

# **Food taxes and their impact on competitiveness in the agri-food sector**

Annexes to the Main report

Client: DG Enterprise and Industry

Rotterdam, 17 July 2014





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Compiled by the following partners of the ECSIP consortium:

- Ecorys
- Euromonitor
- IDEA
- DTI

Rotterdam, 17 July 2014

## About ECSIP

The **E**uropean **C**ompetitiveness and **S**ustainable **I**ndustrial **P**olicy Consortium, **ECSIP** Consortium for short, is the name chosen by the team of partners, subcontractors and individual experts that have agreed to work as one team for the purpose of the Framework Contract on 'Industrial Competitiveness and Market Performance'. The Consortium is composed of Ecorys Netherlands (lead partner), Cambridge Econometrics, CASE, CSIL, Danish Technological Institute, Decision, ECIS, Euromonitor, Fratini Vergano, Frost & Sullivan, IDEA Consult, IFO Institute, MCI, and wiiw, together with a group of 28 highly skilled and specialised individuals.

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# Annex 1 Literature Review

The objective of the literature review was to gain an overall understanding of the extent of research available on the subject of food taxes and provide a qualitative overview highlighting the key findings, as well as data and information gaps requiring further analysis.

## Process

The literature review was undertaken in three steps:

- collection of literature (identifying literature based only on article titles);
- review of literature (reading of articles to check relevance of content); and
- Analysing and drawing conclusions from literature (writing an overview of the evidence and conclusions of the literature).

### Collection of literature

Literature was retrieved via online full-text journal databases and Google Scholar, as well as from various government and institute websites (such as OECD and WHO). The search terms used in the online queries included “tax” along with a combination of “food”, “fat”, “sugar”, “soft drink” and “beverage”, as well as “obesity” combined with either “policy”, “prevention”, “strategy”, “epidemic” or “intervention”. Literature was initially selected based on the title and included only resources in English and with a geographical focus of European Union or OECD countries. Resources published within the last five years were of particular attention, however a small number of pre-2009 resources were also identified as important to include.

These searches yielded a good initial list of articles that was further expanded by scanning the reference lists of the collected articles. Stakeholders from the High Level Forum for a Better Functioning Supply Chain and associated organisations also provided a large number of valuable literature suggestions. At the conclusion of the literature search process, a total of 104 sources were identified (see end of this annex for the full list of sources).

### Review and refinement

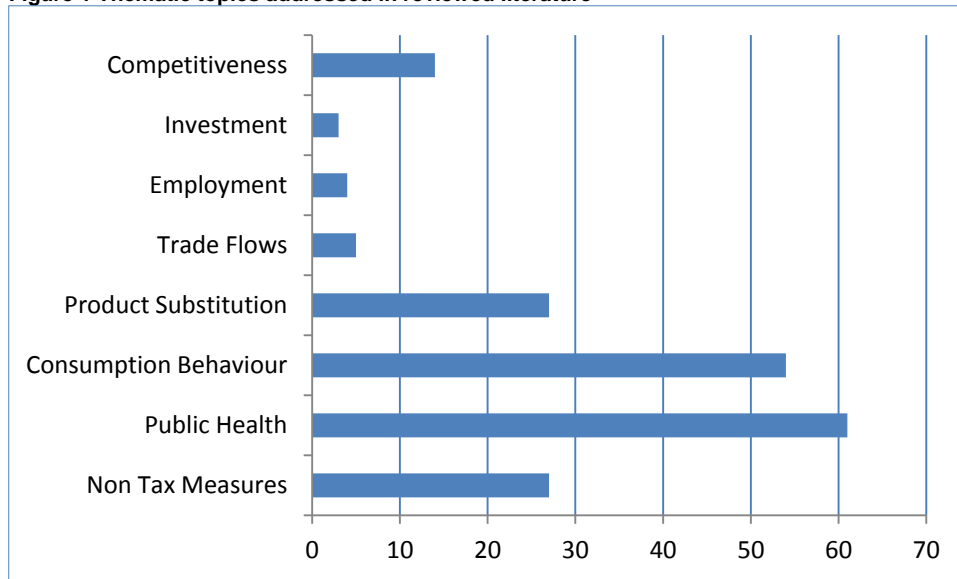
Each literature source was individually reviewed and profiled. The profiling was undertaken using a pre-developed reporting template which allowed key information to be extracted (tax and country examined, study methods used) and findings of the research to be summarised (tax effects observed). By aggregating the information in the individual literature profiles, some general observations of the food tax literature can be made, such as thematic topics addressed, specific tax examined, geographical focus and methodological approach. Where literature had particular relevance or potential added value for subsequent stages of the food taxes study, this was highlighted. A number of the resources were found to not be of use for the study and this was also noted in the profile.

### *Thematic topics addressed*

We found rather limited research and analysis that addresses the impact of food taxes on the agro-food industry specifically. The topics of competitiveness, investment, employment and trade flows were among the least studied within the collection of literature. In contrast the topics of consumer behaviour and health effects were more widely studied with the issue of product substitution having been found as a common subtopic of consumer behaviour (though not always). Non-tax measures such as labelling, advertising regulation, mass media education and school programs were policies

commonly discussed in combination with, or in comparison to, food tax policies, although often not in detail. Figure 1 shows the distribution of thematic topics across the literature with sources often addressing more than one thematic area.

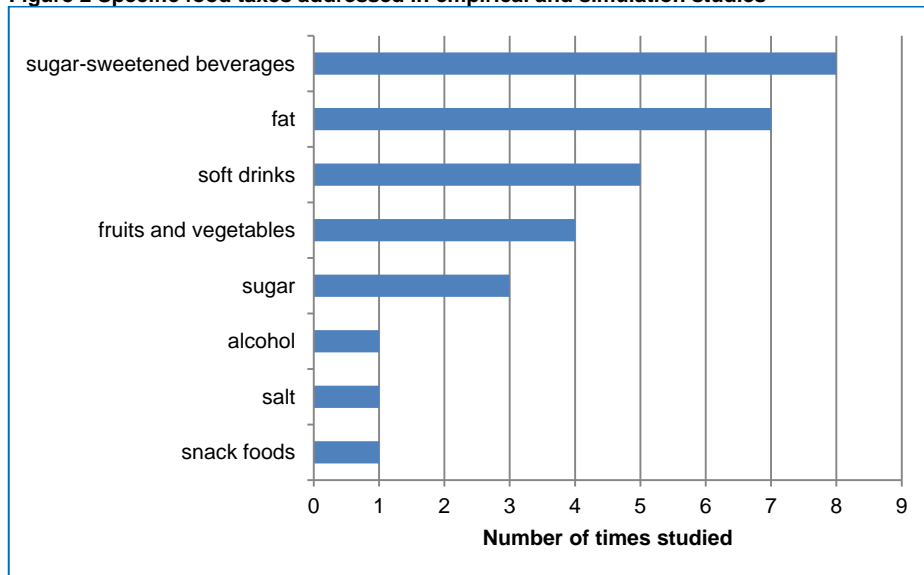
**Figure 1 Thematic topics addressed in reviewed literature**



#### *Food taxes examined*

The food taxes studied predominantly related to sugar, mostly with respect to sugar in beverages. The sugar-sweetened beverage (SSB) category, specifically named so as to include juices, flavoured waters, energy drinks and soft drinks (distinctly broader than the soft drinks category), dominated the literature. Saturated fat was also highly studied. Figure 2 illustrates the food taxes that were examined noting that some studies examine multiple taxes (for example a subsidy on fruits and vegetables in combination with a tax on fat or sugar).

**Figure 2 Specific food taxes addressed in empirical and simulation studies**



#### *Geographical focus*

In terms of geographical focus, around one third of the empirical and simulation literature studied a food tax in the US context. Within the EU literary sources, it is not surprising that the countries studied most were those which currently have, or had in the past, a health motivated food tax. The



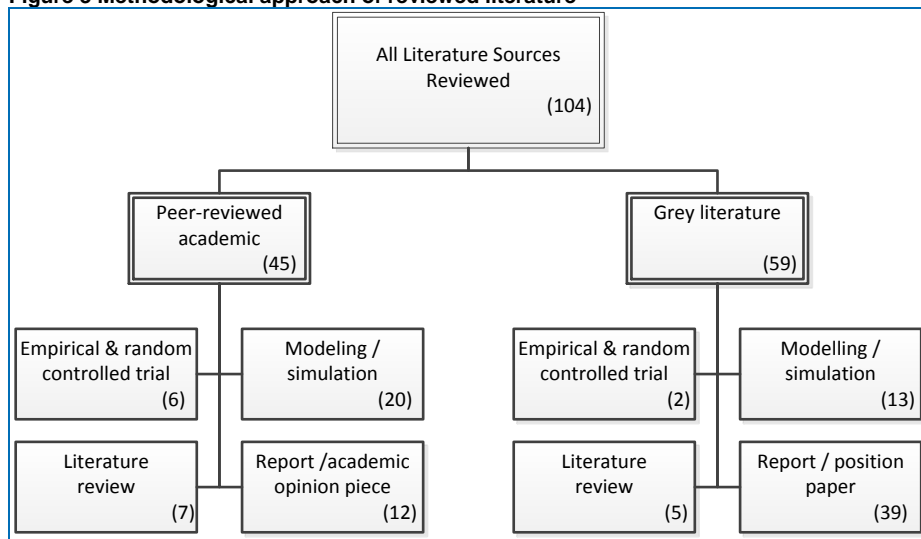
United Kingdom (UK) is the exception with a considerable body of literature on food taxes despite not having implemented such a tax.

### Methodological approach

The literature profiling also allowed for a simple quality assessment of the literature. Sources were identified as either peer-reviewed, academic literature or grey literature and further categorised based on methodological approach. Sources were classified as peer-reviewed, academic literature if formally published in a peer-reviewed book or journal. Grey literature was defined as informally published documents<sup>1</sup> such as reports from government agencies, impact assessments, legislation, position papers, working papers from universities or research groups (which may use empirical or modelling / simulation methods) and conference abstracts. Peer-reviewed, academic literature is generally higher quality than the grey literature. Empirical methods are considered the most robust evidence, with modelling / simulation results providing valuable research support.

The below diagram shows the categorisation of the peer-reviewed, academic literature and grey literature according to methodological approach.

**Figure 3 Methodological approach of reviewed literature**



### Empirical

Analysing the literature profiles revealed that of the 104 literature sources reviewed, only 8 used empirical methods to examine a food tax (6 were peer-reviewed, academic studies and 2 were from the grey literature). Empirical studies rely on observations from actual experiences and usually use statistical techniques such as regression to analyse the observational data<sup>2</sup>. Included in the empirical category are random controlled trials (RCT) which also rely on observation however do this through controlled experiments. RCTs are “An experiment in which two or more interventions, possibly including a control intervention or no intervention, are compared by being randomly allocated to participants”<sup>3</sup>.

The very low number of empirical studies might be due to the fact that few countries in the EU have had, or currently have, health motivated food taxes and most have been quite recently implemented. Therefore, the number of natural experiments (non controlled, ‘real world’ cases) and

<sup>1</sup> Higgins JPT, Green S (editors). 2011. "Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]." The Cochrane Collaboration. [www.cochrane-handbook.org](http://www.cochrane-handbook.org).

<sup>2</sup> Higgins JPT, Green S (editors). 2011.

<sup>3</sup> Higgins JPT, Green S (editors). 2011.

extent of longitudinal data upon which to perform ex post analysis is limited. Even for those countries that provide natural experiments, other factors may be influencing behaviour patterns.

### **Modelling / simulation**

There is a comparatively larger body of modelling / simulation (ex ante) food tax literature with 20 peer-reviewed, academic studies and 13 grey literature studies. Ex ante analysis involves developing an economic model and simulating a tax in order to predict what the 'real world' effects of a tax may be. The challenge with ex ante modelling studies however, is they are dependent on the availability of data and the robustness of assumptions. The quality of the data and the necessity to make simplifying assumptions is commonly cited by the authors themselves as key limitations and therefore results and conclusions of any modelling / simulation study need to be viewed in conjunction with these limitations.

### **Literature review**

Literature reviews are “a review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used”<sup>4</sup>. Therefore the 12 literature reviews provided a useful check against our own analysis of the empirical and modelling / simulation literature.

### **Report, academic opinion piece and position paper**

The reports mostly summarise and apply the empirical and modelling / simulation research to the context and interests of specific stakeholder groups, and may also draw on statistics and trend analysis. These reports are often conducted by researchers who are funded by industry or health associations, or by institutional bodies. Academic opinion pieces present arguments, often for and against, a particular topic based on their own research and the research of peers (usually empirical or modelling / simulation research). Position papers by industry or health organisations generally advocate for or against a particular topic, usually referring only to research that supports their claims.

### **Analysing and drawing conclusions**

Of the 104 literary sources, 40 were ultimately used for the analysis and drawing of conclusions on food taxes in the EU. The 8 empirical studies (including randomly controlled trials) are considered to provide the most credible evidence as these studies observe and analyse actual consumer / industry responses to an implemented food tax (or controlled, experimental price change). The 27 modelling studies which simulate implementation of a food tax in a particular country provide supporting research. However, their findings must be viewed together with their limitations, such as quality of the national data used, robustness of economic modelling approach and existence of simplifying assumptions. One systematic literature review and 4 research reports were also drawn upon. The position papers, mainly from related stakeholder groups, were not incorporated in the literature review but were used to supplement the EU level interviews.

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<sup>4</sup> Higgins JPT, Green S (editors). 2011.

A table summarising the key findings of the 40 literary sources is provided on the following page.

**Table 1 Summary table of key findings in empirical and modelling studies**

Study and year	Study focus	Study type and country	Data	Taxation change	Key Findings	Additional findings
<b>Peer-reviewed literature - Empirical</b>						
Jensen and Smed 2013	Excise duty on saturated fat	Empirical, Denmark	Weekly food purchase data from household panel dataset of ~2000 households. Jan 2008 to Jul 2012.	In Oct 2011, introduction of tax of DKK16/kg of saturated fat.	Consumption of fats dropped by 10–15%. The average price of butter increased by 8.17 DKK/kg, average price of margarine increased 4.57 DKK/kg.	Hoarding - a few weeks prior to introduction of the tax. Shifts in demand - from high price supermarkets towards low-price discount stores. Heterogeneity in transmission of tax to consumer prices.
Bahl et al. 2003	Excise duty on soft drinks	Empirical, Ireland	Data from 1975 to 1996 of soft drink prices, soft drink sales, and food price index.	1990 tax was reduced from IR£0.37 to IR£0.29 per gallon (~21%) 1992 tax was abolished.	Price elasticity of demand for soft drinks - 1.10. A 10% reduction in the tax rate caused an 11% increase in consumption, other factors held constant.	Consumer prices did not fall by the full amount of the tax reduction. The price of other foods did not have an impact.
Fletcher, Frisvold, and Tefft 2010	Sales taxes on soft drinks	Empirical, US	Soft drink tax data from 1989 to 2006, combined with National Health Examination and Nutrition Survey data.	Sales taxes on soft drinks in US, average rate varies between 1.5 and 2.3% during the period. There were 53 tax rate changes within states over the time.	A one percentage point increase in the soft drink tax rate reduces the amount of calories consumed by soda by nearly 6 cal, which is about 5% of the average calories from soda - for children and adolescents.	A one percentage point increase in the soft drink tax rate increases caloric intake from whole milk by nearly 8 cal per day, which is 13% of the average calories from whole milk. Some suggestive evidence that soft drink taxes affect the consumption of juice or juice-related drinks.
Block et al. 2010	Soft drink price increase	Randomly controlled trial, US	Sales data on food and beverages in two nearby hospital cafeterias (one with price intervention and one without), over 18 weeks.	A price increase on regular soft drinks of \$0.45 (35%).	Sales of regular soft drinks declined by 26%. At the comparison site (with no price increase), no difference in regular soft drink sales occurred.	Diet soft drink sales increased by 20%. Snack and dessert sales did not significantly change throughout the study period.
Waterlander et al. 2013	Fruit and vegetable discounts	Randomly controlled trial, Netherlands	Supermarket register receipts over a nine month period, including baseline, intervention and post intervention data. Total of 151 participants.	A 50% price discount on fruit and vegetables, plus education.	At 6 months, 5.4 kg more F&Vs were purchased per households for 2 wks, which corresponds to 124g/person per day. (Dutch people consume, on average, 198g of F&Vs/d). No difference was observed in the non-discount groups.	Results showed that participants did not spend the money saved from the discounts in other supermarket (food) categories. At month 9, 3 months after the interventions were completed, all effects had vanished.
Lachat et al. 2009	Fruit and vegetables for free	Randomly controlled trial, Belgium	Food and beverage intake during lunchtime at a university canteen, 209 participants.	Two portions of fruits and one portion of vegetables for free at lunchtime, for three days.	Participants ate 80g more fruits and 108g more vegetables on a daily basis than the participants receiving no free F&V.	No differences were found for energy density, total energy, Na and energy from fat between the groups per day. Meaning that increased F&V did not displace other foods.
<b>Grey literature - Empirical</b>						
Bergman and Hansen. 2010	Excise duties on alcoholic beverages and soft drinks	Empirical, Denmark	Product, brand, store and regional level price data from 1998-2010 of beverages.	liquor ↓ 2003, soft drinks ↑ 1998 and 2001 and ↓ 2003, beer ↑ 1997 and ↓ 2005.	Taxes are more than fully passed through to consumers when there is a tax hike, undershifting when taxes are cut. The amounts of soft drinks and beers bought outside Denmark increased in the years following the reduction of excise taxes.	Considerable heterogeneity across products, brands, types of stores and regions. Large differences between the tax pass-through across regions but no strong empirical result suggesting a German or a Swedish border effect on strategic pricing behaviour.
Berardi et al. 2012	Tax on sugar-	Empirical, France	Product, brand and store price	From Jan 2012, tax of €7.16 per	Gradual passed-through to consumer	Considerable heterogeneity across

Study and year	Study focus	Study type and country	Data	Taxation change	Key Findings	Additional findings
	sweetened beverages		data from Aug 2011 to Jun 2012 of non-alcoholic beverages.	hectolitre of sugar-sweetened beverage.	prices, full transmission to soda prices after 6 months, fruit drinks and flavoured waters pass-through was not complete.	products, brands and retailing groups. Pass-through was significantly higher for private labels than it was for other brands.
<b>Peer-reviewed literature - Modelling</b>						
Salois and Tiffin. 2011	Tax on saturated fat and subsidy for fruit and vegetables	Demand modelling, UK	Household level data from the UK Expenditure and Food Survey, using two week food expenditure diaries. The sample is from 2003-2004, based on 7,014 households.	A price increase of each food group by 1% for every percent of saturated fats, with a ceiling of 15% price increase. A subsidy on fruit and vegetables is introduced, so as to exactly cancel the costs of the fat tax paid by consumers.	Average intake of saturated fats fall by 6.2% and average intake of total sugar falls by 2.4%.	The general trend in changes in nutrient intakes is that most nutrient intakes tend to fall as a result of the combination of fat taxes and thin subsidies. It remains unclear what health repercussions may arise from such substantial dietary changes.
Tiffin and Arnoult. 2011	Tax on saturated fat and subsidy for fruit and vegetables	Demand modelling, UK	Household level data from the UK Expenditure and Food Survey, using two week food expenditure diaries. The sample is from 2005-2006, based on 6,760 households.	A price increase of each food group by 1% for every percent of saturated fats, with a ceiling of 15% price increase. A subsidy on fruit and vegetables is introduced, so as to exactly cancel the costs of the fat tax paid by consumers.	product: % tax, demand ↓ full fat milk: 2.6%, 2.20%, skim milk: 0.13%, 0.13%, chips: 13.77%, 14.24% The estimated consumption reductions in fat intake are found insufficient to meet dietary recommendations. The tax/subsidy policy leads to a marginal increase in the consumption of sugar.	A subsidy approaching 15% of the price of fruit and vegetables is predicted to be effective in bringing mean levels of fruit and vegetable consumption in line with dietary recommendations. Once the changes in diet are converted into changes in the risks of disease, the impacts of the policy are negligible.
Nnoaham et al. 2009	Taxes on saturated fat	Demand and health modelling, UK	Expenditure data from the Expenditure and Food Survey. Estimates of effect on cardiovascular disease and cancer mortality of changing fat, salt, fruit and vegetable intake were taken from previous meta-analyses.	Four scenarios involving only a tax on saturated fat, tax on high fat/sugar/salt foods, and two different combination scenarios of a subsidy on F&V with a tax on HSSF.	Few obesity-related CVD deaths are averted by any of the regimens.	The tax is regressive and positive health effects will not necessarily be greater in lower income groups.
Jensen and Smed. 2007	Tax on saturated fat and subsidy for fruit and vegetables	Demand modelling, Denmark	Aggregate annual data from Statistics Denmark, spanning the period 1972–1996.	7 scenarios are created and scaled to yield the same welfare loss in order to make the scenarios comparable.	A tax on all fats in foods leads to a reduction in the consumption of all food categories of animal origin, except eggs. If a tax is only directed towards the foods' contents of saturated fats, the reducing effect on the consumption of fats and cheese is 10–15% stronger. A combined regulation has a relatively strong impact on the intake of all the considered components.	Tax is regressive. Subsidies to the consumption of fruits and vegetables, (via reduced VAT) will increase consumption of F&V at the cost of a range of other foods, including dairy products, eggs and fish. A subsidy to the content of fibres in the foods leads to an increase in the consumption of fibre rich foods: flour/bread, potatoes, fruit and vegetables, mainly at the cost of dairy products, eggs and

Study and year	Study focus	Study type and country	Data	Taxation change	Key Findings	Additional findings
Chouinard et al. 2007	Tax on fat in dairy products	Demand modelling, US	Weekly city-level aggregates of grocery store scanner data over three years, 1997 - 1999, for 23 US cities.	A 10 percent ad valorem tax on the percentage of fat in 14 dairy product categories.	Consumption of fat reduces by less than 1%.	fats. The tax is regressive. Demand for low-fat products increases and demand for high-fat products lowers.
Nordström and Thunström. 2011	VAT reforms and excise duty reforms relating to fibre, added sugar and saturated fat	Demand modelling, Sweden	Household grain purchases from private market research data from GfK Sweden (2003), combined with household expenditure data from Statistics Sweden (1996) and nutritional information from the SLV nutrition database.	Various scenarios involving excise duty reforms containing a subsidy of fibre content, funded by excise duties on either added sugar or saturated fat.	The revenue-neutral tax scheme that appears to be most efficient in redirecting consumption to healthier levels is a subsidy on fibre, funded either by an excise duty on added sugar or an excise duty on saturated fat. Both the VAT reforms and the excise duty reforms appear to be progressive in income terms.	VAT reforms have a similar impact across all income groups, with increases in fibre intake, but also unwanted increases in the intake of fat, salt and sugar. The impact on dietary quality of the VAT reforms is therefore difficult to evaluate. Excise duty reforms seem to have a positive health effect across all other income groups, except the lowest income group.
Kuchler, Tegene and Harris. 2005	Ad valorem tax on salty snack foods	Demand modelling, US	Nielsen Homescan Panel data, 1999.	20% ad valorem tax on potato chips. 20% ad valorem tax on a broad range of salty snacks.	The tax on potato chips is estimated to reduce purchases by 5.54 ounces per person per year, or 830 calories. Widening the tax base to include all salty snacks yields similar results of reduced purchases in the range of 4–6 ounces per person.	Assuming that no food would be substituted, at 3,500 calories per pound of body weight, the reduction translates into less than a fourth of a pound. Neither tax was found to appreciably affect overall dietary quality of the average consumer.
Zhen, et al. 2013	Excise tax on sugar-sweetened beverages	Demand model, US	Household-based Nielsen Homescan consumer purchase panel data.	Half cent per ounce increase in SSB prices, from an excise tax.	Predicted to reduce total calories but increase sodium and fat intakes by 0.2g and 49.8mg respectively as a result of product substitution.	Tax is regressive. Predicted decline in calories is larger for low-income households than for high-income households.
Bonnet and Réquillart. 2013	Excise tax on soft drinks	Demand model, France	Individual data on food purchases from a representative survey of 19,000 French households in 2005.	Excise tax of EUR 0.0716/litre for soft drinks, approximately equal to a 10% price increase.	Manufacturers and retailers over-transmit excise taxes to consumers with the average pass-through rate varying from 1.16 to 1.22. Prices of regular products increase by 12%, on average.	Considerable heterogeneity exists in price response. There is a delay in the way prices are adjusted.
Briggs et al. 2013	Tax on SSBs	Demand and health modelling, UK	Data on prices and purchasing of drinks from a 2010 representative UK survey using two week food expenditure diaries (5,263 households).	20% tax on sugar-sweetened beverages	The tax is predicted to reduce the prevalence of obesity in the UK by 1.3% (around 180 000 people).	The greatest effects may occur in young people, with no significant differences between income groups.
Lin et al. 2011	Tax on SSBs	Demand and health modelling, US	Nielsen National Consumer Panel 1998–2007. Data from National Health and Nutrition Examination Survey 2003–2006 used to estimate changes in calorie intake, weight loss, and body weight status.	20% effective tax rate (or about 0.5 cent per ounce) on SSBs	An average daily reduction of 34–47 calories among adults and 40–51 calories among children.	Estimated reductions in body weight and obesity prevalence from reduced calorie intakes can differ greatly between two prediction models (static and dynamic). Tax is regressive, although it represents about 1% of household food and beverage spending.
Andreyeva Chaloupka and Brownell.	Excise tax on SSBs	Demand modelling, US	Industry data on consumption (volume) and total sales for 2008.	Penny per ounce excise tax on sugar-sweetened beverages	Estimated 24% reduction in sugar-sweetened beverage consumption, if there is no substitution to other caloric beverages or	Could translate into significant losses in average body weight—up to 5 lb/year, assuming linear weight

Study and year	Study focus	Study type and country	Data	Taxation change	Key Findings	Additional findings
2011				(around 20% price increase)	food.	loss from calorie reductions.
Dharmasena and Capps. 2012	Tax on SSBs	Demand modelling, US	Nielsen Homescan Panel data, 1998 to 2003.	20% tax on sugar-sweetened beverages	Consumption of isotonic, regular soft drinks and fruit drinks falls by 129%, 49% and 26%, respectively. Diet soft drinks, high-fat milk and bottled water consumption fall by 6.63, 1.60 and 5.08%, respectively.	Notable increases in the consumption of low-fat milk (11%), fruit juices (29%) and coffee (26%) are evident. Reduction in body weight estimated to be 1.54 to 2.55 lb/year, partially offset by a rise in consumption of fruit juices and coffee.
Finkelstein et al. 2013	Tax on SSBs	Demand modelling and regression analysis, US	Nielsen Homescan Panel data, 2006	20% tax on sugar-sweetened beverages	Estimated decrease of 24.3 kcal per day per person, translating into an average weight loss of 1.6 pounds during the first year and a cumulated weight loss of 2.9 pounds in the long run. Substitution to other beverages was limited and only involved fruit juices.	Do not find evidence of substitution to sugary foods and show that complementary foods could contribute to decreasing energy purchases. Despite their significantly lower price elasticity, the tax has a similar effect on calories for the largest purchasers of SSBs.
Finkelstein et al. 2010	Tax on SSBs	Regression modelling, US	Nielsen Homescan Panel data, 2006	20% or 40% tax on (1) carbonated SSBs only or (2) carbonated SSBs, fruit drinks, and sports/energy drinks simultaneousl y.	A 20% and 40% tax on carbonated SSBs only would reduce beverage purchases by a 4.2 and 7.8 kcal/d per person, respectively. Extending the tax to all SSBs generates mean reductions of 7.0 and 12.4 kcal/d per person, respectively.	Estimated mean weight losses resulting from a 20% and 40% tax on all SSBs are 0.32 and 0.59kg/y per person, respectively. The tax is not regressive in that higher-income households pay the largest share, although they receive no benefit in terms of weight loss.
Lock et al. 2010	Saturated fat intake at 'healthy levels'	Computable general equilibrium, epidemiological and economic modelling, UK	Data from 2004 from the Global Trade Analysis Project database. Health modelling was restricted to pathways leading from consumption of saturated fat to ischaemic heartdisease (did not model obesity).	Assumed a consumption decrease of saturated fat equal to match 'nutritional guidelines'. Did not examine a tax change.	Changes in spending concurrent with healthy eating would dictate which sectors grow, such as fruit and vegetable production. The mobility of resources, particularly labour, from declining to increasing sectors will determine rates of employment and losses to people working in the affected sectors.	Reductions in dietary intake of foods from all animal sources has little effect, whereas changes in dairyproduct consumption have the most substantial effects for health outcomes. In the UK, if diets matched nutritional guidelines, 70 000 premature deaths could be prevented each year
Cecchini et al. 2010	Public health strategies including fiscal measures	Chronic disease prevention modelling, UK	The model simulates the dynamics of a specific country or regional population over a lifetime (set at 100 years).	Public health strategies including fiscal measures, mass-media, regulation and labelling.	Price interventions and regulation can produce the largest health gains in the shortest timeframe. A strategy of several interventions would generate substantially larger health gains than would individual interventions.	The least gains were obtained through mass media health-promotion campaigns and the largest gains through regulation of food advertising to children. Food labelling is also cost-saving, but with smaller health effects than for fiscal measures.
<b>Grey literature - Modelling</b>						
Allais, Etilé and Lecocq. 2012	Tax on saturated fat in fromages blancs and dessert yoghurts	Demand modelling, France	French household scanner data on fromages blancs and dessert yogurts, 2007.	Ad valorem tax of 10% (5%) on the producer price of full-fat (semi-skimmed) fromages blancs and dessert yoghurts.	Reduction in consumption of the taxed products by 38%, when assuming full pass-through of tax to prices. Reduction in consumption of 9%, when assuming pass-through rate is under 40%.	Producers neutralise up to 96% of the impact of the tax on demand, via large price cuts on products with large ex ante margins. Firm reactions will depend on the market under consideration, specifically on the margins.
Kotakorpi et al. 2011	Excise tax on sugar, reduced	Demand and health modelling,	Finnish Household Budget	1) a sugar tax of 1 € /kg (9.2% price ↑ for	The excise tax on sugar could lead to a 3 kg reduction in the	Sugar tax is mildly regressive. The health effects appear



Study and year	Study focus	Study type and country	Data	Taxation change	Key Findings	Additional findings
	VAT for fruit and vegetables	Finland	Survey data from 1995-1996, 1998, 2001 and 2006.	sweets and sugary foods) 2) abolishment of the current 13% VAT on fruit, vegetables and fish (~11.5% price ↓ price of fish, F&V). 3) a combined scenario of both the sugar tax and VAT abolishment.	average body weight of the adult population. A zero VAT rate on fish, fruit and vegetables would reduce the risk of cardiovascular mortality by approximately 4% and the risk of coronary heart disease by slightly below 1%.	to be most pronounced for low-income individuals, and the reforms may therefore reduce health inequality.
Kotakorpi and Pirttila. 2010	Excise tax on sugar, reduced VAT for fruit and vegetables	Demand and health modelling, Finland	Finnish Household Budget Survey data from 1995-1996, 1998, 2001 and 2006.	1) a sugar tax of 1 € /kg (9.2% price ↑ for sweets and sugary foods) 2) abolishment of the current 13% VAT on fruit, vegetables and fish (~11.5% price ↓ price of fish, F&V). 3) a combined scenario of both the sugar tax and VAT abolishment.	Sugar tax is estimated to decrease demand by 23% for sugar and sweet products and cause large movements towards lower BMI classes. Reduced VAT predicted to increase demand for fish by 11.6% and F&V by 5.4% and have a small positive direct effect on the incidence of coronary heart disease. Similar results in the combined scenario.	The combined policy has a sizable effect on the incidence of obesity and overweight, causing on average an ~13% reduction in the incidence of type 2 diabetes and a smaller reduction in coronary heart disease. Sugar tax is mildly regressive. Weight loss is higher for low-income households, thus the sugar tax is progressive in health terms.
Dioikitopoulos, Katsaitiy and Shaw. 2013	Relationship between economic variables and body weight	General equilibrium growth modelling, US	Historical US economic data over 50 years, combined with BMI data from the 2010 Behavioural Risk Factor Surveillance System database.	A decrease in the tax rate on food from 22% to 15%.	Reducing taxation on food increases food consumption and weight levels, in equilibrium. Labour reallocation towards the less sedentary sector on one hand and higher income on the other function as opposite forces. However, in equilibrium the second effect prevails.	Technological advances in agriculture decrease food prices and increase weight but not necessarily through higher food consumption, but through lower calorie expenditure.
Bonnet and Réquillart. 2012	Excise tax on soft drinks	Demand modelling, France	Consumer panel data from a French representative survey of 19,000 households, 2003-2005, on food purchases (quantity, price, brand, characteristics of goods, store).	Excise tax of EUR 0.0716/litre for soft drinks, approximately equal to a 10% price increase.	Decreases soft drink consumption by more than 3 litres per person per year, or 3.4 litres if the tax is extended to all SSB products (roughly 15% of the initial consumption). Because of strategic pricing, the tax is over-transmitted to consumers with a pass-through rate of 1.14.	Substitutions primarily occur between products in the same categories. For the leading products in each category consumers prefer to switch their retailer to buy the preferred brand rather than switching to another brand sold by the same retailer. This result suggests that some manufacturers have market power in this market.
Bonnet and Réquillart. 2011	Excise tax and ad valorem tax on sugar-sweetened beverages	Demand model, France	Consumer panel data from a French representative survey of 19,000 households, 2003-2005, on food purchases (quantity, price, brand, characteristics of goods, store).	The excise tax ranges from 7.4 euro cents to 11 euro cents per litre of regular soft drink.	SSB consumption decreases by about 33% of initial consumption. Consumption of diet soft drinks increases by about 43% of initial consumption, as does consumption of the outside good by about 10%. Excise tax is overshifted to consumer prices by between 1.07 and 1.33, while ad valorem tax is undershifted.	Excise tax based on sugar content is the most efficient at reducing soft drink consumption. Ignoring strategic pricing by firms leads to misestimate the impact of taxation by 15% to 40% depending on the products and the tax implemented. Price changes significantly affect brand market shares as well as soft drink consumption.
Bonnet, Dubois and Orozco. 2008	Food tax in general	Demand and health modelling, France	Consumer panel data from a French representative survey of 19,000 households,	None, the study calculated price elasticities of food categories.	Price elasticities at the individual level are quite significant and taxing high density and cheap energy categories of food like the one	Taxing the "junk food" category actually reduces the prevalence of overweight and obesity dramatically. A price increase of fat products such as oil and

Study and year	Study focus	Study type and country	Data	Taxation change	Key Findings	Additional findings
			2003-2005, on food purchases (quantity, price, brand, characteristics of goods, store).		usually said as "junk food" appears to be an effective way to change consumption patterns and reduce obesity and overweight.	butter would also reduce the total energy intake and thus the population body mass index. The effect of a price increase is not always to decrease total calories consumption because of product substitution.
Griffith, Nesheim and O'Connell . 2009	Tax on saturated fat	Demand modelling, UK	Data on butter and margarine purchases from TNS World Panel 2006, 15,764 households.	A 10p tax on 100g of saturated fat, (price increase of 12.5% on average across all products, 14.9% for butter and 11.1% for margarine).	In general products with high saturated fat intensity lose market share while those with low intensity gain. However, there is substantial heterogeneity.	Households in all income bands reduce their demand in response to an increase in price (by choosing smaller pack sizes). Market share of margarine products increases by 2.2% at the expense of butter products.
Foodob and Institute for Fiscal Studies. 2012	Tax on sugar and saturated fat	Demand modelling, France and UK	French and British micro panel data.	Range of scenarios of taxes on sugar and saturated fat.	Taxing SSBs would help combat the obesity epidemic. An excise tax based on sugar content would be the most efficient way to limit the consumption of SSBs.	Price changes as a result of taxation bring about significant substitutions among products. Firms do not perfectly transmit the tax to consumers.
Briggs et al. 2013	Tax on SSBs	Demand and health modelling, Ireland	Ireland's 2007 Survey on Lifestyle and Attitude to Nutrition.	10% tax on sugar-sweetened beverages, with tax pass-through rate of 90%.	The tax is estimated to reduced BMI of adults by 1.25%, equal to 10,000 less obese adults 14,000 less obese and overweight adults.	Weight reductions across income groups is similar. The weight reduction would be greater if the study had included children.
<b>Peer-reviewed literature – Systematic review</b>						
Brownell et al. 2009	Tax on SSBs	Literature review, US.	Literature review of empirical studies on US SSB taxes.	Historical taxation changes on sugar-sweetened beverages across US States.	Research to date suggests that a tax on sugar-sweetened beverages would have strong positive effects on reducing consumption. The US SSB taxes are too small to affect consumption.	A specific excise tax per ounce or per gram of added sugar would be preferable to a sales tax or an ad valorem excise tax (a tax levied as a percentage of price) and would provide an incentive to reduce the amount of sugar per ounce of a sugar-sweetened beverage.
<b>Grey literature - Report</b>						
National Institute for Health Developm ent 2013	Public health product tax	Impact assessment , Hungary	Price, sales and tax revenue data 2010 - 2012. Survey of manufacturers (69 respondents). 2010 and 2011 balance sheet data of companies paying the major part of NETA.	From 2011, taxes introduced on added salt, caffeine and sugar in packaged products.	Supply and sales of products containing taxed ingredient(s) decreased by 27%. People consumed 25% - 35% less products subject to NETA than one year before.	Estimated tax revenue was almost fully realized (less than 5% deviation) The average price of manufacturers' products subject to NETA decreased by 29%. Balance sheet data of "large NETA payers" improved from 2010 to 2011.
The Institute of Public Health in Ireland. 2012	Tax on SSBs	Impact assessment , Ireland	Ireland's 2007 Survey on Lifestyle and Attitude to Nutrition, polling, interviews and literature review.	Hypothetical 10% tax on sugar-sweetened beverages.	Obesity is multifactorial; not caused by one factor but by environmental, physiological, genetic and lifestyle factors. This complex mix of factors means the solutions to obesity are not simple but the food environment will certainly form an integral part of the solution.	Suggestive evidence on link between obesity and SSBs but not conclusive.
Oxford Economic s International Tax and Investme	Food taxes in general	Various but particularly Denmark, Hungary, Finland, France	Literature review, case studies, research and data analysis.	The implemented EU food taxes in Denmark, Hungary, Finland and France	Finds weak evidence in the available academic literature in support of food taxes as measures to raise significant overall government revenue or	Food taxes imposes administrative costs on governments and companies causing a detrimental impact on jobs and investment.



