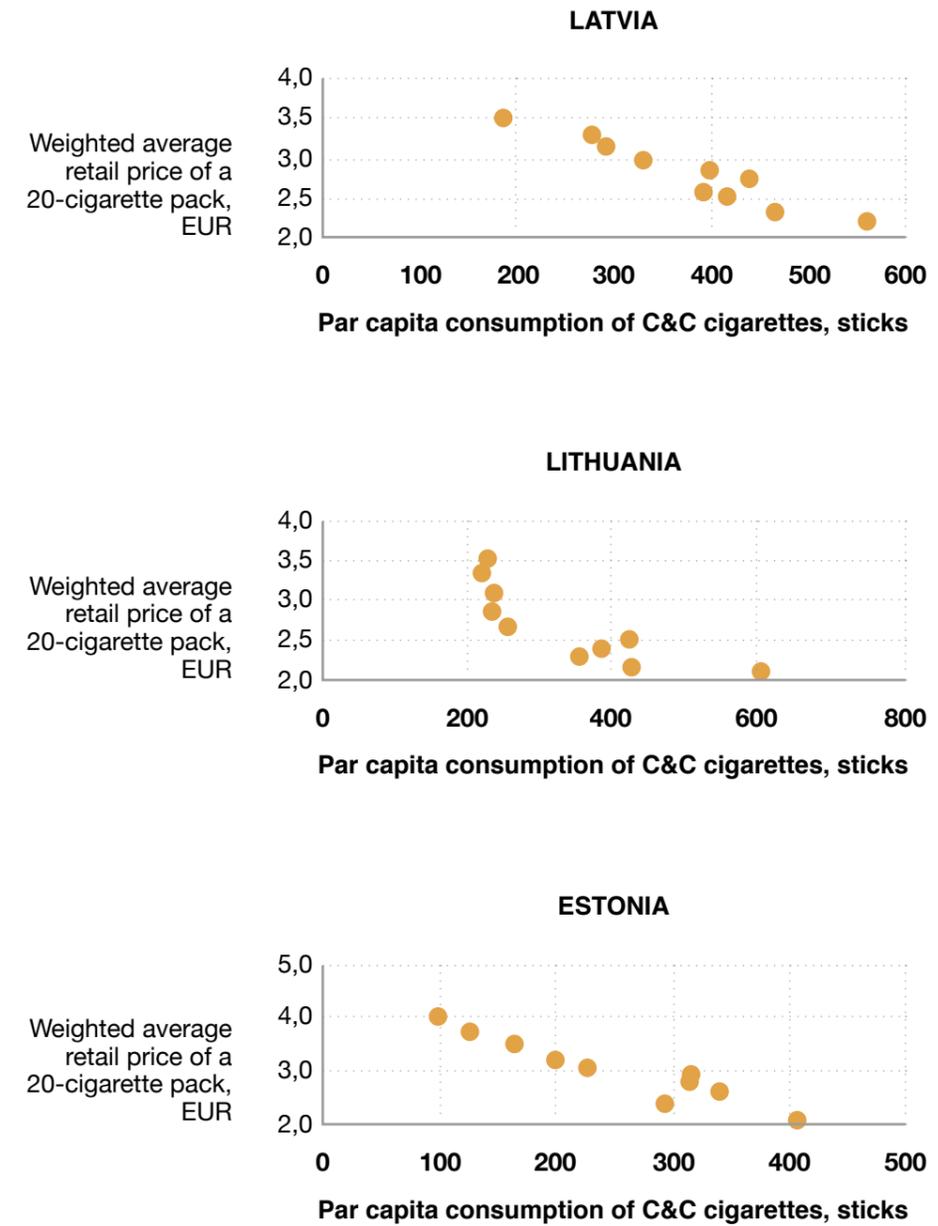


Note: Actual total consumption of cigarettes in a market includes Legal Domestic Consumption (LDC, defined as Legal Domestic Sales (LDS) net of outflows) and illicit products (C&C Counterfeit & Contraband) as well as those legally purchased overseas (ND(L)).

Source: KPMG, Project Sun: A study of the illicit cigarette market in the European Union, Norway and Switzerland, 2019, 2016 and 2012 Results

There is a clear negative correlation between per capita (persons aged 15 and over) consumption of C&C cigarettes and weighted average retail price of a 20-cigarette pack in the Baltic countries (see Figure 5.5). A decrease of inflows of C&C cigarettes is likely to be driven by better enforcement and increased border controls (KPMG, 2018). There is also a negative correlation between actual per capita cigarette consumption and weighted average retail price of a 20-cigarette pack in the Baltic countries (see Figure 0.3 in Annex).

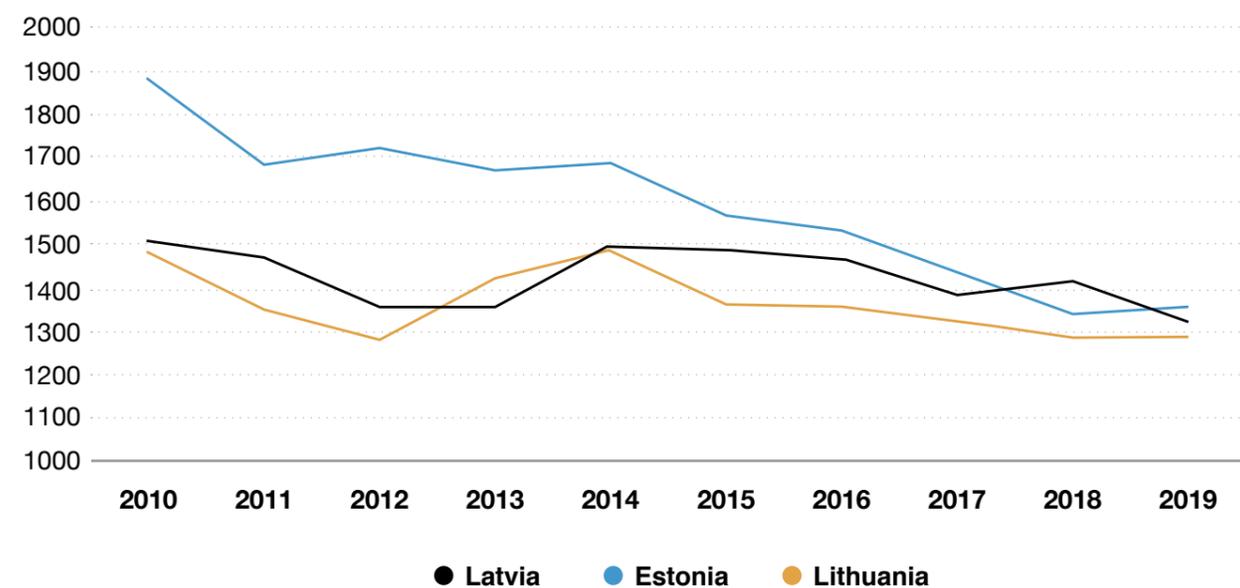
Figure 5.5: Weighted average retail price of a 20-cigarette pack, EUR, vs. per capita (persons aged 15 and over) consumption of C&C cigarettes, sticks, in the Baltic countries, in 2010-2019



Source: Authors calculations using data on weighted average retail price of cigarettes obtained from AC Nielsen; data on C&C consumption derived from KPMG, Project Sun: A study of the illicit cigarette market in the European Union, Norway and Switzerland, 2019, 2016 and 2012 Results

In 2010-2017, annual cigarette consumption per capita (persons aged 15 and over) was significantly higher in Estonia than in Latvia and Lithuania, but the gap was narrowing over time (see Figure 5.6). In 2010, in Estonia per capita cigarette consumption was 1.2–1.3 times as high as in Latvia and Lithuania, while in 2017 this ratio was only 1.0–1.1. Over the last ten years, per capita consumption of cigarettes decreased the most in Estonia (by 28% in 2019 compared to 2010), followed by Lithuania (13%) and Latvia (12%).

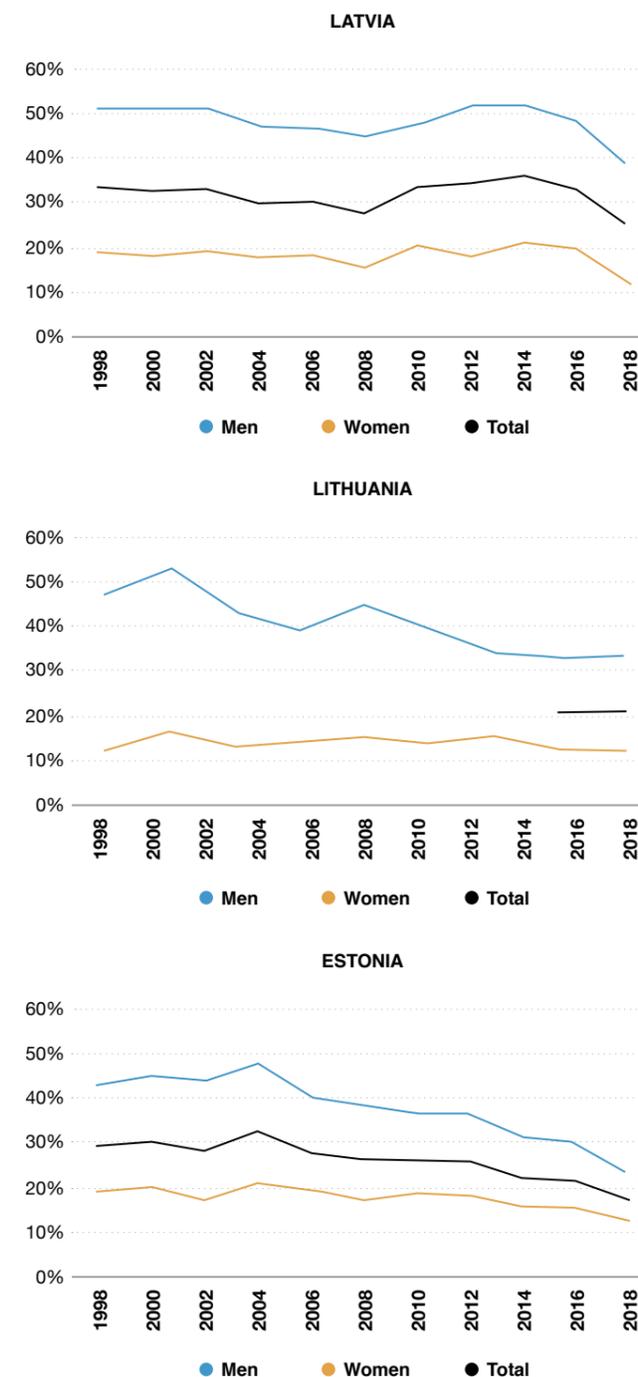
Figure 5.6: Actual cigarette consumption per capita (persons aged 15 and over) in the Baltic countries, 2010-2019, sticks



Source: Authors` calculations using data on actual total consumption derived from KPMG (2020). Data on population is derived from national statistical institutes (it was assumed that in 2019 population of adults (15+ years) in Estonia was the same as in 2018).

In 1998-2018, proportion of daily smokers in the Baltics has also declined (see Figure 5.7). Among the Baltic countries the lowest proportion of daily smokers was in Lithuania, but the largest proportion was in Latvia.

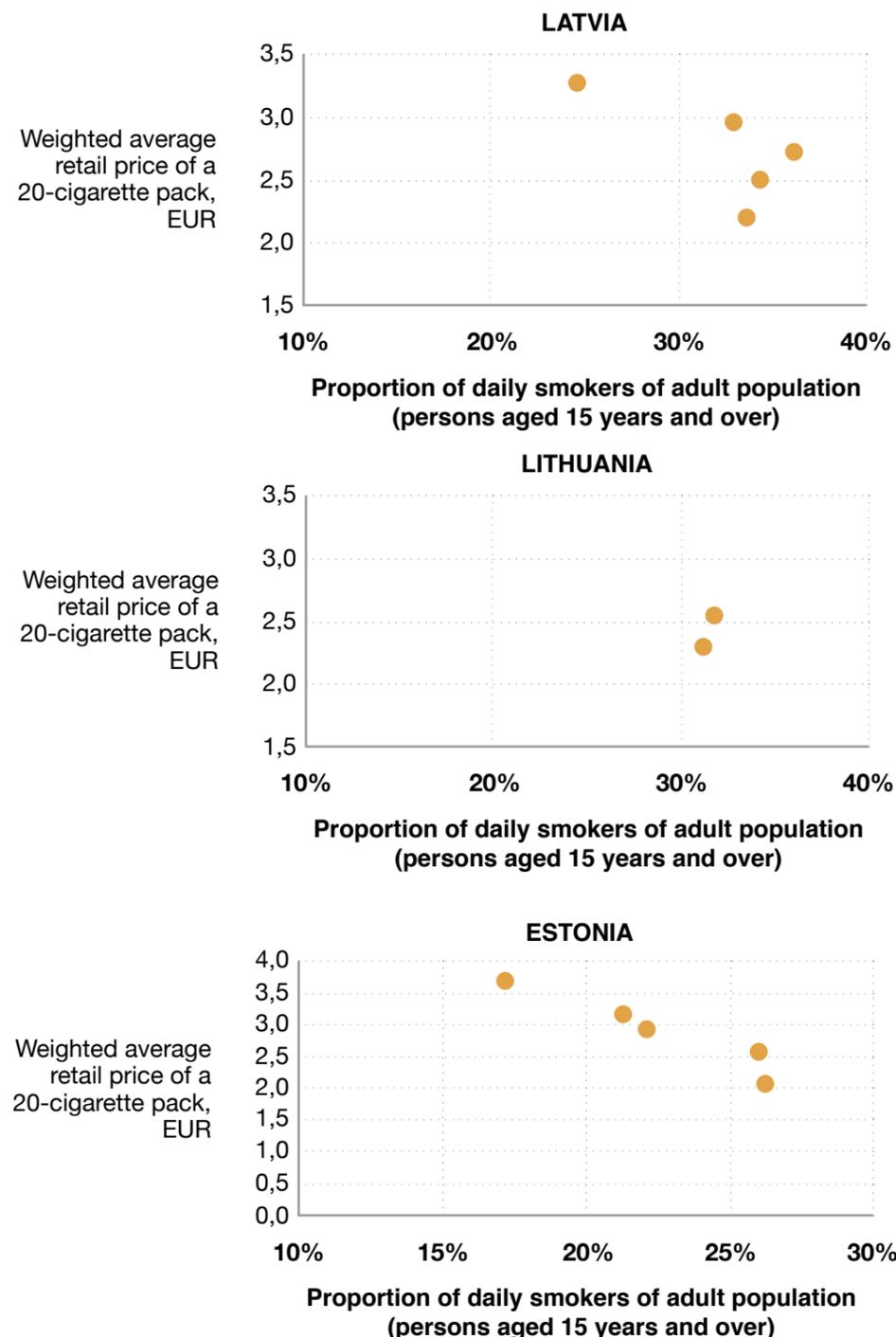
Figure 5.7: Proportion of daily smokers among adult population in the Baltic countries in 1998-2018, % of total population



Source: (i) Centre for disease prevention and control. Latvijas iedzīvotāju veselību ietekmējošo paradumu pētījums. (engl. - Health Behaviour among Latvian Adult Population). 11 reports conducted every two years since 1998; (ii) Lithuania Health Behaviour among the Adult Population. 9 reports conducted every two years since 1998 (iii) National Institute for Health Development. Health Behaviour among Estonian Adult Population.

Correlation between the proportion of daily smokers among adult population in the Baltic countries and the weighted average retail price of a 20-cigarette pack suggests that there is a clear negative relationship between these two indicators in Estonia and no strong evidence for a negative relationship in Latvia (see Figure 5.8). Data on smoking incidence for Lithuania is limited for drawing conclusions about the existing relationship between these indicators.

Figure 5.8: Weighted average retail price of a 20-cigarette pack, EUR, vs. proportion of daily smokers of adult population in the Baltics, in 2010-2018



Source: data on weighted average retail price of cigarettes obtained from AC Nielsen; data on total cigarette consumption derived from KPMG, Project Sun: A study of the illicit cigarette market in the European Union, Norway and Switzerland, 2019, 2016 and 2012 Results.

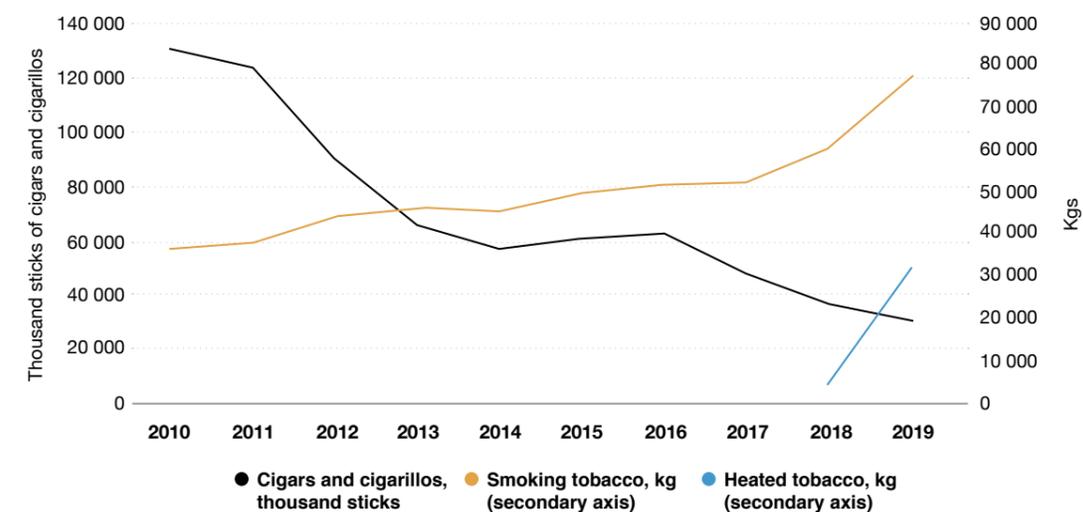
Data on proportion of daily smokers of adult population derived from (i) Centre for disease prevention and control. (engl. - Health Behaviour among Latvian Adult Population). 11 reports conducted every two years since 1998; (ii) Lithuania Health Behaviour among the Adult Population. 9 reports conducted every two years since 1998 (iii) National Institute for Health Development. Health Behaviour among Estonian Adult Population.

5.2.2 CONSUMPTION OF OTHER TOBACCO PRODUCTS AND E-CIGARETTES

In the recent years, the increasing number of substitutes, like smoking tobacco, heated tobacco and electronic cigarettes, have gained a wider popularity. To analyse the recent trends in consumption of tobacco products (other than cigarettes) and other alternative products, we use annual data of State Revenue Service of Latvia on the amount of tobacco products and liquid for e-cigarettes released for retail sale in Latvia (by type of products). Data shows that fine cut smoking tobacco and other smoking tobacco, as well as cigars and cigarillos are the most broadly used tobacco products other than cigarettes. In the last decade, the volume of smoking tobacco released for retail sale has doubled. The sales volume of cigars and cigarillos declined by 77.0% over the last decade (see Figure 5.9) that is likely to be driven by a significant increase in excise tax rates on cigars and cigarillos that considerably exceeds the general increase in the tax rate for other tobacco products. To compare, in Latvia in 2019 the excise duty on cigars and cigarillos was 5.6 times as high as in 2010, while the excise duty on smoking tobacco was only 2.1 times as high as in 2010. During 2010-2019, the minimum excise duty on cigarettes was increased by a factor of 1.7, the specific component was increased by a factor of 2.5, while the ad valorem rate was decreased by 15 percentage points.

Heated tobacco and liquid for e-cigarettes are relatively new products used as an alternative to cigarette smoking. Heated tobacco was released for retail sale in Latvia in March 2018 for the first time²⁰, and its sales volume has been growing rapidly. At the same time, the sales volume of liquid for e-cigarettes is still very small and without stable trend to increase.