Study and year	Study focus	Study type and country	Data	Taxation change	Key Findings	Additional findings
nt Centre. 2013					to address public health concerns	
PWC Public Health Product Tax Study. 2013	Public Health Product Tax	Impact study, Hungary	Nielsen, Euromonitor, industry data via questionnaire	2011 Public Health Product Tax on confectionery, salty snacks and seasoning products	Domestic sales of the products subject to public health product tax and net domestic sales revenue have continued to drop. The permanent (and significant) drop of sales diminishes the efficiency and competitiveness of Hungarian food manufacturing plants, and has a detrimental effect on the whole industry.	Consumption rates of the majority of taxed products have dropped significantly, lower salty snack, sweets and seasoning consumption had only a minimum impact (measurable in per mill) on the population's salt and sugar intake compared to total salt and sugar intake, and the decrease in sugar consumption also had only a per mill impact on energy intake decrease.



## Results of the literature review on food taxes

The literature review results are divided into three key question areas on food taxes; consumer behaviour, industry impact and health effects.

*Consumer behaviour* is primarily concerned with the question of whether a tax on a certain product or nutrient, generates a response by consumers to reduce their consumption of that good and by how much. Directly related to this is the question of whether consumers purchase other products to compensate for their reduced consumption of the taxed good, and which products are purchased (product substitution).

*Industry related questions* centre around firm behaviour in response to the implementation of a food tax, as well as the impact of a food tax on industry competitiveness including investment, employment and trade flows.

*Health effects* are critically important as improved nutrition and health are the driving motivations for implementing food taxes. The key question is whether the overall bundle of food purchases made by consumers subsequent to a food tax, which now may include product substitutes, has a more healthy composition and if so, how big is the health benefit. An associated issue is socio-economic effects such as whether food taxes are regressive in terms of income, that is, if low-income households pay a greater proportion of their income on food taxes than high-income households<sup>5</sup>.

The findings of the literature review will be presented in line with these three themes and sub questions.

### Consumer behaviour

The empirical (ex post) and modelling/simulation (ex ante) studies generally conclude that a food tax will reduce consumption of the taxed product and increase consumption of substitute products. The following discussion first presents results from the empirical literature and then the modelling/simulation literature.

#### *Empirical evidence*

Of the 8 empirical studies, 6 examined consumer behaviour:

- Bahl, Bird and Walker (2003), Ireland's soft drink taxes;
- Jensen and Smed (2013), Denmark's saturated fat tax;
- Fletcher, Frisvold, and Tefft (2010), US soft drink taxes;
- Waterlander et al. (2013) conducted a randomly controlled trial (RCT) in the Netherlands for fruit and vegetable price discounts;
- Block et al. (2010) conducted a RCT in the US for soft drink price increases;
- Lachat et al. (2009) conducted a RCT in Belgium on the effect of providing free fruit and vegetables on total dietary intake.

Additional views are obtained from:

- National Institute for Health Development (2013), Hungary's public health product tax;
- Price Waterhouse Coopers (PwC) study (2013), Hungary's public health product tax.

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<sup>5</sup> Nnoaham, Kelechi E., Gary Sacks, Mike Rayner, Oliver Mytton, and Alastair Gray. 2009. "Modelling income group differences in the health and economic impacts of targeted food taxes and subsidies" *International Journal of Epidemiology* 38 (5):1324-1333. doi: 10.1093/ije/dyp214.

Jensen and Smed<sup>6</sup> conducted an ex post analysis of the Danish saturated fat tax (introduced in October 2011) for the product categories of butter, butter blends, margarine and oils using weekly household purchasing data. This study although not using a flexible demand model nor taking possible demand changes in non-taxed products into account, is one of the stronger studies from a methodological point of view. The study found that the tax had caused a 10-15% reduction in the consumed level of fats from the examined product categories. However, these results must be interpreted cautiously because the study observed that hoarding occurred, i.e. consumers purchased large amounts of fat products in the weeks leading up to the introduction of the saturated fat tax and therefore the observed consumption reduction may be overstated. The study found evidence of product substitution, observing that consumers reduced purchases of butter and increased margarine and blend purchases. Substitution within a product category, for example between different butter brands or high and low fat variations, was not examined as brand level data was not available. Another limitation of the Danish study is that the tax had only been in place for a relatively short period at the time the study was conducted, and hence results may not be representative of long run effects.

An impact assessment<sup>7</sup> of NETA, the Hungarian public health product tax targeting the sugar, salt and caffeine content of food, found that consumption of the tax-affected products decreased by between 25% and 35% in the year following introduction of the tax. These results are based on a national representative survey of 100 adults whereby respondents were asked if they had decreased or increased their consumption of the taxed product in the preceding year. However, quantitative data on the consumption of the taxed products could not be obtained from the population survey. The researchers also noted another fundamental problem in that no reliable sales data on the taxed products were available from the private sector. Based on the results of an industry survey (49 respondents) the assessment also found that the supply of products containing the targeted ingredients decreased due to manufacturers reformulating products. The impact assessment examined the first year of the NETA tax being in place (September 2011 to August 2012) and therefore longer term consumption effects are unknown. No mention of consumption changes in non-taxed food categories is made, therefore product substitution effects are unknown.

A PwC impact study (2013)<sup>8</sup>, commissioned by the Association of Hungarian Confectionery Manufacturers, examined effects of the public health product tax on confectionery products, salty snacks and seasoning industry using industry data and market research data from Nielsen and Euromonitor International. The study found that "chocolate sales fell by 3.9% year-on-year between December 2011 – May 2012, the sweets market dropped by 6% (including chocolate, biscuits and candy sales) and the salty snack market diminished by 12%." This trend of decreased sales continued for most products for the second half of 2012 and first half of 2013. PwC also highlights that consumers may be able to substitute the taxed products with non-taxed products of similar nutritional composition, as well as purchase the cheaper brands within the same taxed product category. Their data analysis showed evidence of increases in sales of the private label brands, which are generally the lower priced products, for confectionery and salty snacks.

An empirical analysis<sup>9</sup> on the response of consumption to changes in Ireland's soft drink taxes (fiscally motivated excise tax in place from 1916 to 1992 with various rate changes) found that soft drink consumption increased after the excise tax was abolished in 1992 by a slightly more than

<sup>6</sup> Jensen, Jørgen D., and Sinne Smed. 2013. "The Danish tax on saturated fat: Short run effects on consumption, substitution patterns and consumer prices of fats" *Food Policy* 42: 18 - 31. [www.elsevier.com/locate/foodpol](http://www.elsevier.com/locate/foodpol).

<sup>7</sup> National Institute for Health Development Hungary. 2013. "Impact Assessment of the Hungarian Public Health Product Tax (NETA)" World Health Organisation. [www.oefi.hu](http://www.oefi.hu).

<sup>8</sup> Price Waterhouse Coopers 2013. "Public Health Product Tax Study" Association of Hungarian Confectionery Manufacturers.

<sup>9</sup> Bahl, Roy, Richard, Bird, and Mary Beth Walker. 2003. "The uneasy case against discriminatory excise taxation: soft drink taxes in Ireland" *Public Finance Review* 31 (5): 510-533. doi: 10.1177/1091142103253753.

proportional amount than the price fall. The increase in consumption being proportionally greater than the price fall was attributed to the existence of product substitutes (other sugar-sweetened beverages) which were not subject to the same tax changes. From a methodological point of view, this study did not use household consumption data in the demand model or consider possible substitution effects.

An empirical study<sup>10</sup> which analysed US soft drink taxes between 1989 and 2006 observed moderate reductions in soft drink consumption by children resulting from a soft drink tax, and found that these reductions were more than offset by increases in fruit juice and milk consumption. However, the authors of the study note that historical soft drink taxes in the US are very small, 5.2% on average, and therefore their study results may not be applicable when evaluating larger soft drink taxes currently being considered in the US, which are closer to 10%-20%. In a randomly controlled trial (RCT)<sup>11</sup> which took place in a US hospital cafeteria, soft drink prices were increased by 35% and this led to a 26% decrease in soft drink sales. The sales of diet soft drinks increased by 20% and no changes were observed in the sale of water or coffee, or in the sale of non-beverage products such as sweets and desserts.

In a six month long RCT<sup>12</sup> involving fruit and vegetable price reductions in a Netherlands supermarket, participants purchased 5.4 kg more fruit and vegetables per two weeks than those without the price reductions. It was observed that participants did not spend the money saved on fruit and vegetable price discounts on other food categories. A Belgian RCT<sup>13</sup> examined the effect of providing free fruit and vegetables in a university lunch canteen on daily dietary intake of canteen customers. The trial found that participants increased consumption of fruit and vegetables with the new intake levels meeting daily recommended fruit and vegetable intake, but the increased fruit and vegetable consumption did not displace other foods.

All of the above-mentioned empirical studies observed that following introduction of a food tax, consumption of the taxed products decreased (or that a reduction/abolishment of a tax caused consumption to increase). Increased consumption of product substitutes is generally found to occur as a result of the taxes. In the case of price subsidies or free provision of fruit and vegetables (F&V), F&V consumption is found to increase and no product substitution is observed, with consumers maintaining total food intake levels.

#### *Modelling / simulation research*

Of the 27 modelling /simulation studies, 24 of them examined consumer behaviour (other studies examined industry response or health effects and these will be discussed in the relevant sections). Of these 24 studies, 13 simulated a soft drink or sugar-sweetened beverage tax and these will be discussed collectively. The remaining 11 studies which simulated a tax are:

- Chouinard et al. (2007), fat tax on dairy products in the US;
- Jensen and Smed (2007), fat and sugar taxes in Denmark;
- Allais, Etile and Lecocq (2012), fat tax in France for dessert yoghurts and fromage blancs;
- Salois and Tiffin (2011), saturated fat tax and F&V subsidy in the UK;

<sup>10</sup> Fletcher, Jason M., David E. Frisvold, and Nathan Tefft. 2010. "The effects of soft drink taxes on child and adolescent consumption and weight outcomes" *Journal of Public Economics* 94: 967–974. doi:10.1016/j.jpubeco.2010.09.005.

<sup>11</sup> Block, Jason P., Amitabh Chandra, Katherine D. McManus, and Walter C. Willett. 2010. "Point-of-purchase price and education intervention to reduce consumption of sugary soft drinks." *American Journal of Public Health* 100 (8):1427-1433. doi: 10.2105/AJPH.2009.175687.

<sup>12</sup> Waterlander W.E., M.R. de Boer, A.J. Schuit, J.C. Seidell, I.H. Steenhuis. 2013. "Price discounts significantly enhance fruit and vegetable purchases when combined with nutrition education: a randomized controlled supermarket trial." *American Journal of Clinical Nutrition* 97(4):886-95. doi: 10.3945/ajcn.112.041632.

<sup>13</sup> Lachat, Carl K., Roosmarijn Verstraeten, Bruno De Meulenaer, Joris Menten, Lieven F. Huybregts, John Van Camp, Dominique Roberfroid and Patrick W. Kolsteren. 2009. "Availability of free fruits and vegetables at canteen lunch improves lunch and daily nutritional profiles: a randomised controlled trial" *British Journal of Nutrition* 102: 1030–1037. doi:10.1017/S000711450930389X.

- Tiffin and Arnoult (2011), saturated fat tax and F&V subsidy in the UK;
- Griffith, Nesheim and O'Connell (2009), saturated fat tax in the UK;
- Nnoaham et al. (2009), saturated fat and F&V subsidy in the UK;
- Katakorpi et al. (2011), sugar tax and F&V subsidy in Finland;
- Katakorpi and Pirttila (2010), sugar tax and F&V subsidy in Finland;
- Nordstrom and Thunstrom (2011), sugar and fat tax and fibre subsidy in Sweden;
- Kuchler, Tegene and Harris (2005), snack food tax in the US.

Chouinard et al (2007) simulated a fat tax on dairy products in the US with the results that a 10% ad valorem tax would decrease consumption by a little less than 1%. This study<sup>14</sup> found that the fat tax on dairy products increased the demand for the low fat items within the dairy product category and reduced demand for high fat products. From a methodological point of view, this study belongs to the weaker ones as it is based on aggregated demand and is not controlling for price endogeneity. Jensen and Smed (2007)<sup>15</sup> calculated that a fat tax in Denmark would reduce fluid milk fat consumption by 8-10% as consumers are expected to substitute away from high fat milk to low fat varieties. This study was based on aggregated consumption data not on micro data. A modelling study specific to dessert yoghurts and fromage blancs in France<sup>16</sup> simulated a 10% and 5%, fully passed through, ad valorem tax on full fat and half-fat products respectively and found consumption reduced by 38%. These three studies indicate that consumption decreases resulting from a fat tax on dairy may be very different for the different types of dairy products e.g. milk, yoghurt, dessert yoghurt etc. Luxury goods, such as dessert yoghurts, tend to show higher rates of substitution than staple foods like milk.

A number of studies investigated a fat tax in the UK. Nnoaham et al (2009) found that a 17.5% VAT on saturated fat reduced consumption by 3%. In a simulation study of a fat tax combined with a F&V subsidy, Salois and Tiffin (2011)<sup>17</sup> found that the average intake of fat decreased by 6.2%. Sugar consumption also reduced which is attributed to the decrease in consumption of biscuits, cake and pastries that are also high in saturated fat. However, intake of other useful nutrients such as calcium, vitamin D and iron decreased. Another study that simulated a fat tax in the UK, found that the tax reduced fat intake but contrary to the aforementioned study, a slight increase in sugar consumption was observed<sup>18</sup>. A fourth UK study<sup>19</sup> that simulated a fat tax, specifically examined product substitution behaviour for butter and margarine products. The results predicted that all households would reduce demand in response to the price increase and that the most likely product substitution would be from high saturated intensity products to lower saturated intensity products, rather than substituting away to an entirely different food product. Indeed, the study estimated that margarine purchases would increase slightly by 2.2%, at the expense of butter purchases.

<sup>14</sup> Chouinard, Hayley H., David E. Davis, Jeffrey T. LaFrance, Jeffrey M. Perloff. 2007. "Fat taxes: big money for small change" *Forum for Health Economics & Policy* 10(2). doi: 10.2202/1558-9544.1071.

<sup>15</sup> Jensen, Jørgen D., and Sinne Smed. 2007. "Cost-effective design of economic instruments in nutrition policy" *International Journal of Behavioral Nutrition and Physical Activity* 4:10. doi:10.1186/1479-5868-4-10.

<sup>16</sup> Allais, Olivier, Fabrice Etile, and Sébastien Lecocq. 2012. "Mandatory labelling, nutritional taxes and market forces: An empirical evaluation of fat policies in the French fromage blanc and yogurt market" Department of Economics, University of York. [york.ac.uk/res/herc/hedgwp](http://york.ac.uk/res/herc/hedgwp).

<sup>17</sup> Salois, Matthew J., and Richard J. Tiffin. 2011. "The Impacts of Fat Taxes and Thin Subsidies on Nutrient Intakes" *Agricultural Economics Society*. <http://purl.umn.edu/108789>.

<sup>18</sup> Tiffin, Richard, and M Arnoult. 2011. "The public health impacts of a fat tax" *European Journal of Clinical Nutrition* 65: 427-433. doi:10.1038/ejcn.2010.281.

<sup>19</sup> Griffith, R., and M. O'Connell. 2010. "Public policy towards food consumption" *The Institute for Fiscal Studies*. doi: 10.1111/j.1475-5890.2010.00122.x.

Two related Finnish modelling studies<sup>20,21</sup> simulated an excise tax on sugar, equivalent to a 10% increase in the price of sugary products. The studies assumed that the tax would be fully passed onto consumers and assumed no product substitution. The studies found that consumption of the targeted products would be reduced by around 1.5%. From a methodological point of view, these studies, although not controlling for price endogeneity nor missing values leading to overestimates belongs to the more robust ones. A Swedish study<sup>22</sup> simulated a revenue neutral tax scenario of a subsidy on high fibre products, funded by an excise tax on added sugar. This study concluded that such a policy would result in decreased added sugar consumption and lower overall sugar consumption. In the same study the scenario which examined a tax on saturated fat to fund the fibre subsidy showed that total fat and saturated fat consumption reduced and consumption of sugar also decreased - although not as much as in the sugar excise scenario. However total calorie intake and salt intake increased for the latter scenario, and the intake of other undesirable nutrients may also increase due to substitution. This study belongs to the methodological stronger studies. A study<sup>23</sup> on salty foods modelled the effect of a 20% ad valorem tax in the US on chips and other salty snacks and found that the tax is expected to reduce consumption by 4-6 ounces per person. The study concluded that this reduction in consumption would have very small dietary impacts. Further, the study concluded that a larger tax would not appreciably affect overall dietary quality of the average consumer. This study belongs to the lower quality due to its lack of an underlying demand model and lack of other techniques to reduce bias.

Those studies which model a SSB tax in the range of 15% to 40%, found that a SSB tax will reduce consumption. Briggs et al (2013)<sup>24</sup> modelled a SSB sales tax in the UK of 20% and found consumption reduced by 15% and the average calorie intake reduced by 4 kcal/person/day (equivalent to 1 g of sugar), without taking substitution effects into account. This study belongs to "average" robust modelling approaches. Andreyeva et al (2011)<sup>25</sup> simulated a 20% SSB tax in the US and found this resulted in a 24% reduction in SSB consumption when diet soft drinks were not taxed, and a 16.3% reduction when the tax included diet drinks. Finkelsteina et al (2013)<sup>26</sup> simulated a 20% tax on SSBs in the US and found consumption decreased by an equivalent 24.3 kcal per day per person, with effects thought to be larger as the study only looked at supermarket purchases and not purchases from restaurants, deli's and other take-away type outlets. Bonnet and Réquillart (2012)<sup>27</sup> modelled a soft drink tax in France and found that a 0.0716 e/litre tax lead to a 10% increase in retail price and as a result, reduced soft drink consumption by 15% of initial soft drink consumption. This modelling is based on aggregated consumption data of the observed drink category without possible product substitution nor explicit demand model. It focuses more on strategic behaviour of market participants in terms of pass-through than on consumer behaviour.

<sup>20</sup> Kotakorpi, Kasia, and Jukka Pirttilä. 2010. "Health and distributional effects of differentiated food taxation" University of Tampere. [https://editorialexpress.com/cgi-bin/conference/download.cgi?db\\_name=IIPF67&paper\\_id=204](https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=IIPF67&paper_id=204).

<sup>21</sup> Kotakorpi, Kasia, Tommi Härkänen, Pirjo Pietinen, Heli Reinivuo, Ilpo Suoniemi, and Jukka Pirttilä. 2011. "Health-based Food Tax Policy" Labour Institute for Economic Research. <http://www.labour.fi/tutkimusiulkaisut/tyopaperit/sel271.pdf>.

<sup>22</sup> Nordström, L.J., and L Thunström. 2011. "Can targeted food taxes and subsidies improve the diet?: Distributional effects among income groups" *Food Policy* 36(2): 259-271. <http://dx.doi.org/10.1016/j.foodpol.2010.11.023>.

<sup>23</sup> Kuchler, Fred, Abebayehu Tegene, and James M. Harris. 2005. "Taxing Snack Foods: Manipulating Diet Quality Or Financing Information Programs?" *Review of Agricultural Economics* 27(1): 4-20. <http://ssrn.com/abstract=876691>.

<sup>24</sup> Briggs, Adam D. M., Oliver T. Mytton, Ariane Kehlbacher, Richard Tiffin, Mike Rayner, and Peter Scarborough 2013. "Overall and income specific effect on prevalence of overweight and obesity of 20% sugar-sweetened drink tax in UK: econometric and comparative risk assessment modelling study" *BMJ Publishing Group*. doi: 10.1136/bmj.f6189.

<sup>25</sup> Andreyeva T, F.J. Chaloupka, and K.D. Brownell. 2011. "Estimating the potential of taxes on sugar-sweetened beverages to reduce consumption and generate revenue" *Prev Med* 52: 413-6. doi: 10.1016/j.ypmed.2011.03.013.

<sup>26</sup> Finkelsteina, Eric A., Chen Zhenb, Marcel Bilgera, James Nonnemakerb, Assad M. Farooquia, and Jessica E. Todd 2013. "Implications of a sugar-sweetened beverage (SSB) tax when substitutions to non-beverage items are considered" *Journal of Health Economics* 32 (1):219-239. <http://dx.doi.org/10.1016/j.jhealeco.2012.10.005>.

<sup>27</sup> Bonnet, Céline, and Vincent Réquillart. 2013. "Impact of Cost Shocks on Consumer Prices in Vertically-Related Markets: The Case of The French Soft Drink Market" *American Journal of Agricultural Economics* 95 (5). doi: 10.1093/ajae/aat055".



In relation to product substitution of SSB taxes, it is generally found that if a tax only affects regular carbonated soft drinks, consumers will substitute to similarly high calorie sports/energy drinks and sugary fruit juices<sup>28</sup> or to diet versions of the carbonated soft drinks<sup>29</sup>. In the 'Food consumption and obesity: Public policy measures' (Foodob) study<sup>30</sup> taxing of all SSBs according to sugar content is recommended specifically to prevent product substitution to other high sugar beverages. If the whole SSB category is taxed, product substitution outside the SSB product category is however uncertain. Briggs et al (2013) argues that as SSBs are a non-essential food item with no beneficial nutrients, a reduction in consumption of SSBs will not cause any detrimental health effects as the product substitutes are most likely to be healthier options, for example diet drinks, water, low-fat milk and low-sugar fruit juice. Indeed, Dharmasena and Capps (2012)<sup>31</sup> found that the consumption of fruit juices, low-fat milk, coffee and tea increased when a SSB tax of 20% was simulated in the US. However, neither of these two studies considered foods as a substitute for SSBs. Zhen et al. (2013), discussed above, did consider food as a product substitute and found that one half of the reduction in calories from decreased SSB consumption was substituted with calories from other foods and beverages such as canned soup, bread, cheese, cereals, candy and snacks. This study scores high in terms of methodological quality. In contrast, Finkelsteina et al. (2013), also discussed above, did not find any evidence of substitution to sugary foods, such as ice cream and snacks. The study found product substitution to fruit juices only. This study is of high methodological quality but in the model used, the estimates of elasticities to simulate the impact of a large SSB tax on SSB consumption and weight outcomes are derived from the literature rather than estimated in the model itself.

#### *Conclusions from the literature review on consumer behaviour*

Food is not a single product but a complex bundle of goods with many substitutes, making it quite challenging to predict how consumers will alter their buying behaviour in response not only to the taxed good, but especially with respect to other related goods. Overall however, empirical and modelling results show that an increase in the price of a good, resulting from a tax, reduces consumption of the taxed good. Results also suggest that reduced consumption of the taxed good is generally coupled with increased consumption of substitute goods. There are a wide variety of findings, sometimes contradictory, as to the specific product substitution that occurs. Debate also extends to whether product substitution results in consumers increasing or decreasing their intake of the targeted nutrient (commonly sugar, salt or fat), that is, whether the aim of the tax in reducing consumption of a specific nutrient is actually achieved or if consumers simply find non-taxed products with the same or similar sugar, salt or fat content. Results on product substitution vary depending on the product or the classification of products studied.

There are caveats and limitations to the findings on consumption and product substitution. The empirical studies are limited by the available data which is often at a broader category level, preventing observations of product substitution within a given product category (e.g. moving to cheaper versions of the same product). Empirical studies also include the caveat that the results may not be representative of long term outcomes of food taxes given the short timeframe over which food taxes have been in effect in the EU Member States studied. The modelling studies are limited by the robustness of the demand elasticities that they use to predict consumer purchase behaviour towards the taxed product and product substitutes. There is a wide variety of own price (the taxed product) and cross price (product substitutes) elasticity estimates for any given product

<sup>28</sup> Zhen, Chen, Eric A. Finkelstein, James M. Nonnemaker, Shawn A. Karns and Jessica E. Todd. 2013. "Predicting the effects of sugar-sweetened beverage taxes on food and beverage demand in a large demand system" *American Journal of Agricultural Economics* 1(25). doi: 10.1093/ajae/aat049.

<sup>29</sup> Andreyeva, Chaloupka, and Brownell. 2011.

<sup>30</sup> Foodob and Institute for Fiscal Studies 2012. "Food consumption and obesity: public policy measures" European Commission. [http://cordis.europa.eu/result/report/rcn/51329\\_en.html](http://cordis.europa.eu/result/report/rcn/51329_en.html).

<sup>31</sup> Dharmasena S, and O Jr. Capps. 2012. "Intended and unintended consequences of a proposed national tax on sugar-sweetened beverages to combat the U.S. obesity problem." *Health Economics* 21(6):669-94. doi: 10.1002/hec.1738.



category which is being studied. As demand elasticities play a crucial role in simulating the consumption effects of a food tax, the results hinge upon the credibility of the elasticity estimates and assumptions<sup>32</sup>. A significant caveat of the majority of the modelling studies is that the simulated tax is assumed to be passed on fully (one-for-one) to consumer prices. However, in reality this may not be the case, making estimates of consumption reduction less reliable.

### Industry response

From the empirical and modelling/simulation literature, 7 studies examine industry behaviour in response to a food tax:

- Bahl, Bird and Walker (2003), Ireland's soft drink taxes;
- Jensen and Smed (2013), Denmark's saturated fat tax;
- Bergman and Niels (2010), Denmark's sugar tax on soft drinks;
- Berardi et al (2012), France's sugar-sweetened beverage tax;
- Bonnet and Requillart (2013 and 2011), simulated sugar tax on soft drinks in France; and
- Allais, Etilé and Lecocq (2012), simulated fat tax in France on dessert yoghurts and fromage blancs.

Additional views are obtained from:

- Oxford Economics and the International Tax and Investment Centre (2013), food taxes in general.

These 7 studies present strong evidence of firms engaging in strategic pricing behaviour in response to tax policy changes, whereby they may undershift (increase prices by less than the tax increase) or overshift (increase prices by more than the tax increase) the tax to consumer prices as well as change prices of substitute products<sup>33, 34, 35,36, 37, 38</sup>. Factors that influence a tax being over or undershifted are the tax design (ad valorem or excise), whether the policy change is a tax increase or a tax reduction, and the dynamics of the particular industry affected. Bonnet and Requillart (2011) propose that by not taking into account strategic pricing behaviour of firms, the impact of a tax on consumption behaviour may be under or over estimated by 15% to 40%. Understanding how food taxes are likely to be transmitted to consumer prices has significant implications for the impacts on brand market shares and profit for manufacturers and retailers, as well as the total effect on consumption.

Supporting Bonnet and Requillart's claims that a 100% pass through assumption misguides consumption estimates in response to a food tax is the (earlier discussed) study by Allais, Etilé, and Lecocq (2012). This French study found that a 10%, fully passed through, ad valorem tax on full fat yoghurt and fromage blanc products reduced consumption by 38%. However this reduction significantly lowered to 9% when it was assumed the tax was undershifted. This research found that large undershifting was possible due to the high ex ante margins in these product categories.

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<sup>32</sup> Lin B.H., T.A. Smith, J.Y. Lee, and K.D. Hall. 2011. "Measuring weight outcomes for obesity intervention strategies: the case of a sugar-sweetened beverage tax" *Econ Hum Biol* 9 (4):329-41. doi: 10.1016/j.ehb.2011.08.007.

<sup>33</sup> Jensen and Smed. 2013.

<sup>34</sup> Bahl, Bird, and Walker. 2003.

<sup>35</sup> Allais, Etilé, and Lecocq. 2012.

<sup>36</sup> Bonnet and Réquillart. 2013.

<sup>37</sup> Bonnet, Céline, and Vincent Réquillart. 2011. "Strategic pricing and health price policies." Toulouse School of Economics. [http://neeo.univ-tlse1.fr/2944/1/strategic\\_pricing.pdf](http://neeo.univ-tlse1.fr/2944/1/strategic_pricing.pdf).

<sup>38</sup> Bergman, Michael, and Niels L. Hansen. 2010. "Are Excise Taxes on Beverages Fully Passed Through to Prices? The Danish Evidence" Department of Economics, University of Copenhagen. <http://www.econ.ku.dk/okombe/BergmanHansen.pdf>.

In their 2013 modelling study on the effects of the French soft drink tax Bonnet and Requillart found that due to strategic pricing, excise taxes are over-transmitted to consumers and ad valorem taxes are under-transmitted to consumer prices – confirming earlier observations<sup>39</sup>. Results from both studies suggest a high heterogeneity in product pricing and indicate a delay of up to six months in price adjustment. A recent empirical study<sup>40</sup> on the French soft drink tax (introduced in 2012) confirmed these findings. The results show that prices of the newly taxed beverages increased gradually over time, but not homogeneously, with transmission of the tax differing across product categories. Full transmission of the tax occurred for soft drinks six months after the introduction of the tax but prices of flavoured waters and fruit drinks did not reflect an increase. Instead, producers and retailers decided to decrease their profit margins on these beverage categories. This market strategy may be explained by the fact that for these latter two categories of products (flavoured waters and fruit drinks), competition and product substitution are possibly stronger, hence the aim of producers and retailers to maintain their market share might be more dominant.

This empirical analysis on the French soft drink tax also found that pricing differed across retailing groups and beverage brands. The data showed that the two largest retailers in France had the lowest average pass-through rate, and that the pass-through was much higher for private labels than for other brands. This indicates that the bigger retailing groups have a strong bargaining power, even with the large beverage producers, but the large producers have considerable negotiating power with smaller retailers. Supporting the French soft drink tax experience are results from the empirical analysis<sup>41</sup> on the Danish saturated fat tax which showed that the various retail stores adopted different pricing strategies. Supermarkets fully passed on the tax to consumers for blends and margarine, but under shifted the tax for butter and oils. Discount stores perfectly transmitted the price of blends and oils to consumer prices, but over shifted the tax for butter and margarines to take advantage of the opportunity to increase margins as a result of consumers switching to discount stores for purchases of the tax-affected products.

In addition to tax design and market dynamics influencing strategic pricing behaviour, the direction of the tax change (increase or reduction) has also been found to have an effect. The empirical study<sup>42</sup> of Ireland's soft drink excise tax that studied the period in which the excise tax was lowered (1990) and then abolished (1992), showed that the price of soft drinks did not fall between 1990 and 1992 despite the tax reduction. This was thought to be because of rising marginal costs of soft drink production. Following the tax abolishment in 1992, soft drink prices fell but not by the full amount of the tax, attributed to the fact that under shifting of tax cuts is likely in imperfectly competitive markets. A study<sup>43</sup> on the Danish soft drink tax (including juices) supports these findings and notes that taxes are more than fully passed through to consumers when there is a tax increase while there is an under shifting when taxes are lowered or abolished. The study has been looking mainly at beverages and has also confirmed heterogeneity across a number of subcategories with liquor producers and retailers acting very much in unity but higher price variations for soft drinks and beers.

#### *Conclusions from the literature review on industry response*

The findings discussed above show that there is no clear and uniform transmission of taxes to consumer prices due to strategic pricing behaviour by manufacturers and retailers. An important implication of this finding, is that firms may be able to neutralise the effect of tax policy interventions

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<sup>39</sup> Bonnet, Céline, and Vincent Réquillart. 2011.

<sup>40</sup> Berardi, Nicoletta, Patrick Sevestre, Marine Tepaut and Alexandre Vigneron. 2012. "The impact of a 'soda tax' on prices. Evidence from French micro data" Banque de France.

<sup>41</sup> Jensen and Smed. 2013.

<sup>42</sup> Bahl, Bird, and Walker. 2003.

<sup>43</sup> Bergman and Niels. 2010.

on consumer prices by undershifting the tax<sup>44</sup>. A report by Oxford Economics and the International Tax and Investment Centre<sup>45</sup> points out that undershifting of a tax means that firms absorb the tax by reducing margins and therefore profitability lowers. Alternatively if a tax is fully passed or overshifted, then generally sales reduce and profitability is again lowered. However, as some empirical studies highlight, manufacturer's or retailers may take advantage of increased demand for substitute products by raising prices and thereby increasing margins on those products. The dominant factors in shaping the responses of manufacturers and retailers are the existing margins within the product market in question, the design of the tax and direction of the tax change, the market share and thus bargaining power of individual retailers and producers, and the availability of substitute products.

### Impacts on industry

There is very limited empirical or simulation literature that specifically studies the impact of a food tax on employment and investment. Impacts on industry competitiveness, while not specifically studied, can be inferred from the results of a number of studies which examined product price and market share effects of food taxes. The relevant empirical and modelling studies are listed below with all but the last study having already been introduced in earlier sections:

- Bahl, Bird and Walker (2003), Ireland's soft drink taxes;
- Jensen and Smed (2013), Denmark's saturated fat tax;
- Jensen and Smed (2007), simulated fat tax in Denmark;
- Bergman and Niels (2010), Denmark's sugar tax on soft drinks;
- Bonnet and Requillart (2012), simulated sugar tax on soft drinks in France;
- Lock et al (2010), computable general equilibrium modelling for adoptions of a healthy diet (related to decreasing saturated fat consumption) in the UK.

Additional views are obtained from:

- Oxford Economics and the International Tax and Investment Centre (2013), food taxes in general;
- National Institute for Health Development (2013), Hungary's public health product tax;
- Price Waterhouse Coopers (PwC) study (2013), Hungary's public health product tax.

### Competitiveness

The food tax effects discussed in the literature that relate to industry competitiveness include administrative burden of taxes, tax-induced price changes that alter market share between producers and tax-induced price changes that cause structural shifts in the retailing sector.

Bahl, Bird and Walker (2003) comment on the administrative costs of excise taxes and VAT, stating that Ireland's special excise tax on soft drinks (in place from 1916 to 1992) was easy to assess and collect and did not suffer the same complications and administrative burden as the highly differentiated and complicated VAT rates for soft drinks. Even so, the study concluded that abolishment of the special excise tax on soft drinks reduced overall administrative burden. Jensen and Smed (2007) also refer to the potentially high administration costs, in this case, with reference to an excise tax that targets specific nutrients such as saturated fat or sugar. Due to the higher costs associated with documentation and calculation of the tax across a large number of products, this design appears more costly than, for example, a VAT reduction for fruits and vegetables. Even so, this simulation study found the specific taxing of nutrients 10-30% more effective in terms of improving nutrition than broad food category taxes like VAT.

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<sup>44</sup> Allais, Etilé, and Lecocq. 2012.

<sup>45</sup> Oxford Economics, International Tax and Investment Centre. 2013. "The impacts of selective food and non-alcoholic beverages taxes" International Tax and Investment Centre. <http://www.iticnet.org/publications/studies-and-reports>.

Oxford Economics and ITIC (2013) also discuss the administrative costs of food taxes and specifically with respect to a sugar tax, raise the concern that due to the many kinds of sugar used in products, the government would need to monitor the ingredients of thousands of products in order to calculate the correct tax. It may be possible for manufacturers to reformulate products and lower or remove the ingredients attracting the tax, however this also has associated costs. The impact assessment<sup>46</sup> on the Hungarian public health product tax (NETA), based on a manufacturer's survey, found that 40% of respondents either removed the taxed product completely or decreased the quantity of the taxed ingredient.

With respect to the market power of retailers and manufacturers, Bonnet and Réquillart (2011)<sup>47</sup> estimate that for the leading soft drink brands, consumers prefer to buy the same brand from an alternative, lower cost retailer, than to switch between brands sold by the same retailer. Similarly, the results of the empirical Danish fat tax study<sup>48</sup> indicated that structural shifts in the retailing sector occurred as consumers moved their purchasing from supermarkets to discount stores. The Danish empirical analysis is limited by the fact that category level data was used and therefore only shifts between stores could be observed. However, many stores in Denmark offer both brand and discount varieties within the same store and hence switching between high end and discount varieties may be underestimated. An earlier mentioned UK study<sup>49</sup> estimated product substitution between brands in the same product category and found that the most likely substitution resulting from a fat tax on dairy was from a high fat intensity product to a brand that contained half the fat content of its competitor. This study also found increased margarine purchases at the expense of butter purchases. The PwC impact study<sup>50</sup> of Hungary's taxes on confectionery and salty snacks found evidence of increases in sales of the private label brands, which are generally the lower priced products, following introduction of the tax.

The results of the above-mentioned studies suggest that food taxes can alter consumer preferences towards products (e.g. butter to margarine), brands (high fat/sugar products to low fat/sugar products) and stores (higher-end retailers to lower-end retailers). Such behavioural changes by consumers have the potential to impact on the market share and profitability of product lines, producers and retailers. The extent of this impact is highly variable depending on the products taxed, the available substitutes, as well as the brand and bargaining power of the market players.

#### *Trade flows*

A common argument against food taxes is that they raise the price of goods relative to the prices of the same goods in neighbouring countries where no such tax exists and thereby promote cross border shopping<sup>45</sup>. There is however, limited information regarding the actual impact of non-harmonised EU food taxes on trade flows. This might be explained by the fact that trade flows directly relatable to the introduction of such food taxes can prove to be difficult to measure as there are a number of other market, regulatory and economic factors that can result in a change of consumption and export/import flows.