Figure 5.9: Cigars and cigarillos, thousand sticks, heated and smoking tobacco, kgs, released for retail sale in Latvia, 2010-2019



Note: Heated tobacco was released for retail sale in Latvia in March 2018 for the first time
Source: State Revenue Service of Latvia

²⁰ According to data of the State Revenue Service, the volume of heated tobacco released for consumption is recorded starting from March 2018.

Heated tobacco products are marketed as so-called potentially reduced-exposure products, or even as modified-risk tobacco products. Heated tobacco is different from conventional cigarettes in their mechanism, which heats the tobacco to considerably lower temperatures. According to tobacco-industry and a number of independently funded studies including some government institutions in Germany (Mallock N. u.c., 2018), the Netherlands (National Institute for Public Health and the Environment, 2018) and the United Kingdom (Food Standards Agency, 2017), heating tobacco generates significantly lower levels of harmful chemicals than conventional tobacco products (PMI science). It can be argued, that if heated tobacco has the potential to present less risk of harm, then this could be reflected in the lower duty rate than for conventional tobacco products. The main rationale for differential taxation is that lower excise duties and therefore lower prices can encourage consumers to migrate from highly taxed cigarettes to less risky products that are heated rather than burned. Nevertheless, WHO (2020) states that “currently there is insufficient evidence to conclude that HTPs (heated tobacco products) are less harmful than conventional cigarettes. In fact, there are concerns that while they may expose users to lower levels of some toxicants than conventional cigarettes, they also expose users to higher levels of other toxicants. It is not clear how this toxicological profile translates into short- and long-term health effects”. European Network for Smoking and Tobacco Prevention (ENSP) co-funded by the European Union reviews the scientific evidence as well as position of national and international organisations including the European Respiratory Society (European Respiratory Society, 2018) and the French Alliance Against Tobacco (The French Alliance against tobacco, 2017) and concludes “that heated tobacco products are shown to: 1) be harmful and addictive; 2) undermine smokers’ wish to quit; 3) undermine ex-smokers’ wish to stay smoke-free; 4) be a temptation for non-smokers, in particular adolescents and young people; 5) pose a risk of re-normalisation of smoking; 6) pose a risk of dual use with conventional cigarettes.” (ENSP, 2018).

In July, 2020, the U.S. Food and Drug Administration (hereafter – FDA) authorized the marketing of Philip Morris Products S.A. “IQOS Tobacco Heating System” as modified risk tobacco products (U.S. FDA, 2020) recognizing that “the authorized information could help addicted adult smokers transition away from combusted cigarettes and reduce their exposure to harmful chemicals, but only if they completely switch.”. At the same time, U.S. Centers for Disease Control and Prevention emphasizes that “heated tobacco products are not an FDA approved method for quitting smoking” (U.S. Centers for Disease Control and Prevention, 2020). Moreover, FDA points out that “there is no safe tobacco product.... All tobacco products can lead to nicotine addiction and contain toxic, cancer-causing chemicals that can cause serious health problems” (U.S. FDA, 2020a).

In the UK, using e-cigarettes is considered as far safer alternative to smoking tobacco: this view is supported by leading UK health and public health organisations including the RCGP (Royal College of General Practitioners, 2017), BMA (the British Medical Association, 2017) and Cancer Research UK (2018) now agree that although not risk-free, e-cigarettes are far less harmful than smoking. Moreover, using e-cigarettes is considered as an effective option to quit smoking: e-cigarettes makes it one and a half times as likely a person will quit smoking, while combining stop smoking aids (like prescription tablets, nicotine replacement therapy products such as patches, inhalers and gum, as well as e-cigarettes or vapes) with expert support from local stop smoking services makes someone 3 times as likely to stop smoking successfully. Nevertheless, WHO states that “there is a growing body of evidence in some settings that never-smoker minors who use Electronic Nicotine Delivery Systems (ENDS) at least double their chance of starting to smoke conventional tobacco cigarettes later in life... The scientific evidence regarding the effectiveness of ENDS as a smoking cessation aid is still being debated. To date, in part due to the diversity of ENDS products and the low certainty surrounding many studies, the potential for ENDS to play a role as a population-level tobacco cessation intervention is unclear. To truly help tobacco users quit and to strengthen global tobacco control, governments need to scale up policies and interventions that we know work...” (WHO, 2020h).

To sum up, there is a mixed existing evidence on health harms of heated tobacco products compared to conventional cigarettes and on the effectiveness of e-cigarettes as a smoking cessation aid. Although there is growing amount of evidence that smokeless products are less harmful comparing to the cigarette smoking, there are concerns about potential of smokeless products to attract new tobacco users, especially youth, and to discourage smoking cessation. On the one hand, there is a rationale for differential taxation of tobacco products and their alternative products according to the health risks that they present, to encourage less harmful consumption. On the other hand, government could closely monitor (by amending regular existing surveys and studies such as those carried out regularly by the Center for Disease Prevention and Control in Latvia) how these products are used by consumers to ensure that these products do not cause increased use among people, especially youth. Similar approach (with regard to marketing of heated tobacco) was recently announced by the US Food and Drug Administration (U.S. FDA, 2020).

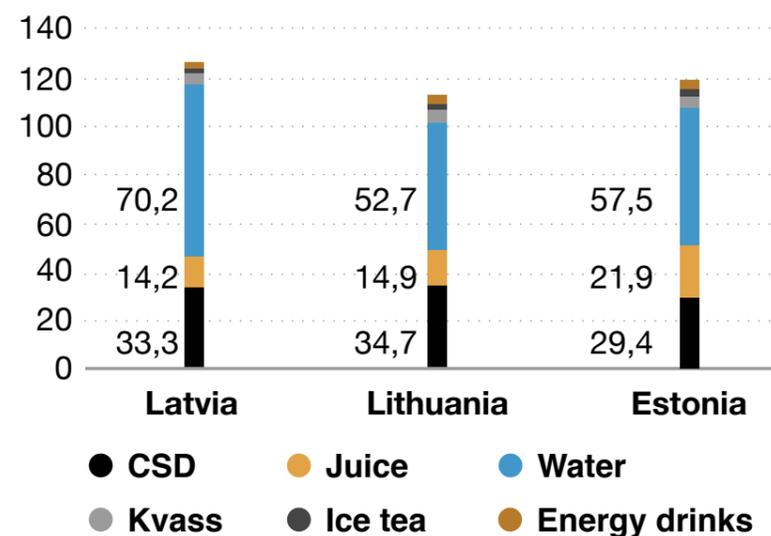
5.3 CONSUMPTION OF SOFT DRINKS

5.3.1 CONSUMPTION OF SOFT DRINKS IN THE BALTIC COUNTRIES

Since there is no evidence that people are going to neighbouring countries to purchase soft drinks in the Baltics so far, we use data on sales volume of non-alcoholic beverages²¹ (hereafter - soft drinks) as a proxy for consumption.

In 2018, Latvia had the highest per capita sales of soft drinks²² among the Baltic countries (126.1 litres per capita), followed by Estonia (118.7 litres) and Lithuania (112.9 litres, see Figure 5.10). Sales of water accounts for the largest share (approximately half) of total sales of soft drinks. The second largest category is carbonated soft drinks (hereafter – CSD), accounting for 24-31% of total sales of soft drinks. Juices are the third largest category, being more important in Estonia (with 18% of total sales in 2018) than in other two Baltic countries (11 – 13%). The share of kvass, ice tea and energy drinks does not exceed 10% of total soft drinks sales (see Figure 5.11).

Figure 5.10: Structure of per capita sales of soft drinks in the Baltic countries, in 2018, litres

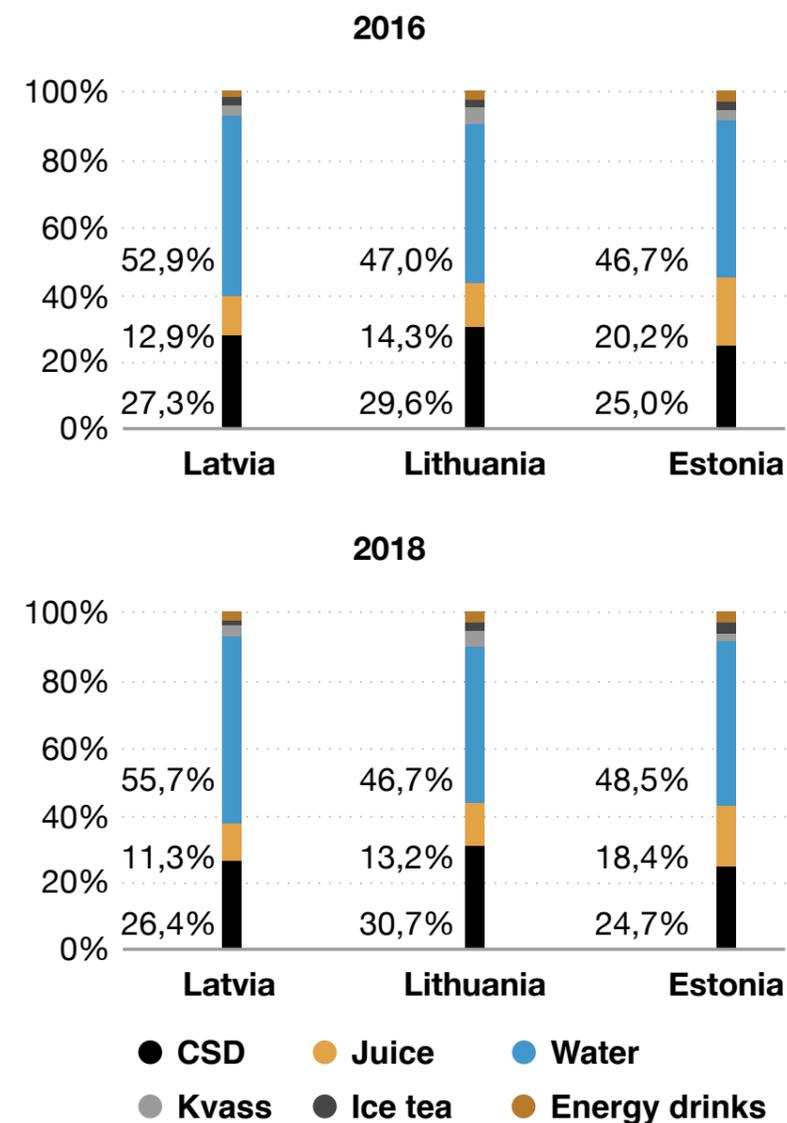


Source: data on sales of soft drinks obtained from AC Nielsen, data on population from national statistical institutes and authors' calculations

²¹ Data on sales volume of non-alcoholic beverages (non alcoholic ready to drink or NARTD) is obtained from AC Nielsen.

²² Soft drinks include the following types of drinks: water (both flavoured and unflavoured), carbonated soft drinks (CSD), juice drinks, energy drinks, ice tea and kvass.

Figure 5.11: Structure of soft drinks sales in the Baltic countries, 2016 and 2018, % of total sales



Source: data on sales of soft drinks obtained from AC Nielsen and authors' calculations

According to data on consumption of non-alcoholic drinks²³ in 2017 published by UNESDA (2020), per capita sales of non-alcoholic drinks in the Baltic countries accounts to only half (49.0-55.6%) of the average level across EU countries, while per capita sales of soft drinks accounts to 61.2%–67.3% of the average level across EU countries. Consumption structure is different from the EU average. The data shows that packaged water²⁴ makes up roughly half of total soft drinks consumption on average in the EU. This is

²³ UNESDA classifies non-alcoholic drinks into 4 categories: (1) soft drinks (include CSD, still juice drinks, iced tea drinks, iced coffee drinks, sport drinks, energy drinks, flavoured water and enhanced water); (2) packaged water; (3) dilutables; (4) juice & nectars.

²⁴ Excluding bulk/HOD water, flavoured and enhanced water.

similar to the share of water in Latvia and Lithuania, but in Estonia the share is 20 percentage points smaller. In the Baltic countries the share of juice and nectars and other soft drinks (including flavoured and enhanced water, but excluding packaged water) in total consumption is higher, but the share of dilutables is much lower (with the exception of Estonia) than on average in EU countries.

5.3.2 EVIDENCE FROM OTHER COUNTRIES ON EFFECTIVENESS OF TAXES IN REDUCING SUGAR INTAKE

There is no doubt about the negative health outcomes caused by obesity. The McKinsey Global Institute (MGI, 2014) studied 44 possible interventions aimed at changing consumer behaviour to address the problem of growing obesity in the world, and estimated potential costs of implementing such interventions. One of MGI main findings is that no single solution will be good in a fight with obesity, interventions should be used jointly within a systematic and comprehensive programme. In addition, they concluded that the most effective obesity is to reduce portion size (“encouraging appropriate consumption through incremental (i.e., 1% to 5%) reductions in portion sizes and designing packaging to better delineate portion size to help moderate consumption”) and to reformulate the product (incremental reduction of calories in food products to drive subconscious reduction in consumption), while introduction of the tax scored only 13th out of 16 intervention areas. Lithuania has managed to agree on the reduction of sugar levels in non-alcoholic beverages without imposing a tax. There is not yet data available to identify the impact of such policy, however, one can expect a positive effect.

A study conducted by New Zealand Institute of Economic Research (NZIER, 2017) provides a critical review of the evidence for sugar taxes as a fiscal instrument to improve health outcomes. The authors state that reduction in the rates of morbidity (incidence of disease, disability and ill-health) and mortality represents the desired welfare gain, rather than any reduction in consumption of sugar itself. They find no conclusive evidence that sugar taxes have a positive impact on health outcomes. In their review the authors conclude that studies which are using sound methods report reduction in sugar intake that is likely to be too small to generate health benefits and could easily be cancelled out by substitution with other caloric products. On the other hand, studies reporting a meaningful change in sugar intake assume no compensatory substitution. The abundance of substitutes with not only high sugar levels but also fats creates a risk that potential benefits from the tax are overturned and makes it hard to evaluate the real effect on health outcomes.

Experience of other countries

A Soft Drinks Review by Britvic's (2019) states that an increase in prices caused by the levy on soft drinks with sugar content of at least 5 grams per 100 ml²⁵ encouraged people to switch from high-sugar drinks to drinks with low or no sugar, proving the success of the levy. Before introducing the Soft Drinks Industry Levy in April 2018, UK provisioned to collect in excise duties on soft drinks around 500 million pounds by the end of 2018 (UK government, 2016). In response to the government decision to introduce a levy on soft drinks, many companies opted to reformulate their products by reducing sugar content in order to minimise the decline in sales volume. This resulted in only 8.4% of soft drinks being exposed to the levy once it commenced; while the projected revenue decreased to 240 million pounds (BBC News, 2018). Given that the UK is one of the countries with the highest share of the population being obese, the UK government is considering to expand the tax's base putting a levy on sugary milk products as well (Financial Times, 2018).

Capacci S. et.al. (2019) employed a difference-in-difference technique in their analysis and revealed that a tax on non-alcoholic sugary drinks introduced in France in 2012 had a minor effect on reducing sales volume of sweetened drinks (less than half a litre per capita per year) possibly due to the low tax rate. However, the study detects a higher response by heavy consumers, which is explained by a larger effect on their budget.

The experience from Hungary and Finland gives an evidence that a sugar tax is effective when imposed on a wide range of the products and consumers instead of switching to other foods with added sugar, salt and fats chose healthier options, which were not covered by the tax. However, there are significant negative effects to the industry, employment and competitiveness of domestic manufacturers.

Public Health Product Tax (PHPT) in Hungary was introduced in 2011 on a broad range of food products containing unhealthy levels of sugar, salt and other ingredients as well as soft drinks with added sugar. Introduction of the tax, in general, promoted switching from taxed products to healthier alternatives and to reformulation of the products (40% of the manufacturers changed their recipe, 70% of them reduced the amount of the targeted ingredient and 30% of them completely removed the targeted ingredient) (Ecorys, 2014a). Manufacturer sales of taxable products fell by an average of 27% and prices of taxable products rose by an average of 29% (WHO, 2015a). Overall, domestic companies operating only in Hungarian market were more affected by the tax than multinationals companies whose products were also exported (as exports are exempt from the tax). Producers affected

²⁵ Other than fruit juice, vegetable juice, and milk.

by PHPT reported that they cut investment, reduced production amounts and laid off part of the staff. In the period from 2011 to 2014 Hungarian government raised in PHPT around EUR 200 mln which was consistent with the initially estimated amount indicating that planning was based on a reliable method (WHO, 2015b). Important to note that revenue from PHPT was allocated to health care budget.

In Finland the reintroduction of a tax on sweets²⁶ (applied to confectionery, chocolate and ice-cream, while excluding such products as, e.g., biscuits, baked goods, yoghurt products, puddings) in 2011 raised prices on average by 30%. The main motivation for the reintroduction of the tax was to increase government revenue while improving the public's health was a secondary motive. Already in a year after the introduction of the tax consumers switched from taxed products to more healthy substitute options. Between 2012 and 2013 consumption of soft drinks alone decreased by 4%, while in 2011-2013 consumption of ice-cream decreased by 20%, equal to a reduction of 2 litres per capita, and consumption of chocolate and confectionery decreased by 5–6% (Ecorys, 2014b). Declining sales affected manufacturers of taxed products, casting a negative effect on employment and innovation too – a side effect of a sugar tax on the industry as also observed in Hungary. For example, employment in brewery sector, main producer of carbonated drinks and mineral water, in the period from 2010 to 2013 laid off 12% of their employees. The tax has significantly affected smaller producers as their bargaining power is lower and retailers transferred additional costs to manufacturers.

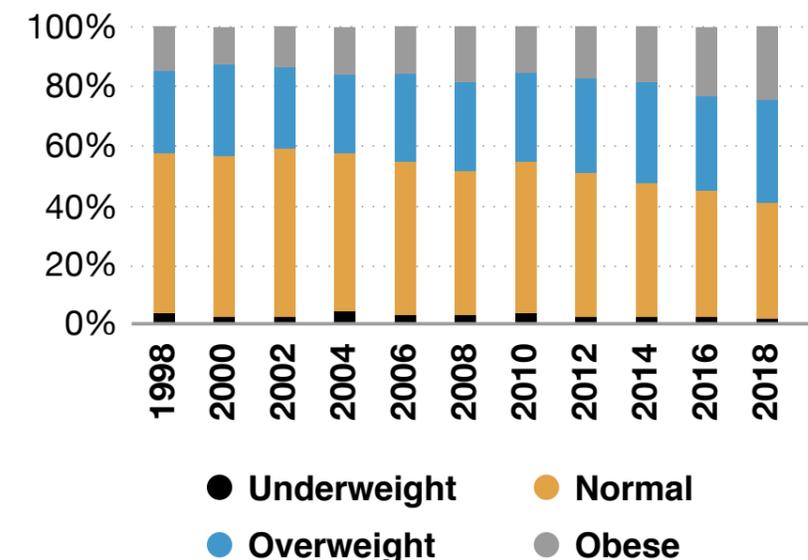
Experience of Latvia

In Latvia the tax on non-alcoholic beverages with added sugar was introduced in 1999, which was mainly motivated by the budget's financial needs.

Figure 5.12 shows dynamics of the shares of underweight, normal weight, overweight and obese population, measured by the body mass index in Latvia in 1998-2018. The share of population with normal weight decreased by 14 percentage points, while the share of the population being overweight and obese increased by 7 and 10 percentage points, respectively.

²⁶ Finland was one of the first countries in the world that in 1926 started to tax chocolate and candies, and non-alcoholic beverages in 1940. In 2000, however, the tax on sweets was abolished. Later, in 2011, the sweets tax was reinstated and is applied to confectionery, chocolate and ice-cream, while excluding bakery products, yoghurt, puddings and other such products. As of 2017, the sweets tax was abolished because of a warning from the European Commission that the tax is incompatible with EU State aid rules, while excise tax on non-alcoholic beverages remains to be in force.