Jensen and Smed (2007) briefly mention in their simulation of a Danish fat tax that food taxes may cause cross-border shopping. In their later 2013 empirical study of the implemented Danish fat tax, the authors comment that the issue of cross border shopping may be valid for those citizens living close to the border, but that for most people the transactions costs to travel outside the border are too high for purchases of oils and fats. They highlight that this is an area for further research.

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<sup>46</sup> National Institute for Health Development Hungary. 2013.

<sup>47</sup> Bonnet, Céline, and Vincent Réquillart. 2011. "Does the EU sugar policy reform increase added sugar consumption? An empirical evidence on the soft drink market." *Health Economics* 20 (9): 1012-1024. doi: 10.1002/hec.1721.

<sup>48</sup> Jensen and Smed. 2013.

<sup>49</sup> Griffith and O'Connell. 2010.

<sup>50</sup> Price Waterhouse Coopers 2013.

A study<sup>51</sup> which analysed the reduction of excise taxes for soft drinks Denmark in 2003 (tax cuts aimed at reducing cross border shopping), found that the tax cuts did not reduce cross border shopping and in fact, cross border shopping increased for soft drinks. This was thought to be predominantly due to firms not passing all of the tax reduction on to consumer prices. However, The findings of the Danish Ministry of Taxation contradict the findings of the study. It estimates the fall of cross border trade following the 13% excise reduction in 2005 was up to 25%.

### *Investment and employment*

One macro-economic simulation study<sup>52</sup> comments that changes in food spending which result from a health motivated food tax will cause some sectors to grow (such as fruit and vegetables) and others to decline (such as the animal sector in the case of a tax on saturated fat), and that rates of employment and job loss will depend on the mobility of resources to move from one sector to another.

A report by Oxford Economics and ITIC<sup>53</sup> discusses the impact of food taxes on the agri-food sector and concludes that the introduction of such taxes leads to lower profits for the industry (either through absorbing part of the tax as an added cost, or passing the tax on to consumers and thereby having losses in sales). The report argues that in either case, the reduction of profit would likely lead to job losses in the tax-affected food sectors and associated supplier and distribution industries. The report highlights Hungary and Denmark as examples of where such profit losses and employment effects have occurred, citing results of a 2012 PwC impact study of Hungary's Public Health Product Tax (NETA) and a quote in an online newspaper by Danish company Fynbo foods to support their argument; "60 employees at a marmalade factory near Hjørring risk losing their jobs as a result of the tax".

PwC conducted a follow up impact study<sup>54</sup> in 2013 to update data and cover a broader scope than the above mentioned 2012 impact study. Both impact studies were commissioned by the Association of Hungarian Confectionery Manufacturers (Hunbisco). PwC examined effects of the public health product tax on confectionery products, salty snacks and seasoning industry using industry data, market research data from Nielsen and Euromonitor International and publicly available statistical and public health data. In analysing the industry data, PwC observed that domestic sales of the products subject to NETA and net domestic sales revenue had declined since introduction of the tax. PwC concluded that the permanent (and significant) drop of sales diminishes the efficiency and competitiveness of Hungarian food manufacturers, and has a detrimental effect on the whole industry. A very important factor in the discussion on sales and revenue changes for Hungarian manufacturers is that the prices of raw materials increased substantially and the rate of VAT increased from 25% to 27% in the period that NETA came into effect. Therefore prices of affected products generally increased and PwC found the sales revenue therefore increased slightly for most product categories despite falling sales. Even so, this sales revenue was found not to cover the public health product tax payments required by the industries concerned and thus, companies suffered considerable losses which they had to fund from other sources e.g. (profit from product lines not subject to NETA).

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<sup>51</sup> Bergman and Niels. 2010.

<sup>52</sup> Lock, Karen, Richard D. Smith, Alan D. Dangour, Marcus Keogh-Brown, Gessuir Pigatto, Corinna Hawkes, Regina Mara Fisberg, Zaid Chalabi. 2010. "Health, agricultural, and economic effects of adoption of healthy diet recommendations" *The Lancet* 376 (9753): 1699-1709. doi:10.1016/S0140-6736(10)61352-9.

<sup>53</sup> Oxford Economics, International Tax and Investment Centre. 2013.

<sup>54</sup> Price Waterhouse Coopers. 2013.

An impact assessment<sup>55</sup> conducted by the National Institute for Health Development in cooperation with the National Institute for Food and Nutrition Science and WHO experts on the Hungarian Public Health Product Tax, analysed balance sheet data of the 35 companies paying the majority (80-90%) of the tax. The assessment found that their net sales revenue and number of employees increased and their net loss reduced from 2010 to 2011, the years before and after introduction of the tax. However, there is no detail given as to whether the impact assessment controlled for the presence of other factors that may have been impacting on revenue and employment in Hungary. Furthermore, it is uncertain to what extent the 35 companies in question are producers of non-taxed products and whether revenue changes for taxed and non-taxed products were examined and accounted for. A point made in the PwC study is that most manufacturers produce both tax-affected and non tax-affected products with both product categories contributing to profit/loss outcomes. It is not clear if the balance sheet analysis by the National Institute for Health Development accounted for this.

#### *Conclusions from the literature review on impacts on industry*

From this literature review it is apparent that very limited empirical evidence, nor modelling / simulation evidence of high methodological quality, exists on the impact of food taxes on investment, employment or trade flows. More empirical research is needed in these specific areas. There is some evidence from the available academic literature that food taxes impact competitiveness of the agri-food industry in the form of increased administrative costs and costs associated with product reformulation. In addition, a number of the reviewed sources find that food taxes may cause changes in consumer demand between product categories, brands and retailing outlets – which creates in turn both winners and losers.

#### **Health effects**

No empirical studies on the health effects of EU food taxes were found. Within the modelling/simulation literature that examines health effects of food taxes, there is no definitive consensus as to the question of whether food taxes improve public health. From the 27 modelling studies, 23 examined health effects of food taxes. As with the consumer behaviour discussion, SSB taxes will be discussed collectively, the remaining 11 studies are:

- Salois and Tiffin (2011), simulate a fat tax and F&V subsidy in the UK;
- Jensen and Smed (2007), fat and sugar taxes and fibre and F&V subsidies in Denmark;
- Nnoaham et al (2009), various tax scenarios for fat, sugar and salt in the US;
- Tiffin and Arnoult (2011), fat tax and F&V subsidy in the UK;
- Nordstrom and Thunstrom (2011), sugar and fat tax and fibre subsidy in Sweden;
- Katakorpi et al. (2011), sugar tax and F&V subsidy in Finland;
- Katakorpi and Pirttila (2010), sugar tax and F&V subsidy in Finland;
- Bonnet, Dubois, and Orozco (2008), general food tax in France;
- Lock et al (2010), computable general equilibrium modelling for adoptions of a healthy diet (related to decreasing saturated fat consumption) in the UK;
- Cecchini et al (2010), general food tax in the UK and various non-EU countries;
- Dioikitopoulos Katsaitiy and Shaw (2013), general food tax in the US.

Two related Finish modelling studies<sup>56, 57</sup> simulated an excise tax on sugar and estimated large shifts towards lower BMI with an average reduction in body weight of 3.2 kg. The resultant body weight loss, as well as the changes in nutritional intake, is estimated to bring about an average 13% reduction in the prevalence of type 2 diabetes and a 3.0% average reduction in incidence of coronary heart disease. However, this study did not consider product substitution.

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<sup>55</sup> National Institute for Health Development Hungary. 2013.

<sup>56</sup> Kotakorpi and Pirttila. 2010.

<sup>57</sup> Kotakorpi et al. 2011.



A study<sup>58</sup> which did consider product substitution and simulated a fat tax in the UK, found that the modelled fat tax was successful in decreasing fat and sugar intake, but the overall health benefit was unclear because other useful nutrients in dairy products such as calcium, iron and vitamin D also declined, suggesting unintended health repercussions. A more recent UK study<sup>59</sup> simulating a tax on saturated fat combined with a 15% fruit and vegetable subsidy, found that the F&V subsidy did succeed in bringing average F&V intake levels in line with dietary recommends but the fat tax failed to reach this goal and sugar consumption increased slightly. The study concluded that a substantial amount of the population continues to consume an unhealthy diet and thus, the combined tax and subsidy policy had a negligible effect on the risks of disease. The use of fiscal policies in combination with other interventions was promoted as a better tool to achieve improvements in diet.

A third UK study<sup>60</sup> predicts that taxes in the UK on saturated fat, sugar or salt are all unlikely to prevent deaths from obesity related diseases unless combined with a fruit and vegetable subsidy and even then the effect is small. Jensen and Smed (2007) found a combination policy of taxes on fat and sugar and subsidies on fibre and F&Vs to be most effective in producing an overall healthy diet intake (although the study ignored product substitution). In Nordström and Thunström's (2011) Swedish study<sup>61</sup> that simulated various tax scenarios combining fibre subsidies with fat or sugar excise duties, health effects were deemed difficult to evaluate as while fibre increased as a result of the subsidy, fat, salt and sugar consumption also increased for some segments of the population.

A number of empirical studies examine the health effects of SSB taxes in the US. This is possible due to the fact that a majority of states in the US have had taxes on SSBs, usually in the form of a sales tax, for many years. A systematic review of all US literature on SSB taxes up to 2006<sup>62</sup>, concluded that studies that analyse existing soft drinks taxes in the US to determine consumption and body weight effects, find little to no relationship between SSB taxes and weight. However, Zhen et al. (2013) points out that this is not an unexpected result given that the current state level SSB taxes in the US are very low (between 1% - 7%).

In contrast to the empirical studies on US SSB taxes, modelling studies which simulate a SSB tax in the US and estimated body weight losses generally find positive health effects<sup>63, 64, 65, 66</sup>. Finkelsteina et al (2013) found a 20% SSB tax resulted in average weight loss of 1.6 pounds during the first year and a cumulative weight reduction of 2.9 pounds in the longer term. Another study<sup>67</sup> that simulated a 20% SSB tax in the US estimated between 1.54 and 2.55 pounds per year weight loss. Andreyeva, Chaloupka and Brownell (2011) calculated an average weight loss of 5 pounds per year from a penny-per-ounce SSB tax, roughly equivalent to a 20% SSB tax (assuming full pass through).

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<sup>58</sup> Salois and Tiffin. 2011.

<sup>59</sup> Tiffin and Arnoult. 2011.

<sup>60</sup> Nnoaham et al. 2009.

<sup>61</sup> Nordström, L.J., and L Thunström. 2011. "Can targeted food taxes and subsidies improve the diet?: Distributional effects among income groups" *Food Policy* 36(2): 259-271. <http://dx.doi.org/10.1016/j.foodpol.2010.11.023>.

<sup>62</sup> Brownell K.D., T. Farley, W.C. Willett, B.M. Popkin, F.J. Chaloupka, J.W. Thompson, et al. 2009. "The public health and economic benefits of taxing sugar-sweetened beverages" *New England Journal of Medicine* 361: 1599-605. doi: 10.1056/NEJMhpr0905723.

<sup>63</sup> Andreyeva, Chaloupka, and Brownell. 2011.

<sup>64</sup> Finkelsteina et al. 2013.

<sup>65</sup> Foodob and Institute for Fiscal Studies 2012.

<sup>66</sup> Bergman and Niels. 2010.

<sup>67</sup> Foodob and Institute for Fiscal Studies 2012.

However Lin et al<sup>68</sup> (2011) warns that static models (as used by the three studies discussed above) that calculate body weight losses and reductions in obesity prevalence based on reductions in SSB calorie intake can largely overestimate the effects. In comparison to the dynamic model used by Lin et al (2011), the static model estimates 7.6 times more weight loss than the dynamic model that accounts for the fact that a constant calorie reduction does not cause the same weight loss over time, but that weight loss slows and plateaus.

Another variable to consider in the health results of SSB modelling studies is highlighted by an earlier study<sup>69</sup> that simulated a 20% and 40% tax on SSBs. The study compared two simulations, one assumed only carbonated soft drinks were taxed and one assumed all SSBs attracted the tax. The study observed that the health effects depend not only on the size of the tax but on the selection of products which attract the tax. The study estimates the health benefits are 60% greater when the tax applies to all SSBs, as product substitution is more difficult. Furthermore, most SSB studies assume no product substitution outside the beverage category. Zhen et al (2013) considered food as a product substitute to SSBs and found that weight losses were predicted, however increases in sodium and fat from product substitution offset about one half of the calculated calorie reductions.

In addition to the US studies, Briggs et al (2013) investigated the impact of a 20% sales tax on sugar-sweetened beverages in the UK on weight, measured in terms of BMI, and predicted the prevalence of obesity in adults would reduce by 1.3%, around 180 000 citizens, and 0.9% for overweight, around 285 000 people. This estimate is based on the consumption findings of the study which calculated an average calorie reduction of no more than 4 kcal/person/day (equivalent to 1 g of sugar). Briggs notes that the health effects are smaller than those estimated in US studies because the consumption of SSBs is much smaller in the UK than in the US to start with. However, the authors state that the quantity of sugar sweetened drinks consumed in the UK remains uncertain due to differences between national data sources (the National Diet and Nutrition Survey and Living Costs, and Food Survey are broadly comparable) to the industry data source (the British Soft Drinks Association's figures are threefold to fourfold higher). The authors highlight that as the level and pattern of consumption is what determines the magnitude of the public health effects of a sugar sweetened drinks tax, further work should be done to clarify the level (and patterns) of sugar sweetened drink consumption in the UK. The study does not take food substitution into account when estimating consumption reduction and substitution. A modelling exercise<sup>70</sup> which supported a Health Impact Assessment<sup>71</sup> of Ireland's proposed 10% SSB tax, estimated that the tax would reduce obesity in adults by 1.25%. The Foodob study<sup>Error! Bookmark not defined.</sup> which simulated soft drink taxes in the UK and France concluded that SSB taxes are an effective policy tool to help lower obesity.

A number of studies didn't simulate a food tax, but instead investigated more generally the effectiveness of reducing intake of certain nutrients on population health. Bonnet, Dubois and Orozco<sup>72</sup> used French purchasing data over a two year period and nutrient information on all products to estimate calorie consumption. The study concluded that taxing the "junk food" category

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<sup>68</sup> Lin et al. 2011.

<sup>69</sup> Finkelsteina, Eric A., Chen Zhenb, James Nonnemakerc, and Jessica E. Todd 2010. "Impact of targeted beverage taxes on higher- and lower-income households" Archives of International Medicine 170 (22):2028-34. doi: 10.1001/archinternmed.2010.449.

<sup>70</sup> Briggs, Adam, Oliver Mytton, David Madden, Donal O'Shea, Mike Rayner and Peter Scarborough. 2013. "The potential impact on obesity of a 10% tax on sugar-sweetened beverages in Ireland, an effect assessment modelling study" BMC Public Health 13: 860. doi:10.1186/1471-2458-13-860.

<sup>71</sup> The Institute of Public Health in Ireland 2012. "Proposed Sugar-Sweetened Drinks Tax: Health Impact Assessment" The Institute of Public Health in Ireland. [http://www.dohc.ie/publications/Health\\_Impact\\_Assessment\\_PSSDT.html](http://www.dohc.ie/publications/Health_Impact_Assessment_PSSDT.html).

<sup>72</sup> Bonnet, Céline, Pierre Dubois, and Valérie Orozco. 2008. "Food Consumption and Obesity in France: Identification of Causal Effects and Price Elasticities" Toulouse School of Economics. <http://www.eea-esem.com>.



would produce significant decreases in the prevalence of obesity due to the high price elasticity of this food category. The fat and oils category is also highlighted as a possible target for taxation to reduce BMI levels. This is proposed with the caveat that a tax incentive to lower consumption of one category of goods, may not always reduce total calories due to product substitution.

Lock et al<sup>73</sup> applied epidemiological and economic modelling to a case study of lowering saturated fat consumption in the UK. The study found that targeting reduction of dairy products as opposed to a blanket reduction of all food, had the greatest health effect. A health service saving of GBP 20 million could be achieved and 70 000 premature deaths could be prevented each year if saturated fat consumption matched nutritional guidelines. However, the study did not estimate the size or design of the tax needed to generate the required consumption reduction, and did not consider product substitution. A US economic modelling study<sup>74</sup> on food taxation more generally, examined the relationship between food taxes and weight and concluded that reducing taxation on food increased food consumption and body weight levels.

A UK study<sup>75</sup> simulated a fruit and vegetable subsidy and compared this fiscal measure to a range of non-tax measures such as labelling, regulation, school programs and mass media campaigns. The study concluded that price interventions and regulation can generate the biggest health benefits in the shortest timeframe, and that a health policy combining a number of interventions is more successful than individual policy measures.

#### *Conclusions from the literature review on health effects*

The findings on health effects from modelling / simulation literature is not conclusive. There are two key reasons for this: 1) product substitution and 2) calculation method of health effects. Firstly, product substitution has important implications for the total health effects of food taxes because a food tax aimed at reducing one product or ingredient, may increase consumption of other products<sup>76</sup>. If the product substitutes have the same or similar nutrient composition, this may undermine the intended health outcomes of the tax<sup>77</sup>. The effectiveness of food taxes in curbing obesity are therefore uncertain.

Secondly, modelling studies generally determine health effects by simulating a food tax, predicting consumer response (including assumptions about product substitution), calculating the overall nutrient or calorie reduction/increase for a population and then translating the increases/reductions to weight loss and/or disease prevalence. This methodology assumes a linear connection between these "variables", of which the size and sign is in itself not undisputed. Each of these steps is highly complex and the credibility of the final conclusions relies on the quality of data and robustness of methodological approach. No empirical research has to our knowledge been done to verify findings of simulation studies.

It is important to add that consumption results in the studies discussed above are average consumption, meaning the average across all consumers. No studies were identified that examined the possibility of consumers having different price elasticities based on preferences, or on existing

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<sup>73</sup> Lock, Karen, Richard D. Smith, Alan D. Dangour, Marcus Keogh-Brown, Gessuir Pigatto, Corinna Hawkes, Regina Mara Fisberg, Zaid Chalabi. 2010. "Health, agricultural, and economic effects of adoption of healthy diet recommendations" *The Lancet* 376 (9753): 1699-1709. doi:10.1016/S0140-6736(10)61352-9.

<sup>74</sup> Dioikitopoulos, Evangelos V., Marina-Selini Katsaitiy, and Philip Shaw. 2013. "A Growth Model of Weight Preferences, Food Consumption and Public Policy" Brunel University London. [http://www.brunel.ac.uk/\\_data/assets/pdf\\_file/0007/331693/1325.pdf](http://www.brunel.ac.uk/_data/assets/pdf_file/0007/331693/1325.pdf).

<sup>75</sup> Cecchini, Michele, Franco Sassi, Jeremy A. Lauer, Yong Y. Lee, Veronica Guajardo-Barron, and Daniel Chisholm. 2010. "Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness" *The Lancet* 376 (9754): 1775-1784. doi:10.1016/S0140-6736(10)61514-0.

<sup>76</sup> Zhen et al. 2013.

<sup>77</sup> Nnoaham et al. 2009.

BMI levels. For example, it is not clear if the consumption decrease is largely from consumers who eat the taxed products as part of a balanced diet and healthy lifestyle, or from those who over consume (calorie intake exceeds calorie expenditure) the nutrient which is being targeted by the tax. Such individuals are at risk of obesity or may already be obese. If the consumption decrease occurs in the segment of the population that are eating the products as part of a balanced diet, and does not effect consumption of those at risk (does not target excess consumption), it may be that the tax is ineffective in reducing obesity. This is an area where further research is required.

### Socio-economic effects

A common criticism of food taxes is that they are regressive, meaning that low-income households pay a greater proportion of their income on food taxes than high-income households<sup>78</sup>. The consistent finding in the literature is that food taxes are regressive<sup>79, 80, 81, 82, 83, 84, 85, 86</sup>. However, the actual income impact is predicted to be very low<sup>87, 88</sup>. It is also argued that food taxes will benefit the low-income population the most in terms of improving nutrition and hence be progressive from a health perspective<sup>89, 90</sup>.

A simulation study<sup>91</sup> of SSB taxes in the US predicted that due to the fact that low-income households purchase more sugar-sweetened beverages, the welfare loss resulting from the SSB tax would be greater than high-income households however, the calorie reductions would be higher for low-income households. Another simulation study<sup>92</sup>, found an excise tax on sugar in Finland would be mildly regressive however, predicted the health benefits to be greatest for low-income households as they are more sensitive to changes in price of sugary and sweet products.

A UK study<sup>93</sup> which specifically examined health and economic impacts for different income groups of a range of tax (fat, salt and sugar) and subsidy (fruit and vegetables) scenarios, estimated no health benefit for low-income populations. However, this finding is not necessarily robust and health benefits for the poor may be underestimated as, unlike the two earlier mentioned studies, this study did not account for low income households having an existing higher prevalence of obesity related diseases or for differences in price elasticity across income groups. Another UK simulation study<sup>94</sup> also found no evidence that low-income groups would experience larger health benefits, rather the study concluded that the modelled 20% SSB sales tax would be most beneficial for those adults below 30 years of age as this is the highest group of SSB consumers.

Contrary to the numerous studies supporting the argument that food taxes are regressive, a simulation study<sup>95</sup> on the impact of a SSB tax on low and high-income households in the US found the SSB tax not to be regressive. Instead, high-income households were found to pay the largest share of the tax because they are least likely to change purchasing behaviour in response to higher

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<sup>78</sup> Nnoaham et al. 2009.

<sup>79</sup> Nnoaham et al. 2009.

<sup>80</sup> Chouinard et al. 2007.

<sup>81</sup> Jensen and Smed. 2007.

<sup>82</sup> Kotakorpi and Pirttila. 2010.

<sup>83</sup> Kotakorpi et al. 2011.

<sup>84</sup> Briggs et al. 2013.

<sup>85</sup> Zhen et al. 2013.

<sup>86</sup> Lin et al. 2011.

<sup>87</sup> Briggs et al. 2013.

<sup>88</sup> Lin et al. 2011.

<sup>89</sup> Kotakorpi and Pirttila. 2010.

<sup>90</sup> Zhen et al. 2013.

<sup>91</sup> Zhen et al. 2013.

<sup>92</sup> Kotakorpi and Pirttila. 2010.

<sup>93</sup> Nnoaham et al. 2009.

<sup>94</sup> Briggs et al. 2013.

<sup>95</sup> Lin et al. 2011.

prices and because they generally pay a higher price for SSBs, unlike low-income households who buy from discount stores, buy in bulk or buy when the products are on sale.

#### *Conclusions from the literature review on socio-economic effects*

The majority of studies find food taxes to be regressive. There are suggestions that food taxes may be progressive in terms of health benefits, however the findings are contradictory and therefore inconclusive.

### Conclusions from the literature review

The ultimate conclusion from the literature review is that the current body of evidence is not sufficient to make a definitive judgement on the effects of food taxes on consumer behaviour, industry and health. Food taxes have been introduced too recently to allow anything more than preliminary findings in the small number of empirical studies conducted. The simulation studies are limited by availability of data and robustness of methodology, particular with respect to the assumptions made around price elasticities of the taxed products and cross-price elasticities of any non-taxed product substitutes. In this context, conclusions on the effects of food taxes are formulated in terms of expected outcomes and likely possibilities, based on a suggestive but inconclusive body of evidence.

Based on the literature review, we conclude that:

- A food tax is expected to reduce consumption of the taxed product/nutrient, however the extent of the decrease in consumption will depend on the pass-through rate, the tax design, the size of the tax and the availability of product substitutes;
- Product substitution is a likely outcome of a food tax, and the extent of substitution will vary based on the tax design, more specifically the product category / nutrient which is taxed;
- Firms may not necessarily transmit the tax one-to-one to consumer prices. An ad valorem tax and situation of high ex ante margins will likely result in undershifting with firms bearing part of the tax through reduction of margins, while an excise tax, strong brand power and a highly competitive market will likely result in full transmission;
- Food taxes may impact industry competitiveness in terms of administrative burden, and profitability. Relative competitive positions, at both the retail and manufacturing level, may also be affected by changes in consumer preferences brought about as a result of taxes. Investment and employment effects have so far received only little attention in empirical research. As a result robust conclusions in this field are still lacking. The same holds true for the impact on trade flows, where the lack of empirical research can be explained by measurement issues and data limitations;
- Health effects are uncertain, primarily due to uncertainties and disparate views on product substitution, as well as due to the linear methods used in simulation studies which translate calorie reductions to weight loss. These have been criticised as overstating weight reductions;
- Food taxes are generally regressive in terms of income. There are suggestions that food taxes could benefit the low-income population segments the most in term of health outcomes, however findings on this are not conclusive.

We further conclude from the literature review that the effects of a food tax depend on many factors, including:

- choice of food to tax (nutrient or product category) and inclusions or exclusions;
- tax base (sales, ad valorem, excise);
- size of the tax rate;
- likely product substitutes and their comparative sugar, fat or salt content;

- expected under or over shifting by firms of the tax to retail prices;
- possible trade flow effects;
- administrative complexities of the tax; and
- combination with other measures such as subsidies for fruits and vegetables or fibre.

**Table 2 Summary of literature sources**

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
Bibliographical Details			Type	Method										Topics Addressed					Geographic focus	Specific food tax			
1	Predicting the effects of sugar-sweetened beverage taxes on food and beverage demand in a large demand system	Chen Zhen, Eric A. Finkelstein, James M. Nonnemaker, Shawn A. Karns and Jessica E. Todd.	2013	x			x											x	x	x		United States	sugar-sweetened beverages
2	Taxing Food and Beverages: Theory, Evidence, and Policy	Yuqing Zheng, Edward W. McLaughlin and Harry M. Kaiser.	2013	x					x											x		United States	general food tax
3	Impact of Cost Shocks on Consumer Prices in Vertically-Related Markets: The Case of The French Soft Drink Market	Bonnet, Céline, and Vincent Réquillart.	2013	x			x						x									France	soft drinks
4	Health and distributional effects of differentiated food taxation	Kotakorpi, Kasia, and Jukka Pirttila.	2010		x		x												x	x		Finland	sugar, fruits & vegetables
5	Priority actions for the non-communicable disease crisis	Beaglehole, Robert, Ruth Bonita, Richard Horton, Cary Adams, George Alleyne, Perviz Asaria, Vanessa Baugh, et al.	2011	x					x											x	x	non-specific	general food tax
6	Health, agricultural, and economic effects of adoption of healthy diet recommendations	Lock, Karen, Richard D. Smith, Alan D. Dangour, Marcus Keogh-Brown, Gessuir Pigatto, Corinna Hawkes, Regina Mara Fisberg, Zaid Chalabi.	2010	x			x													x		United Kingdom, Brazil	saturated fat
7	Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness	Cecchini, Michele, Franco Sassi, Jeremy A. Lauer, Yong Y. Lee, Veronica Guajardo-Barron, and Daniel Chisholm.	2010	x			x													x	x	Brazil, China, India, Mexico, Russia, South Africa, United Kingdom	general food tax
8	Increased food energy supply is more than sufficient to explain US epidemic of obesity	Swinburn, B, G Sacks, and E Ravussin.	2009	x			x													x		United States	none

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient	
9	Frameworks for the major population based policies to prevent childhood obesity	Swinburn, B, J Shill, G Sacks, W Snowdon, C Strugnell, J Herbet, E Gleeson, and R Carter.	2009		x							x								x	x	Norway, Finland, Sweden, Australia, New Zealand, Bogota, Switzerland, United States, China, Brazil, France	general food tax	
10	The uneasy case against discriminatory excise taxation: soft drink taxes in Ireland	Bahl, Roy, Richard, Bird, and Mary Beth Walker.	2003	x		x								x						x		Ireland	soft drink tax	
11	Death and premature loss of life caused by overweight and obesity in Australia 2011-2050: Benefits from different intervention scenarios	Gray, V, and C Holman.	2009		x		x														x		Australia	none
12	Obesity prevention: the role of policies, laws and regulation	Swinburn, Boyd.	2008	x						x											x		Australia, New Zealand	none
13	Ounces of prevention – the public policy case for taxes on sugared beverages	Brownell, Kelly D., and Thomas R. Frieden.	2009	x						x											x		United States	sugar-sweetened beverages
14	Epidemiology of obesity and public health strategies for its control in Japan	Yoshiike, N, F Kaneda, and H Takimoto.	2002	x			x														x		Japan	none
15	Personal responsibility and obesity: a constructive approach to a controversial issue	Brownell, Kelly D., Rogan Kersh, David S. Ludwig, Robert C. Post, Rebecca M. Puhl, Marlene B. Schwartz, and Walter C. Willett.	2010	x						x											x	x	United States	general food tax
16	Sugar-sweetened beverage taxes: an updated policy brief	Friedman, Roberta R., and Kelly D. Brownell.	2012		x							x								x	x	United States	sugar-sweetened beverages	

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
17	The impacts of selective food and non-alcoholic beverages taxes	Oxford Economics, International Tax and Investment Centre.	2013		x							x			x	x	x	x	x	x		Denmark, Hungary, Egypt, Finland, France	general food tax
18	Health in the European Union, trend and analysis: Ch 7, pg 85 - 90	Mladovsky, Philpa, Sara Allin, Cristina Masseria, Cristina Hernandez-Quevedo, David McDaid, and Elias Mossialos.	2009		x							x								x		European Union	none
19	The 'fat tax': economic incentives to reduce obesity	Leicester, Andrew, and Frank Windmeijer.	2004		x							x							x	x		United Kingdom	general food tax
20	Public policy towards food consumption	Griffith, R., and M. O'Connell.	2010		x							x							x	x	x	United Kingdom	general food tax
21	The role of commodity taxes in health promotion	Belloni, Annalisa.	2013		x								x						x	x		OECD	general food tax
22	A Growth Model of Weight Preferences, Food Consumption and Public Policy	Dioikitopoulos, Evangelos V., Marina-Selini Katsaitiy, and Philip Shaw.	2013		x		x													x		United States	general food tax
23	Taxation and regulation of smoking, drinking and gambling in the European Union	Cnossen, Sijbren, David Forrest and Stephen Smith.	2009		x							x					x		x	x	x	European Union	tobacco, alcohol, gambling
24	Global Status Report on Non Communicable Diseases 2010	World Health Organisation.	2011		x							x								x	x	European Union	general food tax
25	The effect of fiscal policy on diet, obesity and chronic disease: a systematic review	Thow, Anne Marie, Stephen Jan, Stephen Leeder, and Boyd Swinburn.	2010	x				x												x		non-specific	general food tax
26	All-of-government approach needed to tackle obesity	James, Phillip, and Fiona Fleck.	2013	x						x										x	x	non-specific	general food tax
27	Europe's visible epidemic	Humphreys, Gary, and Catherine Fiankan-Bokonga.	2013	x						x											x	France	none
28	Policy Brief: Overweight and obesity in Australia	Obesity Policy Coalition.	2012		x						x									x		Australia	none
29	Weighing it Up: Obesity in Australia	The House of Representatives Standing Committee on Health and Ageing.	2009		x							x									x	Australia	none

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient	
30	Strategies to Prevent Obesity and Other Chronic Diseases	Centres for Chronic Disease Prevention.	2011		x							x									x	United States	none	
31	F as in Fat: How obesity threatens America's Future	Levi, Jeffrey. Laura M. Segal, Kathryn Thomas, Rebecca St. Laurent, Albert Lang, and Jack Rayburn.	2013		x							x								x	x	United States	none	
32	Press Release: Smart Snacks in School Regulation in the US	Food and Nutrition Service, USDA.	2013		x						x											x	United States	none
33	Which environmental and policy interventions prevent childhood obesity?	Crum, R.	2013		x				x													x	United States	none
34	Making the economic case for addressing obesity in the United States	Hill, D.	2012		x				x													x	United States	none
35	What is the role of health related food duties	Landon, Jane, and Hannah Graff.	2012		x								x					x	x	x		United Kingdom, France, Denmark, Hungary	general food tax	
36	Policy Brief: OECD Obesity Update 2012	OECD	2012		x						x									x	x	OECD	general food tax	
37	The impact of a 'soda tax' on prices. Evidence from French micro data	Berardi, Nicoletta, Patrick Sevestre, Marine Tepaut and Alexandre Vigneron.	2012		x	x							x									France	sugar-sweetened beverages	
38	The Danish tax on saturated fat: Short run effects on consumption, substitution patterns and consumer prices of fats	Jensen, Jørgen D., and Sinne Smed.	2013	x		x								x				x	x			Denmark	saturated fat	
39	Nutrition taxes: the costs of Denmark's fat tax	Petkantchin, Valentin.	2013		x							x		x					x			Denmark	saturated fat	
40	Fiscal and economic impacts of beverage excise taxes imposed by Maine public law 629	Gabe, Todd.	2008		x		x									x				x		United States	beer, wine and soft drinks	
41	Joint EFFAT-FoodDrinkEurope position on discriminatory food	FoodDrinkEurope.	2013		x						x			x								European Union	general food tax	



No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
	taxes																						
42	Competitiveness report - Development of EU industrial policy for food	FoodDrinkEurope.	2012	x								x		x	x	x						European Union	none
43	Data & trends of the European food and drink industry	FoodDrinkEurope.	2013	x								x		x	x	x			x			European Union	none
44	Sugar Policy Reform, Tax Policy and Price Transmission in the Soft Drink Industry	Bonnet, Céline, and Vincent Réquillart.	2012	x		x								x				x	x			European Union	soft drinks
45	Food Consumption and Obesity in France: Identification of Causal Effects and Price Elasticities	Bonnet, Céline, Pierre Dubois, and Valérie Orozco.	2008	x		x													x		x	France	general food tax
46	Food Prices and Obesity: Evidence and Policy Implication for Taxes and Subsidies	Powell, Lisa M., and Frank J. Chaloupka	2009	x				x											x	x		United States	general food tax
47	Health related food taxes and subsidies: Submission of written evidence to the Academy of Medical Royal Colleges Obesity Project	Mytton, Oliver, and Mike Rayner	2012	x								x						x	x	x		United Kingdom	sugar-sweetened beverages, soft drinks, saturated fat
48	Report on Food Labelling Practices	High Level Forum for a Better Functioning Food Supply Chain.	2009	x									x								x	European Union	none
49	How to Set up an Effective Food Tax?	Bonnet, Céline.	2013	x						x									x	x		non-specific	general food tax
50	An Analysis of Asymmetric Consumer Price Responses and Asymmetric Cost Pass-Through in the French Coffee Market	Bonnet, Céline, and Sofia B. Villas Boas	2013	x		x								x								France	none
51	Strategic pricing and health price policies.	Bonnet, Céline, and Vincent Réquillart.	2011	x		x								x					x			France	sugar-sweetened beverages

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
52	Does the EU sugar policy reform increase added sugar consumption? An empirical evidence on the soft drink market.	Bonnet, Céline, and Vincent Réquillart.	2011	x			x											x	x			France	none
53	Health-based Food Tax Policy	Kotakorpi, Kasia, Tommi Härkönen, Pirjo Pietinen, Heli Reinivuo, Ilpo Suoniemi, and Jukka Pirttilä.	2011		x		x												x	x		Finland	sugar, fruit & vegetables
54	Policy brief: Evidence of food advertising effects on children	Obesity Policy Coalition.	2011		x						x									x	x	Australia, United States, United Kingdom	none
55	Policy brief: Food advertising regulation in Australia	Obesity Policy Coalition.	2011		x						x										x	Australia	none
56	Policy brief: Traffic light labelling	Obesity Policy Coalition.	2011		x						x										x	Australia, United Kingdom, New Zealand	none
57	Fat taxes: big money for small change	Chouinard, Hayley H., David E. Davis, Jeffrey T. LaFrance, Jeffrey M. Perloff.	2007	x			x											x	x			United States	fat in dairy products
58	The global context for public health nutrition taxation	Thow, Anne Marie, Peter Heywood, Stephen Leeder, and Lee Burns.	2009	x					x											x		Poland, US, UK, Ireland, Denmark, Norway, Sweden, France, Australia	general food tax
59	Fat taxes: can taxing unhealthy food and drink improve health?	Food Ethics Council Business Forum	2012		x								x							x		United Kingdom, United States, Ireland	general food tax
60	EPHA Briefing Paper on Fiscal Measures applied to Food Policy	EPHA	2011		x						x									x	x	United States, Denmark, Fiji, Hungary,	general food tax

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
																						France	
61	Taxing unhealthy food and drinks to improve health	Mytton, Oliver, Dushy Clarke, and Mike Rayner	2012	x						x								x	x	x		Denmark, Hungary, France, Peru, Ireland, United Kingdom	general food tax
62	Emerging evidence on real-world effects of taxation	World Cancer Research Fund International	2013		x						x							x	x	x		France, Hungary, Denmark, Finland, Pacific Islands, United States	general food tax
63	Impact Assessment of the Hungarian Public Health Product Tax (NETA)	National Institute for Health Development	2013		x							x		x					x			Hungary	sugar, salt, caffeine
64	Overall and income specific effect on prevalence of overweight and obesity of 20% sugar-sweetened drink tax in UK: econometric and comparative risk assessment modelling study	Briggs, Adam D. M., Oliver T. Mytton, Ariane Kehlbacher, Richard Tiffin, Mike Rayner, and Peter Scarborough	2013	x			x												x	x	x	United Kingdom	sugar-sweetened beverages
65	The public health and economic benefits of taxing sugar-sweetened beverages	Brownell K.D., T. Farley, W.C. Willett, B.M. Popkin, F.J. Chaloupka, J.W. Thompson, et al.	2009	x					x									x	x	x		United States, Mexico	sugar-sweetened beverages
66	Food taxation and pricing strategies to "thin out" the obesity epidemic	Kim Daniel, and Ichiro Kawachi.	2006	x						x								x	x	x		United States	soft drinks, snack foods, fast foods
67	Measuring weight outcomes for obesity intervention strategies: the case of a sugar-sweetened beverage tax	Lin B.H., T.A. Smith, J.Y. Lee, and K.D. Hall.	2011	x			x												x	x		United States	sugar-sweetened beverages