Figure 5.12: Body mass index in Latvia in 1998-2018, % of population



Source: Centre for disease prevention and control. *Latvijas iedzīvotāju veselību ietekmējošo paradumu pētījums*. (engl. - *Health Behaviour among Latvian Adult Population*). 11 reports in 1998-2018. Available: https://spkc.gov.lv/lv/statistika-un-petijumi/petijumi-un-zinojumi/veselibu-ietekmejoso-paradumu-?glo_template=text

Taking into account experience of other countries which suggests that a sugar tax is effective when imposed on a wide range of products, we estimate the possible effect of an introduction of the excise tax on yoghurts, flavoured dairy drinks with added sugar or other sweeteners and ice-cream. Our approach is as follows. First, we estimate the tax base using Latvian data on sales of manufactured industrial products²⁷, as well as import and export²⁸ of the respective products in 2018. According to our estimations, in 2018 the tax base for yoghurts and flavoured dairy drinks with added sugar or other sweeteners would amount to 16.9 mln kilograms and the tax base for ice creams to 17.1 mln litres. In the next step, we estimate the budgetary effect assuming that the excise tax rate applicable to non-alcoholic beverages in Latvia is also applicable to yoghurts, flavoured dairy drinks with added

²⁷ Central Statistical Bureau of Latvia. RUG020. Sales of manufactured industrial products (in 10 digit of PRODCOM classification), (quantity; Thsd euro). For yoghurts we use PRODCOM 1051524500 - Flavoured liquid yoghurt or acidified milk (sour milk, cream, yoghurt and other fermented products, flavoured or containing added fruit, nuts or coconut), kg. For ice cream we use PRODCOM 1052100000 A -Ice cream and other edible ice (including sherbet, fruit ices, confectionery) (excluding mixtures and raw materials for ice cream), litres

²⁸ Central Statistical Bureau of Latvia. ATD8181. Imports in 2018 by country (euro, kg and supplementary unit; CN in 8 digits); ATD8180. Exports in 2018 by countries (euro, kg and supplementary units; CN in 8 digits) For yoghurts, we use the following product codes of the eight-digit Combined Nomenclature (CN): 04031031, 04031033, 04031039 (these categories include yoghurt, containing added sugar or other sweeteners, but not flavoured, not containing added fruit, nuts or cocoa); 04031091, 04031093, 04031099 (these categories include yoghurt, flavoured or containing added fruit, nuts or cocoa). For flavoured dairy drinks with added sugar or other sweeteners, we use the following product codes of the eight-digit Combined Nomenclature (CN): 04039061, 04039063, 04039069 (these categories include dairy products containing added sugar or other sweeteners, but not flavoured, not containing added fruit, nuts or cocoa), 04039091, 04039093, 04039099 (these categories include yoghurt, flavoured or containing added fruit, nuts or cocoa).

sugar or other sweeteners and ice cream (i.e., EUR 7.40 per 100 l of yoghurt and flavoured dairy products with added sugar or other sweeteners and EUR 7.40 per 100 kg of ice cream). The results of our estimations show that the application of the excise tax on these products would generate additional excise tax revenue of about EUR 2.5 mln, including EUR 1.25 mln from yoghurts and flavoured dairy drinks and EUR 1.27 mln from ice-cream. Starting from January 2022, when the excise duty on soft drinks will be differentiated according to sugar content, application of the excise tax on these products would generate excise tax revenue equal to EUR 4.8 mln (assuming that the sugar amount in these products exceeds 8 grams per 100 ml and therefore these products will be subject to the excise duty rate of EUR 14 per 100 litres). However, the excise duties would lead to a higher base for calculating VAT, therefore increasing VAT revenues.

Due to the lack of necessary data (time series of retail prices and sales by type of product necessary to estimate price elasticity of demand), here we disregard any possible reduction in sales due to price change. Nevertheless, it is important to keep in mind that such tax could have a significant negative impact on output, employment and profits of domestic manufacturers in the short run. Some people employed in manufacturing of dairy products would have their wages reduced or they would lose their jobs. In Latvia, if manufacturers will not opt to reformulate their products by reducing sugar content in order to minimise the decline in sales volume, such broadening of the tax base would potentially affect at least 68 firms operating in manufacturing of dairy products with around 3000 employees and overall annual turnover close to EUR 416 mln²⁹.

²⁹ Source: Central Statistical Bureau of Latvia. SBG010. Key business indicators of enterprises. NACE C105 Manufacture dairy products.

6 SHORT-TERM EFFECT OF EXCISE TAX ON BUDGET REVENUES: ECONOMETRIC ANALYSIS

The fiscal effect of a tax increase depends on the responsiveness of demand for an excise good to a change in its price, and on tax pass-through rate to a retail price³⁰. The effect of the price change on demand is measured by price elasticity. Price elasticity is defined as the percentage change in demand in response to a 1% change in price. The greater the absolute value of the price elasticity, the higher the price sensitivity of demand. In turn, the tax pass-through to prices measures how much prices increase in response to an increase in the tax.

The approach to simulating the budgetary effect of the excise tax increase is similar for soft drinks, cigarettes and alcoholic drinks. First, we use monthly or quarterly data on sales and prices of soft drinks, cigarettes and alcoholic drinks to estimate the price elasticity of demand. Second, we simulate different scenarios of the expected budgetary effect using the estimated elasticities and assuming different degrees of tax pass-through rate to retail prices.

To estimate the price elasticity of demand, we test dependency of the quantity of sold excise goods (soft drinks, cigarettes, and alcoholic drinks) on two main factors: the price of the excise good and the income level, which is approximated by real GDP. In case of the soft drinks, we estimate separate regression for different types of soft drinks and additionally include prices of substitutes as determinants of sales. In case of alcoholic drinks, we estimate separate regressions for different types of alcoholic drinks³¹.

This section presents estimations of short-term effects on sales in various industries and budgetary effect, not long-term social welfare effects. Welfare effects in the long run are important, and they are promoted for the general public, but tax collection could be important consideration in the short run.

³⁰ Tax incidence depends on the relative price elasticity of supply and demand. When supply is more elastic than demand, consumers bear most of the tax burden. When demand is more elastic than supply, producers bear most of the tax burden.

³¹ The estimated coefficients for substitute drinks are not statistically significant, and hence are not included in our baseline results.

6.1 SOFT DRINKS: PRICE ELASTICITY OF DEMAND

In this section we estimate the relationship between sales volume and prices for all types of soft drinks subject to excise tax in Latvia³² using monthly data on prices and sales volume in each of the Baltic countries. We estimate regressions where sales of regular CSD, light CSD, flavoured water, kvass, ice tea and energy drinks in month t - (Q_t^{CSD} , $Q_t^{regular\ CSD}$, $Q_t^{light\ CSD}$, $Q_t^{flavoured}$, Q_t^{kvass} , $Q_t^{ice\ tea}$, $Q_t^{energy\ drinks}$, respectively), measured in litres, are explained by the following factors:

- The respective per litre weighted average retail prices in month t : P_t^{CSD} , $P_t^{regular\ CSD}$, $P_t^{light\ CSD}$, $P_t^{flavoured}$, P_t^{kvass} , $P_t^{ice\ tea}$, $P_t^{energy\ drinks}$;
- Income, approximated by real GDP index in month t (Y_t). Data on GDP is available only by quarters; therefore, quarterly series were interpolated to monthly frequency using weighed average of monthly real industrial output and monthly real retail trade turnover;
- Per litre prices of other soft drinks in month t assuming that different types of soft drinks can be substitutes;
- The sales volume of respective soft drink in month $t-1$;
- To account for seasonality, in the model we include intercept dummies for expected seasonal peak and off-peak months for the respective type of soft drinks;
- We additionally include time trends (in some model specifications).

Tables 0.3-0.6 in Annexes present the results of our preferred regression specifications. According to our estimations, the demand for the following soft drinks – regular CSD, flavoured water, kvass and ice tea is price elastic in all Baltic countries, which means that an increase in price leads to a more than the proportional reduction in quantity sold. In contrast, the demand for light CSD and energy drinks is price inelastic, implying a smaller than proportional reduction in sales due to a price change.

Our findings are consistent with the literature, which generally concludes that demand for soft drinks is responsive to price changes of soft drinks in such countries as US, UK, France, Brazil, Mexico. Briggs et al. (2013) estimated the price elasticity of sugar-sweetened beverages in UK to be between -0.81 and -0.92. Powell et al. (2013) provides a systematic review of 10 studies based on US data and reports the mean price elasticity of demand for sugar-sweetened beverages equal to -1.21. Colchero et al. (2015) provides consistent findings for price elasticities in US equal to 1.06 for soft drinks and -1.16 for all sugar-sweetened beverages. Cabrera Escobar et al. (2013) include 9 studies³³ in their meta-analysis and report price elasticity of demand in the US, Mexico, Brazil and France. These studies show negative price elasticity of demand for sugar-sweetened beverages ranging from -0.85 to -2.21 with the pooled price elasticity estimate equal to -1.3.

6.2 SOFT DRINKS: SHORT-TERM OR DIRECT IMPACT AND STATE BUDGET IMPLICATION

In the next step, we simulate several scenarios to assess the fiscal effect of an increase of excise duty on soft drinks in Latvia (and introduction of the excise duty in Lithuania and Estonia).

Latvia is the only country among the Baltic countries applying the excise duty on soft drinks with added sugar, other sweetener or flavouring. Therefore, we use Latvian data on weighted average retail prices (WAP) for each type of soft drinks to empirically estimate the degree of tax pass-through to consumers. Our results suggest that the tax pass-through to consumers varies by type of soft drinks and from one episode of the tax increase to another, but generally exceeds 50%. Our empirical strategy is as follows. We estimate a regression where soft drink price is a function of its own lagged values and the output gap which is included as a proxy for consumer demand. Then we use the estimated regressions to predict monthly prices for each type of soft drink and any price dynamics that cannot be explained by the model is interpreted as the impact of the tax increase. In our following

³² In what follows we consider regular and light CSD, flavoured water, kvass, ice tea and energy drinks as excisable beverages, but all types of juice (including still juice drinks; in Latvia according to our observations still juice drinks mostly contain more than 10 per cent of juice) and unflavoured water are considered as exempted from excise tax. According to the Law on Excise Duties, in Latvia the excise tax is applied to water and mineral water with added sugar, other sweeteners or flavouring, and other non-alcoholic beverages. The exceptions are fruit and vegetable juice and nectar, beverages which contain at least 10 per cent of juice (except for fruit juices made of concentrate), not more than 10 per cent of added sugar and which do not contain food additives and flavourings, natural water and mineral water, without added sugar, other sweetener or flavouring.

³³ Published from 2000 to 2013.

estimations of the budgetary effect, we make two alternative assumptions about the same degree of pass-on for all types of soft drinks: (i) we assume tax pass-through rate of 100%, implying that sellers adjust retail prices by the amount of the tax increase; (ii) we assume that 50% of a tax hike is passed on to consumers.

We analyse 4 alternative scenarios of the budgetary effect for each Baltic country:

(1)

Based on the price-quantity relationship for each type of soft drinks estimated on the Latvian, Estonian and Lithuanian data and tax pass-through rate of 100%;

(2)

Based on the price-quantity relationship for each type of soft drinks estimated on the Latvian, Estonian and Lithuanian data and tax pass-through rate of 50%;

(3)

Based on the average price-quantity relationship across the Baltic countries for each type of soft drinks and tax pass-through rate of 100%;

(4)

Based on the average price-quantity relationship across the Baltic countries for each type of soft drinks and tax pass-through rate of 50%;

In order to estimate the short-term or direct impact of excise tax increase, we assume the following hypothetical scenario of excise tax reform: the excise duty on soft drinks (except light CSD and flavoured water) is increased from EUR 7.4 to EUR 14.0 per 100 litres, which is equivalent to a 89.2% increase in excise duty for Latvia (since the current tax rate is equal to EUR 7.40 per 100 litres). Light CSD and flavoured water remains to be subject to tax rate of EUR 7.40 per 100 litres. Increase in excise duty in the hypothetical reform scenario corresponds to the tax rate increase, which is planned to be applied in Latvia to soft drinks with a sugar content above 8 grams per 100 millilitres starting from January 2022.

Table 0.7 in Annex presents the estimated short-term or direct impact and state budget implication for each type of soft drinks in each Baltic country. Table 6.1 summarizes our estimations across all types of soft drinks. Note that our results represent a short-term or direct fiscal effect, so that we do not account for any second-round effects that can arise from changes in domestic production, employment and therefore other tax revenues.

According to results of our simulations, in case of a 100% tax pass-through, such a hypothetical reform could lead to a 7.2% increase in soft drink prices in Latvia (considering only soft drinks subject to excise duty), 14.6% and 19.9% in Estonia and Lithuania respectively³⁴. The price increase in Estonia is smaller than in Lithuania because prices for soft drinks in Estonia are higher and therefore the excise duty accounts for a smaller part of the price. In the case of a 50% tax pass-through, the growth of prices is 50% lower.

The expected fall in sales is calculated based on the estimated price elasticity of demand for each type of soft drink and on the average price elasticity of demand for each type of soft drink across the Baltic countries. The largest fall in sales of soft drinks subject to excise duty (29.6-32.3% in case of tax pass-through rate of 100% and 14.8-16.1% in case of tax pass-through rate of 50%) would take place in Lithuania since the price increase would be the highest. In Estonia, sales of soft drinks would fall by 18.6-21.0% in case of tax pass-through rate of 100% and by 9.3-10.5% in case of 50% tax pass-on to consumers. In Latvia, where excise duty has already been applied for more than two decades, sales volumes of soft drinks would decrease the least compared to other Baltic countries – by 11.1-11.3% in case of tax pass-through rate of 100% and by 5.5-5.7% in case of tax pass-through rate of 50%

The introduction of excise tax on soft drinks is expected to generate EUR 6.5-7.6 mln in Estonia and EUR 12.6-16.0 mln in Lithuania annually. In Latvia the increase in the revenue from excise duties is estimated in the amount of EUR 4.7-5.7.

Another short-run (partial equilibrium) effect of the tax that we don't explicitly account for in our analysis is that some people employed in the soft drinks production industry would have their wages reduced and / or they would lose their jobs. In case of Latvia, the tax increase would potentially affect at least 34 firms operating in soft drinks production industry with around 900 employees and overall annual turnover close to EUR 100 mln.

³⁴ The price increase in Estonia and Lithuania is higher than in Latvia, because for these countries we simulate a new tax on soft drinks, while for Latvia we simulate an increase in the existing tax.

Table 6.1: Short-term or direct effect of the excise tax increase on excise tax revenues from soft drinks in the Baltic countries

Scenario:	LATVIA				ESTONIA				LITHUANIA			
	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
Price elasticity of demand												
Tax pass-through rate	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Change in excise tax revenues from soft drinks, % from pre-reform scenario	154,5	165,2	155,0	165,4								
Potential revenues from introduction or increase of excise tax on soft drinks, mln euro	4,74	5,67	4,78	5,69	6,72	7,56	6,51	7,45	12,55	15,72	13,10	15,99
Change in prices of soft drinks subject to excise tax, %	7,22	3,61	7,22	3,61	14,64	7,32	14,64	7,32	19,94	9,97	19,94	9,97
Change in sales of soft drinks subject to excise tax, %	-11,31	-5,65	-11,06	-5,53	-18,61	-9,30	-20,96	-10,48	-32,28	-16,14	-29,56	-14,78
Change in total sales of soft drinks, %	-4,20	-2,10	-4,11	-2,05	-8,34	-4,17	-9,40	-4,70	-14,93	-7,47	-13,67	-6,84
Turnover of firms in soft drink industry, mln euro		96,3				NA				NA		
Number of persons employed in soft drink industry ³⁵		892				NA				NA		

Notes:

Latvia: before tax increase prices refer to October 2019;

Estonia: before tax increase prices refer to December 2018;

Lithuania: before tax increase prices refer to October 2019.

Source: authors' calculations using data on prices and sales volume of soft drinks obtained from AC Nielsen.

³⁵ Central Statistical Bureau of Latvia. SBG010. Key business indicators of enterprises. NACE C1107
Manufacture of soft drinks; production of mineral waters and other bottled waters

6.3 CIGARETTES: PRICE ELASTICITY OF DEMAND

In this section, first, we estimate the relationship between sales and prices for cigarettes using monthly data on weighted average retail prices and sales volume obtained from AC Nielsen. Then we analyse different scenarios of the expected budgetary effect using the estimated elasticities and assuming different degrees of tax pass-through to retail prices.

We follow a standard approach in the literature and approximate the demand by sold packs of cigarettes per potential smoker, where the potential smoker is defined as a person above the age of 15. We estimate regressions where the quantity of sold packs of cigarettes per potential smoker (hereafter – per capita sales of cigarettes) in month t (Q_t^{cig}) is explained by the following factors³⁶:

- The weighted average retail price per cigarette pack in month t , assuming 20 cigarettes in a pack: P_t^{cig} ,
- Income approximated by real GDP per adult person (Y_t) in month t . Data on GDP is available only by quarters; therefore, quarterly series were interpolated to monthly frequency using weighed average of monthly real industrial output and monthly real retail trade turnover,
- The sales volume of cigarette packs in month $t-1$,
- Seasonal variation in sales is captured by intercept dummies for seasonal drops and seasonal peaks.

Table 6.2 presents the results of our preferred regression specifications. According to our estimations, demand for cigarettes is price inelastic in all Baltic countries. The estimated price elasticity ranges from -0.18 to -0.32, implying that a 10% increase in the price of cigarettes is expected to decrease cigarette sales only by 1.8%-3.2%. This is consistent with the studies conducted since 2000 using data from low- and middle-income countries, with the majority of estimates ranging from -0.2 to -0.8, where price elasticity estimates tend to be lower in countries with low-priced and thus relatively affordable cigarettes (U.S. NCI, WHO, 2016; Yurekli, Ayda Aysun, 2018). The low responsiveness of demand to price change makes the excise tax on cigarettes less effective in reducing cigarette consumption but at the same time it makes cigarettes ceteris paribus a suitable base for raising additional tax revenues.

³⁶ We additionally test for the effect of a time trend in some model specifications (Tt), which could capture the effect of other explanatory variables not included in the regression, such as, e.g., changes in the lifestyle, counteradvertising, smoking restrictions. The estimated coefficients for a time trend are not statistically significant, and hence are not included in our baseline results.

Table 6.2: Regression results on per capita sales of 20-cigarette packs in the Baltic countries

Country	CIGARETTE PACKS					
	$\ln(Q_t^{cig})$					
Sample	LATVIA		LITHUANIA		ESTONIA	
	2010-2019		2010-2019		2010-2018	
$\ln(P_t^{cig})$	-0,317	***	-0,183	***	-0,204	***
	(0,000)		(0,000)		(0,000)	
$\ln(Y_t)$	0,464	***	0,269	***	0,295	***
	(0,000)		(0,000)		(0,000)	
Q_{t-1}^{cig}	0,619	***	0,818	***	0,778	***
	(0,000)		(0,000)		(0,000)	
Constant	-2,976	***	-1,447	***	-1,542	***
	(0,000)		(0,000)		(0,000)	
D_{max}	0,052	***	0,023	***	0,024	***
	(0,000)		(0,001)		(0,009)	
D_{min}	-0,071	***	-0,088	***	-0,070	***
	(0,000)		(0,000)		(0,000)	
R^2	0,930		0,953		0,936	
Adj R^2	0,927		0,951		0,933	
N of obs	118		118		107	
F stat	299,10		451,27		296,74	
Prob > F	0,000		0,000		0,000	
DW stat.	2,28		1,62		1,46	

Level of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, p-values in parentheses.