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
68	Estimating the potential of taxes on sugar-sweetened beverages to reduce consumption and generate revenue	Andreyeva T, F.J. Chaloupka, and K.D. Brownell.	2011	x			x												x	x		United States	sugar-sweetened beverages
69	Intended and unintended consequences of a proposed national tax on sugar-sweetened beverages to combat the U.S. obesity problem.	Dharmasena S, and O Jr. Capps.	2012	x			x											x	x	x		United States	sugar-sweetened beverages
70	Implications of a sugar-sweetened beverage (SSB) tax when substitutions to non-beverage items are considered	Eric A. Finkelsteina, Chen Zhenb, Marcel Bilgera, James Nonnemakerb, Assad M. Farooquia, and Jessica E. Todd	2013	x			x											x	x	x		United States	sugar-sweetened beverages
71	Impact of targeted beverage taxes on higher- and lower-income households	Eric A. Finkelsteina, Chen Zhenb, James Nonnemakerb, and Jessica E. Todd	2010	x			x											x	x	x		United States	sugar-sweetened beverages
72	Food Pricing Strategies, Population Diets, and Non-Communicable Disease: A Systematic Review of Simulation Studies	Eyles, Helen, Cliona Ni Mhurchu, Nhung Nghiem, and Tony Blakely.	2012	x					x									x	x	x		OECD	soft drinks, saturated fat, fruits & vegetables
73	The impact of food prices on consumption: a systematic review of research on the price elasticity of demand for food	Andreyeva T, M.W. Long, and K.D. Brownell.	2010	x														x	x	x		United States	none
74	Point-of-purchase price and education intervention to reduce consumption of sugary soft drinks.	Block, Jason P., Amitabh Chandra, Katherine D. McManus, and Walter C. Willett.	2010	x				x										x	x		x	United States	soft drinks

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
75	The effect of rising food prices on food consumption: systematic review with meta-regression	Green, Rosemary, Laura Cornelsen, Alan D. Dangour, Rachel Turner, Bhavani Shankar, Mario Mazzocchi, and Richard D. Smith.	2013	x					x										x			non-specific	none
76	Price discounts significantly enhance fruit and vegetable purchases when combined with nutrition education: a randomized controlled supermarket trial.	Waterlander W.E., M.R. de Boer, A.J. Schuit, J.C. Seidell, I.H. Steenhuis.	2013	x				x										x	x			Netherlands	fruit & vegetables
77	The Impacts of Fat Taxes and Thin Subsidies on Nutrient Intakes	Salois, Matthew J., and Richard J. Tiffin.	2011	x			x												x	x		United Kingdom, United States	saturated fat, fruit & vegetables
78	Cost-effective design of economic instruments in nutrition policy	Jensen, Jørgen D., and Sinne Smed.	2007	x			x											x	x	x		Denmark	fat, sugar
79	Modelling income group differences in the health and economic impacts of targeted food taxes and subsidies	Nnoaham, Kelechi E., Gary Sacks, Mike Rayner, Oliver Mytton, and Alastair Gray.	2009	x			x											x	x	x		United Kingdom	fat, sugar, salt
80	'Fat taxes' in Europe – A Legal and Policy Analysis under EU and WTO Law	Alemanno, Alberto, and Ignacio Carreño.	2013	x						x								x	x	x		Denmark, Hungary, France, United Kingdom, Japan	general food tax
81	What is known about the effectiveness of economic instruments to reduce consumption of foods high in saturated fats and other energy-dense foods for preventing and treating obesity?	Goodman C, and A. Anise.	2006	x					x									x	x	x		European Union, China	fat, sugar, salt, fibre
82	Taxing Snack Foods: Manipulating Diet Quality Or Financing Information Programs?	Kuchler, Fred, Abebayehu Tegene, and James M. Harris.	2005	x			x											x	x			United States	snack foods

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
83	PFP Position Paper on Food taxes	Primary Food Producers.	2013		x						x								x	x		Denmark, Hungary, Finland	general food tax
84	The Proof of the Pudding: Denmark's fat tax fiasco. IEA Current Controversies Paper n 42	Snowdon, Christopher.	2013		x							x		x			x	x	x	x		Denmark	saturated fat
85	Obesity, sugar-sweetened beverages (SSBs) and Taxation - Some perspectives by The Union of European Beverages Associations (UNESDA)	The Union of European Beverages Associations.	2012		x						x							x	x	x	x	European Union	sugar-sweetened beverages
86	Policy Dialogue: Food taxes in the EU – An effective means to economic and health ends?	European Policy Centre.	2013		x								x				x		x	x		European Union	sugar-sweetened beverages, fat, sugar
87	Mandatory labelling, nutritional taxes and market forces: An empirical evaluation of fat policies in the French fromage blanc and yogurt market	Allais, Olivier, Fabrice Etilé, and Sébastien Lecocq.	2012	x			x							x					x	x	x	France	fat in fromages blancs and dessert yoghurts
88	Are Excise Taxes on Beverages Fully Passed Through to Prices? The Danish Evidence	Bergman, Michael, and Niels L. Hansen.	2010		x	x								x			x					Denmark	alcohol, soft drinks
89	The public health impacts of a fat tax	Tiffin, Richard, and M Arnoult.	2011	x			x												x	x		United Kingdom, United States	saturated fat, fruit & vegetables
90	The effects of soft drink taxes on child and adolescent consumption and weight outcomes	Fletcher, Jason M., David E. Frisvold, and Nathan Tefft.	2010	x		x												x	x	x		United States	soft drinks
91	Empirical estimates of the impact of a fat tax	Griffith, Rachel, Lars Nesheim, and Martin O'Connell.	2009		x		x											x	x	x		United Kingdom	saturated fat

No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
92	Can targeted food taxes and subsidies improve the diet?: Distributional effects among income groups	Nordström, L.J., and L Thunström.	2011	x			x												x	x	x	Sweden	general food tax
93	Food consumption and obesity: public policy measures	Foodob and Institute for Fiscal Studies	2012		x		x											x	x			France, United Kingdom	sugar
94	Availability of free fruits and vegetables at canteen lunch improves lunch and daily nutritional profiles: a randomised controlled trial	Lachat, Carl K., Roosmarijn Verstraeten, Bruno De Meulenaer, Joris Menten, Lieven F. Huybregts, John Van Camp, Dominique Roberfroid and Patrick W. Kolsteren.	2009	x				x											x			Belgium	fruit and vegetables
95	Are Food Taxes the Answer to America's Obesity Problem?	Chang, Dr. Cyril F.	2012		x				x										x	x		United States	general food tax
96	When Do Financial Incentives Reduce Intrinsic Motivation? Comparing Behaviours Studied in Psychological and Economic Literatures	Promberger, Marianne, and Theresa M. Marteau	2013	x						x									x			non-specific	none
97	Experimental research on the relation between food price changes and food-purchasing patterns: a targeted review.	Epstein, LH, N. Jankowiak, C. Nederkoorn, HA. Raynor, S.A. French, and E. Finkelstein.	2012	x					x									x	x	x		non-specific	general food tax
98	Proposed Sugar-Sweetened Drinks Tax: Health Impact Assessment	The Institute of Public Health in Ireland	2012		x		x		x									x	x	x		Ireland	sugar-sweetened beverages
99	Sate Aid Complaint Excise Duty in Finland	Finnish Food and Drink Industries' Federation	2013		x						x			x								Finland	sweets, ice cream and soft drink tax
100	The Finnish Food and Drink Industries' Federation (ETL) Filing a Complaint with the Commission about Competition-Skewing Excise Tax	Finnish Food and Drink Industries' Federation	2013		x						x			x								Finland	sweets, ice cream and soft drink tax



No.	Title	Author(s)	Year	Peer-reviewed	Grey Literature	Empirical	Modelling	Random controlled trial	Systematic Review	Other	Press release / position paper	Report	Conference abstract	Competitiveness	Investment	Employment	Trade Flows	Product Substitution	Consumption Behaviour	Public Health	Non Tax Measures	Countries	Food / drink category or nutrient
101	Position Paper Belgium Food and Drink Federation - health taxes	Belgium Food and Drink Federation	2013		x						x			x								Belgium	general food tax
102	Belgian beer exports to France	Belgium Food and Drink Federation	2013		x						x						x					Belgium	alcohol
103	The potential impact on obesity of a 10% tax on sugar-sweetened beverages in Ireland, an effect assessment modelling study	Briggs, Adam, Oliver Mytton, David Madden, Donal O'Shea, Mike Rayner and Peter Scarborough.	2013	x		x													x	x		Ireland	sugar-sweetened beverages
104	Public Health Product Tax Study	Price Waterhouse Coopers	2013		x							x		x				x	x	x		Hungary	NETA
		<b>Totals</b>																					

# Annex 2 Quantitative analysis

## Methodology

In the data-analyses we addressed several research questions:

1. To what extent have taxes contributed to price increases of taxed products?
2. To what extent has demand reacted to taxation?
3. To what extent has the tax contributed to increasing the demand for non-premium brands?
4. To what extent has the tax contributed to increasing the demand for non-taxed alternatives?
5. To what extent has the tax contributed to changes in the competitiveness of the sector producing the taxed product?

Answering these questions required several methodological steps to be taken. In the text below we address these steps. They include:

- Preparing a dataset of taxes to investigate;
- Selecting products to investigate;
- Preparing passport dataset;
- Local vs premium brands; and
- Competitiveness.

In addition, we address the limitations of this methodology.

### Collection and selecting of taxes to investigate

From public documents, we have assembled a list of food taxes currently being enforced, or recently abolished or modified.

Criteria to investigate tax are as follows:

Changes in tax regime between 1999 and 2013, otherwise it falls outside the scope of our dataset.

Products that are taxed are covered by the dataset. When covered, the taxed product constitutes a large majority of the product category.

### Preparing Passport dataset

For the data analyses we predominantly use information from the passport system, provided by Euromonitor. It provides information on total consumer demand for various food sectors in all European countries from 1999 onward. In addition, for the largest five Western European countries, information on the profitability, employment and costs for various industries active in the food sector.

The Passport dataset uses the following coverage of products (subject to availability for particular countries):

**Table 3 Product coverage**

Product category	Product subcategory	Detailed coverage
Confectionery	Chocolate confectionery	<ul style="list-style-type: none"> <li>• Alfajores;</li> <li>• Bagged selflines/softlines;</li> <li>• Boxed assortments: Standard boxed assortments; Twist wrapped miniatures;</li> <li>• Chocolate with toys;</li> <li>• Countlines;</li> <li>• Seasonal chocolate;</li> <li>• Tablets;</li> <li>• Other chocolate confectionery.</li> </ul>
	Gum	<ul style="list-style-type: none"> <li>• Bubble gum;</li> <li>• Chewing gum: Sugar-free gum; Sugarised gum.</li> </ul>
	Sugar confectionery	<ul style="list-style-type: none"> <li>• Boiled sweets;</li> <li>• Liquorice;</li> <li>• Lollipops;</li> <li>• Medicated confectionery;</li> <li>• Mints: Power mints; Standard mints;</li> <li>• Pastilles, gums, jellies and chews;</li> <li>• Toffees, caramels and nougat;</li> <li>• Other sugar confectionery.</li> </ul>
Ice cream	Frozen yoghurt	<ul style="list-style-type: none"> <li>• Impulse ice cream: Single portion dairy ice cream; Single portion water ice cream.</li> </ul>
	Retail artisanal ice cream	<ul style="list-style-type: none"> <li>• Take-home ice cream: Take-home dairy ice cream (Bulk dairy ice cream; Ice cream desserts; Multi-pack dairy ice cream); Take-home water ice cream (Bulk water ice cream; Multi-pack water ice cream).</li> </ul>
Soft drinks	Bottled Water	<ul style="list-style-type: none"> <li>• Carbonated Bottled Water;</li> <li>• Flavoured Bottled Water;</li> <li>• Functional Bottled Water;</li> <li>• Still Bottled Water.</li> </ul>
	Carbonates	<ul style="list-style-type: none"> <li>• Cola Carbonates: Regular Cola Carbonates (Standard Regular Cola; Speciality Regular Cola);</li> <li>• Low Calorie Cola Carbonates (Standard Low Calorie Cola; Speciality Low Calorie Cola);</li> <li>• Non-Cola Carbonates: Lemonade/Lime (Juice-based Lemonade/Lime; Non Juice-based Lemonade/Lime); Mixers (Ginger Ale; Seltzer; Tonic Water; Other Mixers);</li> <li>• Orange Carbonates: Juice-based Orange Carbonates; Non Juice-based Orange Carbonates;</li> <li>• Other Non-Cola Carbonates.</li> </ul>
	Concentrates	<ul style="list-style-type: none"> <li>• Liquid Concentrates;</li> <li>• Powder Concentrates.</li> </ul>
	Juice	<ul style="list-style-type: none"> <li>• 100% Juice: Frozen 100% Juice; Not from Concentrate 100% Juice; Reconstituted 100% Juice;</li> </ul>

Product category	Product subcategory	Detailed coverage
		<ul style="list-style-type: none"> <li>• Cereal/Pulse-based Drinks;</li> <li>• Fruit-Flavoured Drinks (No Juice Content);</li> <li>• Juice Drinks (up to 24% Juice): Frozen Juice Drinks; Unfrozen Juice Drinks;</li> <li>• Nectars (25-99% Juice): Frozen Nectars; Unfrozen Nectars.</li> </ul>
	RTD Coffee	
	RTD Tea	<ul style="list-style-type: none"> <li>• Still RTD Tea;</li> <li>• Carbonated RTD Tea.</li> </ul>
	Sports and Energy Drinks	<ul style="list-style-type: none"> <li>• Energy Drinks;</li> <li>• Sports Drinks.</li> </ul>
	Asian Speciality Drinks	
Salty snacks <sup>96</sup>	Chips	<ul style="list-style-type: none"> <li>• fried, sliced chips/crisps made from potatoes, sweet potatoes or other vegetables (e.g. carrot chips);</li> <li>• Includes flavoured and unflavoured products, which may be standard chips/crisps, thick-cut, crinkle-cut etc.;</li> <li>• Dried slices of fruit chips/crisps are excluded and are classed under fruit snacks.</li> </ul>
	Extruded Snacks	<ul style="list-style-type: none"> <li>• Processed/reconstituted/shaped potato or cereal (e.g. wheat, maize, rice) based snacks, which can be flavoured (e.g. cheese, prawn) or unflavoured. Rice cracker snacks, with origins in Asia;</li> <li>• Semi-prepared/unfried extruded snacks from Asia (kerupok, also known as crackers);</li> <li>• Rice cakes;</li> <li>• Excludes tortilla chips and corn chips as defined below.</li> </ul>
	Popcorn <sup>97</sup>	<ul style="list-style-type: none"> <li>• Maize/corn seeds which have burst after being heated;</li> <li>• Packaged ready-to-eat popcorn (plain, salted or sugarised) or packaged popcorn products that</li> </ul>

<sup>96</sup> The following product categories are not covered by salty snacks: fruit snacks, tortilla/corn chips, other sweet and savoury snacks. The fruit snacks cover dried or preserved fruit usually sold in a pouch. This includes fruit such as grapes, plums, pears, apricots, cherries etc. Some products may also be coated (ie, with yoghurt) but products coated with chocolate, such as chocolate coated raisins fall under chocolate confectionery. Deep fried fruit slices such as banana chips, plantain chips (popular in Latin America) and the like are also included. Note that products tracked here are made from genuine fruit and not from artificial pastes and/or flavours. Fruit roll-ups or rippers are excluded as is dried fruit used for baking. Products/brands are typically very localised byregion. The leading brand in North America is Sun-Maid (Sun-Maid Growers) while in Latin America, generic products are the most important. In Asia, the leading brand is China-produced Kanghui (Guangdong Kanghui Group) and in Western Europe Sundora Fruits (Sundora Foods). Tortilla/Corn Chips cover a savoury snack, originating in Mexico, made of corn masa, rolled flat (like cookie dough) and/or extruded as long ribbons and/or cut to length and/or cut into a shape, etc. These products may be baked or fried, though typically they are fried in oil. They traditionally have a triangular shape. Leading global brands are from PepsiCo Inc, with Doritos, Tostitos and Fritos. Examples of Other Sweet and Savoury Snacks include seed snacks (eg sunflower seeds), peas, fruit and nut mixes/trail mixes, seaweed snacks, meat snacks (eg beef jerky, biltong), fish snacks, pork scratchings, non-dairy based cup jellies (both chilled and ambient). Cup jelly products in Asia, which can come in mini cups or regular sized cups and are largely targeted at children are included here. Note: Weetabix products are wheat cereal products (to go into breakfast cereals). Snack-a-Jacks and Rispino (Mars) type snacks are also excluded here. These are rice-based extruded snacks and such products fall under extruded snacks.

<sup>97</sup> Sales of popcorn from retail concessions such as cinema counters (usually displayed loose then later packed) are also included under retail sales.

Product category	Product subcategory	Detailed coverage
		need further preparation/heating at home (e.g. microwave popcorn).
	Pretzels	This product category covers a glazed, brittle biscuit that is salted on the outside and usually baked in the form of a loose knot or a stick. Pretzels coated with chocolate are excluded (they are included in bagged selflines). Leading global brands include Rold Gold (PepsiCo Inc.), Snyder's of Hanover (Snyder's of Hanover).
	Nuts	<ul style="list-style-type: none"> <li>• Processed by either cooking in oil or dry roasting, Raw de-shelled nuts sold as snacks;</li> <li>• Peanuts, cashews, mixed nuts and a variety of specialised products, including almonds and pistachios;</li> <li>• Note fruit and nut mixes or trail mixes are included under other sweet and savoury snacks.</li> </ul>
Dairy	Cheese	Processed cheese (spreadable and unspreadable) Unprocessed cheese (spreadable, soft and hard cheese).
	Drinking Milk	<ul style="list-style-type: none"> <li>• Fresh/pasteurised milk;</li> <li>• Long-life/UHT milk;</li> <li>• Goat milk;</li> <li>• Soy beverages;</li> <li>• Powder milk;</li> <li>• Flavoured powder milk drinks and flavoured milk drinks with juices (flavoured powders to which milk or water is added to produce a milk drink).</li> </ul>
	Yoghurt and sour milk drinks	<ul style="list-style-type: none"> <li>• Yoghurt (spoonable and drinking yoghurt);</li> <li>• Sour milk drinks.</li> </ul>
	Other dairy products	<ul style="list-style-type: none"> <li>• Hilled and shelf stable desserts;</li> <li>• Chilled snacks;</li> <li>• Coffee whiteners;</li> <li>• Condensed/evaporated milk, cream;</li> <li>• Fromage frais and quark.</li> </ul>
	Oils and Fats	<ul style="list-style-type: none"> <li>• Olive oil;</li> <li>• Vegetable and seed oil;</li> <li>• Cooking fats;</li> <li>• Butter;</li> <li>• Margarine;</li> <li>• Spreadable oils and fats.</li> </ul>

Source: Euromonitor.

### Selecting products to investigate

We aimed to study those product categories for which there is a similar non-taxed alternative. This allows us to investigate the substitution effect of the taxes.

### Average retail and manufacturing prices

In this dataset we can find the total retail revenue of the sector, the total manufacturing revenue of the sector and the total volume sold in a country. Using these three variables, we constructed

average retail prices and average manufacturing prices per unit of product, by dividing the revenues by the volumes sold.

The following definitions are used throughout the data analysis section (Annex 2):

**Retail price** (retail value retail selling price) is the monetary value of packaged food sales sold through retail channels to consumers. This includes the impact of wholesaler/distributor markups, retailer mark-ups, and VAT on the item's price, and essentially reflects the price the consumer pays for the product in the store.

**Manufacturing price** (retail value manufacturing selling price or manufacturer price) is the monetary value of packaged food sales sold through retail channels that the producer (manufacturer) of a product recommends that it be sold in the stores to the consumers. This excludes the impact of wholesaler/distributor markups, retailer markups, and VAT on the item's price, and essentially reflects the price of the product when it leaves the factory door.

**Retail margin** is the difference in the monetary value between manufacturing and retail price.

#### *Consumer demand*

The consumer demand consists of the total volume sold of a certain (type of) product. To avoid confounding in the variables, such as population growth, that in itself causes consumption to grow, we divide the total consumer demand by the total number of inhabitants in the country. This results in a total consumption per capita. This number of inhabitants is also collected from the passport dataset.

#### **Premium versus non-premium brands**

Combination of two datasets within Passport. One with the market shares of the local and global brand owners. Another with the prices of individual products and their content, sorted by product category. Data was gathered in September 2013.

In the prices dataset, we established per product category the average price per unit of measurement (grams or millilitres). Products above the average unit price received the label **premium brand product**. The products with a price below the average unit price received the label **non-premium brand product**. We excluded the prices collected in restaurants, fast food restaurants and café's, because the pricing pattern is different for those establishments and consequently less relevant for our analyses.

Next, we combined the datasets with the pricing data and the market share data, based on the brand owner (national or global). In a lot of cases this match was not possible. Therefore we adopted the following methodology.

Where matching was not possible, we looked if the non-premium brand has been bought by another brand owner during the observed period. If that is the case, it received the label the new brand owner has. If that is not the case, we occasionally looked on the internet to get an impression of the type of brand. We did this predominantly for the brands with a large market share, or where missing that information has strong influence on the aggregated data.

After conducting this procedure, we determined per global brand owner how many non-premium and premium brands it sold. If the majority was premium, the global brand, and all its subsidiaries received the label premium brand. If that was not the case, and at least one brand of the brand

owner was classified as non-premium, the global brand owner received the label non-premium brand.

For the remaining brand owners, we automatically adjusted the categories private label and other, with the non-premium brand label. It was never the case that this type of brand owner had a different label.

For those cases in which we were unable to classify any of the brands of the brand owner, we classify the global brand owner as unclassifiable.

### Competitiveness

The competitiveness of the industry is assessed from the supply side where the taxes were imposed. We use the following indicators:

- Value added of manufacturers;
- Number of firms;
- Employment (number of persons employed);
- Labour productivity;
- Investments; and
- Trade flows.

For these indicators we used for France the Passport dataset. Unfortunately, information for the other studied countries is unavailable. For this reason, we turn to other sources: Structural Business Statistics and PRODCOM from Eurostat. For the analysis of trade flows we used the statistics from International Merchandise Trade Statistics of United Nations and from International Monetary Fund.

Below we present several definitions of the indicators used in the report to analyse the competitiveness of the industry:

- **Value added** at factor cost is calculated as the gross income from operating activities corrected for operating subsidies and indirect taxes. The actual formula is the following: value added at factor costs is equal to the sum of turnover, capitalized production, other operating income, increases of stocks (if there are decreases in stock, then they are subtracted) minus the purchases of goods and services, other taxes on products which are linked to turnover but not deductible, and duties and taxes linked to production;
- **Apparent labour productivity** is calculated as value added at factor costs divided by the number of persons employed and is measured in thousands of euros per person employed throughout the report;
- **Turnover** corresponds to the total value of market sales of goods and services to third parties (the totals invoiced by the observation unit during the reference period). It includes all duties and taxes on the goods or services invoiced by the unit with the exception of the value-added tax (VAT) invoiced by the unit vis-à-vis its customer and other similar deductible taxes directly linked to turnover; and all other charges (transport, packaging, etc.) passed on to the customer, even if these charges are listed separately on the invoice;
- There are two indicators used for analysis of the investment activity: **investment rate** calculated as total investments per person employed and **investment rate** as Investment rate calculated as total investment divided by the value added at factors cost.

The data is retrieved from Eurostat based on the NACE classification of economic activities. A detailed table below describes the manufacturing activities analysed matching it to the taxes that were imposed on that industry. This also gives an exact overview of which product classes (on the 4-digit level) have been used for the analysis. The NACE 10 heading Manufacture of food products



and the NACE 11 heading Manufacture of beverages are used in the SBS database. Tables 4 and 5 present the coverage of the particular industries and the description of these industries.

**Table 4 Nomenclature for the food industry**

NACE	Description	Tax	Country
10	Manufacture of food products		
10.5	Manufacture of dairy products	Duty on saturated fat	Denmark
<b>10.52</b>	<b>Manufacture of ice cream</b>	<b>Tax on ice cream</b>	Denmark
<b>Coverage</b>	This class includes manufactures of ice cream and other edible ice such as sorbet		
10.8	Manufacture of other food products		
<b>10.82</b>	<b>Manufacture of cocoa, chocolate and sugar confectionery</b>	Excise duty on chocolate and sweets	Denmark
		Tax on sugary products	Finland
		Tax on confectionery	Hungary
<b>Coverage</b>	<ul style="list-style-type: none"> <li>This class includes manufactures of cocoa, cocoa butter, coca fat, cocoa oil; manufacture of chocolate and chocolate confectionery;</li> <li>Manufacture of sugar confectionery: caramels, cachous, nougats, fondant, white chocolate; manufacturing of chewing gum; preserving in sugar of fruit, nuts, fruit peels and other parts of plants; manufacture of confectionery lozenges and pastilles.</li> </ul>		
11	Manufacture of beverages		
<b>11.07</b>	<b>Manufacture of soft drinks; production of mineral waters and other bottled waters</b>	Tax on soft drinks	Denmark
		Tax on soft drinks	Finland
		Sugary and sweetened beverages tax	France
		Tax on soft drinks, tax on energy drinks	Hungary

Notes: the grey headings represent a higher level of aggregation which is not included in the analyses (the manufacture of dairy products is not included in the analysis due to lack of data available; an effect of the changes in the tax on soft drinks in Denmark is not analysed due to absence of data for 2013). Bold headings on the other hand is used for the industries that are being assessed.

**Table 5 Detailed description of the industries covered in the report**

NACE	Description	Coverage
10	Manufacture of food products	This division includes the processing of the products of agriculture, forestry and fishing into food for humans or animals, and includes the production of various intermediate products that are not directly food products.
10.5	Manufacture of dairy products	
<b>10.52</b>	<b>Manufacture of ice cream</b>	This class includes manufactures of ice cream and other edible ice such as sorbet.
10.8	Manufacture of other food products	This group includes the production of sugar and confectionery, prepared meals and dishes, coffee, tea and spices, as well as perishable and specialty food products.
<b>10.82</b>	<b>Manufacture of cocoa, chocolate and sugar confectionery</b>	This class includes manufactures of cocoa, cocoa butter, coca fat, cocoa oil; manufacture of chocolate and chocolate confectionery; manufacture of sugar confectionery: caramels, cachous, nougats, fondant, white chocolate; manufacturing of chewing gum; preserving in sugar of fruit, nuts, fruit peels and other parts of plants; manufacture of confectionery lozenges and pastilles.
11	Manufacture of beverages	This division includes the manufacture of beverages, such as non-alcoholic beverages and mineral water, manufacture of alcoholic beverages mainly through fermentation, beer and wine, and the manufacture of distilled alcoholic beverages.
<b>11.07</b>	<b>Manufacture of soft drinks; production of mineral waters and other bottled waters</b>	This class includes manufacture of non-alcoholic beverages (except non-alcoholic beer and wine) in particular production of natural mineral waters and other bottled waters; manufacture of soft drinks(n non-alcoholic flavoured and/or sweetened waters: lemonade, orangeade, cola, fruit drinks, tonic waters etc.).

For the detailed analysis of the production of manufactured goods of confectionery we use disaggregated data up to 8 digits:

NACE 2 code	Description
10.82.11.00	Cocoa paste (excluding containing added sugar or other sweetening matter) kg S
10.82.12.00	Cocoa butter, fat and oil kg S
10.82.13.00	Cocoa powder, not containing added sugar or other sweetening matter
10.82.14.00	Cocoa powder, containing added sugar or other sweetening matter

NACE 2 code	Description
10.82.21.30	Chocolate and other food preparations containing cocoa, in blocks, slabs or bars > 2 kg or in liquid, paste, powder, granular or other bulk form, in containers or immediate packings of a content > 2 kg, containing >= 18% by weight of cocoa butter
10.82.21.70	Chocolate flavour coating containing 18% or more by weight of cocoa butter and in packings weighing
10.82.22.33	Filled chocolate blocks, slabs or bars consisting of a centre (including of cream, liqueur or fruit paste; excluding chocolate biscuits)
10.82.22.35	Chocolate blocks, slabs or bars with added cereal, fruit or nuts (excluding filled, chocolate biscuits)
10.82.22.39	Chocolate blocks, slabs or bars (excluding filled, with added cereal; fruit or nuts, chocolate biscuits)
10.82.22.43	Chocolates (including pralines) containing alcohol (excluding in blocks, slabs or bars) kg S
10.82.22.45	Chocolates (excluding those containing alcohol, in blocks, slabs or bars) kg S
10.82.22.60	Sugar confectionery and substitutes therefor made from sugar substitution products, containing cocoa (including chocolate nougat) (excluding white chocolate)
10.82.22.70	Chocolate spreads
10.82.22.80	Preparations containing cocoa for making beverages
10.82.23.10	Chewing gum
10.82.23.20	Liquorice cakes, blocks, sticks and pastilles containing > 10% by weight of sucrose, but not containing any other substances
10.82.23.30	White chocolate
10.82.23.53	Sugar confectionery pastes in immediate packings of a net content >= 1 kg (including marzipan, fondant, nougat and almond pastes)
10.82.23.55	Throat pastilles and cough drops consisting essentially of sugars and flavouring agents (excluding pastilles or drops with flavouring agents containing medicinal properties)
10.82.23.63	Sugar coated (panned) goods (including sugar almonds)
10.82.23.65	Gums, fruit jellies and fruit pastes in the form of sugar confectionery (excluding chewing gum)
10.82.23.73	Boiled sweets
10.82.23.75	Toffees, caramels and similar sweets
10.82.23.83	Compressed tablets of sugar confectionery (including cachous)
10.82.23.90	Sugar confectionery, n.e.c.
10.82.24.00	Drained, glace or crystallised fruit, nuts, fruit-peel and other parts of plants

Throughout the report this headings are grouped in order to provide clarity on the changes in the sector producing confectionery:

Grouping	NACE Rev. 2
Sugar confectionery	10.82.22.60 Sugar confectionery and substitutes therefor made from sugar substitution products, containing cocoa (including chocolate nougat) (excluding white chocolate)
	10.82.23.10 Chewing gum
	10.82.23.20 Liquorice cakes, blocks, sticks and pastilles containing > 10% by weight of sucrose, but not containing any other substances
	10.82.23.53 Sugar confectionery pastes in immediate packings of a net content >= 1 kg (including marzipan, fondant, nougat and almond pastes)
	10.82.23.55 Throat pastilles and cough drops consisting essentially of sugars and flavouring agents (excluding pastilles or drops with flavouring agents containing medicinal properties)
	10.82.23.63 Sugar coated (panned) goods (including sugar almonds)
	10.82.23.65 Gums, fruit jellies and fruit pastes in the form of sugar confectionery (excluding chewing gum)

Grouping	NACE Rev. 2
	10.82.23.73 Boiled sweets
	10.82.23.75 Toffees, caramels and similar sweets
	10.82.23.83 Compressed tablets of sugar confectionery (including cachous)
	10.82.23.90 Sugar confectionery, n.e.c.
	10.82.24.00 Drained, glace or crystallised fruit, nuts, fruit-peel and other parts of plants
Chocolate confectionery	10.82.22.33 Filled chocolate blocks, slabs or bars consisting of a centre (including of cream, liqueur or fruit paste; excluding chocolate biscuits)
	10.82.22.35 Chocolate blocks, slabs or bars with added cereal, fruit or nuts (excluding filled, chocolate biscuits)
	10.82.22.39 Chocolate blocks, slabs or bars (excluding filled, with added cereal; fruit or nuts, chocolate biscuits)
	10.82.22.43 Chocolates (including pralines) containing alcohol (excluding in blocks, slabs or bars) kg S
	10.82.22.45 Chocolates (excluding those containing alcohol, in blocks, slabs or bars) kg S
	10.82.22.53 Filled chocolate confectionery (excluding in blocks, slabs or bars, chocolate biscuits, chocolates)
	10.82.22.55 Chocolate confectionery (excluding filled, in blocks, slabs or bars, chocolate biscuits, chocolates)
	10.82.23.30 White chocolate
Cacao products (not chocolate)	10.82.11.00 Cocoa paste (excluding containing added sugar or other sweetening matter) kg S
	10.82.12.00 Cocoa butter, fat and oil kg S
	10.82.13.00 Cocoa powder, not containing added sugar or other sweetening matter
	10.82.14.00 Cocoa powder, containing added sugar or other sweetening matter
	10.82.22.80 Preparations containing cocoa for making beverages
	10.82.22.90 Food products with cocoa (excluding cocoa paste, butter, powder, blocks, slabs, bars, liquid, paste, powder, granular, other bulk form in packings > 2kg, to make beverages, chocolate spreads)
Other chocolate products	10.82.21.30 Chocolate and other food preparations containing cocoa, in blocks, slabs or bars > 2 kg or in liquid, paste, powder, granular or other bulk form, in containers or immediate packings of a content > 2 kg, containing $\geq$ 18% by weight of cocoa butter
	10.82.21.70 Chocolate flavour coating containing 18% or more by weight of cocoa butter and in packings weighing
	10.82.21.90 Food preparations containing <18% of cocoa butter and in packings weighing > 2 kg (excluding chocolate flavour coating, chocolate milk crumb)
	10.82.22.70 Chocolate spreads

For the analysis of trade flows we used the statistics from International Merchandise Trade Statistics of United Nations and from International Monetary Fund. Below we present two correspondence tables linking the nomenclature used for trade statistics (Standard International Trade Classification, Revision 4, SITC, the standard used by United Nations and International Standard Industrial Classification, Revision 4, ISIC, the standard used by International Monetary Fund) and the classification used for the other parts of competitiveness analysis (NACE Rev. 2). The two classifications are quite different, therefore the coverage of activities differs.

**Table 6 Correspondence table for the Sugars, Sugars Products and Honey**

SITC Rev. 4	Description	ISIC Rev. 4	Description	NACE Rev. 2	Description
061.11	Cane sugar, raw	1072	Manufacture of sugar	10.81	Manufacture of sugar
061.12	Beet sugar, raw	1072	Manufacture of sugar	10.81	Manufacture of sugar
061.21	Containing added flavouring or colouring matter	1072	Manufacture of sugar	10.81	Manufacture of sugar
061.29	Other	1072	Manufacture of sugar	10.81	Manufacture of sugar
061.51	Cane molasses	1072	Manufacture of sugar	10.81	Manufacture of sugar
061.59	Beet sugar molasses and other molasses (e.g., corn molasses) resulting from the extraction or refining of sugar	1072	Manufacture of sugar	10.81	Manufacture of sugar
061.6	Natural honey	0143	Raising of camels and camelids	01.44	Raising of camels and camelids
061.6	Natural honey	0145	Raising of swine/pigs	01.46	Raising of swine/pigs
061.6	Natural honey	0146	Raising of poultry	01.47	Raising of poultry
061.6	Natural honey	0149	Raising of other animals	01.49	Raising of other animals
061.6	Natural honey	0321	Marine aquaculture	03.21	Marine aquaculture
061.6	Natural honey	0322	Freshwater aquaculture	03.22	Freshwater aquaculture
061.91	Lactose and lactose syrup	1050	Manufacture of dairy products	01.50	Manufacture of dairy products
061.92	Maple sugar and maple syrup	1072	Manufacture of sugar	10.81	Manufacture of sugar
061.93	Glucose (dextrose) and glucose syrup, not containing fructose or containing, in the dry state, less than 20% but not more than 50% by weight of fructose	1062	Manufacture of starches and starch products	01.62	Support activities for animal production
061.94	Glucose and glucose syrup, containing, in the dry state, at least 20% but not more than 50% by weight of fructose	1062	Manufacture of starches and starch products	01.62	Support activities for animal production
061.95	Pure fructose	1062	Manufacture of starches and starch products	01.62	Support activities for animal production

SITC Rev. 4	Description	ISIC Rev. 4	Description	NACE Rev. 2	Description
061.96	Other fructose and fructose syrup, containing in the dry state more	1062	Manufacture of starches and starch products	01.62	Support activities for animal production
061.99	Other (including invert sugar)	1062	Manufacture of starches and starch products	01.62	Support activities for animal production
062.1	Fruit, nuts, fruit-peel and other parts of plants, preserved by sugar or other sweetening matter (drained, glaze or crystallized)	1073	Manufacture of cocoa, chocolate and sugar confectionery	<b>10.82</b>	<b>Manufacture of cocoa, chocolate and sugar confectionery</b>
062.21	Chewing gum, whether or not sugar-coated	1073	Manufacture of cocoa, chocolate and sugar confectionery	<b>10.82</b>	<b>Manufacture of cocoa, chocolate and sugar confectionery</b>
062.29	Other	1073	Manufacture of cocoa, chocolate and sugar confectionery	<b>10.82</b>	<b>Manufacture of cocoa, chocolate and sugar confectionery</b>

Note: The bold headings are included in the all parts of competitiveness analysis except for trade flows.

Due to the differences in the classifications' coverage, the following categories are covered in the analysis of trade flows: Sugars and sugar confectionery including Cane or beet sugar and pure sucrose, in solid form; Other sugars, including pure lactose, glucose and fructose, in solid form; sugar syrups not containing added flavouring or colouring matter; artificial honey, whether or not mixed with natural honey; caramel; Molasses resulting from the extraction or refining of sugar; Sugar confectionery, not containing cocoa. Due to limited data available at the level of actual taxed products, we use the data for sugars and sugar confectionery<sup>98</sup>.