Note: Q_t^{cig} : sales volumes of 20-cigarette packs per adult (potential user) in month t ; P_t^{cig} : weighted average price of a 20-cigarette pack in month t ; Y_t : income, approximated by real GDP index; Q_{t-1}^{cig} : sales volumes in month $t-1$ (20-cigarette packs); D_{max} : intercept dummy for expected seasonally peak buying; D_{min} : intercept dummy for expected seasonally depressed buying

6.4 CIGARETTES: SHORT-TERM OR DIRECT IMPACT AND STATE BUDGET IMPLICATION

The approach to simulating the budgetary effect of the tax increase on cigarettes is similar to the approach we used for soft drinks. Revenue generating potential of excise tax on cigarettes depends on the price elasticity of demand and the tax pass-through rate to retail prices. Therefore, we analyse different scenarios of budgetary implications of the tax increase, which are different with respect to tax pass-through rate to prices and the price elasticity of demand.

The tax pass-through rate depends on a number of factors (market structure, the overall situation in the market, current and expected purchasing power of smokers, magnitude of current and future tax increases). First, we used the standard assumption of full tax pass-through rate to retail price of cigarettes assuming that sellers adjust the price by the full amount of the tax increase³⁷. In countries adopting strict smoking control policies including regular excise increases, the producers' profits become more and more constrained. Nevertheless, producers can initially keep price increases low when taxes go up, that is not always possible, in particular if tax increase accounts for a large share of profits (Yurekli, Ayda Aysun, 2018). Indeed, there is some evidence suggesting that cigarette taxes is less than fully passed through to consumer prices though consumers bear more of the burden (75%-85% tax pass through) (Harding M. u.c., 2012; Rozema K., Ziebarth N.R., 2017), while some other scholars find the excise tax is being overshifted, i.e. retail prices rise by more than the tax increase (Hanson A., Sullivan R, 2009; Sullivan R.S., Dutkowsky D.H., 2012; NCI, WHO, 2016).

For the purpose of our analysis, we use a 75% tax pass through as a lower bound and 100% tax pass through as an upper bound. We do not consider scenarios with cigarette taxes being more than fully passed through to consumer prices, assuming that producer/distributor tends to minimize the decrease in sales and therefore does not increase the retail price per pack before taxes.

The hypothetical scenarios are as follows: each Baltic country increases the specific component of the excise tax by 5%, 10%, 15%, 20% and 30%. This leads to a higher increase in retail price, since the excise tax is included in the base for calculating VAT.

Like in the analysis of soft drinks, we analyse 4 alternative scenarios of the excise tax increase in each Baltic country:

(1)

Based on the price-quantity relationship for cigarettes estimated on the Latvian, Estonian and Lithuanian data and full tax pass-on to consumers,

(2)

Based on the price-quantity relationship for cigarettes estimated on the Latvian, Estonian and Lithuanian data and 75% tax pass-on to consumers;

(3)

Based on the average price-quantity relationship across the Baltic countries for cigarettes and full tax pass-on to consumers;

(4)

Based on the average price-quantity relationship across the Baltic countries for cigarettes and 75% tax pass-on to consumers.

First, we simulate an increase in retail prices caused by the excise tax and VAT increase, and then, using the estimated demand elasticities, derive the expected change in sales and, hence, the budget revenues. Table 6.3 reports the estimated results of one of hypothetical reform scenarios: a 15% increase in specific component of the excise duty on cigarettes. The estimated results of other hypothetical scenarios are reported in Tables 0.8, 0.9, 0.10, 0.11 in Annex.

³⁷ The assumption is made in the baseline of The World Health Organization's tobacco tax simulation model WHO TaXSiM (WHO, 2013) and, e.g., Goodchild M. u.c. (2016).

Table 6.3: Short-term or direct impact of the excise tax increase (a 15% increase in specific tax rate) on excise tax revenues from cigarettes in the Baltic countries, deviation from no tax change scenario

SCENARIOS	LATVIA				LITHUANIA				ESTONIA			
SCENARIO: A 15% INCREASE IN SPECIFIC TAX RATE	1	2	3	4	1	2	3	4	1	2	3	4
	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
Price elasticity of demand	-0,317	-0,317	-0,235	-0,235	-0,183	-0,183	-0,235	-0,235	-0,204	-0,204	-0,235	-0,235
The tax pass through rate to retail price	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75
Weighted average price (WAP) of a cigarette pack before the increase in excise tax, EUR	3,51	3,51	3,51	3,51	3,59	3,59	3,59	3,59	4,04	4,04	4,04	4,04
Excise tax component of WAP, EUR	2,29	2,29	2,29	2,29	2,21	2,21	2,21	2,21	2,85	2,85	2,85	2,85
Share of excise tax in WAP, %	65,4	65,4	65,4	65,4	61,6	61,6	61,6	61,6	70,5	70,5	70,5	70,5
WAP after the excise tax increase, EUR	3,86	3,77	3,86	3,77	3,94	3,85	3,94	3,85	4,50	4,39	4,50	4,39
Excise tax component of WAP after the reform, EUR	2,58	2,56	2,58	2,56	2,50	2,47	2,50	2,47	3,24	3,20	3,24	3,20
Share of excise tax in WAP after the reform, %	66,9	68,0	66,9	68,0	63,4	64,2	63,4	64,2	71,8	72,9	71,8	72,9
Change in WAP (incl. excise tax and VAT), %	9,9	7,4	9,9	7,4	9,5	7,1	9,5	7,1	11,4	8,5	11,4	8,5
Change in sales, %	-3,1	-2,4	-2,3	-1,7	-1,7	-1,3	-1,7	-1,3	-2,3	-1,7	-2,7	-2,0
Change in excise tax revenues from cigarettes, % from pre-reform scenario	9,0	9,1	9,9	9,8	10,8	10,3	10,3	9,9	10,8	10,3	10,4	10,0
Potential additional revenues, mIn EUR	19,5	19,8	21,5	21,3	30,1	28,8	28,6	27,7	23,6	22,4	22,7	21,8

Note: Est.: price elasticity of demand estimated using econometric approach on Latvian, Estonian and Lithuanian data (see Table 6.2). Av.: price elasticity of demand average across Baltic countries (calculated as a mean value); Before tax increase prices refer to December 2019;

Change in sales are estimated as estimated as growth in prices multiplied by the price elasticity of demand; Source: authors' calculations using data on cigarette prices and sales volume obtained from AC Nielsen

The direct short-term consequence of the excise tax increase is higher prices; higher prices lead to lower demand for cigarettes, but higher indirect taxes (excise tax and VAT) on cigarettes bring additional revenues per unit sold. Which of the above effects is stronger depends on the depth of sales reduction, which in turn is determined by the tax pass-through rate and on the price elasticity of demand for cigarettes. According to the Nielsen market data, the lowest weighted average price of a cigarette pack (WAP) is in Latvia, and the highest in Estonia (before tax increase prices refer to December 2019). Nevertheless, the higher increase in price induced by the excise tax increase occurs in the country with the highest share of the excise tax component in WAP. The growth in WAP induced by the excise tax is the highest for Estonia (9–11%), followed by Latvia and Lithuania (7–10%).

The estimated fall in sales in the Baltic countries of around 1–3% is not large, because of a low price elasticity of demand. As a result, excise tax revenues from cigarettes are expected to go up by 9–10% in Latvia (EUR 20–22 mln annually), 10–11% in Lithuania (EUR 28–30 mln) and 10–11% in Estonia (EUR 22–24 mln). Note that our results represent a short-term or direct fiscal effect, so that we do not account for any second-round effects that can arise from changes in local production, employment and therefore other tax revenues.

6.5 ALCOHOLIC DRINKS: PRICE ELASTICITY OF DEMAND

We follow a similar approach to estimate the budgetary implications of the tax increase on alcohol. In case of alcoholic drinks, due to the lack of relevant high-frequency data on Lithuania and Estonia, we base our demand sensitivity estimations on Latvian data only.

We use State Revenue Service quarterly data on the amount of alcoholic drinks released for consumption in Latvia (by types of drinks), and data about the average quarterly prices of drinks obtained from the Central Statistical Bureau of Latvia³⁸. We estimate demand sensitivity for three major types of drinks: vodka, wine and beer. These three types of drinks account for more than 80% of total alcoholic drinks consumed in Latvia. Our econometric approach to estimating the relationship between consumption and prices is similar to that for cigarettes and soft drinks. We regress per adult person consumption of vodka, beer and wine in quarter t (Q_t^{vodka} , Q_t^{beer} and Q_t^{wine} , respectively), measured in liters, on:

- The respective per liter retail prices in quarter t : P_t^{vodka} , P_t^{beer} and P_t^{wine} ;
- Real per capita GDP in quarter t (Y_t);

- Prices of other alcoholic drinks (e.g. brandy, sparkling wine), assuming that different types of drinks can be substitutes;
- We additionally include time trends, air temperature and include dummy variables to control for one-time shocks.

Due to the lack of reliable data, we do not explicitly control for the effects of cross-border trade in the regressions. But since the data on consumption includes consumption by non-residents, the estimated price coefficients should capture the effects of the cross-border trade.

All variables are included in the regressions in the form of year-on-year growth rates. Table 6.4 reports the results of our preferred regression specifications. The estimated coefficients for substitute drinks are not statistically significant, and hence are not included in our baseline results. The estimated price coefficients are negative for all considered drinks and statistically significant in the regressions for vodka and beer. In all regressions the coefficients are smaller than 1, suggesting a low degree of demand responsiveness to changes in price. In case of wine, the estimated coefficient is very close to zero and is not statistically significant. At the same time, we find that year-on-year growth of wine consumption follows a positive trend, which may be indicative of changing consumer tastes. In case of beer, we find air temperature being a significant determinant of the consumed amount.

On the whole, our findings are consistent with the existing literature showing that demand for strong alcoholic drinks is generally more responsive to price changes than demand for beer and wine. E.g., Wagenaar et al (2009) perform meta-analysis of 112 studies and find that simple means of reported elasticities are -0.46 for beer, -0.69 for wine and -0.80 for spirits. Similarly, Customs Associated Ltd (2001) find that consumption of beer and wine generally does not change in response to an increase in the tax rate, while consumption of spirits does respond to changes in taxation in most EU member states. Strateičuks (2014) summarizes available elasticity estimates and concludes that demand for beer is the least responsive to price changes, while demand for spirits is the most elastic, with Eastern European and Latin American countries having the highest elasticity, mainly due to the large size of the illegal alcohol market.

³⁸ Quarterly series are derived by computing simple average of monthly prices.

Table 6.4: Regression results for consumption of alcoholic drinks in Latvia: vodka, beer and wine

	VODKA ($\ln(Q_t^{\text{vodka}}) - \ln(Q_{t-4}^{\text{vodka}})$)	BEER ($\ln(Q_t^{\text{beer}}) - \ln(Q_{t-4}^{\text{beer}})$)	WINE ($\ln(Q_t^{\text{wine}}) - \ln(Q_{t-4}^{\text{wine}})$)
$\ln(P_t^i)$, $i = \text{vodka, beer or wine}$, year-on-year change	-0.440** (0.0265)	-0.255** (0.020)	-0.022 (0.881)
$\ln(Y_t)$, year-on-year change		0.419** (0.028)	0.552*** (0.006)
$\ln(Y_{t-1})$, year-on-year change	0.818*** (0.000)		
T_t			0.002*** (0.004)
Average air temperature in quarter t , year-on-year change		0.0134*** (0.001)	
Constant	-0.0174 (0.219)	0.004 (0.709)	-0.482*** (0.006)
Year 2009 dummy	-0.173*** (0.000)		
2009q1 dummy		-0.172*** (0.004)	
Crisis dummy (2009q1 – 2010q1)		0.187*** (0.000)	
Post-crisis dummy (2010q2 – 2011q1)			0.160*** (0.000)
Year 2011 dummy	-0.0993*** (0.002)		
Dummy for year 2015 and after	0.0003*** (0.001)		
R2	0.863	0.510	0.5790
Adj R2	0.843	0.456	0.5389
N of obs (sample)	47 (2008q1 – 2019q3)	51 (2007q1 – 2019q3)	47 (2008q1 – 2019q3)
F stat	42.06	9.36	14.44
Prob > F	0.000	0.000	0.0000
DW stat	1.441	1.305	1.880

Q_t^i ($i = \text{vodka, beer or wine}$): amount of alcoholic drink i per adult person released for consumption in quarter t (in liters);

P_t^i ($i = \text{vodka, beer or wine}$): price of alcoholic drink i in quarter t (EUR);

Y_t : real GDP per capita in quarter t ;

T_t : time trend.

Level of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, p -value in parentheses.

6.6 ALCOHOLIC DRINKS: SHORT-TERM OR DIRECT IMPACT AND STATE BUDGET IMPLICATION

In the next step, we simulate several scenarios to assess the fiscal effect of the tax increase on alcohol in the Baltic countries, which differ with respect to the price elasticity of demand and the degree of the tax pass-through rate to prices.

We empirically estimate the degree of the tax pass-through to prices using Latvian monthly data on alcohol retail prices, separately for vodka, beer and wine. We model monthly price of each drink as a function of its own lagged values and seasonal dummies. The regressions are estimated on the sample from January 2005 to April 2020, excluding the periods when either the excise tax or VAT was changed³⁹. Then we use the estimated regressions to predict monthly prices of vodka, beer and wine in the months of a tax change and interpret the unexplained variation in prices as the effect of the tax change. Our results suggest an overall pretty high degree of the tax pass-on, especially for beer, and especially in the episodes of relatively small tax hikes. However, since the estimated degree of the tax pass-on varies considerably from one episode of the tax increase to another, in the simulated fiscal scenarios we do not use our estimates. Instead, we make two alternative assumptions about the degree of pass-on: (i) assume full tax pass-on to consumers, (ii) assume that 50% of a tax hike is passed on to consumers. Hence, we simulate four alternative scenarios for all Baltic countries:

(1)

Based on the price-quantity relationship estimated on the Latvian data (-0.440 for spirits, -0.255 for beer, and -0.022 for wine) and full tax pass-on to consumers;

(2)

Based on the price-quantity relationship estimated on the Latvian data (-0.440 for spirits, -0.255 for beer, and -0.022 for wine) and 50% tax pass-on to consumers;

(3)

Based on international evidence on price elasticity of demand (-0.80 for spirits, -0.46 for beer, and -0.69 for wine) and full tax pass-on to consumers;

(4)

Based on international evidence on price elasticity of demand (-0.80 for spirits, -0.46 for beer, and -0.69 for wine) and 50% tax pass-on to consumers.

³⁹ For each episode of a tax change, we exclude three months: the month in which the tax was changed and the two consecutive months.

Table 6.5 reports the results of these four scenarios for all Baltic countries, separately for vodka, wine and beer. In all scenarios we simulate a 20% increase in the excise tax per one litre of the drink⁴⁰. E.g., in March 2020, excise tax per one litre of 40% vodka in Latvia was EUR 8.10 (or EUR 1642 per 100 litres of pure alcohol). Hence, we simulate a scenario in which the excise tax is raised to EUR 9.72 (8.10 * 1.2) per one litre of vodka. Note that our results represent a short-term or direct fiscal effect, so that we do not account for any second-round effects that can arise from changes in local production, employment and therefore other tax revenues.

In all simulated scenarios a 20% increase in the tax rate leads to a less than proportional increase in excise tax revenues. The only exception is Scenario 2 for wine in all three countries, which is due to very low demand elasticity. Cross-country differences in the resulting tax revenue changes are due to different shares of the excise tax in retail prices. E.g., in Estonia, where the excise tax on vodka before the tax increase makes up the smallest share of the price, the increase in the tax leads to a smaller increase in the final price, a smaller reduction in sales and hence a bigger increase in the tax revenues.

Table 6.5: Short-term or direct impact of the excise tax increase on excise tax revenues from vodka, wine and beer in the Baltic countries

Scenario:	LATVIA				ESTONIA				LITHUANIA			
	1	2	3	4	1	2	3	4	1	2	3	4
VODKA												
Price elasticity of demand	-0,44	-0,44	-0,80	-0,80	-0,44	-0,44	-0,80	-0,80	-0,44	-0,44	-0,80	-0,80
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per liter before the tax increase, EUR	14,79				18,22				13,74			
Excise tax per liter before the tax increase, EUR	6,57				7,52				8,10			
Excise tax per liter after the tax increase, EUR	7,88				9,02				9,72			
Price per liter after the tax increase, EUR	16,38	15,58	16,38	15,58	20,03	19,12	20,03	19,12	15,70	14,72	15,70	14,72
Change in quantity sold, %	-4,7	-2,4	-8,6	-4,3	-4,4	-2,2	-7,9	-4,0	-6,3	-3,1	-11,4	-5,7
Change in excise tax revenues from vodka, % from pre-reform scenario	14,3	17,2	9,7	14,8	14,8	17,4	10,5	15,2	12,5	16,2	6,3	13,2
WINE												
Price elasticity of demand	-0,02	-0,02	-0,69	-0,69	-0,02	-0,02	-0,69	-0,69	-0,02	-0,02	-0,69	-0,69
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per liter before the tax increase, EUR	9,48				8,12				7,95			
Excise tax per liter before the tax increase, EUR	1,11				1,48				1,65			
Excise tax per liter after the tax increase, EUR	1,33				1,78				1,98			
Price per liter after the tax increase, EUR	9,75	9,61	9,75	9,61	8,48	8,30	8,48	8,30	8,35	8,15	8,35	8,15
Change in quantity sold, %	-0,1	0,0	-1,9	-1,0	-0,1	0,0	-3,1	-1,5	-0,1	-0,1	-3,5	-1,7
Change in excise tax revenues from wine, % from pre-reform scenario	19,8	19,8	17,5	18,7	20,2	20,2	16,6	18,4	19,9	19,9	15,8	17,9
Change in excise tax revenues from wine, mln EUR	3,80	3,81	3,37	3,59								
BEER												
Price elasticity of demand	-0,26	-0,26	-0,46	-0,46	-0,26	-0,26	-0,46	-0,46	-0,26	-0,26	-0,46	-0,46
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per liter before the tax increase, EUR	2,01				3,14				1,93			
Excise tax per liter before the tax increase, EUR	0.41 (0.20 if produced by small breweries)				0.64 (0.32 if produced by small breweries)				0,36			
Excise tax per liter after the tax increase, EUR	0.49 (0.25 if produced by small breweries)				0.76 (0.38 if produced by small breweries)				0,43			
Price per liter after the tax increase, EUR	2,11	2,06	2,11	2,06	3,29	3,22	3,29	3,22	2,02	1,97	2,02	1,97
Change in quantity sold, %	-1,1	-0,6	-2,0	-1,0	-1,1	-0,5	-1,9	-1,0	-1,2	-0,6	-2,1	-1,0
Change in excise tax revenues from beer, % from pre-reform scenario	18,7	19,3	17,7	18,8	18,7	19,3	17,7	18,8	18,6	19,3	17,5	18,8
Change in excise tax revenues from beer, mln EUR	10,0	10,4	9,5	10,1								

Source: authors' calculations.

Notes:

Latvia: before tax increase prices refer to April 2020; Tax rate before the increase refers to 2020.

Estonia: before tax increase prices refer to prices of locally produced alcoholic drinks in 2018; Tax rate before the increase refers to 2020.

Lithuania: before tax increase prices refer to prices of locally produced alcoholic drinks in 2019; Beer price is indicated without deposit; Tax rate before the increase refers to 2020.

*Price per litre of beer after the tax increase is calculated assuming that 28% of beer sold in Latvia is produced in small breweries (According to State Revenue Service of Latvia (2020) 28% of total beer volume produced in Latvia was produced in small breweries subject to the reduced excise rate for beer if sold in Latvia).

We assume that the same share (28%) of sold beer is produced by small breweries in Estonia.

⁴⁰ Table 0.12 in Annex presents short-term or direct effect of different hypothetical scenarios of the excise tax increase on excise tax revenues from vodka, wine and beer in the Baltic countries.

DISCUSSION AND RECOMMENDATIONS

The main rationale for levying excise duties is to discourage excessive consumption of products that would occur in the absence of the taxes, to compensate for negative externalities (the costs imposed by consumption of an excise good on others) and internalities (costs imposed on the consumer of excise good) imposed by consumption of such products. There is considerable evidence that consumption of alcoholic beverages, tobacco products and caloric products generate social costs although their magnitudes can vary depending on the amount consumed. For example, abuse of alcoholic beverages may lead to deteriorated health and an increase in the rate of alcohol-related crimes, thus the government shall provide sufficient funding for health care and law enforcement agencies to ensure well-being and safety of all citizens. Consumption of tobacco products is one of the biggest public health threats. Health care costs for treating diseases caused by smoking or passive smoking poses costs for the entire population. In turn, excessive consumption of unhealthy food and sugar-sweetened soft drinks contribute to weight gain, as well as obesity related and other noncommunicable diseases (NCDs)⁴¹.

There are strong public health reasons for taking measures to discourage excessive consumption of alcoholic beverages, tobacco products, and caloric food products and beverages in the Baltic countries. First of all, Lithuania and Latvia are among the EU countries with one of the highest per capita amounts of pure alcohol consumed. Smoking incidence in the Baltic countries has remained very high over the last two decades. Finally, there is a need to address the problem of growing overweight and obesity in the Baltic countries.

For the Baltic countries, excise duties represent a more important source of tax revenues compared to richer EU member states and EU countries on average, and excise duties have remained the focus of fiscal policy debates for many years. In 2007-2020, all three Baltic countries have increased their excise duties several times. However, the relative (PPP-adjusted) prices for some excise goods remain relatively low if compared to other EU countries. Thus, in 2018, prices for all tobacco products in the Baltic countries were 32-37% below the EU-28. There is no such gap in the prices of alcohol, however: in Lithuania, prices for alcohol were on average 6% lower than in the EU-28, while the average relative prices of alcohol in Latvia and Estonia were above the EU average (8.5% higher in Latvia and 26.3% higher in Estonia).

⁴¹ Longitudinal and observational studies have found a link between the consumption of sugar-sweetened beverages (SSBs) and non-communicable diseases (NCDs) including obesity and diabetes (Bridge G. et.al., 2020).

High levels of per capita alcohol consumption, increasing rates of overweight and obesity, high smoking incidence, as well as low relative prices for tobacco products indicate that there is a scope for increasing excise duties. As of 2020, all Baltic countries plan to further increase excise duty rates for alcohol and tobacco products. Furthermore, Latvia has already approved the introduction of an excise tax on soft drinks differentiated according to sugar content, replacing the uniform rate applied since 1999. However, when raising tax rates, it is important to anticipate changes in consumer behaviour. Evidence from other EU countries shows that increase in excise duties, and, therefore, higher prices, increase the incentives for consumers to engage in cross-border shopping, to purchase the product in the illicit market or to switch to cheaper substitutes. As a result, the increase in excise duty can lead to a smaller decrease in consumption than initially planned or might even increase consumption (stock piling of the product might lead to over-consumption) and can have no positive effect on health outcomes of the population. Therefore, excise tax reforms should be accompanied by excise tax policy coordination between bordering countries, better enforcement and increased border controls.

Coordination of excise tax policies between the Baltic countries

Any change in excise tax policy should be evaluated through the lens of its effect on cross-border sales between the countries, taking into account excise tax rates in the neighbouring countries. Without cooperative behaviour policymakers impose a tax rate unilaterally, ignoring the side effects coming from policies of other countries. However, excise tax policy coordination can lead to potential Pareto improvement that is mutually beneficial for all participating parties. Hansen (2003) considers policy spill-overs of welfare benefit levels in two “rich” countries, A and B, “competing” for potential immigrants from poorer countries. Higher benefits in country A, other things equal, will “redirect” some immigrants and asylum seekers from B to A. This setting is similar to choosing excise tax rates by neighbouring countries, like Latvia and Estonia, because due to cross-border trade Latvian tax rates affects Estonian tax revenues and vice versa. Hansen shows that median voters (or populations in general) in rich countries can benefit from coordination of welfare benefits (compared to uncoordinated Nash equilibrium), but it is difficult to conclude an agreement among rich countries, as a follower position is more attractive for the local population in a country than a coordinated solution.

In 2019, the prime ministers of Latvia and Estonia voiced readiness to discuss harmonization of the two countries’ excise tax policies. However, excise tax rates could be also coordinated with Lithuania in order to minimize price differentials and therefore to prevent incentives for cross-border shopping between Latvia and Lithuania.

Due to similar market and geographical situation the Baltic countries could also coordinate their positions regarding excise tax policy proposals at the EU level, especially in the area of setting minimum rates.

The optimal/required size of the tax rate increase

The excise duties can be increased in a gradual incremental manner or in one large hike. On the one hand, taking into account evidence on illicit trade, an increase in the excise duties should be gradual. When the price increases are relatively small, consumers are gradually adjusting to prices, therefore such excise tax policy does not generate incentives for consumers to switch to untaxed substitutes. At the same time, small tax rate increases are less effective in changing consumers' behaviour (Caro J.C. et.al., 2018; Powell, L.M. et.al, 2013) and reducing overall consumption, while more effective in raising tax revenue. Hence, if accompanied by determined smuggling prevention measures⁴², large price increases will lead to a larger reduction in consumption and therefore better health outcomes. When setting rates, a balance must be struck between economic aspects and human health.

Effects of excise taxes on employment

Tax increases that reduce the sales can result in significant job losses for those who manufacture, distribute and sell these products. However, the net impact of excise tax policies on national employment depends on the magnitude of both job losses in the taxed sector and job gains elsewhere in the economy as some consumers reallocate their spending to other goods and services and governments spend the additional tax revenues raised from tax increases or reduce income taxes that may ceteris paribus lead to larger labour supply. Furthermore, excise taxes on alcohol, tobacco and sugar-rich soft drinks, by reducing consumption of taxed products, lead to a reduction of diseases related to smoking, excessive alcohol consumption and obesity and other noncommunicable diseases (NCDs) and therefore to a decline in health care expenditures attributable to treatment of the respective diseases. Resources not spent on health care would be ultimately allocated to the consumption of other goods and services and create alternative jobs in other sectors of the economy. Important to note that decreased consumption of heavily taxed products could be at least partially offset by increased consumption of less taxed (relatively cheaper) or untaxed products, which are often produced by the same companies or start to be produced if companies opt to reformulate their products in order to minimise the decline in sales volume (Chaloupka F.J. u.c., 2019).

A large number of studies find that reductions in consumption of tobacco products due to higher taxes or other tobacco control policies have either no effect or a net positive effect on overall employment (NCI, WHO, 2016). A similar conclusion was reached in recent studies from the United States regarding alcoholic beverages and sugar-sweetened beverages (Wada R. et.al., 2017; Powell L.M., 2014). Both studies used a macroeconomic simulation model which accounts for changes in product demand, average

state income, and substitution effects. The study on the impact of alcohol taxes on employment showed that two hypothetical alcohol tax increases (a 5-cent per drink excise tax increase and a 5% sales tax increase) in 5 states would result in overall net employment gains, while, in percentage terms, the estimated net employment gains represent relatively small increases ranging from 0.014% to 0.08% of overall employment (Wada R. u.c., 2017). Another study concludes, that a 20% increase in sugar-sweetened beverage taxes in 2 states results in net change in employment close to zero, as declines in employment within the beverage industry were offset by new employment in other industries and government sectors (Powell L.M., 2014).

Conclusions and recommendations regarding excise duties on soft drinks

Evidence from other countries shows that imposing excise duties on soft drinks with added sugar are effective in reducing consumption of these drinks, if the price changes caused by the tax are sufficiently large. According to our estimations, demand for the regular carbonated soft drinks (hereafter – CSD), flavoured water, kvass and ice tea is price elastic in all Baltic countries, which means that an increase in price leads to a more than the proportional reduction in quantity sold. At the same time, the evidence on effectiveness of taxes in reducing sugar intake is inconclusive. According to New Zealand Institute of Economic Research (NZIER, 2017), studies which use sound methods report a reduction in sugar intake that is likely to be too small to generate health benefits and that can easily be cancelled out by substitution with other caloric products. On the other hand, studies reporting a considerable change in sugar intake assume no compensatory substitution. Abundance of substitutes with not only high sugar levels but also fats creates a risk that any potential benefits from the tax are overturned, and makes it hard to evaluate the true effect on health outcomes.

Introduction of an excise duty on soft drinks with added sugar, other sweeteners and flavouring in Latvia in 1999 was mostly motivated by the budgetary needs of the government. To our knowledge, there are no studies assessing the changes in sugar intake caused by the soft drinks tax taking into account possible substitution with other sugar-rich products. Thus, in order to address the problem of growing obesity via application of excise duties on soft drinks, it is extremely important to carry out a public health study assessing the changes in sugar intake caused by the soft drinks tax taking into account possible substitution with other sugar-rich products. The results of the study may justify the need to broaden the tax base to other sugar-rich products.

Experience in Hungary and Finland suggest that a sugar tax is effective in reducing calorie intake when imposed on a wide range of products, as opposed to a tax on a few products, which induces consumers' switching to other foods with added sugar, salt and fats. Motivated by this evidence, we estimate the possible effect of an introduction of the excise tax on yoghurts, flavoured dairy drinks with added sugar or other sweeteners and ice-cream

⁴² Government could commit to allocate the fixed portion of additional excise tax revenues to financing smuggling prevention measures such as purchasing of new modern equipment, investing in modern IT solutions, increasing the number of service dogs involved in contraband detection.

in Latvia, assuming that these products are taxed at the same rate as soft drinks⁴³. The results of our estimations show that the application of the excise tax on these products would generate additional excise tax revenue of about EUR 2.5 mln per year, including EUR 1.25 mln revenues from yoghurts and flavoured dairy drinks and EUR 1.27 mln from ice-cream. Starting from January 2022, when the excise duty on soft drinks will be differentiated according to sugar content, application of the excise tax on these products would generate excise tax revenue equal to EUR 4.8 mln (assuming that the sugar amount in these products exceeds 8 grams per 100 ml of yoghurt and dairy product and per 100 g of ice-cream) and therefore these products would be subject to the excise duty rate of EUR 14 per 100 litres). Excise taxation should not be the only tool to reduce consumption of excise products. According to The McKinsey Global Institute (MGI, 2014), there is a need for comprehensive policy approach to reducing overweight and obesity. No single solution will be sufficient in the fight against obesity, and interventions should be used jointly within a comprehensive programme. In addition, the study concludes that the most effective intervention to abate obesity is to switch to smaller packages in retail and to reformulate the products in manufacturing, while introduction of the tax is less effective and scored only 13th out of 16 intervention areas.

An important role in the reduction of sugar consumption comes from higher awareness of negative health outcomes caused by excessive sugar intake. Policymakers can consider different ways to draw consumers' attention to the sugar content in food products and beverages. For example, products and beverages can be divided into 3 groups according to sugar content - rich, medium and low sugar content – and each group can be labelled in a uniform way. Research evidence indicates that interpretative labelling can encourage reformulation (WHO, 2017; Vyth E.L. et.al., 2010; Mhurchu C.N., 2017). At the same time, it is necessary to check that the packaging of all products and beverages contains information on the sugar content and that the information

provided by producers is correct and written in clear and easily readable text formats. Easy-to-access information about the sugar content would increase the incentives of companies for reformulation.

International evidence shows that in response to the government decisions to introduce or increase the excise duty on soft drinks, many companies opt to reformulate their products by reducing sugar content in order to reduce the decline in sales. The examples of Lithuania and Estonia that managed to reach an agreement on a reduction of sugar content in products without introducing a tax shows successful examples of how to achieve reduction in the consumption of a certain product. Latvia could learn from Lithuania's and Estonia's experience and try to agree with manufacturers of soft drinks and sugary products on reformulating of their products.

Importers and some domestic manufacturers of food and soft drinks may not be covered by the agreements reached between the government and manufacturers, and they also may not voluntarily commit to reducing sugar

⁴³ i.e., EUR 7.40 per 100 l of yoghurt and flavoured dairy products with added sugar or other sweeteners and EUR 7.40 per 100 kg of ice cream.

in their food products and soft drinks and/or reducing portion sizes. Because of this, and taking into account, that a sugar tax is shown to be effective in reducing sugar and calorie intake when imposed on a wide range of products, policymakers could consider introducing the an excise duty on a broad range of sugar-rich food products and soft drinks, while differentiating the duty rate according to sugar content in a product. Policymakers could consider to apply more than two rates and to provide a 100% relief for innovative products such as light soft drinks, water with natural flavouring, sugar-free or low-sugar snacks. Differentiated tax rate would stimulate the industry to take actions and to drive down sugar content. Application of such excise taxes may bring additional resources to the state budget.

We estimate the short-term or direct impact of excise tax increase planned to be applied in Latvia to soft drinks with a sugar content above 8 grams per 100 millilitres starting from January 2022. The excise duty on soft drinks (except light CSD and flavoured water) is increased from current EUR 7.4 to EUR 14.0 per 100 litres, which is a 89.2% increase in excise duty, while light CSD and flavoured water remains to be subject to tax rate of EUR 7.40 per 100 litres. For Estonia and Lithuania, where there is no excise duty on soft drinks as of 2020, we simulate introduction of the same excise duty, i.e. EUR 7.40 per 100 litres of light CSD and flavoured water and to EUR 14.0 per 100 litres of soft drinks with a sugar content above 8 grams per 100 millilitres. According to our results⁴⁴, the introduction of excise tax on soft drinks is expected to generate additional EUR 6.5–7.6 mln in Estonia and EUR 12.6–16.0 mln in Lithuania annually. In Latvia, the increase in the revenue from excise duty is estimated in the amount of EUR 4.7–5.7 mln. The largest fall in sales of soft drinks subject to excise duty (14.8 to 32.3 %) would take place in Lithuania since the price increase would be the highest. In Estonia, sales of soft drinks would fall by 9.3 to 21.0 %. In Latvia, where an excise duty has been applied for more than two decades, the fall in sales of soft drinks would be less pronounced, just 5.5-11.3%.

⁴⁴ Note that our results represent a short-term or direct fiscal effect, so that we do not account for any second-round effects that can arise from changes in local production, employment and therefore other tax revenues.

Conclusions and recommendations regarding excise duties on alcohol

We find that demand for alcohol is inelastic, which ceteris paribus makes alcohol a suitable base for raising additional tax revenues. At the same time, the scope for increasing the tax burden on alcohol is limited by cross-border trade, smuggling and home brewing. Therefore, any increase in excise duties on alcohol could be coordinated between the three Baltic countries and accompanied by determined smuggling measures against smuggling and illegal home production.

In all three Baltic countries, spirits and beer constitute almost equal shares of total recorded alcohol consumption (measured in litres of pure alcohol), while wine and other alcoholic beverages constitute a much smaller share. Over the period 2010–2018, per capita consumption of spirits was growing much faster than that of beer in Latvia. In Lithuania per capita consumption of spirits has not changed, and consumption of beer has declined by about 18%. In Estonia, per capita consumption of beer has declined more than that of spirits. This suggests that from the perspective of public health, increases in excise tax duties on ethyl alcohol (spirits) could be the first priority of a coordinated excise tax policy in the Baltics in the near term. This conclusion is further reinforced by the finding that the price elasticity of demand for spirits is higher than for beer and wine, which means that raising excise taxes on ethyl alcohol will have a stronger impact on consumption of legally sold alcohol than raising excise tax on beer and wine.

The market share of wine is still relatively small in the Baltic countries; per capita sales of wine have been increasing in Latvia over last 10 years, which may be indicative of changing consumer tastes. Among the Baltic countries, Latvia has the lowest excise duty on wine (considering wine with alcohol content exceeding 8.5%⁴⁵), and at the same time we found that demand for wine is price inelastic. Thus, policymakers may consider substantially increasing excise duty on wine⁴⁶, by setting it closer to the excise duty rates on wine in two other Baltic countries.

Governments could consider introducing greater differentiation of excise duty on alcohol with respect to the alcohol content (alcoholic beverages with higher alcohol content could be taxed more than beverages with less alcohol). This would incentivise producers to diversify the alcoholic beverages in terms of alcohol content and likely lead to lower consumption of alcohol in pure alcohol terms.

⁴⁵ There are different rates for wine depending on the alcohol content: (1) not exceeding 6%; LV: EUR 106; EE: EUR 63.35; LT: EUR 65.46; (2) 6 to 8.5%; LV: EUR 106; EE: EUR 147.82; LT: EUR 65.46; (3) exceeding 8.5%; LV: EUR 106; EE: EUR 147.82; LT: EUR 164.67. However, the latter rates really matter, as wine typically feature alcohol content above 8.5%.

⁴⁶ A substantial increase in excise duty on wine occurred in Lithuania in March 2017 when Lithuania more than doubled the excise duties on wine. As the result, in 2017 compared to 2016, sales volume of wine decreased by 22%, but revenues from the excise duty on wine still increased by 57%. Source: data on budget revenues published by State Tax Inspectorate under the Ministry of Finance of the Republic of Lithuania and data on sale of alcoholic beverages in trade and catering enterprises published by Official Statistics Portal of Lithuania.

We estimate the short-term or direct impact of an increase in excise tax per one litre of each type of alcoholic beverages by 10%, 15%, and 20% in the three Baltic countries. Our results suggest that a 20% increase in the excise tax per one litre of each type of alcoholic beverages leads to increase in excise tax revenues as follows: (i) from wine by 18 to 20 % in Latvia (EUR 3–4 mln), 16 to 20 % in Estonia (EUR 4–5 mln) and 16 to 20 % in Lithuania (EUR 6–8 mln) (ii) from vodka⁴⁷ by 10 to 17 % in Latvia, 11 to 17 % in Estonia, 6 to 16 % in Lithuania; (iii) from beer by 18 to 19 % in Latvia (EUR 9–10 mln), 18 to 19 % in Estonia (EUR 11–12 mln) and Lithuania (EUR 15–16 mln). The fall in sales would be the largest for vodka (2 to 10 % in Latvia, 2 to 8 % in Estonia, 3 to 11 % in Lithuania), while the fall in beer and wine sales are expected to not exceed 2% and 4%, respectively.

A 10% increase in the excise tax per one litre of each type of alcoholic beverages leads to increase in excise tax revenues which are roughly by half smaller than the above mentioned.

Conclusions and recommendations regarding excise duties on cigarettes

There is a strong empirical evidence that raising cigarette prices through increased excise duties is effective in reducing cigarette consumption. Moreover, higher prices have particularly large effects on teenagers taking up smoking and becoming addicted (since they are on a tight budget), so the effect of higher prices is long-lasting. Our findings suggest that the long-term price elasticity is pretty low in the Baltic countries with estimated price elasticities ranging from -0.18 to -0.32. This is consistent with the studies conducted using data from low- and middle-income countries, with the majority of estimates ranging from -0.2 to -0.8, where price elasticity estimates tend to be lower in countries with low-priced and thus relatively affordable cigarettes (NCI, WHO, 2016; Yurekli, Ayda Aysun, 2018).

The specific rate applied for cigarettes could be further increased since it is especially appropriate to protect public health while ad valorem rate could be decreased. An increase in the specific tax rate would lead to a smaller price differences across brands since this would reduce incentives to switch to cheaper products and consequently would result in reduced tobacco use. However, if not accompanied by determined smuggling prevention measures, there could be no or even negative effect on budget revenues, while actual cigarette consumption may also not decrease.

⁴⁷ We are not able to estimate potential additional revenues from taxation of vodka, since disaggregated data on excise duty revenues by type of ethyl alcohol is not available.

The low responsiveness of demand to price change in the Baltic countries makes the excise tax on cigarettes less effective in reducing cigarette consumption, but at the same time it makes cigarettes *ceteris paribus* a suitable base for raising additional tax revenues. Taking into account inelastic demand to changes in price, and relatively low (PPP-adjusted) price levels of cigarettes in the Baltics, there is a scope for increasing excise duties on cigarettes.