**Table 7 Correspondence table for the Beverages**

SITC Rev. 4	Description	ISIC Rev. 4	Description	NACE Rev. 2	Description
111.01	Waters, including natural or artificial mineral waters and aerated waters, not containing added sugar or other sweetening matter nor flavoured, ice and snow	1104	Manufacture of soft drinks; production of mineral waters	<b>11.07</b>	<b>Manufacture of soft drinks; production of mineral waters and other bottled waters</b>
111.02	Waters (including mineral waters and aerated waters)	1104	Manufacture of soft drinks;	<b>11.07</b>	<b>Manufacture of soft drinks; production of</b>

<sup>98</sup> This means that the data is provided at a broader level than the actual tax base and the conclusions will be drawn with a caution for actual product categories that are affected by the tax changes.

SITC Rev. 4	Description	ISIC Rev. 4	Description	NACE Rev. 2	Description
	containing added sugar or other sweetening matter or flavoured, and other non-alcoholic beverages, n.e.s.		production of mineral waters		<b>mineral waters and other bottled waters</b>
112.11	Grape must in fermentation or with fermentation arrested other than by the addition of alcohol	1102	Manufacture of wines	11.02	Manufacture of wine from grape
112.11	Grape must in fermentation or with fermentation arrested other than by the addition of alcohol	1102	Manufacture of wines	11.03	Manufacture of cider and other fruit wines
112.11	Grape must in fermentation or with fermentation arrested other than by the addition of alcohol	1102	Manufacture of wines	11.04	Manufacture of other non-distilled fermented beverages
112.13	Vermouth and other wines of fresh grapes flavoured with plants or aromatic substances	1102	Manufacture of wines	11.02	Manufacture of wine from grape
112.13	Vermouth and other wines of fresh grapes flavoured with plants or aromatic substances	1102	Manufacture of wines	11.03	Manufacture of cider and other fruit wines
112.13	Vermouth and other wines of fresh grapes flavoured with plants or aromatic substances	1102	Manufacture of wines	11.04	Manufacture of other non-distilled fermented beverages
112.15	Sparkling wine	1102	Manufacture of wines	11.02	Manufacture of wine from grape
112.15	Sparkling wine	1102	Manufacture of wines	11.03	Manufacture of cider and other fruit wines
112.15	Sparkling wine	1102	Manufacture of wines	11.04	Manufacture of other non-distilled fermented beverages
112.17	Wine of fresh grapes (other than sparkling wine); grape must with fermentation prevented or arrested by the addition of alcohol	1102	Manufacture of wines	11.02	Manufacture of wine from grape
112.17	Wine of fresh grapes (other than sparkling wine); grape must with fermentation prevented or arrested by the addition of alcohol	1102	Manufacture of wines	11.03	Manufacture of cider and other fruit wines
112.17	Wine of fresh grapes (other than sparkling wine); grape must with fermentation prevented or arrested by the addition of alcohol	1102	Manufacture of wines	11.04	Manufacture of other non-distilled fermented beverages
112.2	Fermented beverages, n.e.s. (e.g., cider, perry, mead); mixtures of fermented beverages and mixtures of fermented beverages and non-alcoholic beverages, n.e.s.	1102	Manufacture of wines	11.02	Manufacture of wine from grape



SITC Rev. 4	Description	ISIC Rev. 4	Description	NACE Rev. 2	Description
112.2	Fermented beverages, n.e.s. (e.g., cider, perry, mead); mixtures of fermented beverages and mixtures of fermented beverages and non-alcoholic beverages, n.e.s.	1102	Manufacture of wines	11.03	Manufacture of cider and other fruit wines
112.2	Fermented beverages, n.e.s. (e.g., cider, perry, mead); mixtures of fermented beverages and mixtures of fermented beverages and non-alcoholic beverages, n.e.s.	1102	Manufacture of wines	11.04	Manufacture of other non-distilled fermented beverages
112.3	Beer made from malt (including ale, stout and porter)	1103	Manufacture of malt liquors and malt	11.05	Manufacture of beer
112.3	Beer made from malt (including ale, stout and porter)	1103	Manufacture of malt liquors and malt	11.06	Manufacture of malt
112.41	Whisky	1101	Distilling, rectifying and blending of spirits	11.01	Distilling, rectifying and blending of spirits
112.41	Whisky	2011	Manufacture of basic chemicals	20.12	Manufacture of dyes and pigments
112.41	Whisky	2011	Manufacture of basic chemicals	20.13	Manufacture of other inorganic basic chemicals
112.42	Spirits obtained by distilling grape wine or grape marc	1101	Distilling, rectifying and blending of spirits	11.01	Distilling, rectifying and blending of spirits
112.42	Spirits obtained by distilling grape wine or grape marc	2011	Manufacture of basic chemicals	20.12	Manufacture of dyes and pigments
112.42	Spirits obtained by distilling grape wine or grape marc	2011	Manufacture of basic chemicals	20.13	Manufacture of other inorganic basic chemicals
112.43	Compound alcoholic preparations of a kind used for the manufacture of beverages	1101	Distilling, rectifying and blending of spirits	11.01	Distilling, rectifying and blending of spirits
112.43	Compound alcoholic preparations of a kind used for the manufacture of beverages	2011	Manufacture of basic chemicals	20.12	Manufacture of dyes and pigments
112.43	Compound alcoholic preparations of a kind used for the manufacture of beverages	2011	Manufacture of basic chemicals	20.13	Manufacture of other inorganic basic chemicals
112.44	Rum and tafia	1101	Distilling, rectifying and blending of spirits	11.01	Distilling, rectifying and blending of spirits

SITC Rev. 4	Description	ISIC Rev. 4	Description	NACE Rev. 2	Description
112.44	Rum and tafia	2011	Manufacture of basic chemicals	20.12	Manufacture of dyes and pigments
112.44	Rum and tafia	2011	Manufacture of basic chemicals	20.13	Manufacture of other inorganic basic chemicals
112.45	Gin and Geneva	1101	Distilling, rectifying and blending of spirits	11.01	Distilling, rectifying and blending of spirits
112.45	Gin and Geneva	2011	Manufacture of basic chemicals	20.12	Manufacture of dyes and pigments
112.45	Gin and Geneva	2011	Manufacture of basic chemicals	20.13	Manufacture of other inorganic basic chemicals
112.49	Spirits and distilled alcoholic beverages, n.e.s.	1101	Distilling, rectifying and blending of spirits	11.01	Distilling, rectifying and blending of spirits
112.49	Spirits and distilled alcoholic beverages, n.e.s.	2011	Manufacture of basic chemicals	20.12	Manufacture of dyes and pigments
112.49	Spirits and distilled alcoholic beverages, n.e.s.	2011	Manufacture of basic chemicals	20.13	Manufacture of other inorganic basic chemicals

Note: The bold headings are included in the all parts of competitiveness analysis except for trade flows.

## Limitations

### *Inability to show probable causal relationship*

We are not able to establish a probable causal relationship<sup>99</sup> between the various dependent variables and the change in tax. The most important reason for that is that we did not conduct a proper statistical analyses on the data. This was not possible due to very limited amount of available data. As a rule of thumb, we need at least 10 years of observations before the change in the tax regime, and 10 years of observations after the tax change. There should be no changes in the tax over that period. In our dataset, due to the relative recent implementation of most investigated tax changes, we have at most 3 years of observations after the tax change.

In addition to these criteria, proper statistical analyses includes correcting factors, such as changes in GDP, exchange rates, consumption spending, etc. For this, a panel analyses would be appropriate, which is only possible with at least 10 countries that changed their food tax regime around the same period. Again, we do not have sufficient number of observations to conduct such analyses, lacking sufficient European countries that adopted food taxes.

In addition to our inability to conduct statistical analyses with the available data, the data limitations also make it sometimes hard to establish a trend, or “normal” level for the indicator. This is particularly the case for the competitiveness indicators, for which we have occasionally only four or five observations.

For this reason, we stressed in this report, and again in this section, that we do not presume to show a causal relationship between food taxes and the various indicators for demand, prices and competitiveness.

### Long term effects

Related to the limitations of the dataset that makes it impossible to run proper statistical analyses on the data, also causes us to be unable to distinguish long-term effect after the introduction of the tax. This means that we cannot judge whether the effect of the tax is a one-time effect, that may be wearing off, or is a permanent effect that possibly increases over time.

Cause of not being able to assess the long-term effects is the relative recent introduction or changes made to the investigated food taxes. Simply put, the long term effects are happening now, or in the future. For neither there is data available.

### Passport dataset versus other datasets

We rely heavily on the passport dataset for our analyses. Despite its good reputation among researchers, it has its own methodology, with its own limitations, for collecting data. Consequently, this means other researchers with other datasets such as Nielsen’s dataset, may, in some limited number of instances, come to different conclusions. This does not mean that the methodology we adopted is of higher or lower quality, it simply results from working with different datasets.

Similar comments can be made about the other datasets we used from Eurostat and IMF. Those datasets too are distinguished among researchers, but other, equally distinguished datasets might provide different results.

In general the datasets of equal quality provide the same conclusions on the trend in the market, although in some cases, other datasets will come to different conclusions in some limited number of instances. We are confident in the quality of Passport dataset, and therefore, we are confident that

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<sup>99</sup> Formally, without experimental design in the taxes (which is rarely the case), one can never prove a causal relationship, only reject one.

the conclusions we draw, with all its nuances, accurately depict the developments in the various sectors.

### **Premium and non-premium brands**

To ensure a dataset that we can use in the analyses, we have aggregated the label of premium or non-premium brand to their respective brand owners. This means a brand owner with both expensive and more affordable brands in its portfolio, is not accurately described.

Nevertheless, despite this bias, we are convinced that on average we accurately described each brand. In some cases we assigned brands to the 'non-premium' label wrongfully, in other cases we assigned the label premium wrongfully. On average, we erred in both directions equally.

This error in the assignment of the labels may mean the absolute levels of market shares of premium and non-premium brands is not correct, the underlying pattern and changes coinciding with the taxes are correct.

### **Product categories**

Not all product categories in our dataset are a perfect match between the taxed and non-taxed products. This is most salient for the category "low calorie cola" which is returning quite often in our analyses. This category constitutes both diet cola and zero-sugar cola. It is not sometimes the case that the zero-sugar cola is not taxed, while the diet cola is taxed. This makes it harder to discern a substitution effect from regular cola to the non-taxed cola.

Also in the case of Hungary, it is harder to discern effects, because the design of the tax allows producers to circumvent the tax by reducing the taxed ingredient in the product. Any changes in the ingredients of the products are not visible in the dataset.

## **Visual inspection of individual taxes**

For each selected tax, we describe the tax and present the information found on prices, consumption, demand and retail margins.

### **Tax on chocolate and confectionery – Denmark**

In 1968, an excise tax was introduced in Denmark on Chocolate and chocolate products, liquorice products, marzipan, sweets, effervescent products, chewing gum, cakes with a certain sugar, cacao or chocolate content etc. Certain products that can be used for the production of chocolate and sweets, such as almonds, nuts and cocoa nuts, are subject to raw materials tax.

In 2010, the tax was increased from DKK 14.20 (1.90 euro) to DKK 17.75 (2.38 euro) per kilo of final product and a reduced rate of DKK 14.20 (1.90 euro) for products containing less than 5 grams of sugar per kilo of final product. In 2012 it was raised again to DKK 23.75 (3.18 euros) and 20.2 (2.71 euros) for low-sugar products.

In 2013 it was raised again to DKK 24.61 (3.57 euro) and 20.93 (2.81 euros) for low-sugar products.

## Data Analysis

### Prices

We investigated the effect of the tax being imposed on two types of products: chocolate and the product group sugar confectionery.

Over the observed period, prices remain relatively stable, although a small increase is visible for all products. In relative terms prices of sugar confectionery fluctuated the most with rapid price increases and decreases of more than five percent.

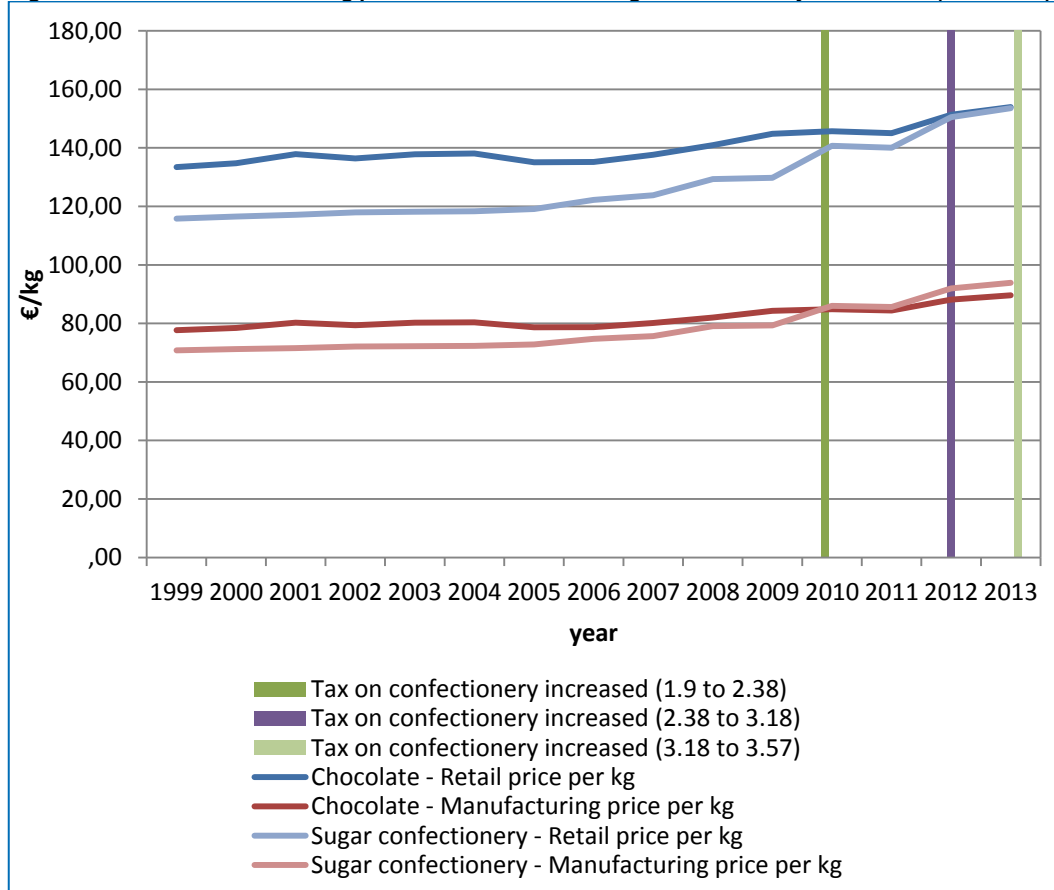
It is interesting to note that the relative price margin for the retailer remains at the same level. This means that all price changes from the manufacturer side are directly transferred to the consumers.

The first tax increase of DKK0.48, means on average a mark-up of 0.3% for chocolate confectionery compared to the average price of the year before, assuming all factors remaining the same. For the second (DKK 0.80) and third (DKK 0.39) tax increase, this figure is 0.6% and 0.3% respectively. For sugar confectionery, the first tax increase is 0.4% of the prices of the previous year. For the tax increases in 2012 and 2013, this figure is 0.6% and 0.3% respectively.

When we look at the data, we see that the first tax increase correspond to sharp price increases for sugar confectionery. For the chocolate products, there is no clear adjustment in the price level visible. However, for the second tax increase confectionery faced a sharp increase in the prices in 2012. The third and final tax increase is not visible for either of the product categories, although the period of observation may have been too short to see the effect.

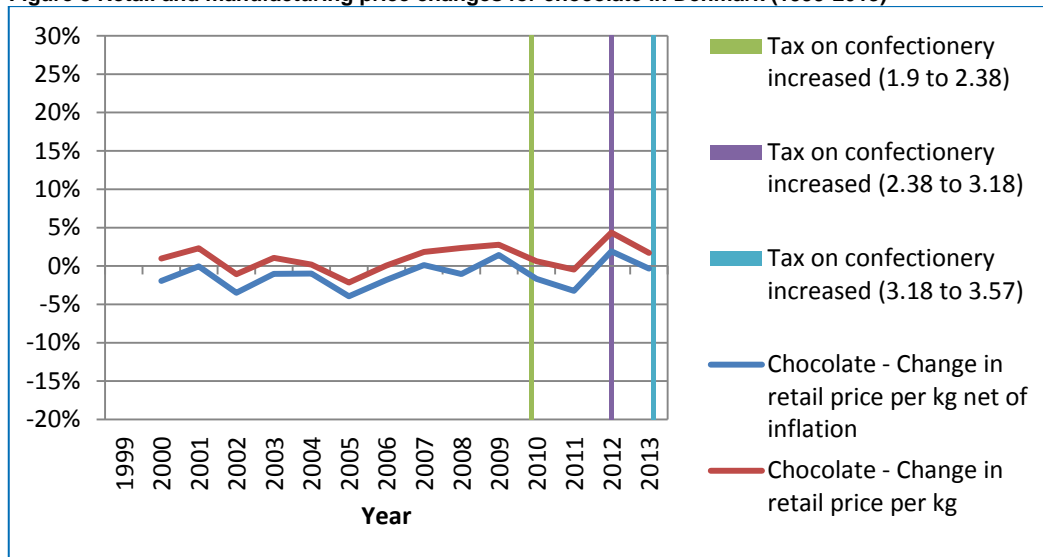
It is interesting to note, that the price increases for sugar confectionery that corresponds with the first and second tax increase are far larger than could have been expected based on the tax amount. This is also the case for the second tax increase for chocolate confectionery. Other factor may play a role in this pricing pattern, such as input prices and pricing strategy.

**Figure 4 Retail and manufacturing prices of chocolate and sugar confectionery in Denmark (1999-2013)**



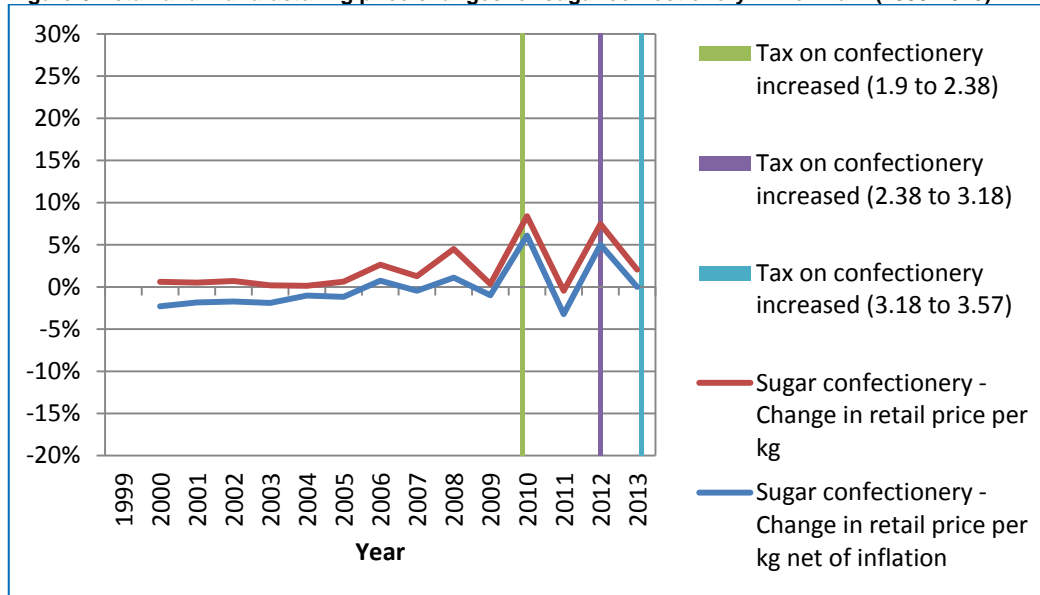
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 5 Retail and manufacturing price changes for chocolate in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 6 Retail and manufacturing price changes for sugar confectionery in Denmark (1999-2013)**



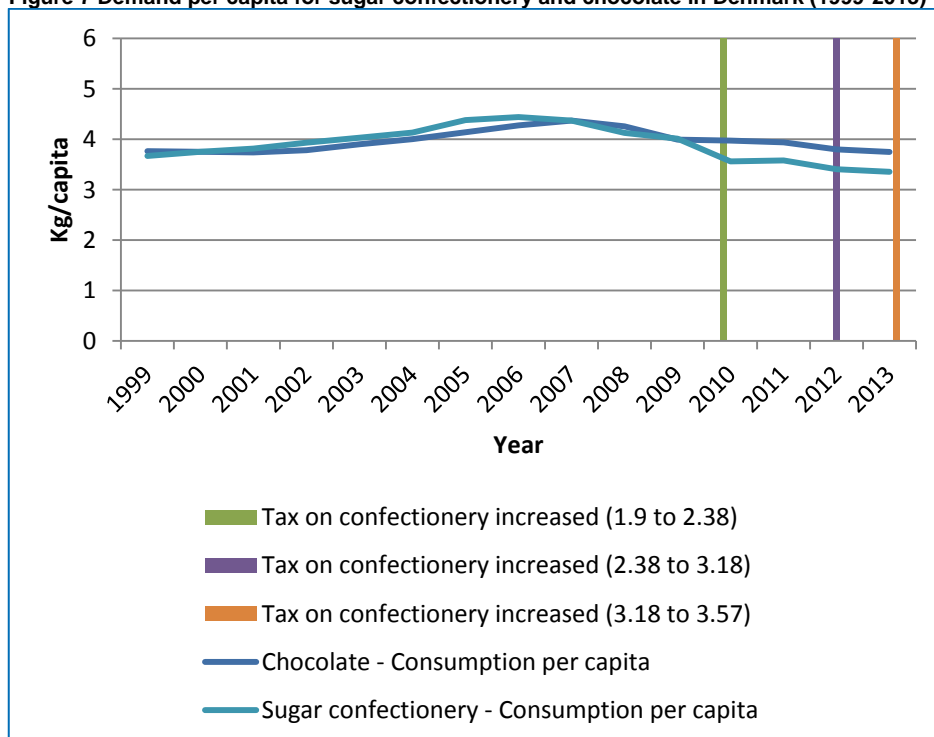
Source: Ecorys based on data from Euromonitor/Passport.

### Demand

Until 2007 we observe an increase in the consumption per capita per year. After that the consumption steadily decreases from more than 4 kg of sugar confectionery and 4kg of chocolate to less than 3.5 kg per capita per year in 2013.

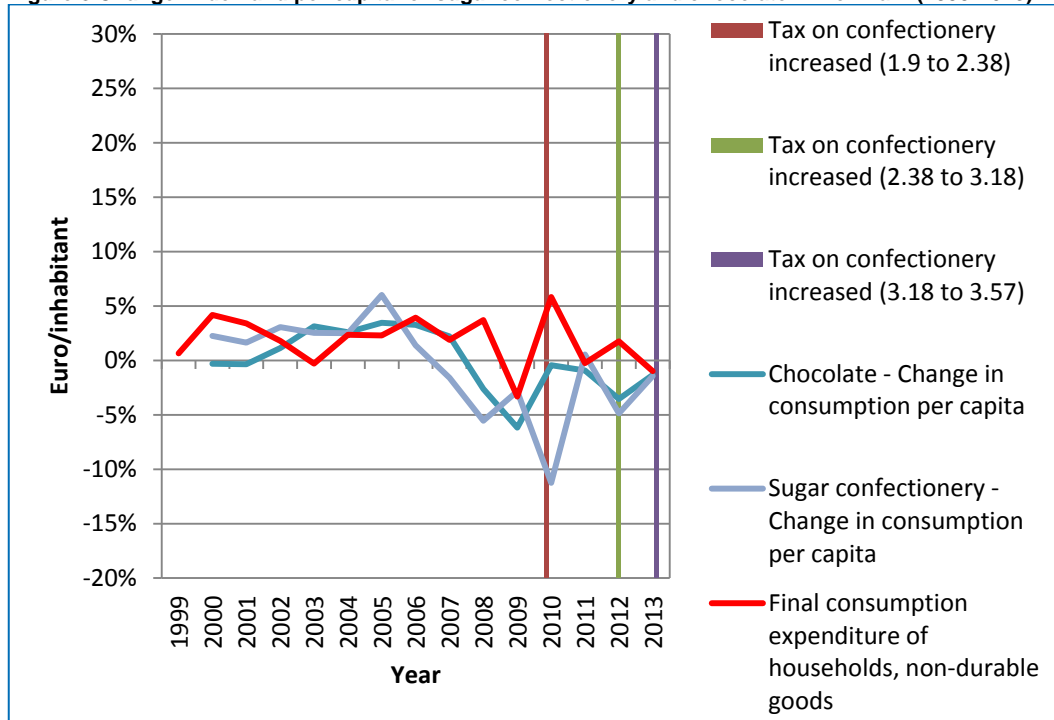
Corresponding to the findings on the effect of the tax on the prices of chocolate and sugar confectionery products, we see a decrease in the consumption of those products that show a price increase - at the same time as the tax is increased. In addition, when prices do not increase when the tax was increased, demand did not show any changes either compared to the average trend in previous years.

**Figure 7 Demand per capita for sugar confectionery and chocolate in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 8 Change in demand per capita for sugar confectionery and chocolate in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

### Market shares

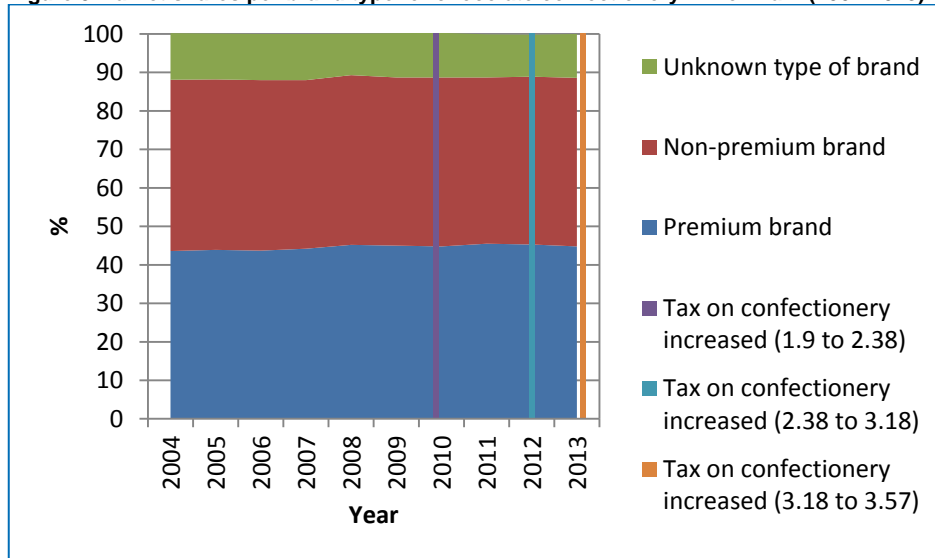
The market shares of the brand types remain relatively stable over the observed period from 2004 till 2013. This is true for both the sugar and chocolate confectionery. For chocolate confectionery around 45% of the market is supplied by premium brands, another 45% by non-premium brands. The remaining 10% of the market is receiving their products from a brand that is not classifiable in our current dataset.

For sugar confectionery, around 20% of the market is supplied by unclassifiable brands. Of the remainder of the market, 50% is served by non-premium brands, and 50% by premium brands.

As described above, and visible in the graphs below, these percentages are very stable over the observed period. The market shares seem unaffected by the tax increases adopted in 2010, 2012 and 2013 in Denmark.

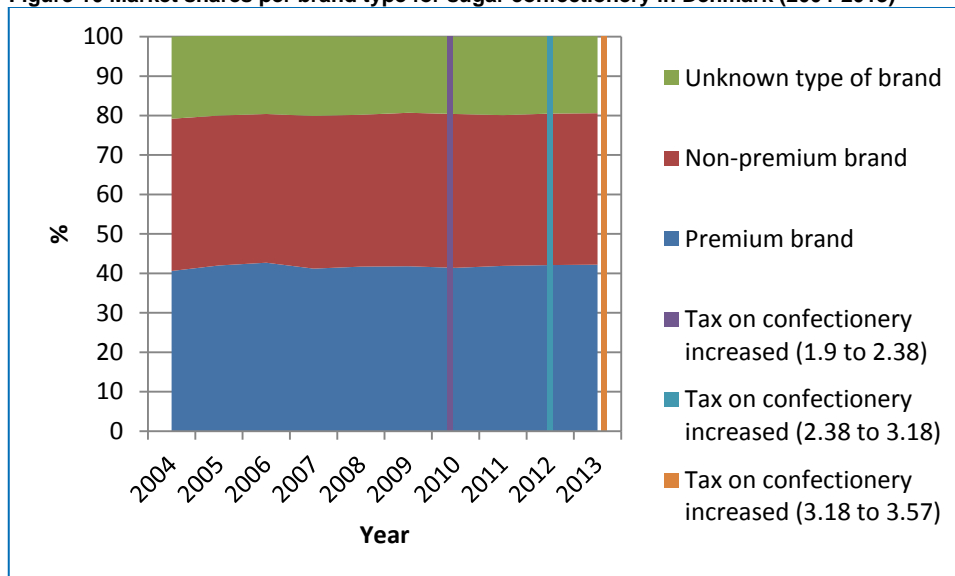


**Figure 9 Market shares per brand type for chocolate confectionery in Denmark (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 10 Market shares per brand type for sugar confectionery in Denmark (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

### Competitiveness

The total number of enterprises producing confectionery<sup>100</sup> remained stable after the tax was raised in 2010, as indicated in Figure 11 .

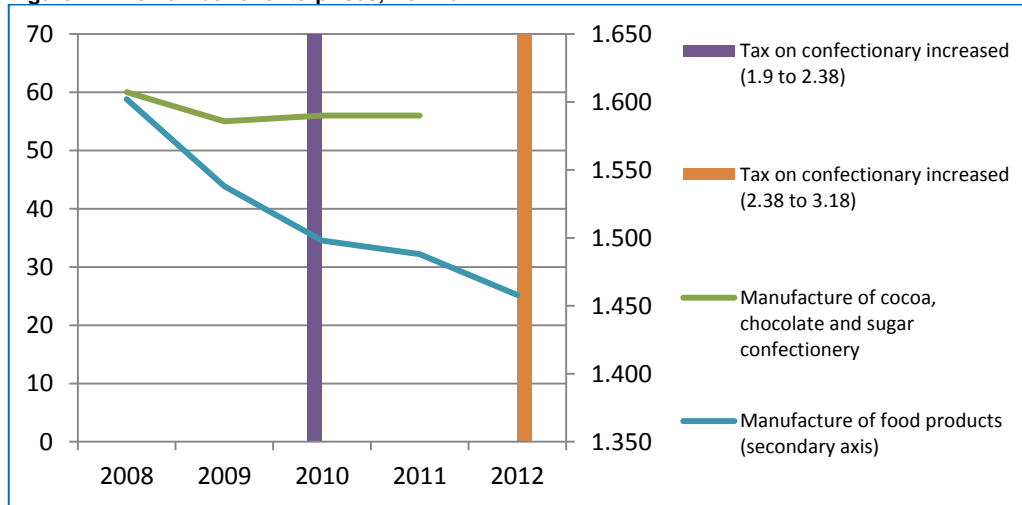
Figure 12 shows the revenues generated by the companies producing cocoa, chocolate and sugary confectionery in the first year of changes in the tax rate. We observe an increase in the revenues after the tax increase, followed by a slight drop. The production value followed the same trend differing in terms of size and effect when the specific subgroups are analysed (Figure 13 ).

For example, the production value decreased substantially after the tax was introduced for gums, fruit jellies and fruit pastes in the form of sugar confectionery (code 10.82.23.65). On the other hand, production was increased after the tax increase for the sector of filled chocolate blocks, slabs or bars (code 10.82.22.33). However, this trend started before the changes in the tax rate took place. Finally, turnover of the manufacturing of food products as a whole (where the confectionery

<sup>100</sup> Production of confectionery covers manufacture of cocoa, chocolate and sugar confectionery.

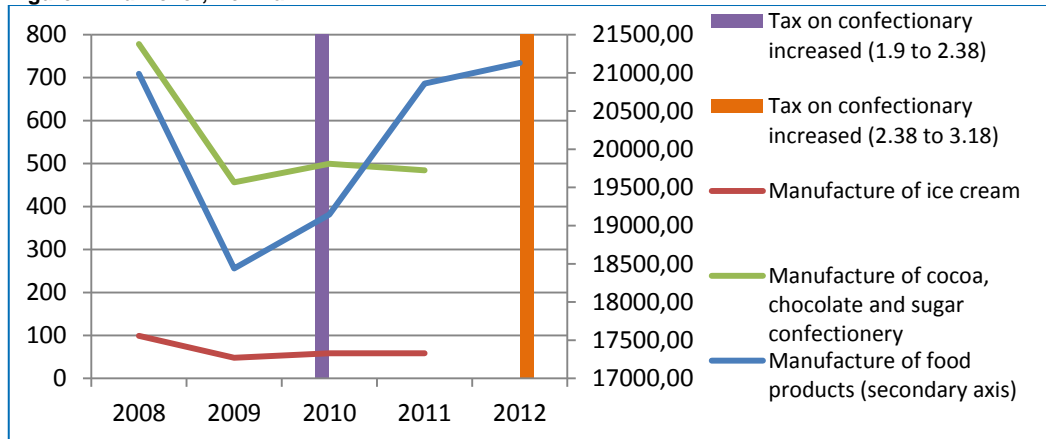
manufacturing represent only one part) increased after the changes in the tax on confectionery in 2010.

**Figure 11 The number of enterprises, Denmark**



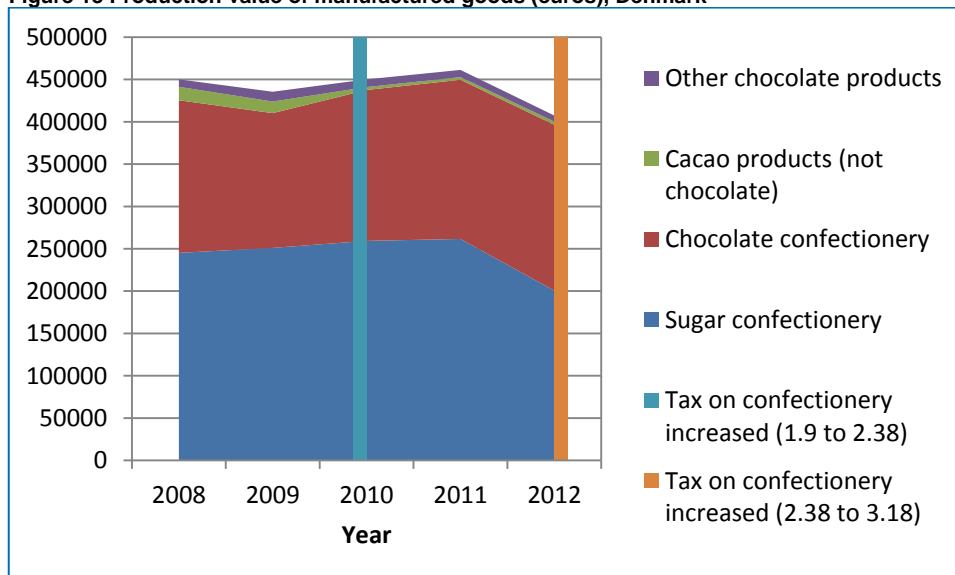
Source: SBS Eurostat.

**Figure 12 Turnover, Denmark**



Source: SBS Eurostat.

**Figure 13 Production value of manufactured goods (euros), Denmark**

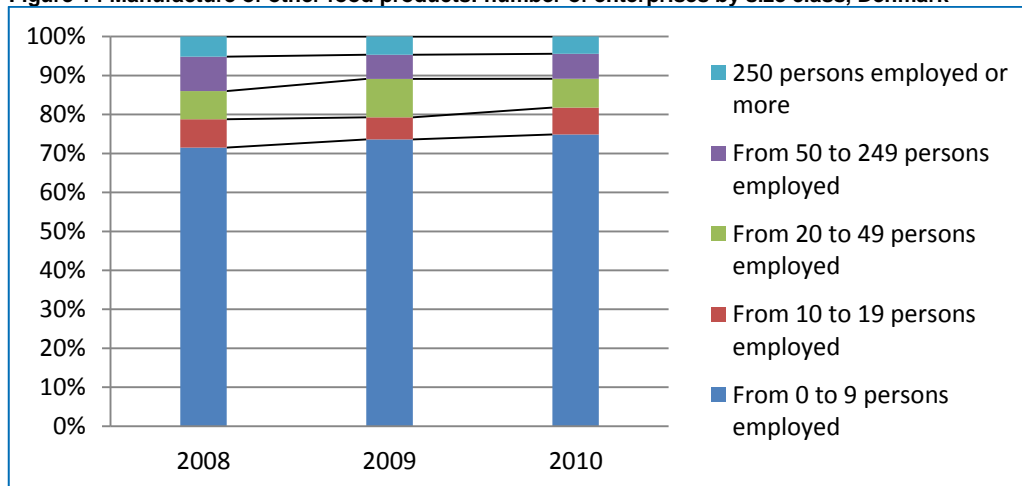


Source: SBS Eurostat and Ecorys.

### Employment and labour productivity

The sector<sup>101</sup> is dominated by small and medium sized enterprises (SMEs) and the self-employed. The data indicate that about 75% of companies in the sector have employees between 0 and 9 on average in Denmark, and 5% of the companies have between 10 and 49 employees in 2010. In this year, also the tax was increased. Compared to the earlier period the share of micro companies active in this sector was increasing.

**Figure 14 Manufacture of other food products: number of enterprises by size class, Denmark**



Source: SBS Eurostat.