Policymakers could decide on the optimal size of the excise tax increase taking into account the current phase of economic cycle. The experience of the Baltic countries shows that during the economic downturn, the share of C&C (Counterfeit and Contraband) in total cigarette consumption could significantly increase. According to KPMG (2014), in 2010 compared to 2008, the share of C&C in total consumption increased by 32 percentage points in Latvia, 25 percentage points in Lithuania and 15 percentage points in Estonia. During rapid economic downturns, policymakers could consider to implement small gradual increases (annual increase of 5-10%) in excise duties on cigarettes thus not significantly increasing incentives for consumers to switch to illicit cigarettes. During economic booms, the tax can be increased more without the risk of a sharp increase in C&C cigarette consumption, while large price increases are expected to lead to a larger reduction in the amount of product consumed.

In 2019 compared to 2010, the C&C share in total cigarette consumption decreased by 23 percentage points in Latvia and Lithuania and by 14 percentage points in Estonia. In 2019, Lithuania ranked second among the EU countries in terms of C&C share in total cigarette consumption (18%). In Latvia this share was 14%, while in Estonia the share of C&C was 7% of total cigarette consumption. Taking into account the share of C&C in total cigarette consumption as of 2019 and increased efficiency of smuggling prevention measures over the time period 2010-2020, and at the same time positive consumer income trend in 2010-2020, we believe it is highly unlikely that consumption of C&C could return to 2010 levels. We believe that a 10 percentage points increase of C&C share in total cigarette consumption corresponds to a maximal realistic increase in the near future. We estimate the short-term or direct impact of an increase in specific tax rate by 5%, 10%, 15%, 20% and 30% in the three Baltic countries. According to the results of our simulations, an increase in specific component of the excise duty in each Baltic country will result in a relatively small decrease in sales of around 1% if the specific tax rate is increased by 5%; and of around 2 to 4 % if the specific tax rate is increased by 20%. As a result of a 5% increase in the specific tax rate, excise tax revenues from cigarettes are expected to go up by 3% in Latvia (EUR 6 mln per year), 3 to 4 % in Lithuania (EUR 9–10 mln) and 3 to 4 % in Estonia (EUR 7–8 mln). A 20% increase in the specific tax rate is expected to generate additional EUR 26–29 mln in Latvia, EUR 37–40 mln in Lithuania and EUR 29–31 mln in Estonia. A 30% increase in the specific tax rate is expected to generate additional EUR 39–43 mln in Latvia, EUR 54–59 mln in Lithuania and EUR 42–46 mln in Estonia.

The above forecasts of the fiscal effects of increasing excise duties on cigarettes should be treated with care as the underlying data refer to the period 2010-2019, when the volume of Counterfeit & Contraband (C&C) consumed in the Baltic countries as well as the share of C&C in total cigarette consumption was steadily and significantly decreasing⁴⁸. Hence, these forecasts would be too optimistic in situation where a large proportion of consumers switch from legal cigarettes to C&C, as it was the case in the Baltic countries during the financial crisis of 2009. As argued above, the maximal expected increase in the C&C share caused by a large increase in the excise tax rate in the near future equals to 10 percentage points. Assuming the scenario when the specific tax rate will be increased by 20% and at the same time the share of C&C in total cigarette consumption will increase by 10 percentage points (to 24% in Latvia, 28% in Lithuania and 17% in Estonia), the fiscal effect of the excise tax from cigarettes reform is still positive: up to EUR 3 mln in Lithuania, EUR 0.4 mln in Latvia and up to EUR 7 mln in Estonia. It would take a 15 percentage points increase in the share of C&C (which we consider unrealistic) to make the fiscal effects significantly negative in all three countries; in this case, excise tax revenues from cigarettes would fall by EUR 16–19 mln in Lithuania, EUR 14–17 mln in Latvia and EUR 6-8 mln in Estonia.

Recommendations regarding taxation of novel heated tobacco products and liquid for e-cigarettes

There is a mixed existing evidence on health harms of heated tobacco products compared to conventional cigarettes and on the effectiveness of e-cigarettes as a smoking cessation aid. Although there is growing amount of evidence that smokeless products are less harmful comparing to the cigarette smoking, there are concerns about potential of smokeless products to attract new tobacco users, especially youth, and to discourage smoking cessation. On the one hand, there is a rationale for differential taxation of tobacco products and their alternative products according to the health risks that they present, to encourage less harmful consumption. On the other hand, government could closely monitor (by amending regular surveys and studies) how these products are used by consumers to ensure that these products do not cause increased use among people, especially youth. Similar approach (with regard to marketing of heated tobacco) was recently announced by the US Food and Drug Administration (U.S. FDA, 2020).

⁴⁸ In 2019 compared to 2010, the C&C share in total cigarette consumption decreased by 23 percentage points in Latvia and Lithuania and by 14 percentage points in Estonia. In Lithuania, the share was stable in 2016-2019.

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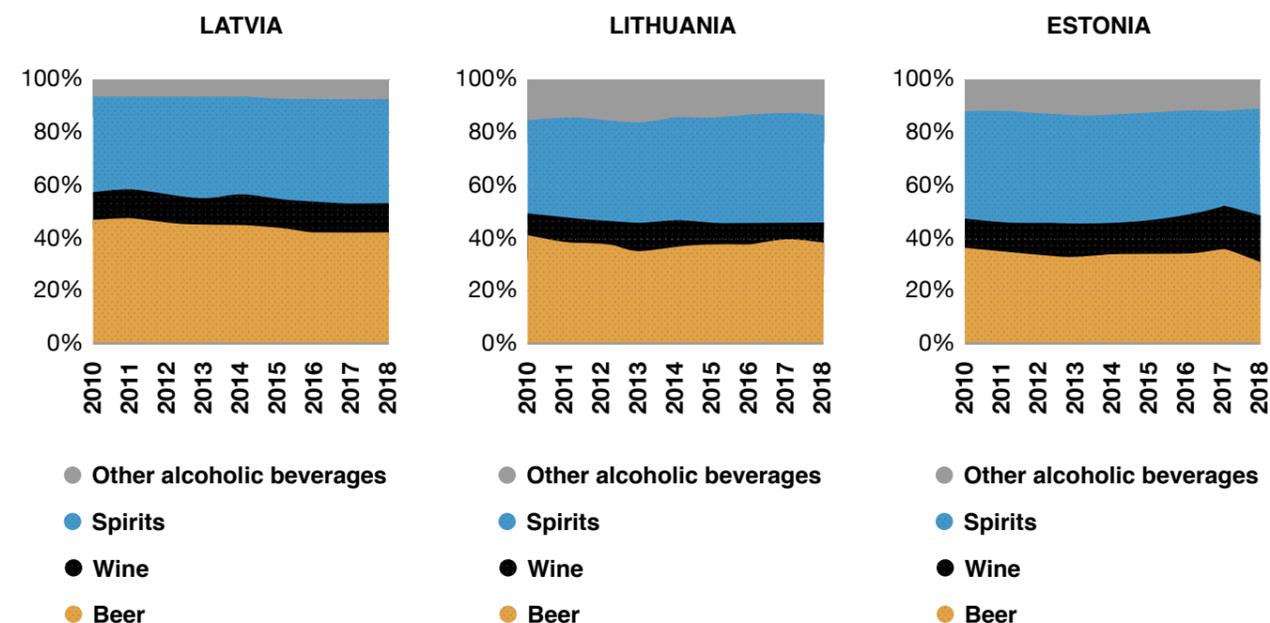
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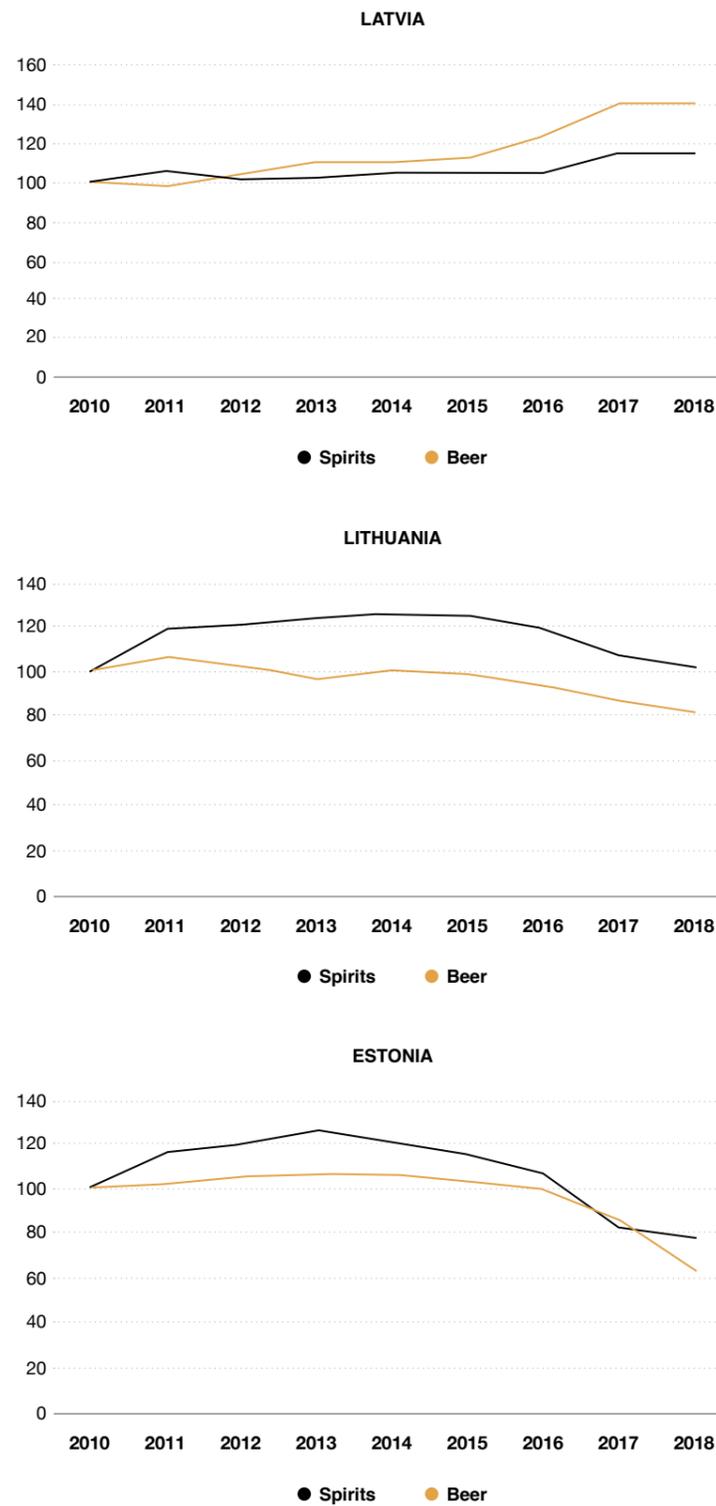
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ANNEXES

Figure 0.1: Composition of recorded alcohol per capita (age 15+ years) consumption (in litres of pure alcohol over a calendar year) in the EU countries, by type of alcoholic beverage 2010-2018Source: WHO (2020g). „Consumption by type of alcoholic beverages by country.” Available: <https://apps.who.int/gho/data/node.main.A1023?lang=en&showonly=GISAH>

Note: Recorded APC is defined as the recorded amount of alcohol consumed per capita (15+ years) over a calendar year in a country, in litres of pure alcohol. The indicator only takes into account the consumption which is recorded from production, import, export, and sales data often via taxation.

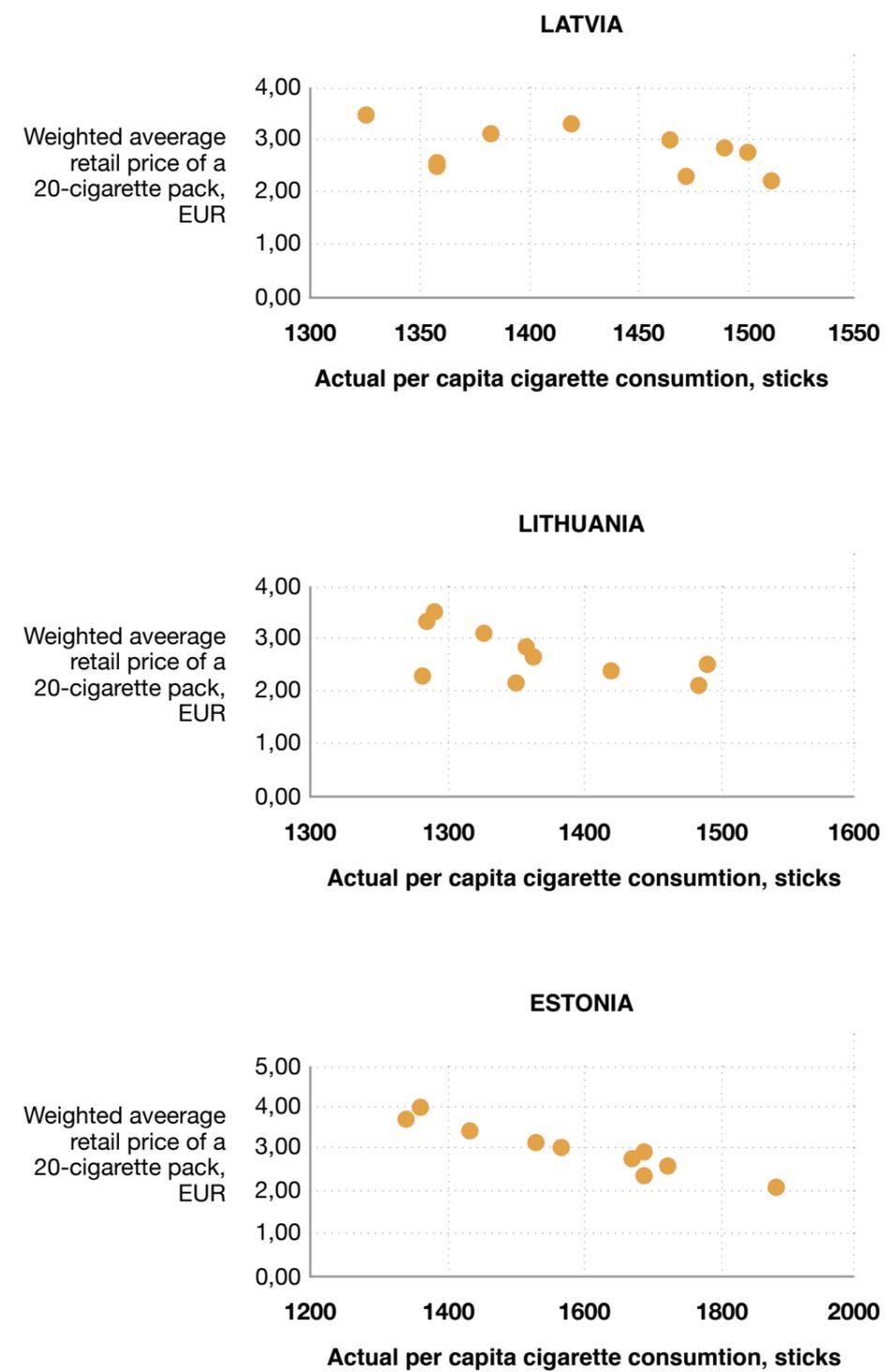
Figure 0.2: Recorded per capita consumption of selected alcoholic beverages (in litres of pure alcohol over a calendar year) in the Baltic countries, 2010=100



Note: Recorded APC is defined as the recorded amount of alcohol consumed per capita (15+ years) over a calendar year in a country, in litres of pure alcohol. The indicator only takes into account the consumption which is recorded from production, import, export, and sales data often via taxation.

Source: WHO (2020g). „Consumption by type of alcoholic beverages by country.“ Available: <https://apps.who.int/gho/data/node.main.A1023?lang=en&showonly=GISAH>

Figure 0.3: Actual per capita (persons aged 15 and over) cigarette consumption, sticks, vs. weighted average retail price of a 20-cigarette pack, EUR, in the Baltics, EUR, in 2010-2019



Source: data on weighted average retail price of cigarettes obtained from AC Nielsen; data on total cigarette consumption derived from KPMG, Project Sun: A study of the illicit cigarette market in the European Union, Norway and Switzerland, 2019, 2016 and 2012 Results

Table 0.1. Examples of implementation of tax on sweetened drinks and food products containing unhealthy levels of sugar in the EU, 2020

EU MEMBER STATE	IMPLEMENTED SINCE	TYPE OF TAX (EXCISE OR NOT EXCISE)		BASE	TAX RATE
United Kingdom	April 2018	Soft drinks industry levy (not classified as excise tax) - is a levy put on drink companies.		Drinks with at least 5 grams of sugar per 100ml are taxed (other than fruit juice, vegetable juice, and milk).	<ul style="list-style-type: none"> • GBP 0.18 per litre on drinks that have a total sugar content of more than 5g and less than 8g per 100ml • GBP 0.24 per litre on drinks that have a total sugar content of 8g or more per 100ml
Finland	January 2011	Excise duty on soft drinks		Soft drinks containing sugar, sugar-free soft drinks, and mineral waters.	<ul style="list-style-type: none"> • EUR 0.12 per litre is applied to sugar-free juices, waters, sugar free wine of fresh grapes (of 1.2% vol. or less) etc. • EUR 0.27 per litre is applied to the soft drinks containing added sugar or other sweetening matter or flavoured
Latvia	December 1999	Excise duty on soft drinks		Drinks with added sugar, sweetener, or other flavouring (excluding fruit and vegetable juices with less than 10 percent added sugar, flavoured waters without added sugars)	EUR 7.40 per litre per hectolitre.
Ireland	May 2018	Excise duty - Sugar Sweetened Drinks Tax		Drinks with more than 5 grams of sugar per 100 millilitres.	<ul style="list-style-type: none"> • EUR 16.26 per hectolitre on drinks with a total sugar content of five grams or more, but less than eight grams, per 100 millilitres. • EUR 24.39 per hectolitre on drinks with a total sugar content of eight grams or more per 100 millilitres.
France	January 2012	Excise tax		Drinks with added sugars or artificial sweeteners.	EUR 0.0716 per litre
Hungary	January 2011	Excise tax - the public health product tax		Food products containing unhealthy levels of sugar, salt and other ingredients.	Sugar sweetened beverages are taxed at HUF 15 (EUR 0.05EUR) per litre and syrup concentrates HUF 250 (EUR 0.77) per litre.
Spain, Catalonia	May 2017	Catalonian excise tax on sugar-sweetened beverages		Sugar-sweetened beverages, such as sodas, energy drinks, fruit juices made from concentrate, and flavoured water.	<ul style="list-style-type: none"> • EUR 0.08 per litre for drinks that contain between 5 and 8 grams of sugar per 100 millilitres (ml) and • EUR 0.12 per litre for drinks that contain more than 8 grams of sugar per 100 ml. • Drinks with less than 5 grams of sugar per 100 ml are exempt from this tax.
Portugal	February 2017	A sugar tax on soft drinks (not classified under excise duties)		Drinks containing added sugar or artificial sweeteners.	<ul style="list-style-type: none"> • EUR 0.08 per litre for drinks with sugar content less than 80 grams per litre; • EUR 0.16 for drinks with greater than 80 grams per litre of sugar.
Belgium	January 1993	Excise tax on non-alcoholic beverages		Non-alcoholic beverages	There are 12 tax rates applied to different types of non-alcoholic beverages. The highest rate applied to sweetened beverages is EUR 11.92 per hectolitre.

Source: when creating a table, the authors relied on the information provided in NYC Food Policy Center (2020) and Capacci S. Et.al. (2019) additionally, verifying that all of mentioned taxes and tax rates are in effect in 2020.

Table 0.2. Historic data availability on sales volume of soft drinks by type of drinks

	LATVIA	LITHUANIA	ESTONIA
CSD TOTAL	154 obs. (Jan2007-Oct2019)	154 obs. (Jan2007-Oct2019)	144 obs. (Jan2007-Dec2018)
(i) light	154 obs. (Jan2007-Oct2019)	154 obs. (Jan2007-Oct2019)	144 obs. (Jan2007-Dec2018)
(ii) regular	154 obs. (Jan2007-Oct2019)	154 obs. (Jan2007-Oct2019)	144 obs. (Jan2007-Dec2018)
JUICE TOTAL	70 obs. (Jan2014-Oct2019)	46 obs. (Jan2016-Oct2019)	60 obs. (Jan2014- Dec2018)
(i) juice	70 obs. (Jan2014-Oct2019)	46 obs. (Jan2016-Oct2019)	60 obs. (Jan2014- Dec2018)
(ii) still drink	70 obs. (Jan2014-Oct2019)	46 obs. (Jan2016-Oct2019)	60 obs. (Jan2014- Dec2018)
(iii) nectar	70 obs. (Jan2014-Oct2019)	46 obs. (Jan2016-Oct2019)	60 obs. (Jan2014- Dec2018)
(iv) puree	18 obs. (May2018-Oct2019)	29 obs. (Jan2016-Nov2016, May2018-Oct2019)	36 obs. (Jan2016-Dec2018)
WATER TOTAL	155 obs. (Dec2016-Oct2019)	154 obs. (Jan2007-Oct2019)	145 obs. (Dec2006-Dec2018)
(i) unflavoured	155 obs. (Dec2016-Oct2019)	154 obs. (Jan2007-Oct2019)	145 obs. (Dec2006-Dec2018)
(ii) flavoured	155 obs. (Dec2016-Oct2019)	154 obs. (Jan2007-Oct2019)	145 obs. (Dec2006-Dec2018)
* carbonated	155 obs. (Dec2016-Oct2019)	154 obs. (Jan2007-Oct2019)	145 obs. (Dec2006-Dec2018)
* still	155 obs. (Dec2016-Oct2019)	154 obs. (Jan2007-Oct2019)	145 obs. (Dec2006-Dec2018)
ENERGY TOTAL	166 obs. (Jan2006-Oct2019)	154 obs. (Jan2007-Oct2019)	156 obs. (Jan2006-Dec2018)
(i) energy drink	166 obs. (Jan2006-Oct2019)	154 obs. (Jan2007-Oct2019)	156 obs. (Jan2006-Dec2018)
(ii) sport drink	166 obs. (Jan2006-Oct2019)	154 obs. (Jan2007-Oct2019)	156 obs. (Jan2006-Dec2018)
(iii) natural energy drink	64 obs. (Aug2014-Oct2019)	104 obs. (Mar2011-Oct2019)	71 obs. (June2012-Dec2012, Sep2013-Dec2018)
(iv) vitamin drink	68 obs. (Sep2013-Oct2013, May2014-Oct2019)	55 obs. (May2015-Oct2019)	56 obs. (May2014-Dec2018)
ICE TEA	106 obs. (Jan2011-Oct2019)	106 obs. (Jan2011-Oct2019)	109 obs. (Dec2009-Dec2018)
KVASS	154 obs. (Jan2007-Oct2019)	154 obs. (Jan2007-Oct2019)	144 obs. (Jan2007-Dec2018)

Source: data on sales volume is obtained from AC Nielsen

Table 0.3: Regression results on total CSD, regular CSD and light CSD sales volume in the Baltic countries

Sample	CSD $\ln(Q_t^{CSD})$						Regular CSD $\ln(Q_t^{regular\ CSD})$						Light CSD $\ln(Q_t^{light\ CSD})$					
	LV		LT		EE		LV		LT		EE		LV		LT		EE	
	Jan2014-Oct2019	Jan2016-Oct2019	Jan2014-Dec2018	Jan2014-Oct2019	Jan2016-Oct2019	Jan2014-Dec2018	Jan2014-Oct2019	Jan2016-Oct2019	Jan2014-Dec2018	Jan2014-Oct2019	Jan2016-Oct2019	Jan2014-Dec2018	Jan2014-Oct2019	Jan2016-Oct2019	Jan2014-Dec2018	Jan2014-Oct2019	Jan2016-Oct2019	Jan2014-Dec2018
$\ln(P_t^i)$, $i = \text{CSD, regular CSD or light CSD}$	-1,591 (0,000)	*** (0,000)	-1,896 (0,000)	*** (0,000)	-1,437 (0,001)	*** (0,001)	-1,560 (0,000)	*** (0,000)	-1,822 (0,000)	*** (0,000)	-1,353 (0,001)	*** (0,001)	-0,505 (0,033)	** (0,011)	-0,646 (0,011)	** (0,011)	-0,674 (0,099)	*** (0,099)
$\ln(Y_t)$	0,633 (0,000)	*** (0,038)	0,383 (0,038)	** (0,038)	0,356 (0,026)	* (0,026)	0,576 (0,000)	*** (0,000)	0,405 (0,055)	* (0,055)	0,291 (0,066)	* (0,066)	0,642 (0,000)	*** (0,000)	1,039 (0,000)	*** (0,000)	0,497 (0,071)	* (0,071)
Q_{t-1}^i , $i = \text{CSD, regular CSD or light CSD}$	0,158 (0,013)	** (0,013)	0,158 (0,008)	*** (0,008)	0,492 (0,001)	*** (0,001)	0,174 (0,007)	** (0,007)	0,164 (0,015)	** (0,015)	0,469 (0,000)	*** (0,000)	0,944 (0,000)	*** (0,000)	0,872 (0,000)	*** (0,000)	0,974 (0,000)	*** (0,000)
$\ln(P_t^{juice})$	0,749 (0,007)	*** (0,007)			0,623 (0,110)		0,536 (0,007)	*** (0,007)			0,451 (0,220)							
$\ln(P_t^{nectar})$			1,273 (0,042)	** (0,042)					1,157 (0,099)	* (0,099)								
$\ln(P_t^{energy\ drinks})$	0,709 (0,000)	*** (0,013)	0,674 (0,013)	*** (0,013)	0,502 (0,063)	* (0,063)	0,513 (0,006)	*** (0,006)	0,377 (0,210)		0,531 (0,047)	** (0,047)						
$\ln(P_t^{still\ water})$	0,336 (0,067)	* (0,067)	0,727 (0,003)	*** (0,003)			0,349 (0,075)	* (0,075)	0,553 (0,039)	** (0,039)								
$\ln(P_t^{regular\ CSD})$													0,115 (0,795)		0,472 (0,306)		0,302 (0,305)	
Constant	3,708 (0,000)	*** (0,000)	5,147 (0,000)	*** (0,000)	1,695 (0,026)	** (0,026)	3,920 (0,000)	*** (0,000)	5,016 (0,000)	*** (0,000)	2,136 (0,006)	*** (0,006)	-2,616 (0,001)	*** (0,001)	-3,945 (0,001)	*** (0,001)	-2,174 (0,080)	* (0,080)
D_{max}	0,143 (0,000)	*** (0,000)	0,113 (0,000)	*** (0,000)	0,143 (0,000)	*** (0,000)	0,140 (0,000)	*** (0,000)	0,122 (0,000)	*** (0,000)	0,151 (0,000)	*** (0,000)	0,093 (0,001)	*** (0,001)	0,152 (0,004)	*** (0,004)	0,141 (0,000)	* (0,000)
D_{min}	-0,098 (0,000)	*** (0,000)	-0,086 (0,000)	*** (0,000)	-0,100 (0,000)	*** (0,000)	-0,090 (0,000)	*** (0,000)	-0,093 (0,000)	*** (0,000)	-0,096 (0,000)	*** (0,000)	-0,169 (0,000)	*** (0,000)	-0,231 (0,000)	*** (0,000)	-0,155 (0,001)	
R ²	0,932		0,953		0,936		0,921		0,932		0,939		0,972		0,962		0,887	
Adj R ²	0,923		0,942		0,927		0,910		0,917		0,930		0,969		0,958		0,874	
N of obs	70		46,000		60		70		46,000		60,000		70		70		60	
F stat	103,94		92,73		108,73		88,28		62,98		113,47		362,5		262,31		69,37	
Prob > F	0,000		0,000		0,000		0,000		0,000		0,000		0,000		0,000		0,000	
DW stat.	1,928		2,219		2,129		1,880		1,852		2,269		2,006		2,052		1,912	

Level of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, pval in parantheses.

Note: Q_t^i ($i = \text{CSD, regular CSD or light CSD}$): sales volumes in month t (in kgs); P_t^i ($i = \text{CSD, regular CSD or light CSD}$): weighted average price of soft drink per kg in month t ; Y_t : income, approximated by real GDP index; Q_{t-1}^i ($i = \text{CSD, regular CSD or light CSD}$): sales volumes in month $t-1$ (in kgs); $P_t^{(still\ water)}$, P_t^{juice} , $P_t^{nectars}$, $P_t^{(energy\ drinks)}$ - prices of substitutes (still water, juice, nectars, energy drinks) for CSD in month t . D_{max} : intercept dummy for expected seasonally peak buying; D_{min} : intercept dummy for expected seasonally depressed buying.

Table 0.4: Regression results on sales volume of juice and still juice drinks in the Baltic countries

	JUICE $\ln(Q_t^{juice})$						STILL JUICE DRINKS $\ln(Q_t^{still\ juice})$					
	LV		LT		EE		LV		LT		EE	
SAMPLE	Jan2014-Oct2019		Jan2016-Oct2019		Jan2014-Dec2018		Jan2014-Oct2019		Jan2016-Oct2019		Jan2014-Dec2018	
$\ln(P_t^i)$, $i = \text{juice or still juice drinks}$	-0,208	**	-0,396	***	-0,588	***	-1,314	***	-1,218	***	-1,348	***
	(0,022)		(0,004)		(0,000)		(0,000)		(0,000)		(0,000)	
$\ln(Y_t)$	0,130	**	0,371	***	0,273	***	0,243	**	0,395	***	0,017	
	(0,032)		(0,000)		(0,017)		(-0,038)		(0,003)		(0,869)	
Q_{t-1}^i , $i = \text{juice or still juice drinks}$	0,501	***	0,672	***	0,604	***	0,556	***	0,293	***	0,716	***
	(0,000)		(0,000)		(0,000)		(0,000)		(0,003)		(0,000)	
Constant	3,274	***	0,967	*	1,924	***	1,845	***	3,003	***	1,709	**
	(0,000)		(0,092)		(0,020)		(-0,001)		(0,000)		(0,031)	
D_{max}	0,056	***	0,064	***	0,037	***	0,081	***	0,095	***	0,097	***
	(0,000)		(0,000)		(0,002)		(0,000)		(0,000)		(0,000)	
D_{min}	-0,080	***	-0,083	***	-0,066	***	-0,078	***	-0,103	***	-0,074	***
	(0,000)		(0,000)		(0,000)		(0,000)		(0,000)		(0,000)	
R^2	0,826		0,916		0,8773		0,852		0,850		0,847	
Adj R^2	0,813		0,905		0,8657		0,840		0,8304		0,832	
N of obs	69		45		59		69		45		59	
F stat	59,96		85,24		75,77		72,24		44,09		58,45	
Prob > F	0,000		0,000		0		0		0		0	
DW stat.	2,352		2,119		1,734		2,370		2,469		1,816	

Level of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, pval in parantheses.

Note: Q_t^i ($i = \text{juice or still juice drinks}$): sales volumes in month t (in kgs); P_t^i ($i = \text{juice or still juice drinks}$): weighted average price of soft drink per kg in month t ; Y_t : income, approximated by real GDP index; $Q_{(t-1)}^i$ ($i = \text{juice or still juice drinks}$): sales volumes in month $t-1$ (in kgs); D_{max} : intercept dummy for expected seasonally peak buying; D_{min} : intercept dummy for expected seasonally depressed buying.

Table 0.5: Regression results on sales volume of flavoured water and kvass in the Baltic countries

	FLAVOURED WATER $\ln(Q_t^{flavoured})$						KVAASS $\ln(Q_t^{kvass})$					
	LV		LT		EE		LV		LT		EE	
SAMPLE	Jan2014-Oct2019		Jan2016-Oct2019		Jan2014-Dec2018		Jan2014-Oct2019		Jan2016-Oct2019		Jan2014-Dec2018	
$\ln(P_t^i)$, $i = \text{flavoured water or kvass}$	-1,404	***	-1,310	***	-1,106	***	-1,850	***	-1,430	***	-1,392	***
	(0,001)		(0,000)		(0,004)		(0,000)		(0,000)		(0,000)	
$\ln(Y_t)$	1,516	***	0,250		0,522	**	1,191	***	0,392	**	0,544	***
	(0,032)		(0,358)		(0,031)		(0,000)		(0,015)		(0,012)	
Q_{t-1}^i , $i = \text{flavoured water or kvass}$	0,678	***	0,440	***	0,515	***	0,664	***	0,422	***	0,408	***
	(0,000)		(0,000)		(0,000)		(0,000)		(0,000)		(0,000)	
$\ln(P_t^{unflavoured})$	1,374	***	0,582		1,192	***						
	(0,002)		(0,179)		(0,007)							
Constant	-3,954	***	2,617	**	1,454		-3,992	***	1,758	***	0,407	
	(0,000)		(0,044)		(0,247)		(0,000)		(0,007)		(0,691)	
D_{max}	0,131	***	0,232	***	0,165	***	0,318	***	0,178	***	0,419	***
	(0,000)		(0,000)		(0,000)		(0,000)		(0,000)		(0,000)	
D_{min}	-0,307	***	-0,176	***	-0,136	***	-0,324	***	-0,183	***	-0,150	***
	(0,000)		(0,000)		(0,000)		(0,000)		(0,000)		(0,000)	
R^2	0,947		0,916		0,924		0,952		0,939		0,963	
Adj R^2	0,942		0,908		0,916		0,948		0,935		0,959	
N of obs	70		70		60		70		70		60	
F stat	187,09		114,93		107,68		254,86		198,1		279,76	
Prob > F	0,000		0,000		0,000		0,000		0,000		0,000	
DW stat.	2,132		2,239		2,036		2,176		2,317		2,002	

Level of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, pval in parantheses.

Note: Q_t^i ($i = \text{flavoured water or kvass}$): sales volumes in month t (in kgs); P_t^i ($i = \text{flavoured water or kvass}$): weighted average price of soft drink per kg in month t ; Y_t : income, approximated by real GDP index; Q_{t-1}^i ($i = \text{flavoured water or kvass}$): sales volumes in month $t-1$ (in kgs); D_{max} : intercept dummy for expected seasonally peak buying; D_{min} : intercept dummy for expected seasonally depressed buying.

Table 0.6: Regression results on sales volume of ice tea and energy drinks in the Baltic countries

	ICE TEA $\ln(Q_t^{ice\ tea})$						ENERGY DRINKS $\ln(Q_t^{energy\ drinks})$					
	LV		LT		EE		LV		LT		EE	
SAMPLE	Jan2011-Oct2019		Jan2011-Oct2019		Dec2009-Dec2018		Jan2006-Oct2019		Jan2007-Oct2019		Jan2006-Dec2018	
$\ln(P_t^i)$, $i = ice\ tea\ or\ energy\ drinks$	-1,545	***	-0,936	***	-1,596	***	-0,092	**	0,011		-0,182	***
	(0,000)		(0,000)		(0,000)		(0,019)		(0,309)		(0,001)	
$\ln(Y_t)$	0,871	***	0,829	***	0,521	**	0,338	***	0,308	***	0,307	***
	(0,002)		(0,006)		(0,034)		(0,000)		(0,000)		(0,000)	
Q_{t-1}^i , $i = ice\ tea\ or\ energy\ drinks$	0,495	***	0,279	***	0,475	***	0,868	***	0,943	***	0,931	***
	(0,000)		(0,000)		(0,000)		(0,000)		(0,000)		(0,000)	
T_t	-0,004	***	-0,006	***	-0,004	***						
	(0,000)		(0,000)		(0,000)							
Constant	1,611	**	4,500	***	3,356	***	-0,786	***	-1,058	***	-0,839	****
	(0,017)		(0,000)		(0,000)		(0,009)		(0,000)		(0,003)	
D_{max}	0,232	***	0,292	***	0,290	***	0,132	***	0,113	***	0,072	***
	(0,000)		(0,000)		(0,000)		(0,000)		(0,000)		(0,000)	
D_{min}	-0,161	***	-0,155	***	-0,081	***	-0,062	***	-0,096	***	-0,113	***
	(0,000)		(0,000)		(0,001)		(0,001)		(0,000)		(0,000)	
R^2	0,941		0,914		0,937		0,966		0,973		0,953	
Adj R^2	0,938		0,909		0,933		0,965		0,972		0,951	
N of obs	105		105		108		165		153		131	
F stat	262,56		174,03		250,79		913,69		1053,74		501,33	
Prob > F	0,000		0,000		0,000		0,000		0,000		0,000	
DW stat.	1,765		2,388		1,931		2,148		2,385		2,100	

Level of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, pval in parantheses.

Note: Q_t^i ($i = ice\ tea\ or\ energy\ drinks$): sales volumes in month t (in kgs); P_t^i ($i = ice\ tea\ or\ energy\ drinks$): weighted average price of soft drink per kg in month t ; Y_t : income, approximated by real GDP index; Q_{t-1}^i ($i = ice\ tea\ or\ energy\ drinks$): sales volumes in month $t-1$ (in kgs); D_{max} : intercept dummy for expected seasonally peak buying; D_{min} : intercept dummy for expected seasonally depressed buying.