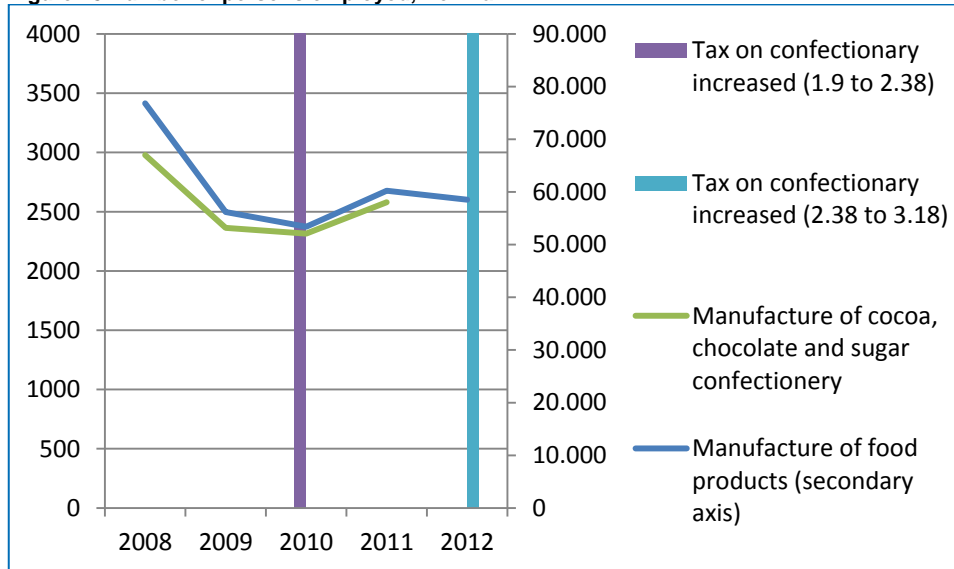
The changes in the tax rate corresponds with a slight drop in the number of persons employed in all investigated sectors in 2010 but after a year this trend reversed reaching a higher level of employment than in 2009 (Figure 15 ). This effect combined with the decreased value added has led to a 3% rise in labour productivity in 2010, but this was followed by a 16% drop in the level of (apparent) labour productivity a year after due to increased employment combined with a decreased value added (Figure 16 ).

### Value added of manufacturers

It is interesting to note that the value added of the manufacturers barely changed in 2010 after earlier that year the tax rate was raised but (Figure 17 ). Since 2008 the value added of the sector dropped by 30%. The changes in the manufacturing of confectionery have followed the same trend as the whole sector of food producers in Denmark. The share of value added of manufacturing of cocoa, chocolate and sugar confectionery in the total manufacturing industry (Figure 18 ) has declined since 2008 before the tax has been introduced. This indicates that the changes in the cocoa, chocolate and sugar confectionery industry follows a general trend in the industry rather than it reflects to the changes in tax on chocolate and confectionery.

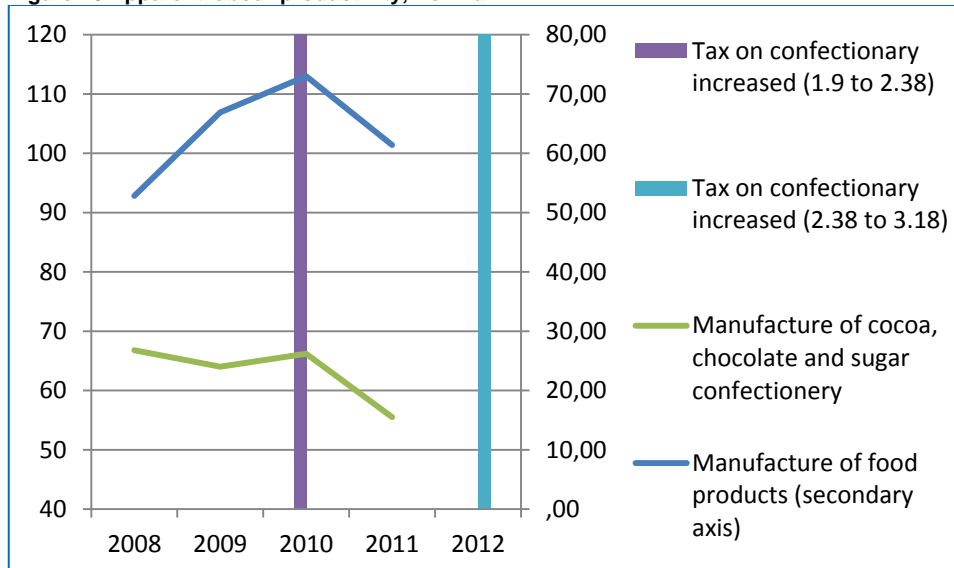
<sup>101</sup> Manufacture of cocoa, chocolate and sugar confectionery is part of the sector of manufacturing of other food products. Since the data are only available on a higher aggregation level, the analysis is based on for manufacturing of other food products for the breakdown by size class.

**Figure 15 Number of persons employed, Denmark**



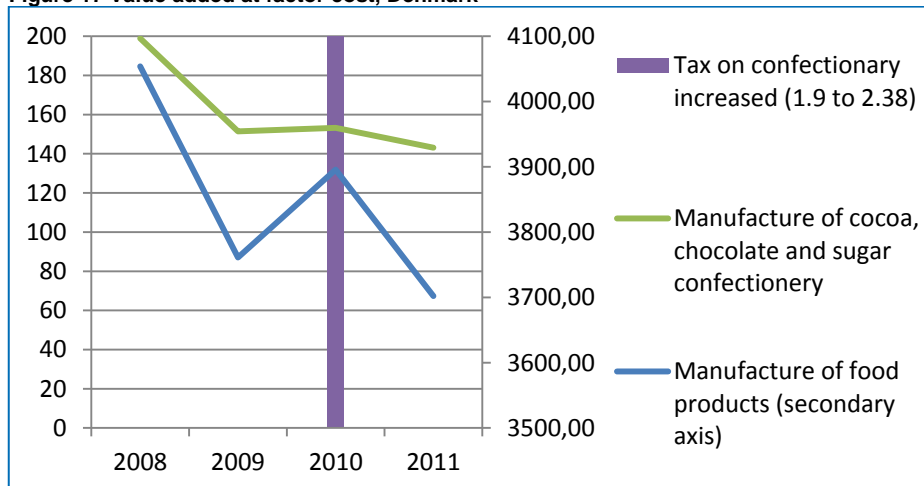
Source: SBS Eurostat and Ecorys.

**Figure 16 Apparent labour productivity, Denmark**



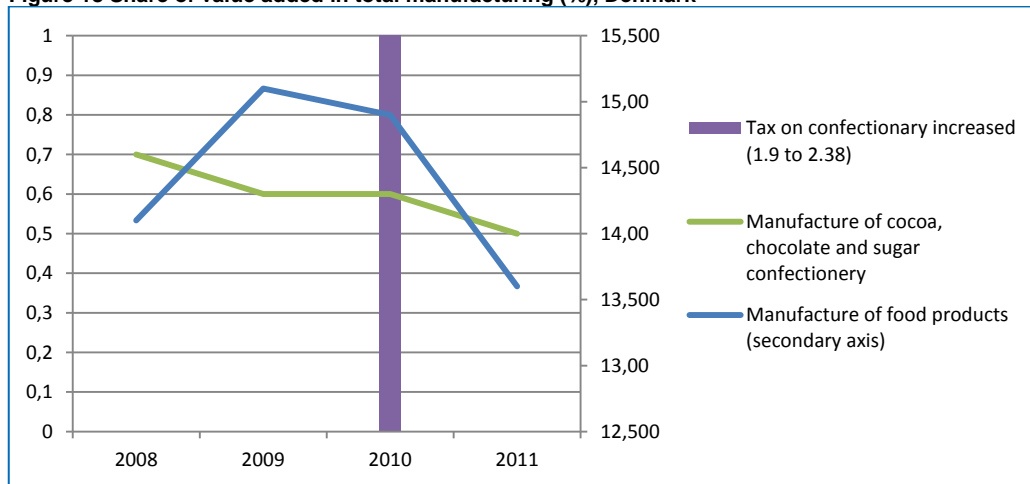
Source: SBS Eurostat and Ecorys.

**Figure 17 Value added at factor cost, Denmark**



Source: SBS Eurostat.

**Figure 18 Share of value added in total manufacturing (%), Denmark**

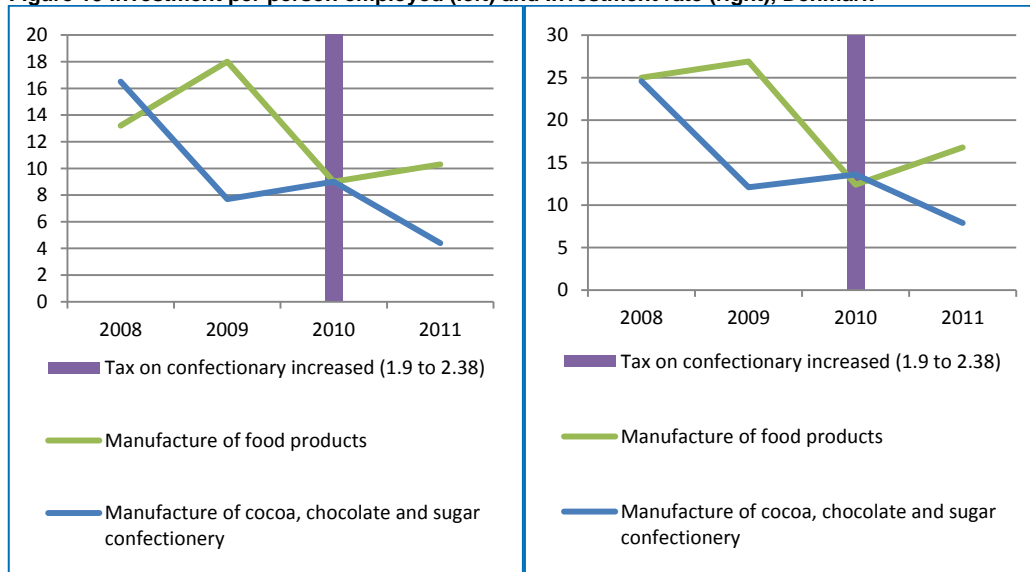


Source: SBS Eurostat.

### Investments

In terms of effects that the tax has on the investment activity of manufactures we clearly see that since the changes in the tax rate were introduced, the absolute level of investment was growing. However, the investment rate<sup>102</sup> slightly increased in 2010 but dropped afterwards (Figure 19). The situation in the total food products manufacturing is reversed: when the investment rates are increasing in the confectionery sector, that of the manufacturing of food products are decreasing, and vice versa.

**Figure 19 Investment per person employed (left) and Investment rate (right), Denmark**



Source: SBS Eurostat.

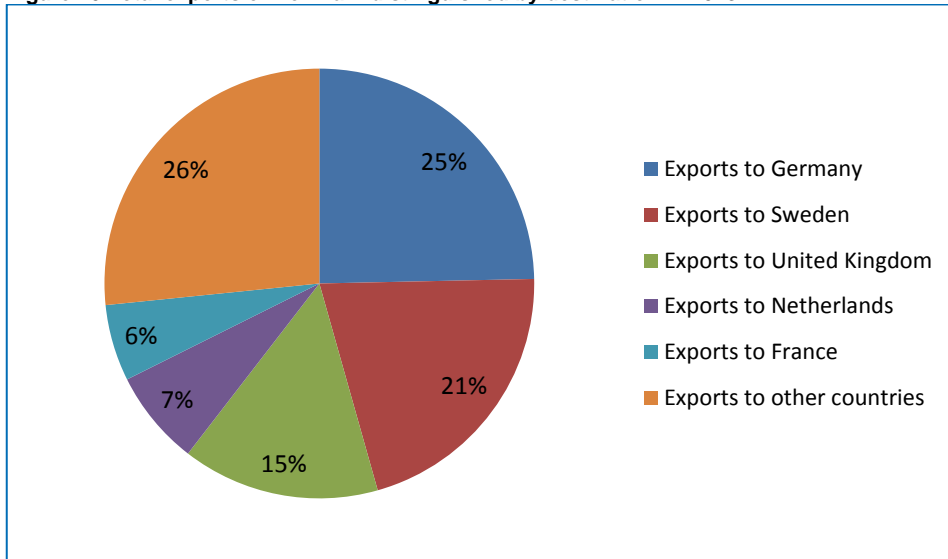
### Trade flows

The main trading partners of Denmark are Germany, Sweden, the UK, the Netherlands, France and Italy. These partners together represent 70% of total exports and imports. The overall trend of exports of sugars and sugar products has been positive over the last five years, though fluctuating a bit. When the first increase in the tax on chocolate and sweets was introduced, the exports of sugars dropped but then started to grow and reached higher level than in 2009. The same happened when in 2012 the tax was increased again. When in 2013 the tax was increased for the

<sup>102</sup> The investment rate is calculated as the investment divided by the value added at factor cost or as a investment divided by the number of persons employed.

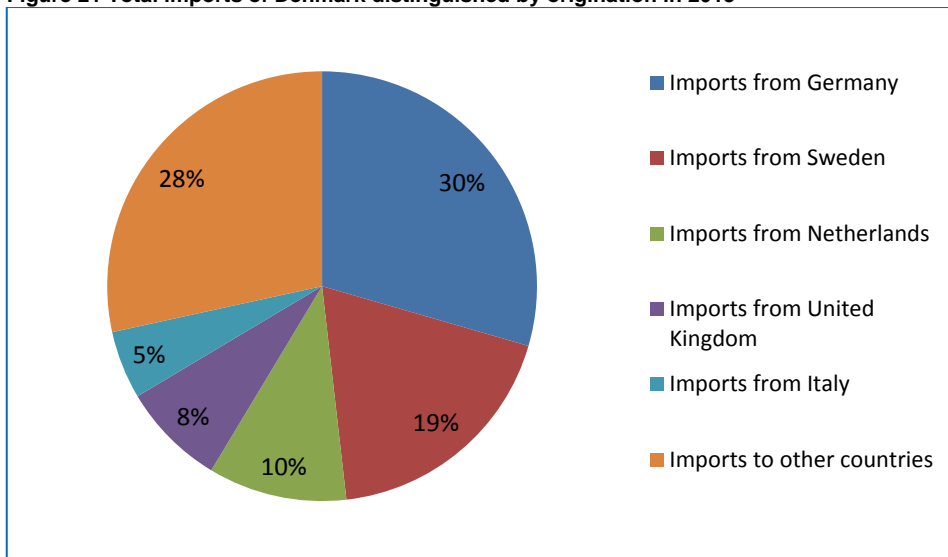
third time, exports increased. The similar patterns are happening with imports of sugars and sugars products.

**Figure 20 Total exports of Denmark distinguished by destination in 2013**



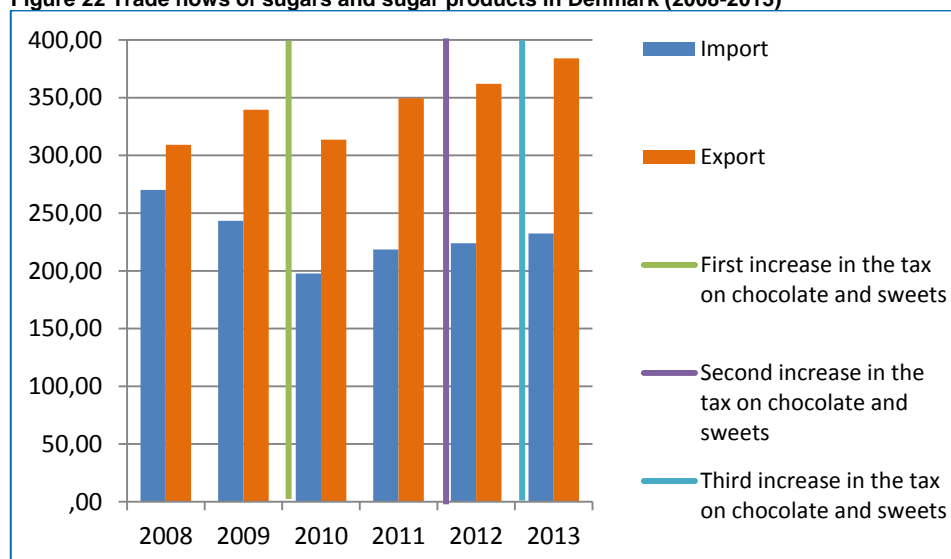
Source: International Monetary Fund (IMF), Direction of Trade Statistics.

**Figure 21 Total imports of Denmark distinguished by origination in 2013**



Source: International Monetary Fund (IMF), Direction of Trade Statistics.

**Figure 22 Trade flows of sugars and sugar products in Denmark (2008-2013)**



Source: United Nations (UN), International Merchandise Trade Statistics and Ecorys.

### Consolidation of findings

The main findings of the data analyses on the tax on chocolate and confectionery are summarised in the table below.

**Table 8 Change in various measures corresponding to change in tax**

	Sugar confectionery	Chocolate confectionery
Tax description	Taxed raised on sugar confectionery with €0.48 per kilo final product in 2010. In 2012 and 2013 the tax was raised with €0.80 and €0.39 respectively. Low sugar products are subject to lower tariffs, but not specifically analysed as the distinction between the two taxes is assumed irrelevant. The tax increases correspond to a mark-up of respectively 0.4%, 0.6% and 0.3% on the average prices of the year before.	Taxed raised on sugar confectionery with €0.48 per kilo final product in 2010. In 2012 and 2013 the tax was raised with €0.80 and €0.39 respectively. Low sugar products are subject to lower tariffs, but assumed irrelevant for the analyses. The tax increases correspond to a mark-up of respectively 0.3%, 0.6% and 0.3% on the average prices of the year before.
Price change	2010: +8.4%, 2012: +7.5%, 2013: +2.0% Tax increases corresponds to out of the ordinary price increases.	2010: +0.6%, 2012: +4.4%, 2013: +1.7% Tax increases corresponds weakly to out of the ordinary price increases
Demand change	2010: -11.2%, 2012: -4.9%, 2013: -1.4% Out of the ordinary demand decreases correspond to out of the ordinary price increases. Long-term effects unknown.	2010: -0.4%, 2012: -3.5%, 2013: -1.3% Out of the ordinary demand decreases correspond to out of the ordinary price increases. Long-term effects unknown.
Demand shift to lower segment	No changes observed	No changes observed
Demand shift to non-taxed product	No information available	No information available
Employment	Slight increase in the year after the first tax increase. No information available for more recent years.	
Labour productivity	Sharp decrease in the year after the first tax increase. No information available for more recent years.	

	Sugar confectionery	Chocolate confectionery
Profit margin retailers	No changes during the observed period.	No changes during the observed period.
Value added of manufacturers	No changes observed directly after the first tax increase. No information available for more recent years.	
Investments	Increase in the year of first tax introduction. In the next year a decrease in investment, fitting in the trend of the years before. No information available for more recent years.	
Trade flows	Lower imports following the tax increases. Export decrease corresponds with first tax increase. For other tax increases there are no changes visible.	No information available.

Price increases for sugar confectionery, corresponding with tax decreases. It is interesting to note that the price increases are larger than could be expected when the tax was the only reason for increasing the price. Following the price increase, we also see a decrease in the consumption levels. This lower demand for sugar confectionery is reflected in the import levels.

For chocolate confectionery, we see the same patterns following any out of the ordinary price increase. Noteworthy is the fact that price increases for this type of product are far more moderate than that of the sugar confectionery products. Consequently, the effects on the demand are also far more moderate than for sugar confectionery.

For the remaining indicators of competitiveness of the sector, we do not see any strong effects of the tax. However, any effect that is present is hard to measure due to the limited availability of data.

Data limitations also do not allow us to measure any long-term effects of the tax increases.

### Tax on saturated fat – Denmark

In October 2011, a tax was introduced on food products such as meat, dairy products, animal fats and vegetable oils which contain more than 2.3 % saturated fat. The duty is taxed on the following goods if the weight of saturated fat exceeds the triviality limit of 2.3 %: meat; dairy products (HS codes 0401-0406)<sup>103</sup>; animal fat (HS codes 1501-1504 and 1516)<sup>104</sup>, which are melted out or extracted in other ways; edible oils and fats (HS codes 1507-1516)<sup>105</sup>; margarine and other food (HS code 1517)<sup>106</sup>; Spreadable blended spreads (HS code 2106)<sup>107</sup>; other food which, based on an

<sup>103</sup> The following product categories are covered: Milk and cream, not concentrated nor containing added sugar or other sweetening matter; Milk and cream, concentrated or containing added sugar or other sweetening matter; Buttermilk, curdled milk and cream, yogurt, kephir and other fermented or acidified milk and cream, whether or not concentrated or containing containing added sugar or other sweetening matter or flavoured or containing added fruit, nuts or cocoa; Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents, whether or not containing added sugar or other sweetening matter, not elsewhere specified or included; Butter and other fats and oils derived from milk; dairy spreads; Cheese and curd.

<sup>104</sup> The following product categories are covered: Pig fat (including lard) and poultry fat, other than that of heading No. 0209 or 1503; Fats of bovine animals, sheep or goats other than those of heading No. 1503; Lard stearin, lard oil, oleostearin, oleo-oil and tallow oil, not emulsified or mixed or otherwise prepared; Fats and oils and their fractions, of fish, or marine mammals, whether or not refined, but not chemically modified; Animal or vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified, or elaidinised, whether or not refined, but not further prepared.

<sup>105</sup> The following product categories are covered: Soya-bean oil and its fractions, whether or not refined, but not chemically modified; Ground-nut oil and its fractions, whether or not refined, but not chemically modified; Olive oil and its fractions, whether or not refined, but not chemically modified; Other oils and their fractions, obtained solely from olives, whether or not refined, but not chemically modified, including blends of these oils or fractions with oils or fractions of heading No. 1509; Palm oil and its fractions, whether or not refined, but not chemically modified; Sunflower-seed, safflower or cotton-seed oil and fractions thereof, whether or not refined, but not chemically modified; Coconut (copra), palm kernel or babassu oil and fractions thereof, whether or not refined, but not chemically modified; Rape, colza or mustard oil and fractions, thereof, whether or not refined, but not chemically modified; Other fixed vegetable fats and oils (including jojoba oil) and their fractions, whether or not refined but not chemically modified.

<sup>106</sup> The following product categories are covered; Margarine; edible mixtures or preparations of animal or vegetable fats or oils or of fractions of different fats or oils of this Chapter, other than edible fats or oils or their fractions of heading No. 1516.



overall evaluation of the nature of the food, its use and the way it is marketed, can be considered a substitute for or imitation of the goods specified above.

The tax applies to food producers with a yearly turnover of more than DKK 50,000 (EUR 6,700) of the corresponding food products in Denmark. The tax was levied on saturated fat in products, and constituted DKK16 per kg of saturated fat. For meat the following structure and rates were imposed in 2012:

Type of meat	Saturated fat pr. 100 g	Duty pr. kg (DKK)
Meat		
Cows	5.2	0.83
Pigs	6.5	1.04
Sheep and goats	6	0.96
Horses, mules, donkeys	4	0.64
Chickens, hens and others	2.5	0.40
Ducks and pigeons	12.1	1.94
Turkeys	0	0.00
Rabbits and hares	0	0.00
Other venison	1.6	0.26
Other meat	4.2	0.7

In January 2013, the tax was abolished.

#### *Data analysis*

We investigate fats and oils to see what effect the taxes have on the retail and manufacturing prices and the consumption of the respective products. Vegetable oils and fats, such as olive oil, contain less saturated fats than for instance butters and cooking fats and are correspondingly taxed less.

#### **Prices**

Of the oils and fats, olive oil is by far the most expensive oil (almost twice as expensive as the second most expensive oil). Vegetable and seed oils are the least expensive fat (almost half the price of the second least expensive oil). This means that the price differences between oils are significant.

Retail prices have slightly increased over the observed period, with a notable exception of margarine. This product has shown some very erratic pricing behaviour before 2006, after which it stabilises at a substantially higher level.

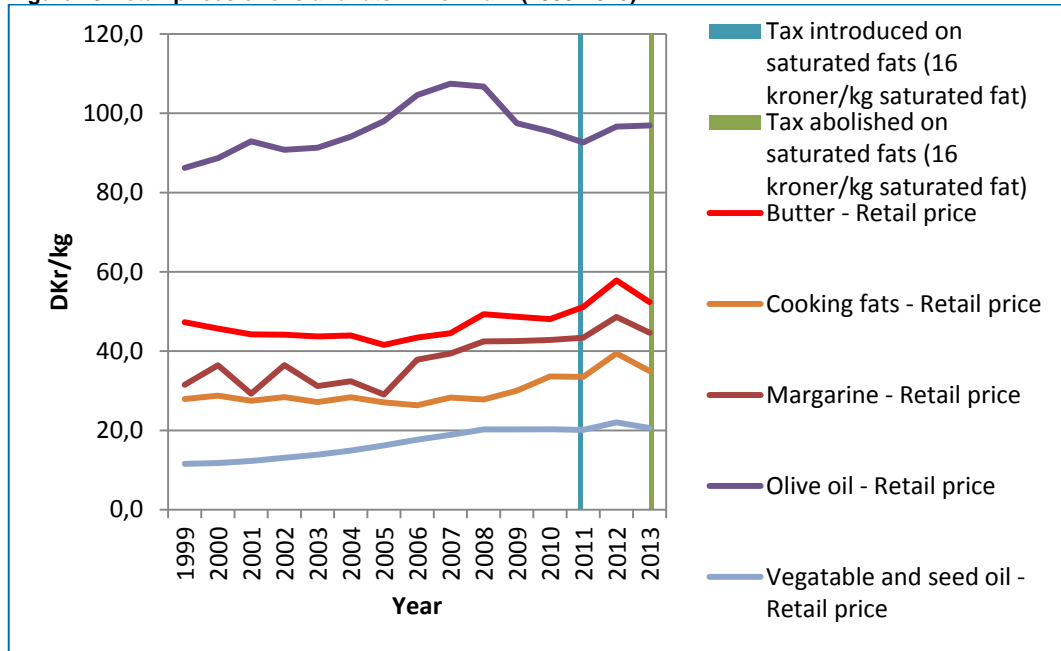
For all fats and oils, the tax seems to have had a strong impact on the price. In the first full year the tax was in force (2012), all products show an increase in prices. Cooking fats show the strongest increase with almost 20% price increase. Olive oil shows the smallest price increase of less than 5%, which is in line with our expectations that of all oils and fats, olive oil contains the least saturated fat and is consequently also taxed the least.

Following the abolition of the tax in the beginning of 2013, prices all decreased with about 10%, while olive oil remained at the same price level.

<sup>107</sup> The following product categories are covered: Reparations not elsewhere specified or included.

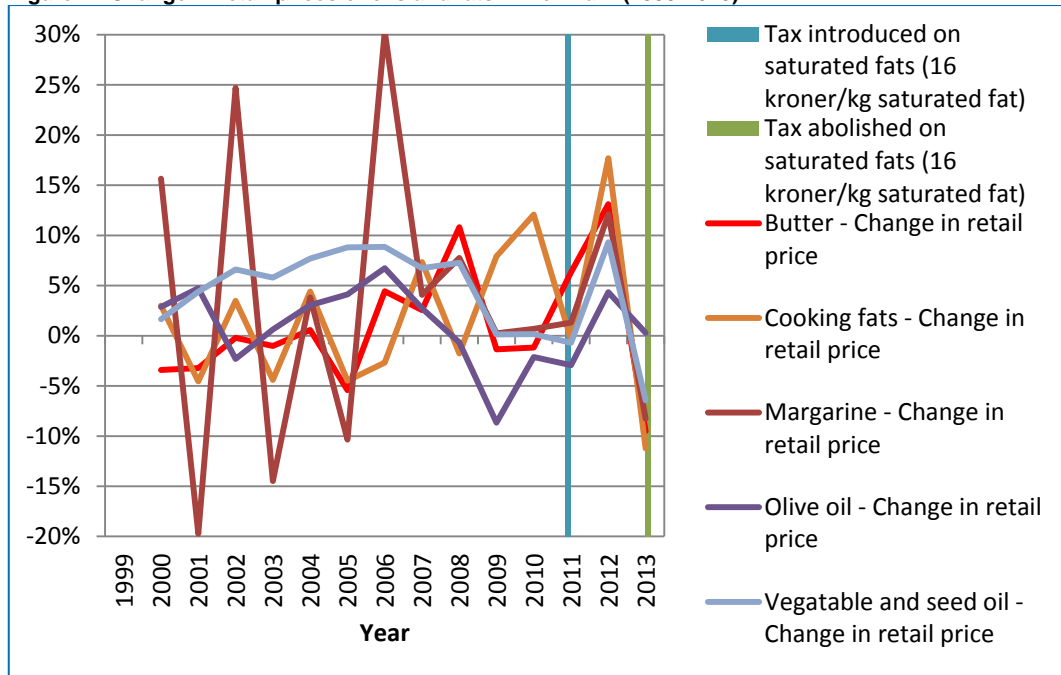
The profit margin for the retailer remains the same over the observed period for all products. All price changes from the manufacturer are directly transferred to the consumer.

**Figure 23 Retail prices of oils and fats in Denmark (1999-2013)**



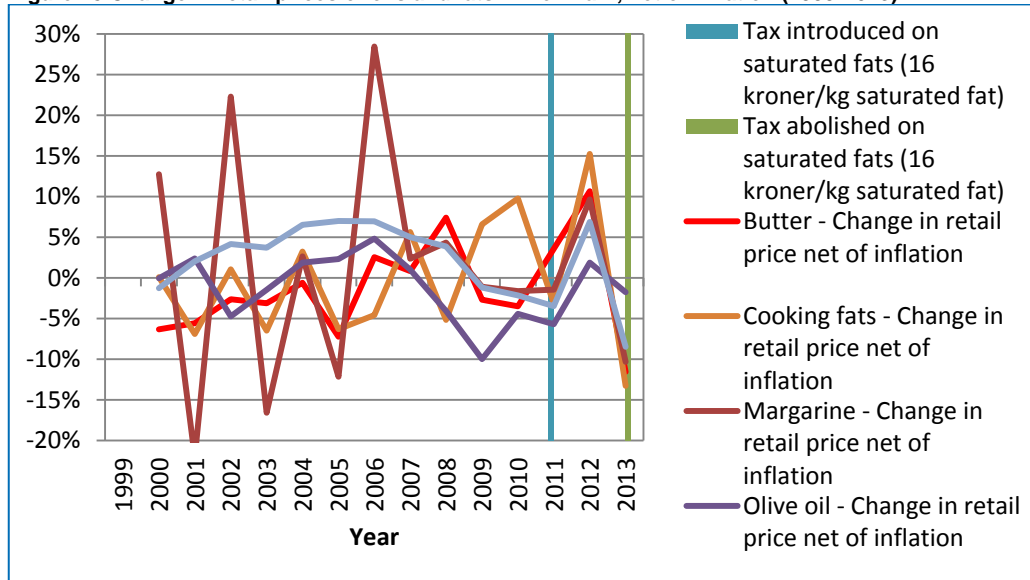
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 24 Change in retail prices of oils and fats in Denmark (1999-2013)**



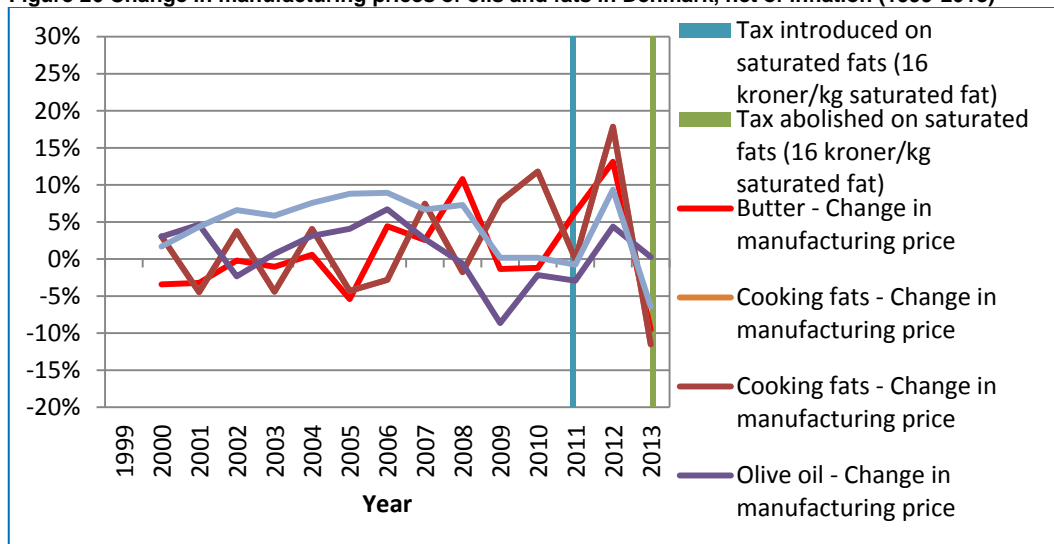
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 25 Change in retail prices of oils and fats in Denmark, net of inflation (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 26 Change in manufacturing prices of oils and fats in Denmark, net of inflation (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

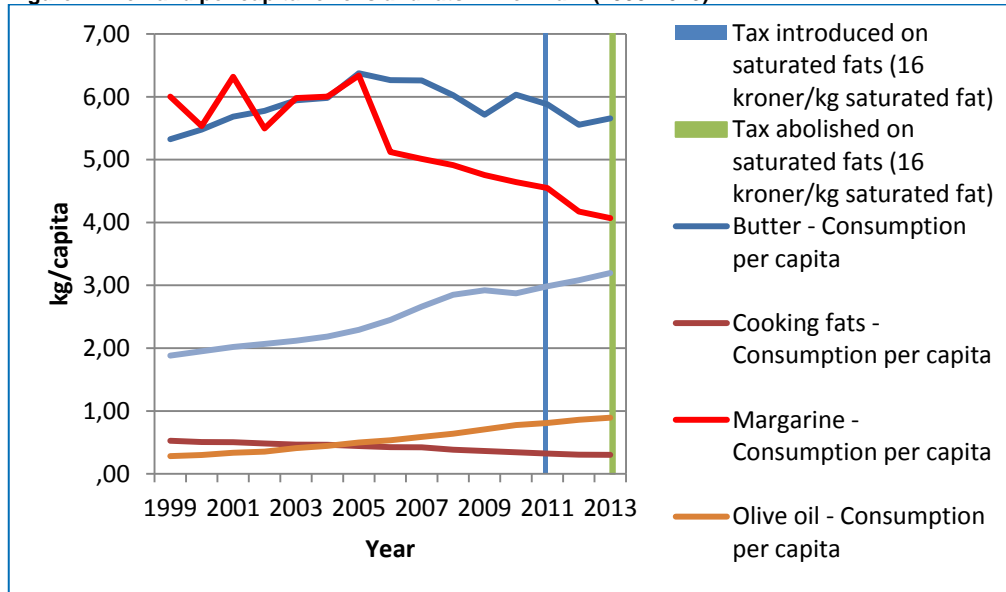
## Demand

In the demand for oil and fats, we see a clear distinction between the popularity of the various types of products under this category. Demand for butter, the most popular fat, is relatively stable, although a slight declining trend is visible in the last years. Margarine was also among the very popular products, but is rapidly losing ground to other types of oils and fats. It is quickly being replaced by vegetable and seed oil. Also olive oil is rapidly becoming more popular, although its market share is still low. Finally, the cooking fats were never consumed a lot, and are on a gliding path downward.

Following the introduction of the tax on saturated fats, only olive oil showed a larger increase in its consumption. The growth rate of vegetable and seed oil also remains relatively stable. All other oils and fats show either a continuing decline in demand or a sudden increased drop in demand.

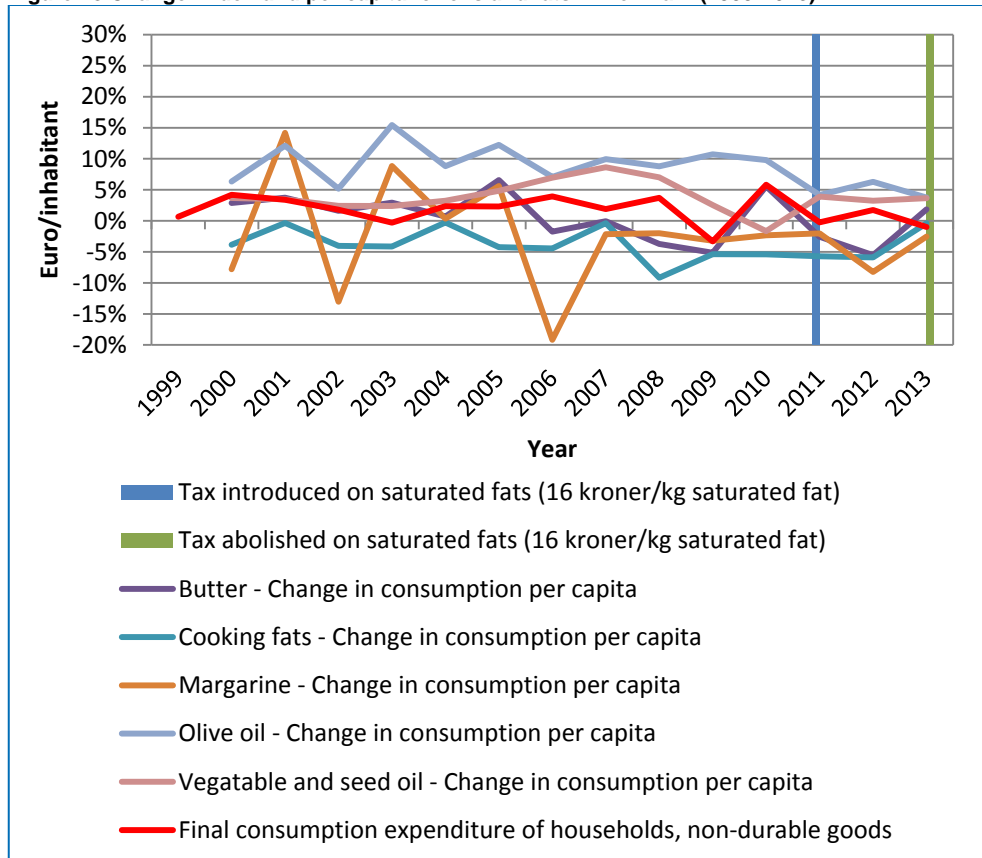
After the abolition of the tax in the beginning of 2013, the demand does not return to the pre-tax levels, but it does stabilize, although it may be too early to tell.

**Figure 27 Demand per capita for oils and fats in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 28 Change in demand per capita for oils and fats in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

### Market shares

The distribution in market share between the unknown, premium and non-premium brands varies over the different oils and fats. It ranges from almost 100% market share of non-premium brands (cooking fats), to a very large majority of the market being served by premium brands (spreadable oils and fats).

Over the observed period we see on average a small decrease in the market share of premium brands and an expansion of the market share of non-premium brands. These non-premium brands predominantly expand at the expense of the unclassifiable type of brands, and only marginally at the expense of premium brands.

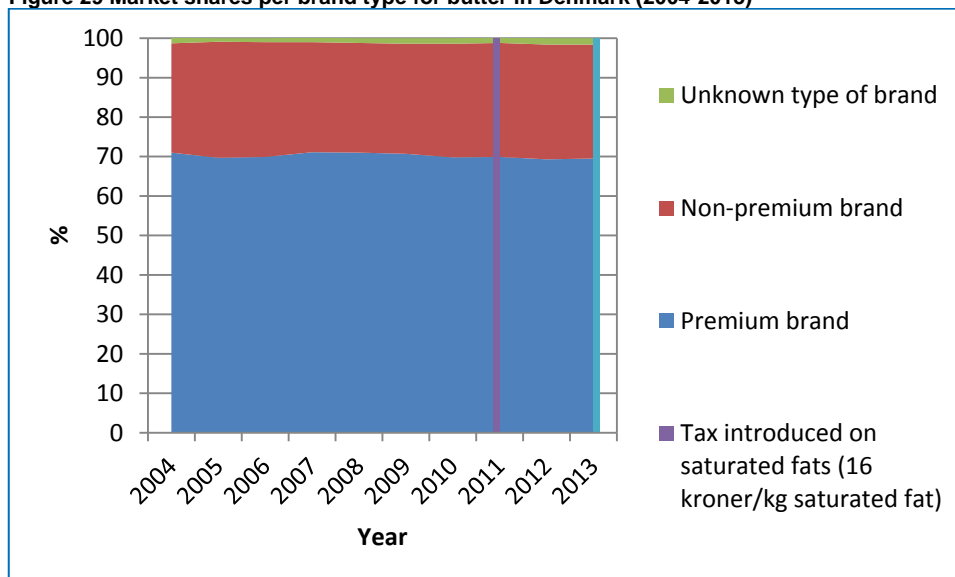
Following the tax introduction in 2011, this trend does not change, with some noteworthy exceptions: cooking fats and olive oils.

For cooking fats, in the two years after the introduction of the tax, the small market share of premium brands is almost completely erased in favour of the non-premium brands.

For olive oil we see a sharp increase in the non-premium brands' market share, directly after the introduction of the tax. This also corresponds to the sharp increase in the demand for olive oils. This effect may therefore be caused by "first-time" consumers, who are looking for a relatively inexpensive brand to "try" the product.

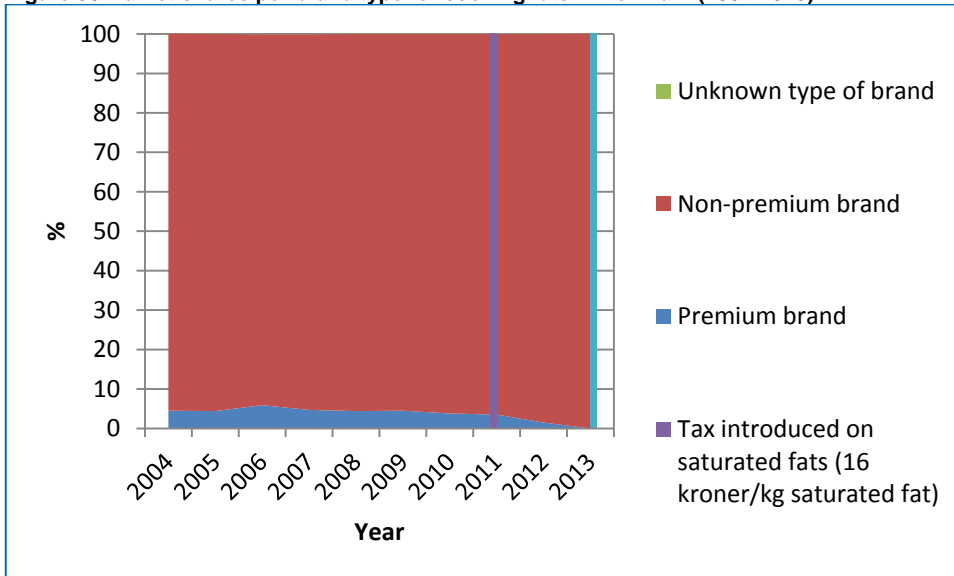
We were unable to observe the effects of the tax abolishment in 2013 due to lack of data.

**Figure 29 Market shares per brand type for butter in Denmark (2004-2013)**



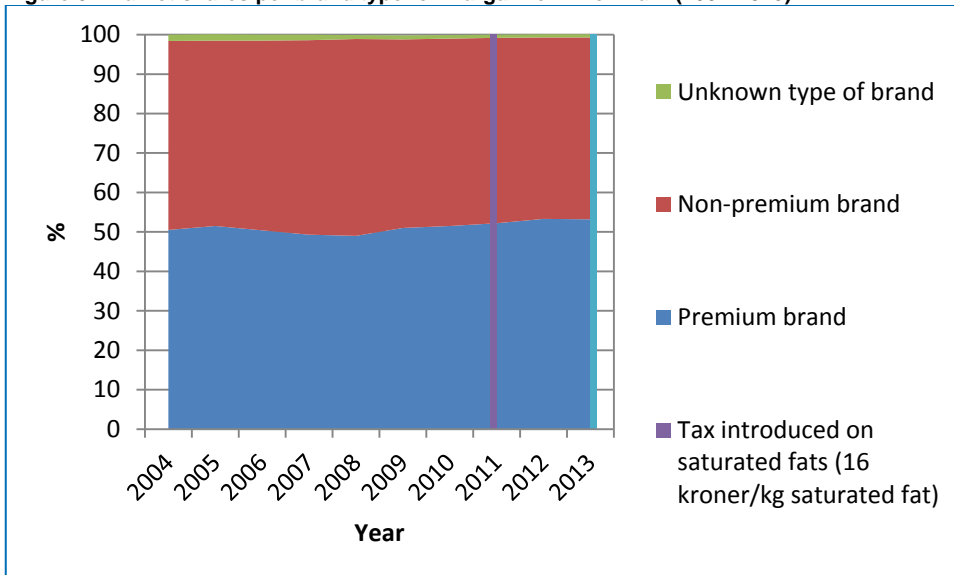
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 30 Market shares per brand type for cooking fats in Denmark (2004-2013)**



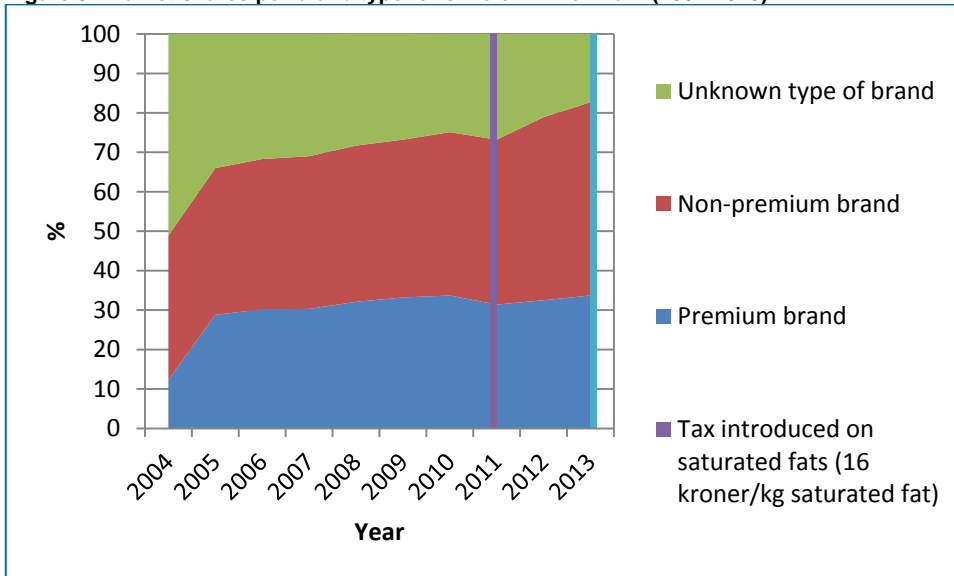
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 31 Market shares per brand type for margarine in Denmark (2004-2013)**



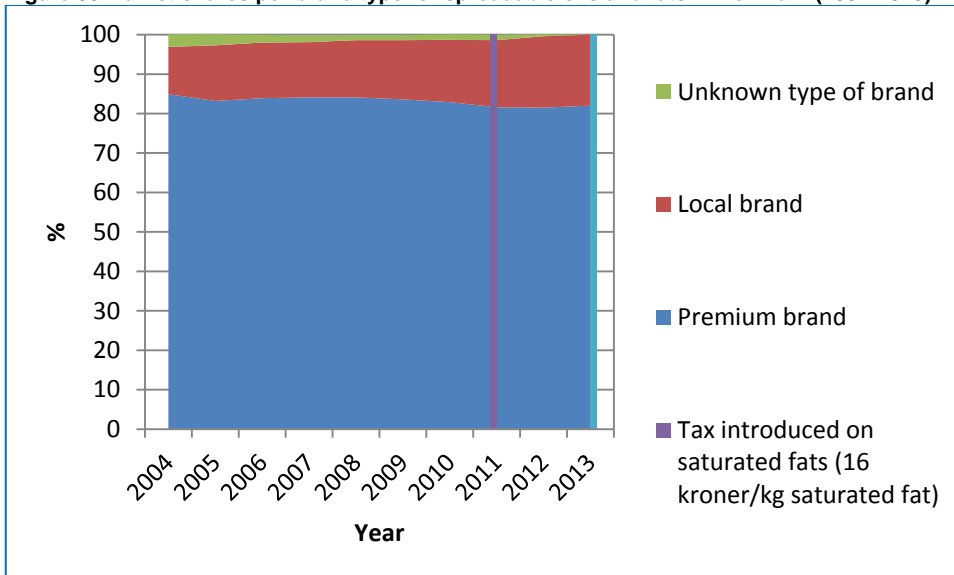
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 32 Market shares per brand type for olive oil in Denmark (2004-2013)**



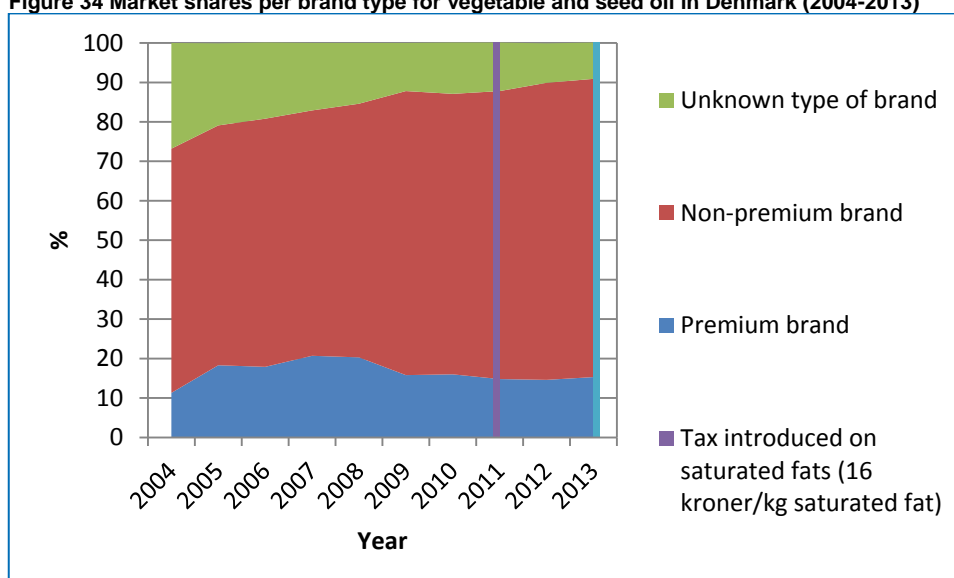
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 33 Market shares per brand type for spreadable oils and fats in Denmark (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 34 Market shares per brand type for vegetable and seed oil in Denmark (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

### Competitiveness

There is no data available on the industries that are affected by this tax.

### Consolidation of findings

The main findings of the data analyses on the tax on saturated fat are summarised in the table below.

**Table 9 Change in various measures corresponding to change in tax**

	Taxed oils and fats	Less-taxed oils and fats
Tax description	Tax introduced on saturated fat in October 2011. Abolished in January 2013. Investigated taxed products are butter, cooking fats and margarine.	Tax introduced on saturated fat in October 2011. Abolished in January 2013. Investigated less-taxed products are olive oil and vegetable and seed oil.
Price change	In 2012, the first full year with taxes, prices increased 13.1% for butter, 12.1% for margarine and 17.7% for cooking fats. In 2013, Prices decreased 9.5% for butter, 8.3% for margarine and 11.2% for cooking fats.	In 2012, price increased for olive oil with 4.3%, and with 9.3% for vegetable and seed oil. In 2013, prices for olive oil increased with 0.3%, and decreased with 6.4% for vegetable and seed oil.
Demand change	In line with price increases, demand decreased in 2012 by 5.5% for cooking oils, 5.5% for butter, and 8.2% for margarine. Demand decrease for cooking oils is in line with years before. In 2013, demand increased (1.9% for butter), or slowly further decreased (-0.4% to -2.5% for respectively cooking oils and margarine).	Demand increase in 2012 for olive oil (+6.3%) and for vegetable oils (+3.2%). In 2013 this trend continued with +3.8% demand increase for olive oil and +3.7% for vegetable oils. For olive oil, demand seem to reinforced in 2012, while going back to the original growth path in 2013. For vegetable oil demand increased less than in other years in 2012.
Demand shift to lower segment	Only changes for cooking oils, where premium brands have virtually no market share left after the tax introduction.	Large expansion of the market share of non-premium brands for the olive oil products at the expense of the unclassifiable brands. No other changes are observed.



	Taxed oils and fats	Less-taxed oils and fats
Demand shift to non-taxed product	Shift to the use of olive oil is visible, reinforcing a previous trend with increasing demand for olive oil and vegetable oils.	
Employment	No information available	
Labour productivity	No information available	
Profit margin retailers	No change in the retailers margin visible in the data.	
Value added of manufacturers	No information available	
Investments	No information available	
Trade flows	No information available	

We see a correlation between the introduction, respectively abolition of the tax on saturated fat and pricing of oils and fats. When the tax is introduced, we see a sharp spike in the prices of all oils and fats, with the exception of olive oil. Consequently, following the abolition of the tax, we see a decline in the prices of all oils and fats, again with the exception of olive oil.

Corresponding to the change in prices, we see a drop in demand when the prices of oils and fats increase. Visa versa when the prices decreases. Interesting to note however is that the demand did not return to pre-tax levels.

We see a clear shift from the taxed products to the less-taxed products olive oil and vegetable and seed oil. To a large extend this trend was already occurring in previous years, although at the time of the tax introduction, this trend seem to be reinforced.

In this interpretation, is vegetable and seed oil an interesting exception. This oil is known for its low fat characteristics, as is olive oil. This may explain why demand for this type of oil continues to increase, despite its relative large price increase: consumers are looking for a non-taxed alternative, and assume that this type of oil is not taxed.

Data limitations also do not allow us to measure any long-term effects of the tax increases, nor the (long-term) competitiveness effects.

#### Tax on soft drinks and juices – Denmark

In the 1930s Denmark introduced a tax on soft drinks and juices. Over the observed period in our dataset, substantial and numerous changes have been made to the regime. In 2001, the tax rate on soft drinks was increased from DKK1 to DKK 1.65 per litre of soft drink. However, already in 2003 and consequently in 2007, the tax rate was lowered again to respectively DKK1.15 and DKK0.91.

In November 2010, the tax regime was substantially altered. For the first time, a distinction was made between sugar-sweetened soft drinks and sweetener-based soft drinks. For the sugar-sweetened soft drinks (with technical sugar threshold  $\geq 0.5\text{g}/100\text{ml}$ ), a standard rate of DKK1.08 per litre was applied. For sweetener-based soft drinks and juices a reduced rate of the DKK 0.57 per litre was applied for light and sugar reduced soft drinks that contain less than 0,5g of sugar per 100 ml.

In 2012, the rate for sugared soft drinks was increased to DKK1.58. The rate for other beverages remained the same. In the beginning of 2013, the rates were indexed to DKK1.64 per litre for products with a content of sugar above 0.5g/100 mltr and DKK 0.59 per litre for products with a content of sugar below 0.5g/100 mltr.

As from July 2013, the tax was reduced by 50%, and fully abolished from January 2014.

#### *Data analysis*

We investigate the effects of the changes in tax rate by looking at the product types of cola and juices. Both these product types have sugar free or low-on-sugar beverages (low calorie cola and juices) and sugar sweetened beverages (regular cola and nectar and juice drinks).

#### **Prices – Cola**

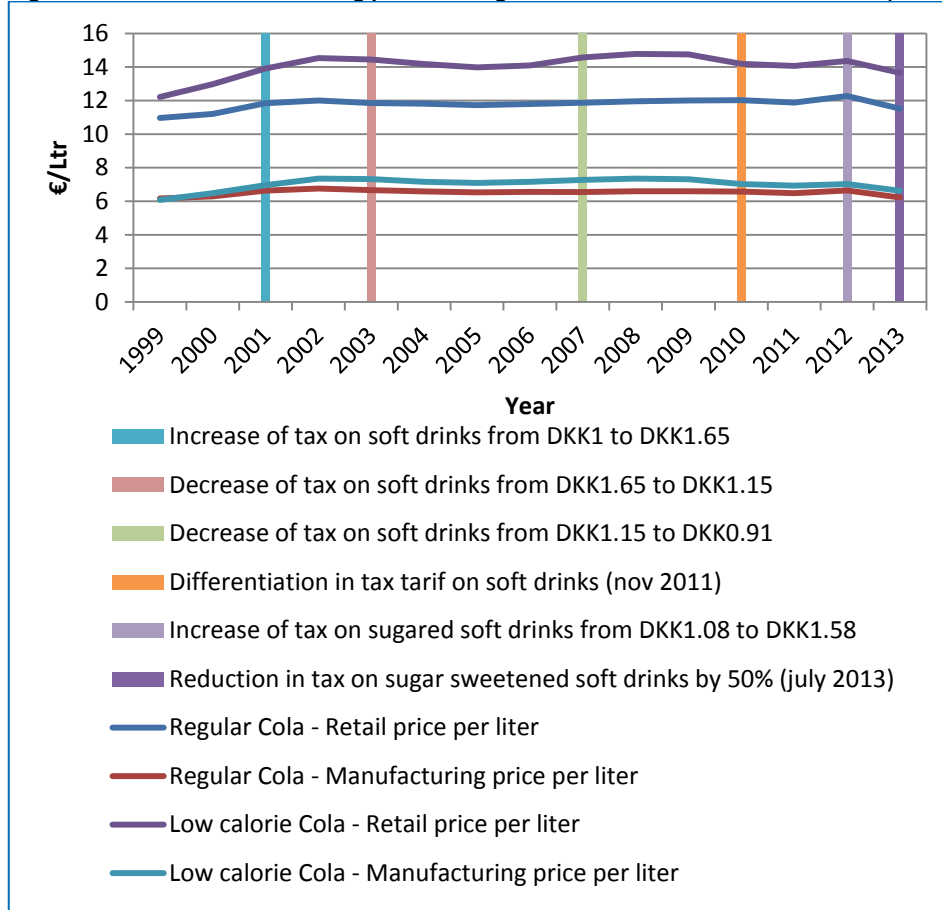
Between 1999 and 2001, the retail prices of low calorie cola rose from around DKK 12 per litre to around DKK 14. In 2001, when the tax rate was increased by 65%, the prices rose by 6-7% compared to the year before suggesting that the tax is not fully passed to the consumers. A similar pattern is visible for the regular cola, although price increases between 1999 and 2001 were less pronounced for this beverage.

Prices seem to react in line with the tax changes. When taxes are increased, prices increase. When taxes are decreased, prices also decrease.

It is interesting to note that the price development of regular cola, closely follows the price development of low calorie cola. This includes the period when the tax was reduced. Although the tax should presumably have the largest effect on prices of regular cola, also the prices of low calorie cola decreased by around 5%, which is only marginally less than regular cola.

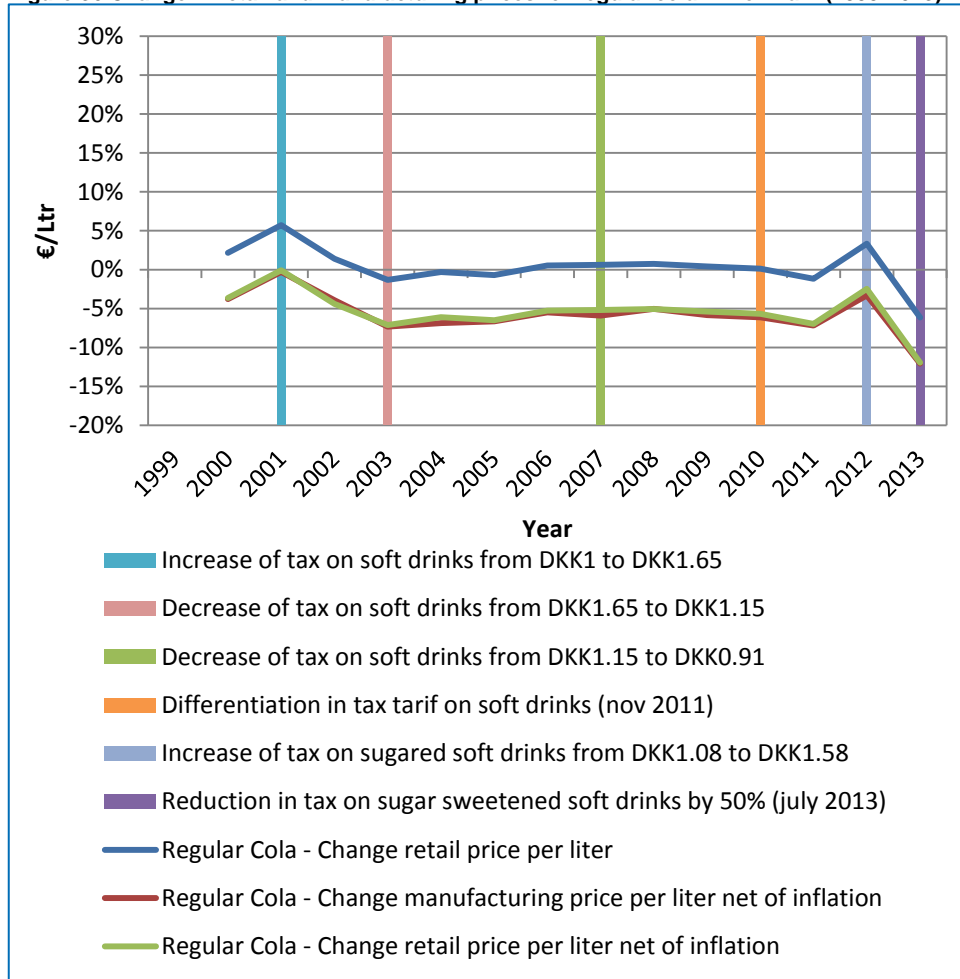
The retailers margin has remained relatively stable throughout the observed period. However, in 2004, 2007 and 2012, the retailers were able to charge higher prices to consumers, without being prompted by manufacturing prices, effectively increasing their margin. The latter two margin increases by retailers (2007 and 2012) occurred in the same years as a tax change was implemented. The increase in retailer margins in 2004 does not coincide with a tax change in that same year, although a tax change did occur in 2003.

Figure 35 Retail and manufacturing prices for regular and low-calorie cola in Denmark (1999-2013)



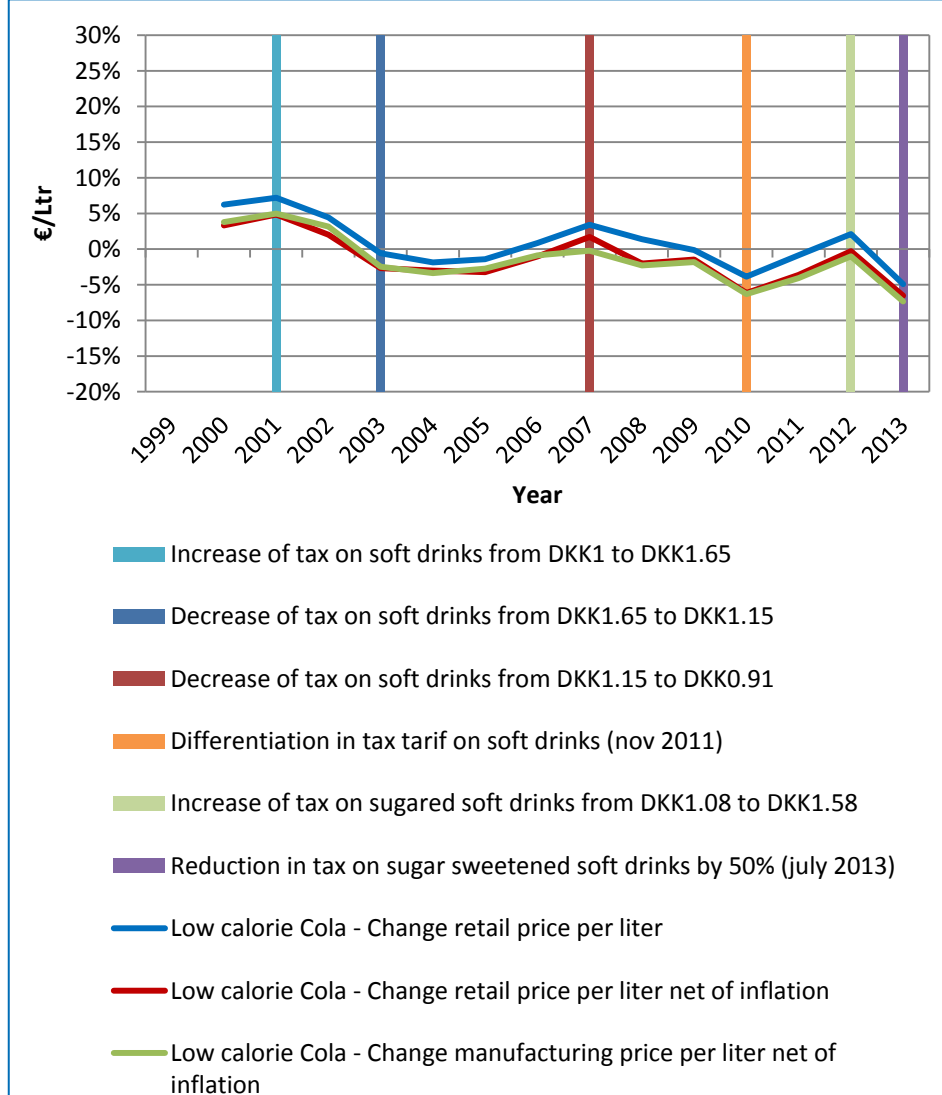
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 36 Change in retail and manufacturing prices for regular cola in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 37 Change in retail and manufacturing prices for low-calorie cola in Denmark (1999-2013)**



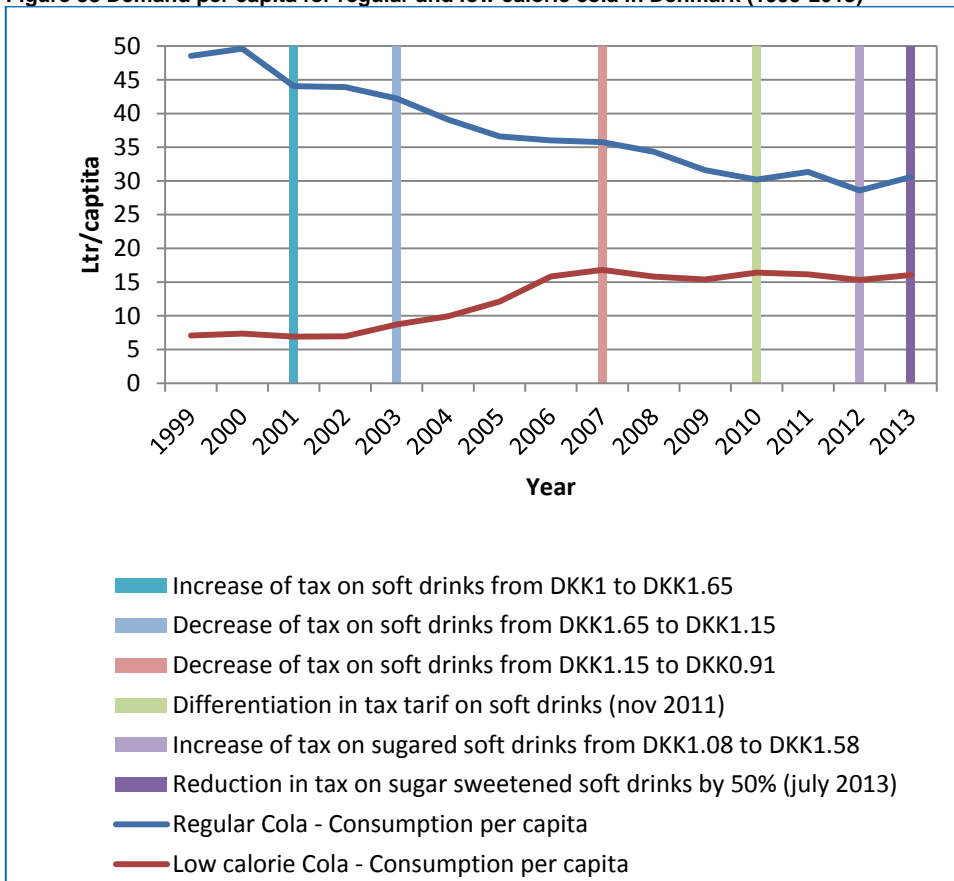
Source: Ecorys based on data from Euromonitor/Passport.

**Demand cola**

Over the observed period, we see a decline in the consumption of cola by consumers. Whereas in 2001 an average consumer drank almost 50 litres of regular cola a year, this has decreased to around 30 litres a year. Between 2003 and 2007, this reduction involves mostly a substitution effect of consumers switching from regular cola to low calorie cola. However, as from 2007, the demand for low calorie cola has stagnated at the level of around 15 litres per capita a year, while the demand for regular cola continued to decrease.

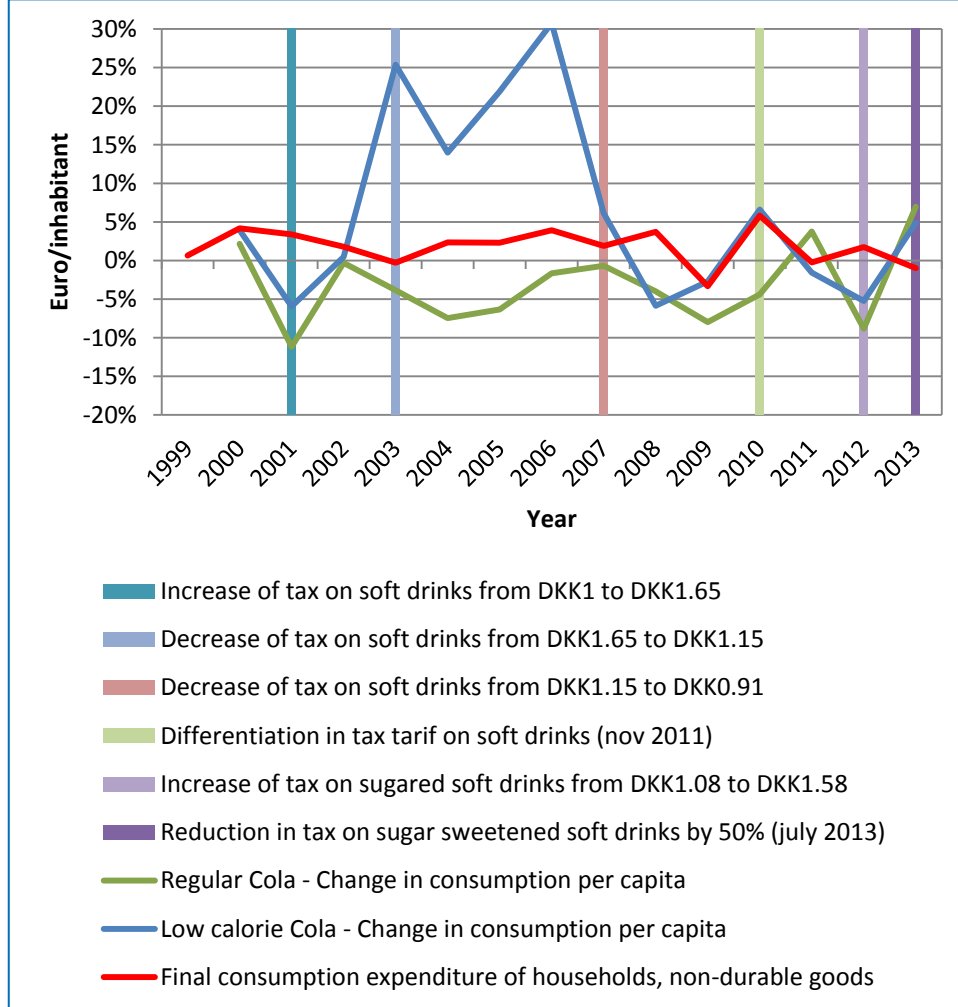
Following the tax increases, we see a reduction in demand. On the other hand, when the tax is decreased, the demand is increased. However, looking at the volatility, it is hard to interpret and attribute all these changes in demand to tax changes. For instance in 2005 and 2006, there were no change in the tax regime, but there were significant increases in the demand for low calorie cola.

Figure 38 Demand per capita for regular and low calorie cola in Denmark (1999-2013)



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 39 Change in demand per capita for regular and low calorie cola in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

### Market shares – Cola

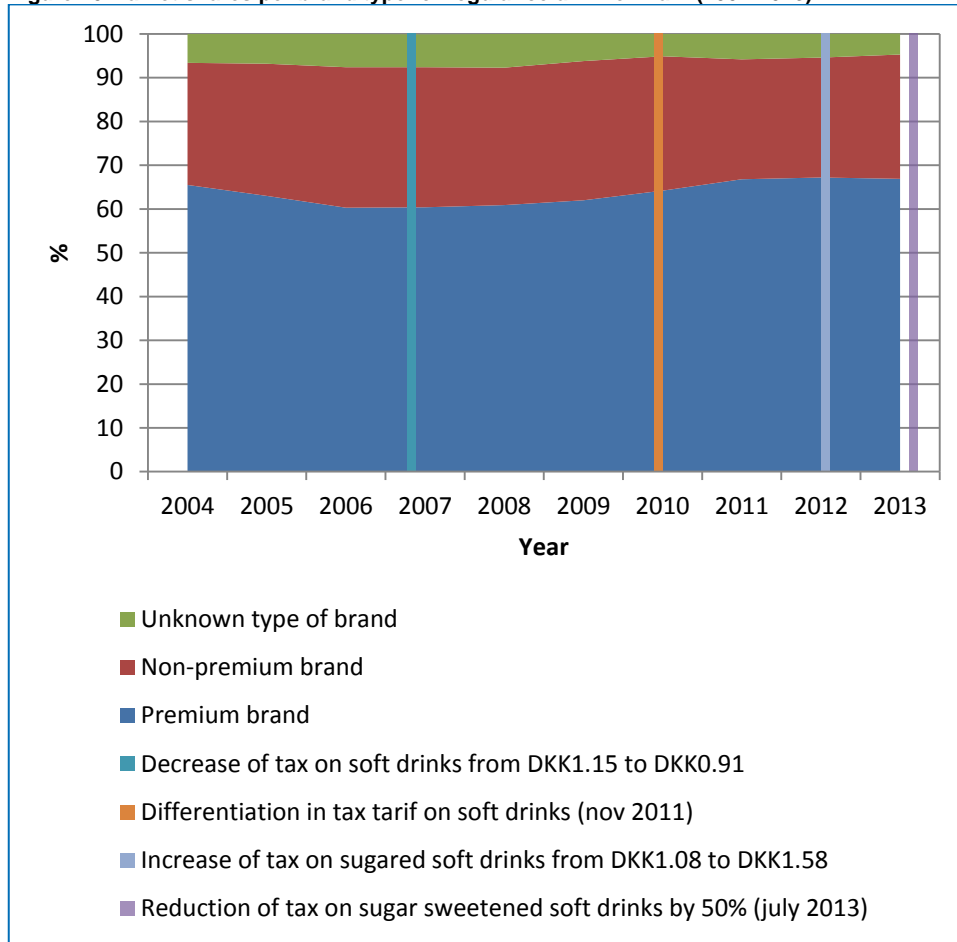
The market for cola, both regular and low-calorie is dominated by premium brands. For the regular cola, between 60 and 70% of the market is served by premium brands, whereas for low calorie cola the market share is between 70 and 80% for premium brands.

Over the observed period, we see a small increase for both type of beverages for the premium brands at the expense of the non-premium brands. For instance for regular cola, we observe the largest market share for non-premium brands in 2006 of 32.1%. This market share deteriorates to 27.4% in 2012. In 2013 we observe a small increase again.