Table 0.7: Short-term or direct impact of excise tax increase on excise tax revenues from soft drinks in Latvia & introduction of excise tax on soft drinks in Lithuania and Estonia

Scenario:	LATVIA				ESTONIA				LITHUANIA			
	1	2	3	4	1	2	3	4	1	2	3	4
	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
REGULAR CSD												
Price elasticity of demand	-1,56	-1,56	-1,58	-1,58	-1,35	-1,35	-1,58	-1,58	-1,82	-1,82	-1,58	-1,58
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per litre before the tax increase, EUR		0,94				0,98				0,77		
Excise tax per litre before the tax increase, EUR		0,074				0,00				0,00		
Excise tax per litre after the tax increase, EUR		0,14				0,14				0,14		
Price per litre after the tax increase, EUR	1,02	0,98	1,02	0,98	1,15	1,06	1,15	1,06	0,94	0,86	0,94	0,86
Change in price, %	8,5	4,2	8,5	4,2	17,2	8,6	17,2	8,6	22,0	11,0	22,0	11,0
Change in quantity sold, %	-13,3	-6,6	-13,4	-6,7	-23,2	-11,6	-27,1	-13,6	-40,1	-20,1	-34,7	-17,4
Change in excise tax revenues from regular CSD, % from pre-reform scenario	64,1	76,6	63,8	76,5								
Potential revenues from introduction of excise tax on regular CSD, mln EUR					3,79	4,37	3,60	4,27	7,69	10,27	8,38	10,61
LIGHT CSD												
Price elasticity of demand	-0,51	-0,51	-0,61	-0,61	-0,67	-0,67	-0,61	-0,61	-0,65	-0,65	-0,61	-0,61
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per litre before the tax increase, EUR		1,06				1,03				0,96		
Excise tax per litre before the tax increase, EUR		0,074				0,00				0,00		
Excise tax per litre after the tax increase, EUR		0,074				0,074				0,074		
Price per litre after the tax increase, EUR	1,06	1,06	1,06	1,06	1,12	1,08	1,12	1,08	1,05	1,01	1,05	1,01
Change in price, %	0,0	0,0	0,0	0,0	8,6	4,3	8,6	4,3	9,3	4,7	9,3	4,7
Change in quantity sold, %	0,0	0,0	0,0	0,0	-5,8	-2,9	-5,2	-2,6	-6,0	-3,0	-5,7	-2,8
Change in excise tax revenues from light CSD, % from pre-reform scenario	0,0	0,0	0,0	0,0								
Potential revenues from introduction of excise tax on light CSD, mln euro					0,24	0,25	0,24	0,25	0,39	0,41	0,39	0,41

Scenario:	LATVIA				ESTONIA				LITHUANIA			
	1	2	3	4	1	2	3	4	1	2	3	4
	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
FLAVOURED WATER												
Price elasticity of demand	-1,40	-1,40	-1,27	-1,27	-1,11	-1,11	-1,27	-1,27	-1,31	-1,31	-1,27	-1,27
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per litre before the tax increase, EUR		0,76				0,79				0,56		
Excise tax per litre before the tax increase, EUR		0,074				0,000				0,000		
Excise tax per litre after the tax increase, EUR		0,14				0,74				0,74		
Price per litre after the tax increase, EUR	0,76	0,76	0,76	0,76	0,88	0,84	0,88	0,84	0,64	0,60	0,64	0,60
Change in price, %	0,0	0,0	0,0	0,0	11,2	5,6	11,2	5,6	16,1	8,1	16,1	8,1
Change in quantity sold, %	0,0	0,0	0,0	0,0	-12,4	-6,2	-14,3	-7,1	-21,1	-10,6	-20,6	-10,3
Change in excise tax revenues from flavoured water, % from pre-reform scenario	0,0	0,0	0,0	0,0								
Potential revenues from introduction of excise tax on flavoured water, mln euro					1,19	1,28	1,17	1,26	1,14	1,29	1,14	1,29
ENERGY DRINKS												
Price elasticity of demand	-0,09	-0,09	-0,09	-0,09	-0,18	-0,18	-0,09	-0,09	0,01	0,01	-0,09	-0,09
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per litre before the tax increase, EUR		2,42				2,85				2,39		
Excise tax per litre before the tax increase, EUR		0,074				0,000				0,000		
Excise tax per litre after the tax increase, EUR		0,140				0,140				0,140		
Price per litre after the tax increase, EUR	2,50	2,46	2,50	2,46	3,02	2,94	3,02	2,94	2,56	2,48	2,56	2,48
Change in price, %	3,3	1,6	3,3	1,6	5,9	2,9	5,9	2,9	7,1	3,5	7,1	3,5
Change in quantity sold, %	-0,3	-0,2	-0,3	-0,1	-1,1	-0,5	-0,5	-0,3	0,1	0,0	-0,6	-0,3
Change in excise tax revenues from energy drinks, % from pre-reform scenario	88,6	88,9	88,6	88,9								
Potential revenues from introduction of excise tax on energy drinks, mln EUR					0,67	0,67	0,67	0,67	1,31	1,31	1,30	1,30

Table 0.8: Short-term or direct impact of the excise tax increase (a 5% increase in the specific tax rate) on excise tax revenues from cigarettes in the Baltic countries, deviation from no tax change scenario

Scenario:	LATVIA				ESTONIA				LITHUANIA			
	1	2	3	4	1	2	3	4	1	2	3	4
	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
ICE TEA												
Price elasticity of demand	-1,54	-1,54	-1,36	-1,27	-1,6	-1,6	-1,36	-1,36	-0,94	-0,94	-1,36	-1,36
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per litre before the tax increase, EUR	0,92				1,01				0,78			
Excise tax per litre before the tax increase, EUR	0,140				0,000				0,000			
Excise tax per litre after the tax increase, EUR	0,140				0,140				0,140			
Price per litre after the tax increase, EUR	1,00	0,96	1,00	0,96	1,18	1,09	1,18	1,09	0,95	0,87	0,95	0,95
Change in price, %	8,7	4,4	8,7	4,4	16,7	8,3	16,7	8,3	21,7	10,8	21,7	10,8
Change in quantity sold, %	-13,5	-6,7	-11,9	-5,9	-26,6	-13,3	-22,6	-11,3	-20,3	-10,1	-29,4	-14,7
Change in excise tax revenues from ice tea, % from pre-reform scenario	63,7	76,4	66,8	78,0								
Potential revenues from introduction of excise tax on ice tea, mln EUR					0,41	0,49	0,44	0,50	0,68	0,77	0,60	0,73
KVASS												
Price elasticity of demand	-1,85	-1,85	-1,56	-1,56	-1,39	-1,39	-1,56	-1,56	-1,43	-1,43	-1,56	-1,56
Degree of the excise tax pass-on	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5
Price per litre before the tax increase, EUR	0,73				0,78				0,71			
Excise tax per litre before the tax increase, EUR	0,074				0,000				0,000			
Excise tax per litre after the tax increase, EUR	0,140				0,140				0,140			
Price per litre after the tax increase, EUR	0,81	0,77	0,81	0,77	0,95	0,87	0,95	0,87	0,88	0,80	0,88	0,80
Change in price, %	10,9	5,5	10,9	5,5	21,5	10,7	21,5	10,7	23,7	11,8	23,7	11,8
Change in quantity sold, %	-20,2	-10,1	-17,0	-8,5	-29,9	-14,9	-33,4	-16,7	-33,9	-16,9	-36,9	-18,5
Change in excise tax revenues from kvass, % from pre-reform scenario	51,0	70,1	57,0	73,1								
Potential revenues from introduction of excise tax on kvass, mln EUR					0,42	0,50	0,39	0,49	1,34	1,68	1,28	1,65

Source: authors' calculations using data on prices and sales volume of soft drinks obtained from AC Nielsen.
Notes: Est.: price elasticity of demand estimated using econometric approach on Latvian, Estonian and Lithuanian data (see Table 0.3-0.6 in Annexes). Av.: price elasticity of demand average across Baltic countries (calculated as a mean value);

Latvia: before tax increase prices refer to October 2019; Estonia: before tax increase prices refer to December 2018; Lithuania: before tax increase prices refer to October 2019.

Scenario: a 5% increase in the specific tax rate	LATVIA				LITHUANIA				ESTONIA			
	1	2	3	4	1	2	3	4	1	2	3	4
	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
Price elasticity of demand	-0,317	-0,317	-0,235	-0,235	-0,183	-0,183	-0,235	-0,235	-0,204	-0,204	-0,235	-0,235
The tax pass through rate to retail price	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75
Weighted average price (WAP) of a cigarette pack before the increase in excise tax, EUR	3,51	3,51	3,51	3,51	3,59	3,59	3,59	3,59	4,04	4,04	4,04	4,04
WAP after the excise tax increase, EUR	3,61	3,58	3,61	3,58	3,71	3,68	3,71	3,68	4,20	4,16	4,20	4,16
Change in WAP (incl. excise tax and VAT), %	2,8	2,1	2,8	2,1	3,2	2,4	3,2	2,4	3,8	2,8	3,8	2,8
Change in sales, %	-0,9	-0,7	-0,6	-0,5	-0,6	-0,4	-0,7	-0,6	-0,8	-0,6	-0,9	-0,7
Change in excise tax revenues from cigarettes, % from pre-reform scenario	2,6	2,6	2,8	2,8	3,7	3,5	3,5	3,4	3,7	3,5	3,6	3,4
Potential additional revenues, mln EUR	5,6	5,6	6,1	6,0	10,2	9,7	9,7	9,3	8,0	7,6	7,7	7,4

Note: Est.: price elasticity of demand estimated using econometric approach on Latvian, Estonian and Lithuanian data (see Table 6.2). Av.: price elasticity of demand average across Baltic countries (calculated as a mean value); Before tax increase prices refer to December 2019;

Change in sales are estimated as estimated as growth in prices multiplied by the price elasticity of demand; Source: authors' calculations using data on cigarette prices and sales volume obtained from AC Nielsen

Table 0.9: Short-term or direct impact of the excise tax increase (a 10% increase in the specific tax rate) on excise tax revenues from cigarettes in the Baltic countries, deviation from no tax change scenario

Scenario: a 10% increase in the specific tax rate	LATVIA				LITHUANIA				ESTONIA			
	1	2	3	4	1	2	3	4	1	2	3	4
Price elasticity of demand	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
	-0,317	-0,317	-0,235	-0,235	-0,183	-0,183	-0,235	-0,235	-0,204	-0,204	-0,235	-0,235
The tax pass through rate to retail price	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75
Weighted average price (WAP) of a cigarette pack before the increase in excise tax, EUR	3,51	3,51	3,51	3,51	3,59	3,59	3,59	3,59	4,04	4,04	4,04	4,04
WAP after the excise tax increase, EUR	3,73	3,68	3,73	3,68	3,82	3,76	3,82	3,76	4,35	4,27	4,35	4,27
Change in WAP (incl. excise tax and VAT), %	6,3	4,8	6,3	4,8	6,3	4,8	6,3	4,8	7,6	5,7	7,6	5,7
Change in sales, %	6,3	4,8	6,3	4,8	-1,2	-0,9	-1,5	-1,1	-1,6	-1,2	-1,8	-1,3
Change in excise tax revenues from cigarettes, % from pre-reform scenario	5,8	5,9	6,4	6,3	7,3	6,9	6,9	6,7	7,3	6,9	7,0	6,7
Potential additional revenues, mln EUR	12,7	12,8	13,9	13,7	20,2	19,3	19,2	18,6	15,9	15,0	15,3	14,6

Note: Est.: price elasticity of demand estimated using econometric approach on Latvian, Estonian and Lithuanian data (see Table 6.2). Av.: price elasticity of demand average across Baltic countries (calculated as a mean value); Before tax increase prices refer to December 2019;

Change in sales are estimated as estimated as growth in prices multiplied by the price elasticity of demand; Source: authors' calculations using data on cigarette prices and sales volume obtained from AC Nielsen

Table 0.10: Short-term or direct impact of the excise tax increase (a 20% increase in the specific tax rate) on excise tax revenues from cigarettes in the Baltic countries, deviation from no tax change scenario

Scenario: a 20% increase in the specific tax rate	LATVIA				LITHUANIA				ESTONIA			
	1	2	3	4	1	2	3	4	1	2	3	4
Price elasticity of demand	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.	Est.	Est.	Av.	Av.
	-0,317	-0,317	-0,235	-0,235	-0,183	-0,183	-0,235	-0,235	-0,204	-0,204	-0,235	-0,235
The tax pass through rate to retail price	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75
Weighted average price (WAP) of a cigarette pack before the increase in excise tax, EUR	3,51	3,51	3,51	3,51	3,59	3,59	3,59	3,59	4,04	4,04	4,04	4,04
WAP after the excise tax increase, EUR	3,98	3,87	3,98	3,87	4,05	3,94	4,05	3,94	4,66	4,50	4,66	4,50
Change in WAP (incl. excise tax and VAT), %	13,5	10,1	13,5	10,1	12,7	9,5	12,7	9,5	15,2	11,4	15,2	11,4
ASSUMING NO CHANGE IN C&C CIGARETTES CONSUMPTION:												
Change in sales, %	-4,3	-3,2	-3,2	-2,4	-2,3	-1,7	-3,0	-2,2	-3,1	-2,3	-3,6	-2,7
Change in excise tax revenues from cigarettes, % from pre-reform scenario	12,1	12,3	13,4	13,3	14,3	13,7	13,5	13,2	14,3	13,6	13,7	13,2
Potential additional revenues, mln EUR	26,2	26,7	29,0	28,8	39,9	38,2	37,7	36,7	31,1	29,7	29,9	28,8
ASSUMING AN INCREASE IN THE SHARE OF C&C IN TOTAL CIGARETTE CONSUMPTION BY 10 PERCENTAGE POINTS IN EACH BALTIC COUNTRY:												
Change in sales, %	-15,6	-14,5	-14,5	-13,7	-13,7	-13,1	-14,4	-13,6	-12,7	-11,9	-13,2	-12,3
Change in excise tax revenues from cigarettes, % from pre-reform scenario	-1,2	-0,8	0,1	0,2	1,0	0,5	0,2	0,0	3,0	2,5	2,4	2,1
Potential additional revenues, mln EUR	-2,5	-1,7	0,3	0,4	2,7	1,5	0,6	-0,1	6,5	5,4	5,3	4,5
ASSUMING AN INCREASE IN THE SHARE OF C&C IN TOTAL CIGARETTE CONSUMPTION BY 15 PERCENTAGE POINTS IN EACH BALTIC COUNTRY:												
Change in sales, %	-21,2	-20,1	-20,1	-19,3	-19,4	-18,8	-20,1	-19,3	-17,5	-16,7	-18,0	-17,1
Change in excise tax revenues from cigarettes, % from pre-reform scenario	-7,7	-7,3	-6,4	-6,3	-5,7	-6,1	-6,5	-6,6	-2,7	-3,1	-3,2	-3,5
Potential additional revenues, mln EUR	-16,8	-15,8	-13,9	-13,7	-15,9	-16,9	-18,0	-18,5	-5,8	-6,8	-7,1	-7,7

Note: Est.: price elasticity of demand estimated using econometric approach on Latvian, Estonian and Lithuanian data (see Table 6.2). Av.: price elasticity of demand average across Baltic countries (calculated as a mean value);

Before tax increase prices refer to December 2019; Change in sales are estimated as estimated as growth in prices multiplied by the price elasticity of demand; Source: authors' calculations using data on cigarette prices and sales volume obtained from AC Nielsen

Table 0.11: Short-term or direct impact of the excise tax increase (a 30% increase in the specific tax rate) on excise tax revenues from cigarettes in the Baltic countries, deviation from no tax change scenario

Scenario: a 30% increase in specific tax rate	LATVIA				LITHUANIA				ESTONIA			
	1	2	3	4	1	2	3	4	1	2	3	4
Price elasticity of demand	Est. -0,317	Est. -0,317	Av. -0,235	Av. -0,235	Est. -0,183	Est. -0,183	Av. -0,235	Av. -0,235	Est. -0,204	Est. -0,204	Av. -0,235	Av. -0,235
The tax pass through rate to retail price	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75	1	0,75
Weighted average price (WAP) of a cigarette pack before the increase in excise tax, EUR	3,51	3,51	3,51	3,51	3,59	3,59	3,59	3,59	4,04	4,04	4,04	4,04
WAP after the excise tax increase, EUR	4,24	4,05	4,24	4,05	4,28	4,11	4,28	4,11	4,97	4,74	4,97	4,74
Change in WAP (incl. excise tax and VAT), %	20,7	15,5	20,7	15,5	19,0	14,3	19,0	14,3	22,8	17,1	22,8	17,1
ASSUMING NO CHANGE IN C&C CIGARETTES CONSUMPTION:												
Change in sales, %	-6,5	-4,9	-4,9	-3,6	-3,5	-2,6	-4,5	-3,4	-4,7	-3,5	-5,4	-4,0
Change in excise tax revenues from cigarettes, % from pre-reform scenario	17,9	18,4	20,0	20,0	21,2	20,4	19,9	19,5	21,0	20,2	20,1	19,5
Potential additional revenues, mln EUR	38,7	40,0	43,4	43,4	59,0	56,8	55,5	54,2	45,8	43,9	43,8	42,4
ASSUMING AN INCREASE IN THE SHARE OF C&C IN TOTAL CIGARETTE CONSUMPTION BY 10 PERCENTAGE POINTS IN EACH BALTIC COUNTRY:												
Change in sales, %	-23,4	-21,8	-21,8	-20,5	-20,6	-19,7	-21,6	-20,5	-19,1	-17,9	-19,8	-18,4
Change in excise tax revenues from cigarettes, % from pre-reform scenario	-3,5	-2,6	-1,3	-1,0	-0,3	-0,8	-1,5	-1,7	2,8	2,2	1,9	1,6
Potential additional revenues, mln EUR	-7,5	-5,7	-2,9	-2,3	-0,8	-2,1	-4,3	-4,7	6,0	4,9	4,0	3,4

Note: Est.: price elasticity of demand estimated using econometric approach on Latvian, Estonian and Lithuanian data (see Table 6.2). Av.: price elasticity of demand average across Baltic countries (calculated as a mean value);
Before tax increase prices refer to December 2019;
Change in sales are estimated as estimated as growth in prices multiplied by the price elasticity of demand;

Source: authors' calculations using data on cigarette prices and sales volume obtained from AC Nielsen

Table 0.12: Short-term or direct impact of the excise tax increase on excise tax revenues from vodka, wine and beer in the Baltic countries

	LATVIA				ESTONIA				LITHUANIA			
	Increase in excise tax rate, %	Change in quantity sold, %	Change in excise tax revenues from specific alcoholic beverage, % from pre-reform scenario	Potential additional revenues, mln EUR	Change in quantity sold, %	Change in excise tax revenues from specific alcoholic beverage, % from pre-reform scenario	Potential additional revenues, mln EUR	Change in quantity sold, %	Change in excise tax revenues from specific alcoholic beverage, % from pre-reform scenario	Potential additional revenues, mln EUR		
VODKA	10%	-4,3 – -1,2	5,3 – 8,7		-4,0 – -1,1	5,6 – 8,8		-5,7 – -1,6	3,7 – 8,3			
	15%	-6,4 – -1,8	7,6 – 13,0		-5,9 – -1,6	8,2 – 13,1		-8,6 – -2,4	5,2 – 12,3			
	20%	-8,6 – -2,4	9,7 – 14,8		-7,9 – -2,2	10,5 – 17,4		-11,4 – -3,1	6,3 – 16,2			
WINE	10%	-0,9 – 0,0	9,0 – 10,0	1,7 – 1,9	-1,5 – 0,0	8,3 – 10,0	2,3 – 2,7	-1,7 – 0,0	8,1 – 10,0	3,3 – 4,0		
	15%	-1,4 – 0,0	13,4 – 15,0	2,6 – 2,9	-2,3 – 0,0	12,4 – 15,0	3,4 – 4,1	-2,6 – 0,0	12,0 – 15,0	4,8 – 6,0		
	20%	-1,9 – 0,0	17,8 – 20,0	3,4 – 3,8	-3,0 – 0,0	16,4 – 19,9	4,5 – 5,5	-3,5 – -0,1	15,8 – 19,9	6,4 – 8,0		
BEER	10%	-1,0 – -0,3	8,9 – 9,7	4,8 – 5,2	-1,0 – -0,3	8,9 – 9,7	5,4 – 5,9	-1,0 – -0,3	8,9 – 9,7	7,4 – 8,1		
	15%	-1,5 – -0,4	13,3 – 14,5	7,2 – 7,8	-1,4 – -0,4	13,3 – 14,5	8,1 – 8,8	-1,5 – -0,4	13,2 – 14,5	11,1 – 12,1		
	20%	-2,0 – -0,6	17,7 – 19,3	9,5 – 10,4	-1,9 – -0,5	17,7 – 19,3	10,7 – 11,7	-2,1 – -0,6	17,5 – 19,3	14,7 – 16,1		

Source: authors' calculations.

Notes:

Latvia: before tax increase prices refer to April 2020; Tax rate before the increase refers to 2020.

Estonia: before tax increase prices refer to prices of locally produced alcoholic drinks in 2018; Tax rate before the increase refers to March 2020.

Lithuania: before tax increase prices refer to prices of locally produced alcoholic drinks in 2019; Beer price is indicated without deposit; Tax rate before the increase refers to 2020.

Price per litre of beer after the tax increase is calculated assuming that 28% of beer sold in Latvia is produced in small breweries (According to State Revenue Service of Latvia (SRS, 2020) 28% of total beer volume produced in Latvia was produced in small breweries subject to the reduced excise rate for beer if sold in Latvia). We assume that the same share (28%) of sold beer is produced by small breweries in Estonia

Potential additional revenues are estimated using data on excise tax revenues from wine and beer in 2019 published by State revenue service of the Republic of Latvia, Statistics Estonia and State Tax Inspectorate Under the Ministry of Finance of the Republic of Lithuania. We are not able to estimate potential additional revenues from taxation of vodka, since disaggregated data on excise duty revenues by type of ethyl alcohol is not available.



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