For low calorie cola we see a similar pattern with non-premium brands constituting 27.7% of the market in 2006, and only 20.9% in 2013.

For these beverages, it is hard to observe the effect of any of the tax changes. All the changes that did occur, did not follow in a consistent manner from the change in the tax.

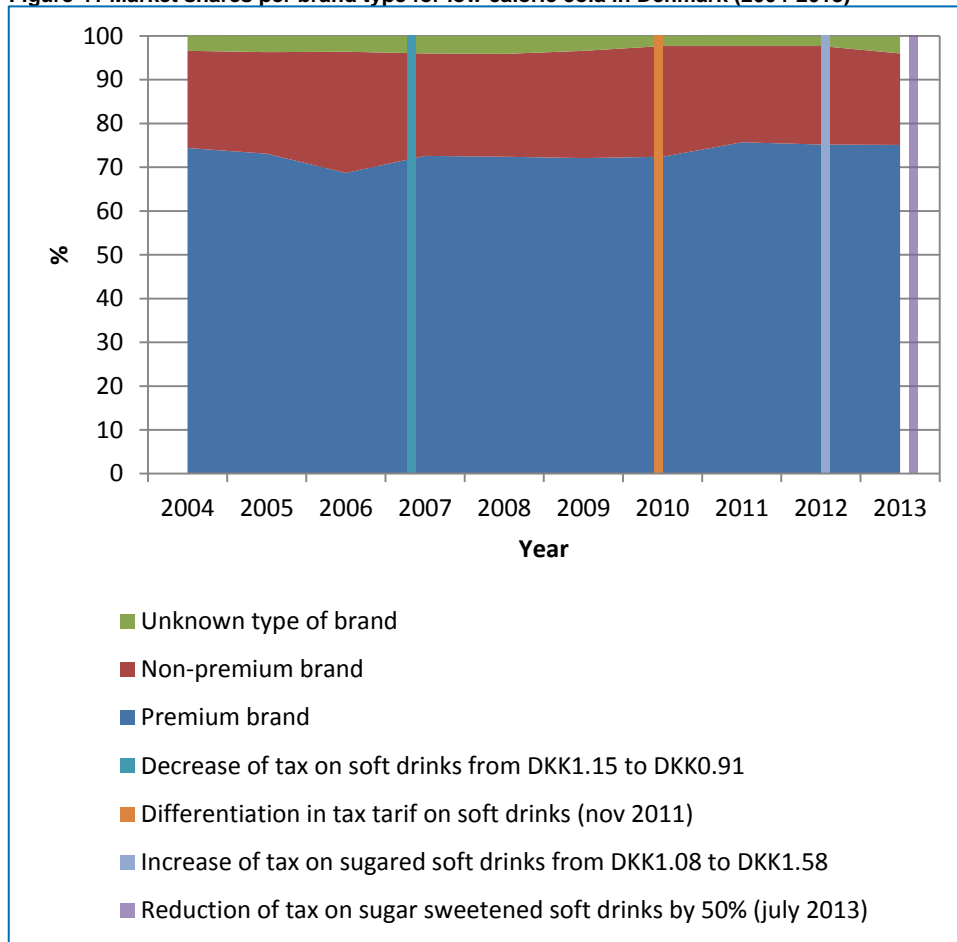
Figure 40 Market shares per brand type for regular cola in Denmark (2004-2013)



Source: Ecorys based on data from Euromonitor/Passport.



**Figure 41 Market shares per brand type for low calorie cola in Denmark (2004-2013)**



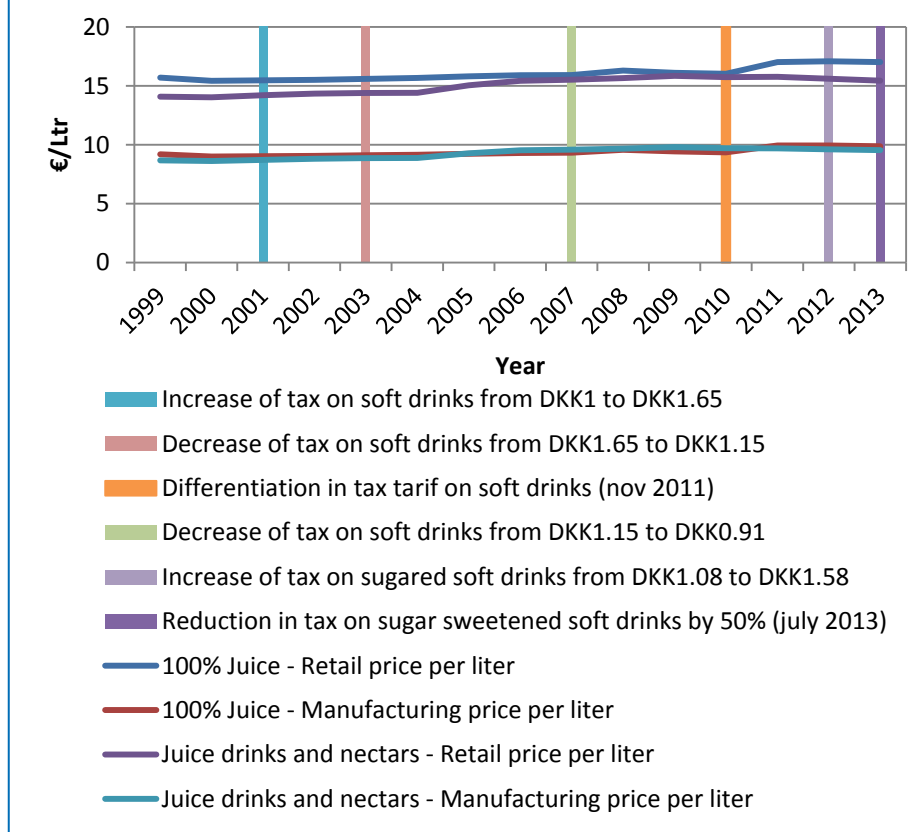
Source: Ecorys based on data from Euromonitor/Passport.

### Prices – Juices

Juices can be distinguished by 100% natural juices and those partially containing natural juices (juice drinks and nectars). Although manufacturing prices for both are very similar, retail prices are not. Retailers realise a higher margin for 100% juices than for the drinks and nectars. Nevertheless, retailers are closely following the changes in the manufacturing prices when they set their own prices.

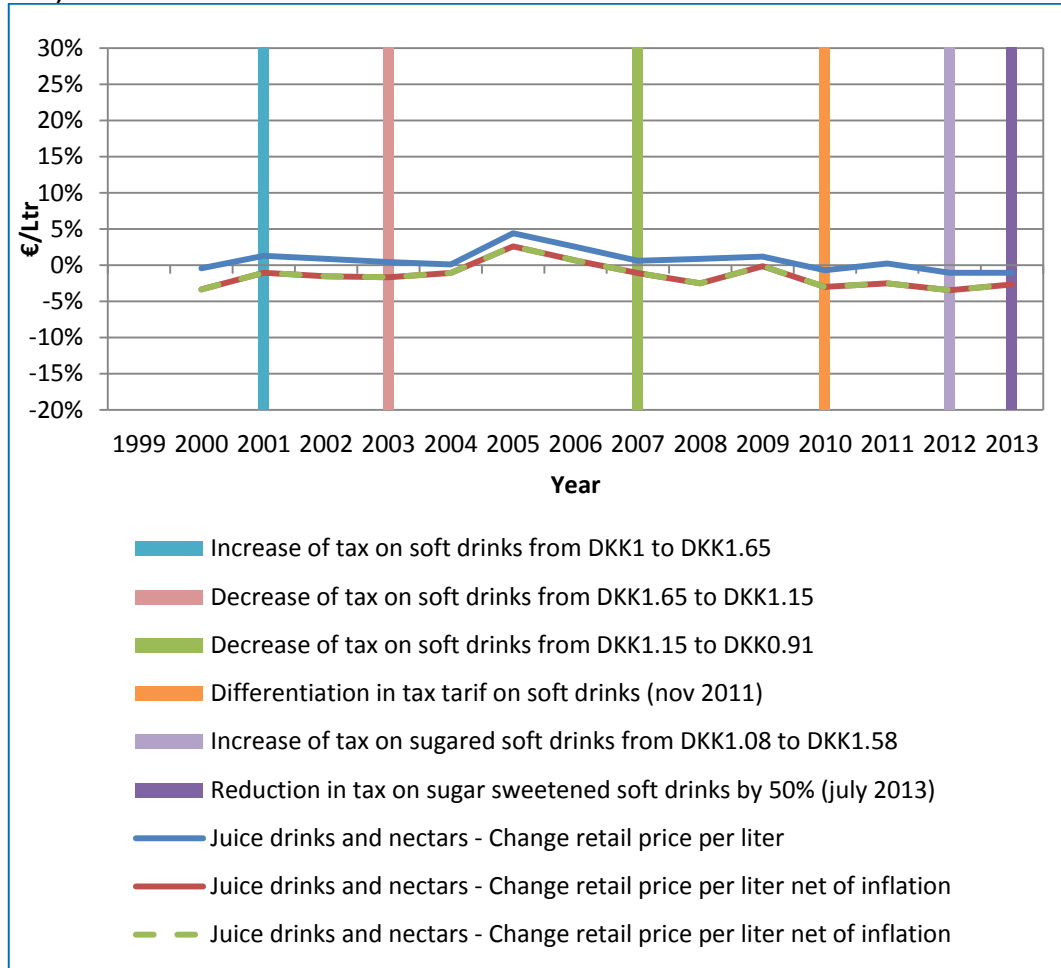
The volatility of the market prices seems to move separately from any of the tax changes. Prices moved around 0% over the observed period. In the years of tax changes, this figure did not change much compared to the average. On the other hand, there are years in which prices were significantly adjusted, but no tax change has occurred. This makes it more likely that other factors contribute to the price decline, rather than the tax reduction. Other factors may for instance be a reduction in the input prices, or changing bargaining positions.

Figure 42 Retail and manufacturing prices of various types of juices in Denmark (1999-2013)



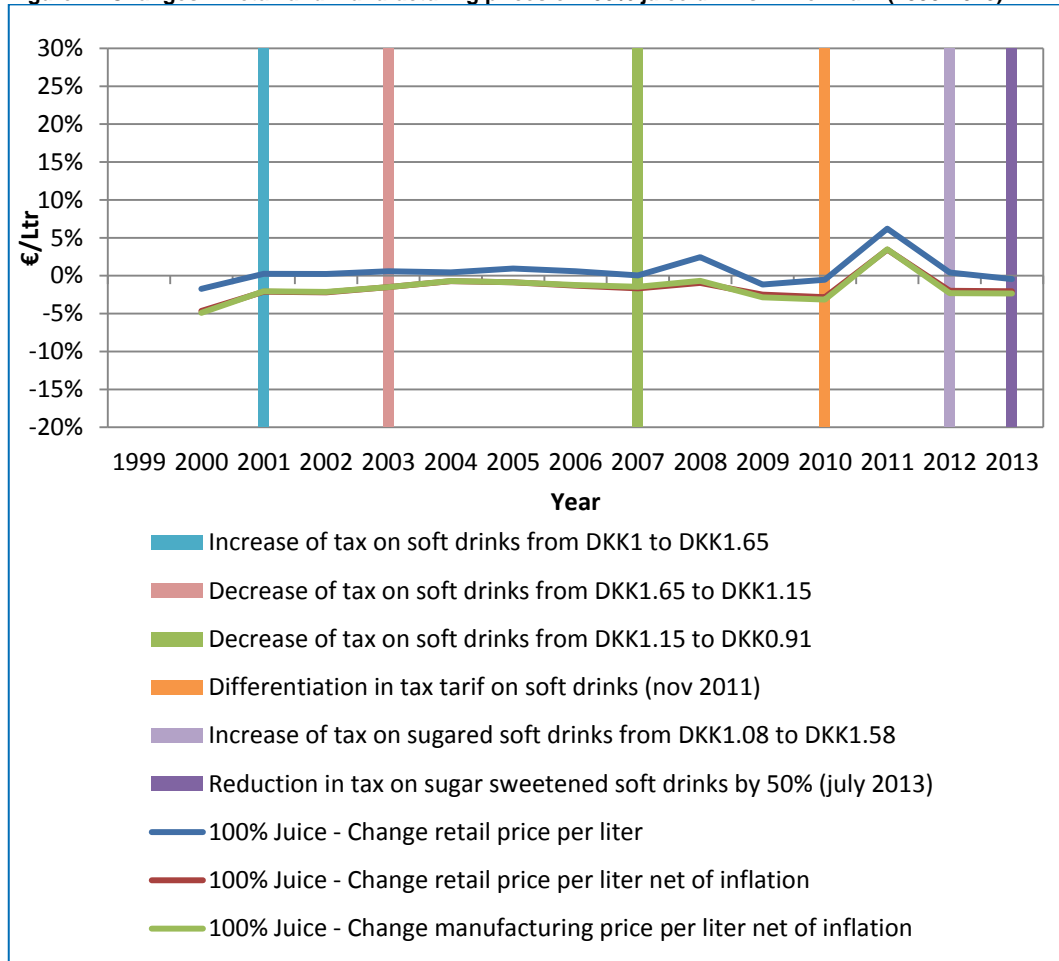
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 43 Changes in retail and manufacturing prices of juice drinks and nectars in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 44 Changes in retail and manufacturing prices of 100% juice drinks in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

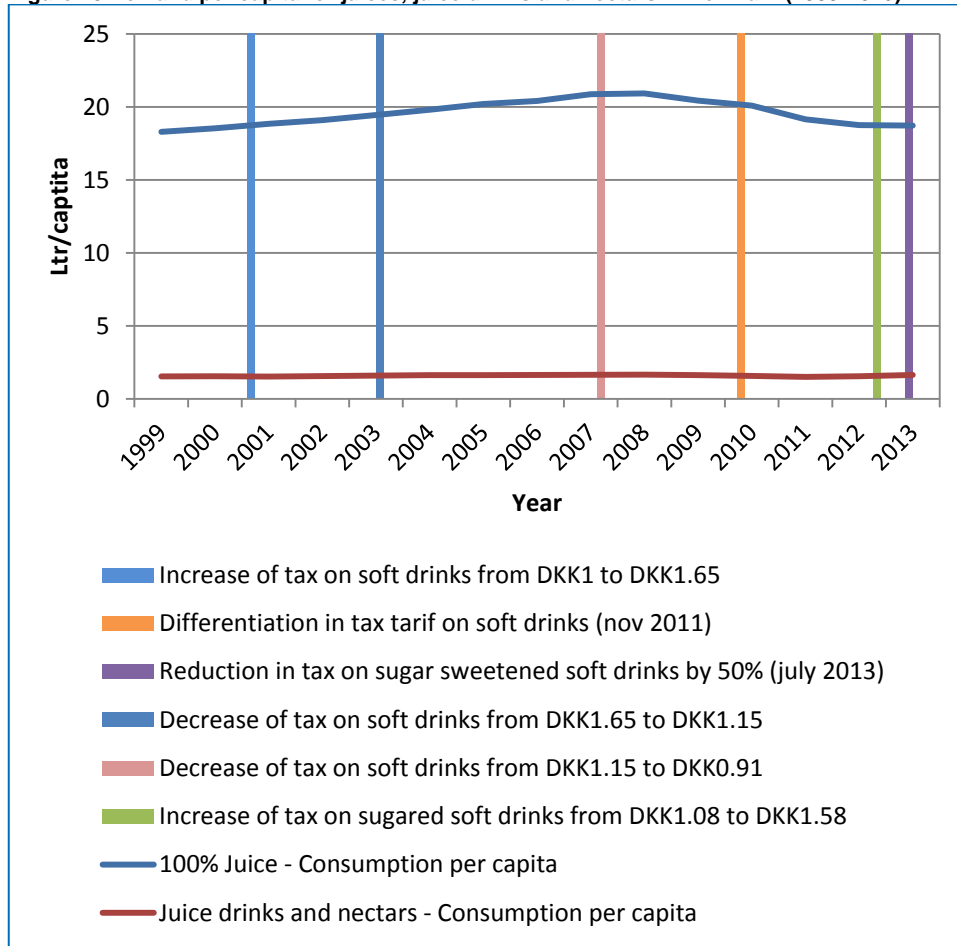
### Demand – Juices

The demand for juices has remained stable over the past 14 years. On average, a consumer drinks around 20 litres a year of 100% juices, and around 2 litres of partial juices.

Demand for 100% juice and other juice types seem to change at the same pace. In the last years, demand for 100% juices seems to be declining with around 2% per year. For juice drinks and nectars, before 2011, the same trend seems to be occurring. However, with the introduction of the tax tariff differentiation in 2010, less than 100% juice drinks seem to profit, and manages to increase the demand for the beverages.

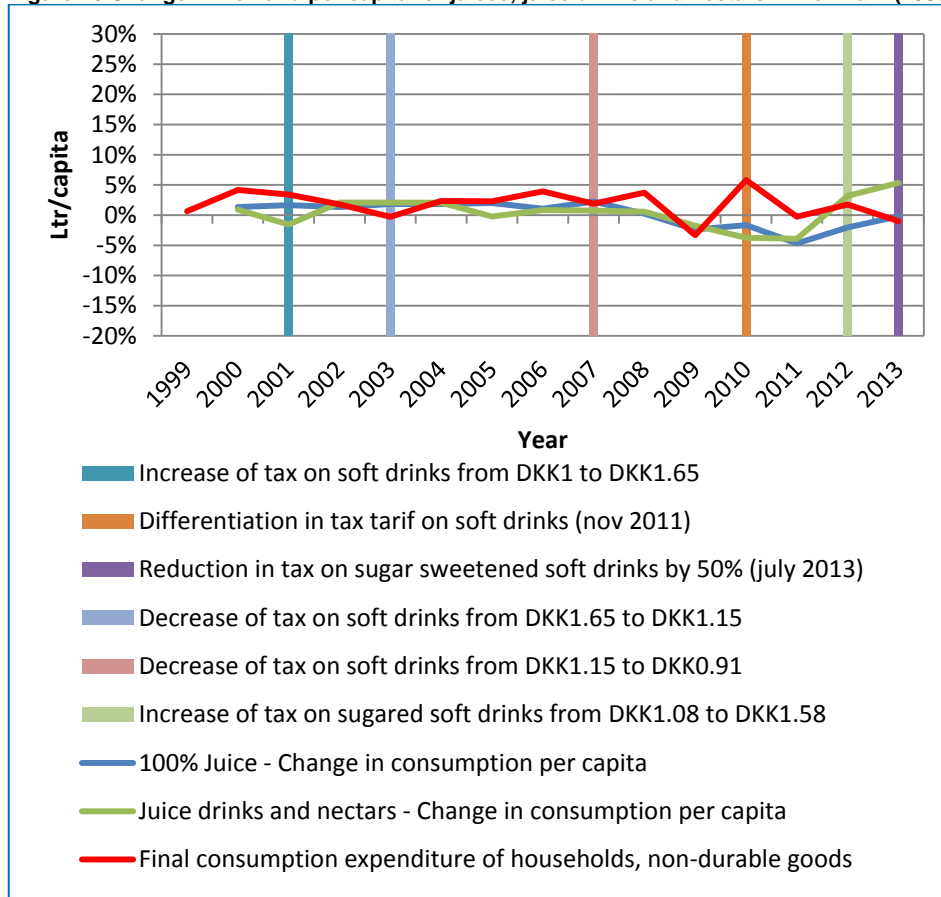
Demand does not seem to change in the years with tax changes compared to the years without tax changes.

Figure 45 Demand per capita for juices, juice drinks and nectars in Denmark (1999-2013)



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 46 Change in Demand per capita for juices, juice drinks and nectars in Denmark (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

### Market shares – Juices

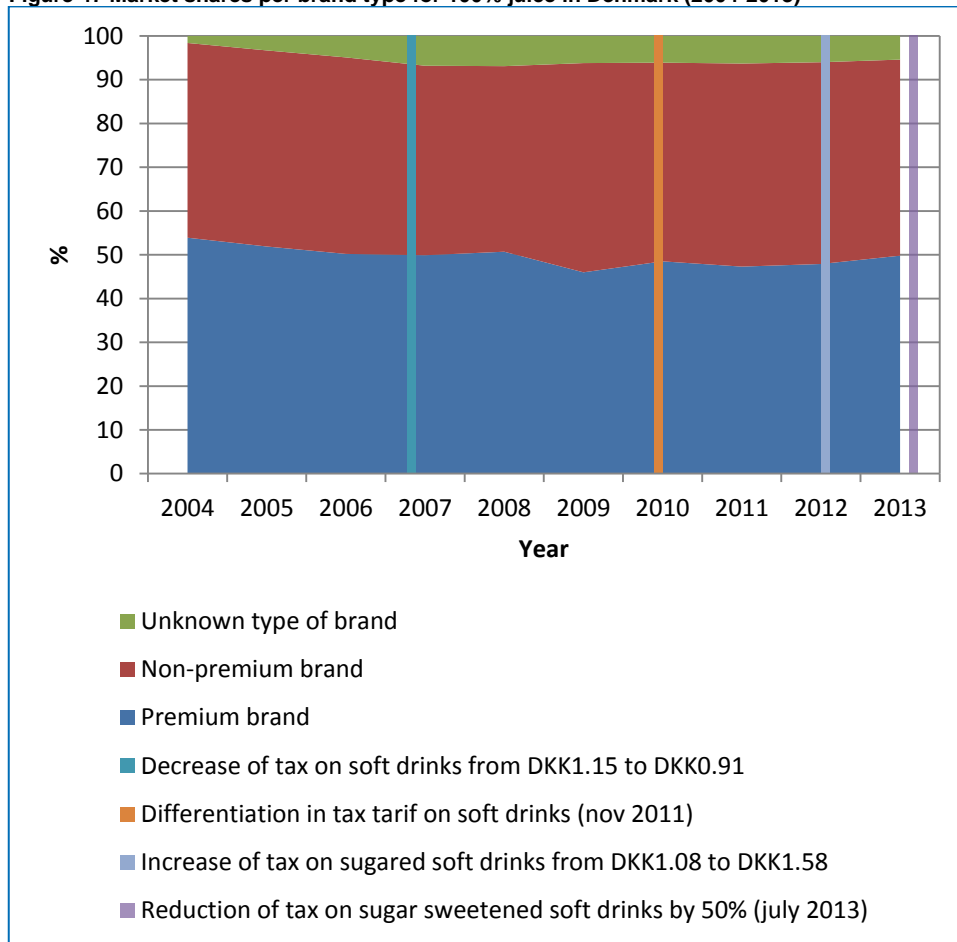
For the market shares for the brand types, we see three different patterns for the three different type of juices. For the 100% juices, we observe around 50% market share for the premium brands, and around 45% for the non-premium brands. This percentage has remained relatively stable, except for the increasing market share of unclassifiable brands. In the last years, we also see an increase in the market share of premium brands, partially reversing the decline in market share from the 2004-2009 period.

On the other hand, for nectars, we see the non-premium brands dominating the market with a market share of 74% in 2013. This is a steep increase compared to the 38% market share in 2004. This increase goes to a large extent at the expense of the premium brands, that constituted in 2005 almost 50% of the market, and slightly over 10% in 2013.

Finally, the market for juice drinks shows a third pattern, with a large majority of the market being supplied by premium brands. The non-premium brands constitute only a marginal role, and this role has been steadily decreasing over the observed period.

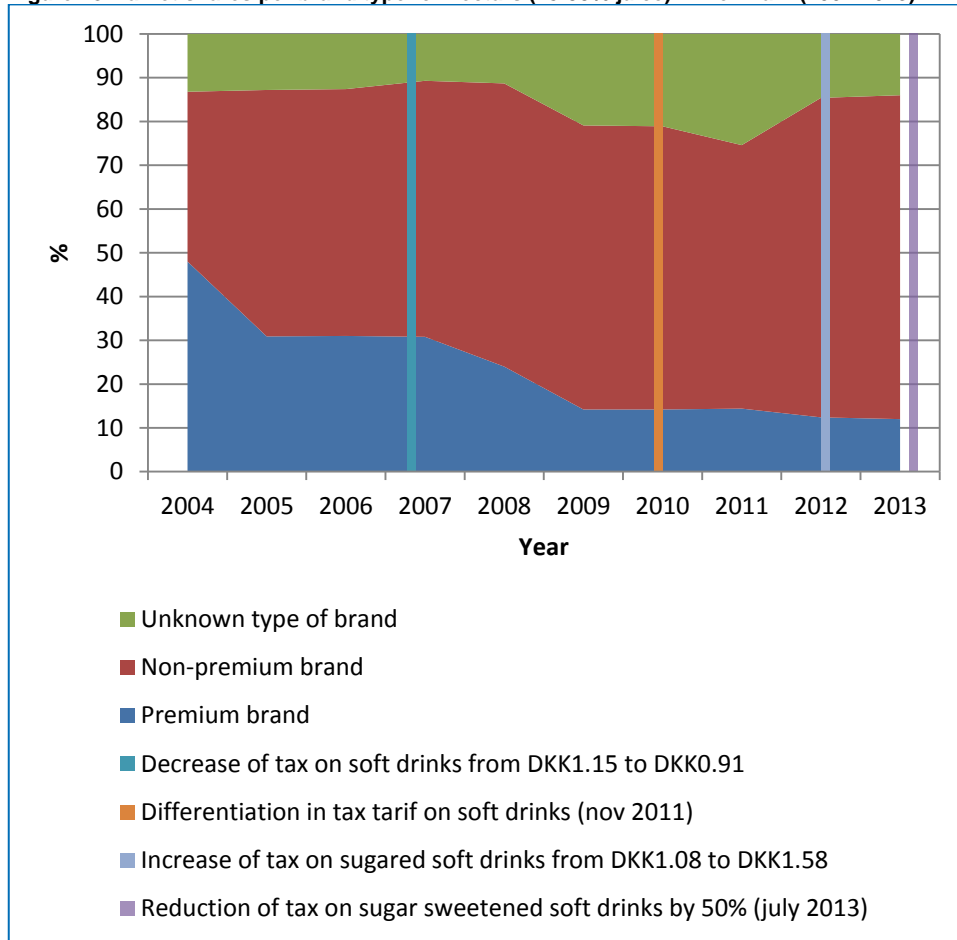
Following the tax changes, we see no consistent picture in the market shares of the brand types. In general, the trend before the tax change is continued.

Figure 47 Market shares per brand type for 100% juice in Denmark (2004-2013)



Source: Ecorys based on data from Euromonitor/Passport.

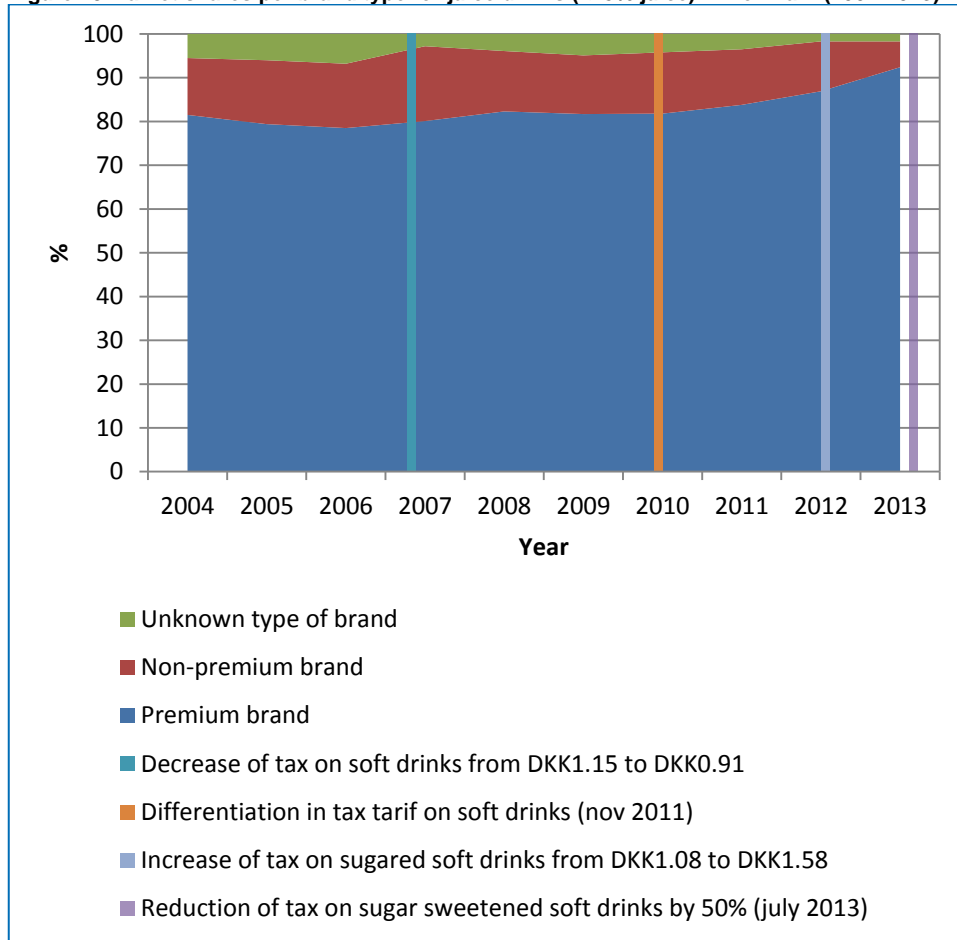
Figure 48 Market shares per brand type for nectars (25-99% juice) in Denmark (2004-2013)



Source: Ecorys based on data from Euromonitor/Passport.



**Figure 49 Market shares per brand type for juice drinks (<25% juice) in Denmark (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

### Competitiveness

Due to the fact that the changes in the tax rate are very recent, there are no data available to investigate the competitiveness position of the manufacturers of sugar sweetened soft drinks.

### Consolidation of findings

The main findings of the data analyses on the tax on sugar sweetened soft drinks in the table below.

**Table 10 Change in various measures corresponding to change in tax**

	Cola	Juices
Tax description	Tax on soft drinks: 2001: tax increased from DKK1.00 to DKK 1.65. 2003: Tax decreased to DKK1.15 2007: Tax decreased to DKK0.91 2010: Tax differentiated: sugared to DKK1.08. non-sugared to DKK 0.57 2012: Tax increased sugared to DKK 1.58 2013: Tax indexed to DKK1.64 for sugared products and DKK0.59 for non-sugared July 2013: Tax for sugared and non-sugared reduced by 50% 2014: full abolishing	Tax on soft drinks: 2001: tax increased from DKK1.00 to DKK 1.65. 2003: Tax decreased to DKK1.15 2007: Tax decreased to DKK0.91 2010: Tax differentiated: sugared to DKK1.08. non-sugared to DKK 0.57 2012: Tax increased sugared to DKK 1.58 2013: Tax indexed to DKK1.64 for sugared products and DKK0.59 for non-sugared July 2013: Tax for sugared and non-sugared reduced by 50% 2014: full abolishing

	Cola	Juices
Price change	When taxes increased, or decreased, prices respectively increase or decrease. Prices changed out of the ordinary trend.	No changes visible from the trend in pricing behaviour in years of tax change.
Demand change	Demand changed out of the ordinary trend upon the changes in tax, decreasing following tax increases and increasing following tax reductions.	No changes visible from the trend in demand in the first years of observations. Afterwards a reversed effect than expected with increasing demand for more-taxed products after tax reduction.
Demand shift to lower segment	Not visible in data compared to other years.	Not visible in data compared to other years.
Demand shift to non-taxed product	To a limited extent shift to low-calorie cola, but due to trend in previous years may not be attributable to tax.	Shift in the latest years to more-taxed product, which is only after tax increase of sugared product. Trend continues after reduction of tax.
Employment	No information available.	
Labour productivity	No information available.	
Profit margin retailers	No change visible in the year of tax reduction.	Virtually no change visible in the year of tax reduction.
Value added of manufacturers	No information available.	
Investments	No information available.	
Trade flows	No information available.	

The many tax changes makes it very hard to establish a general trend how the market would have behaved without the taxes. Thus a benchmark is lacking. Nevertheless, we do observe some interesting patterns in the data, but those should be interpreted with more caution than usual.

In the analyses we distinguish between cola and juices. For juices it is noteworthy that we see virtually no change in the pricing behaviour, also not when tax tariffs are changed or not. However, we do see a change in the demand in the latest years, when the tariff is differentiated between sugared beverages and non-sugared beverages. In those later years, the less taxed products are decreasing their market share, while the taxed products are seeing an increasing demand. Thus for juices, the expected changes are not occurring, rather, the reverse seem to be true.

For cola, the patterns are as predicted. When taxes are increased, or decreased, prices respectively increase or decrease. This has its consequences for the demand, which is also reacting as expected.

Other anticipated effects, such as change to lower-priced segment are not occurring as predicted, or are hard to attribute to changes in taxes.

In terms of competitiveness of the soft drinks sector in Denmark, we can only analyse the effect on the retail margin. It is clear from the data that for cola, in general, retailers manage to increase their margin every time the tax is increased. In other cases prices follow the manufacturing price. Other insights on competitiveness are not available.

Data limitations do not allow us to measure any long-term effects of the tax increases, nor the (long-term) competitiveness effects.

### Tax on confectionery, chocolate and ice cream – Finland

In 1999 Finland abolished its tax on sweets (confectionery and chocolate), but reintroduced it again in 2011 (with the addition of ice cream as a new taxable category) in order to raise revenue and promote consumer health. Initially, the tax on sweets was set in 2011 at €0.75/kg. In 2012, the tax was raised to €0.95/kg.

In addition to this tax, Finland also has a tax on soft drinks, including all soft drinks that are ready-to-drink as well as bottled water, active since 1940. In 2011, the tax on soft drinks was combined with the reintroduced tax on sweets to form one tax; *Excise duty on sweets, ice-cream and soft drinks*.

The data analysis on soft drinks is presented subsequent to the data analysis on confectionery and ice cream. We use the term “sweets tax” or “tax on sweets” when discussing the tax as it applies to confectionery and ice cream. We refer to the “soft drink tax” or “tax on soft drinks” when discussing the tax as it applies to soft drinks. It is important to highlight that the term “soft drinks”, as it is used in the official name of the tax, includes waters, juices and soft drinks - both sugared and non-sugared.

The excise duty on sweets, ice-cream and soft drinks is being levied on confectionery, chocolate, ice-cream and soft drink (including fruit juices, mineral water and lemonade) products that are sold to consumers. Only the small manufacturers are exempted when the amount of products released for consumption does not exceed 10 000 kilogrammes or 50 000 litres.

The following rate structure was adopted since 2014 for confectionery, chocolate and ice-cream products:

Product category	Tax rate
Sugar confectionery, not containing cocoa	95 cent per kg
Products which are sweetened with products other than sugar	95 cent per kg
Chocolate and other food preparations containing cocoa	95 cent per kg
Ice cream and other edible ice, whether or not containing cocoa	95 cent per kg
Mixes intended for the manufacture of ice-cream	95 cent per kg

Source: "Taxes in Europe - Tax reforms" database, European Commission.

### Data analysis

We investigated the effect of the sweets tax being reintroduced on two types of products: confectionery and ice-cream (see Table 3 in the methodology section of this annex for the Euromonitor category definitions).

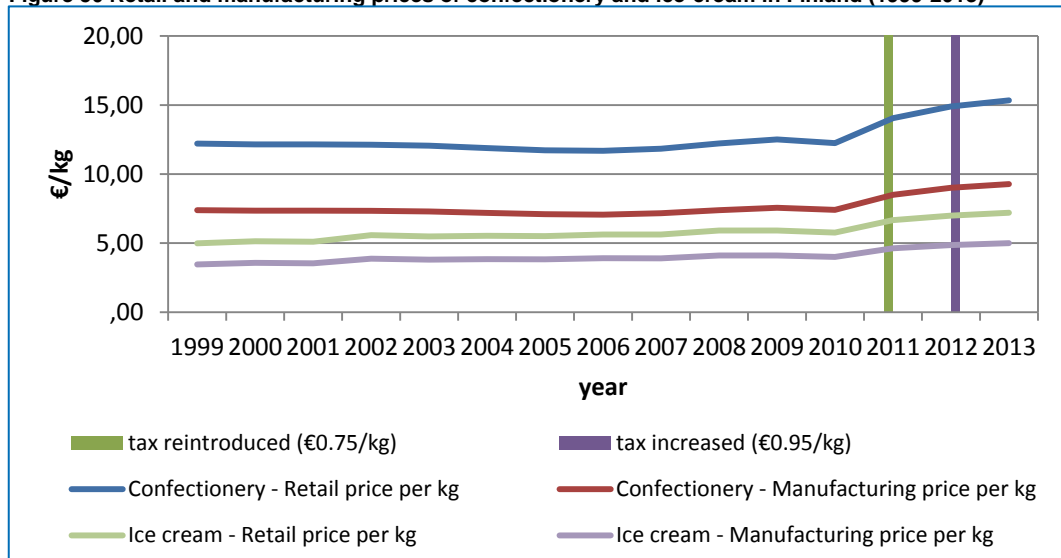
### Prices – confectionery and ice-cream

Prices of both confectionery and ice-cream have remained very stable from 1999 until 2010 at a price level of €12/kg and €6/kg respectively. We see, however, that a price increase for both retailers and consumers coincided with the tax reintroduction. Also in 2012, when the tax was raised, the prices further increased and reached, in 2013, significantly higher level than before.

We observe that prices in 2011 and 2012 increased more than twice as much as can be attributed to the tax. Compared to the average prices in 2010 for confectionery, we see the tax reintroduction in 2011 constitutes 6.1% of the price. Actual prices increased in 2011 compared to 2010 by 14.8% in 2011 and 6.0% in 2012. In 2012, we see that the tax increase constitutes 1.7% of the average price. In 2013 the prices grew further by 2.9% compared to 2012.

Over the observed period, price margins for retailers have not changed. The adjustments in manufacturing price seem to be directly passed on to consumers.

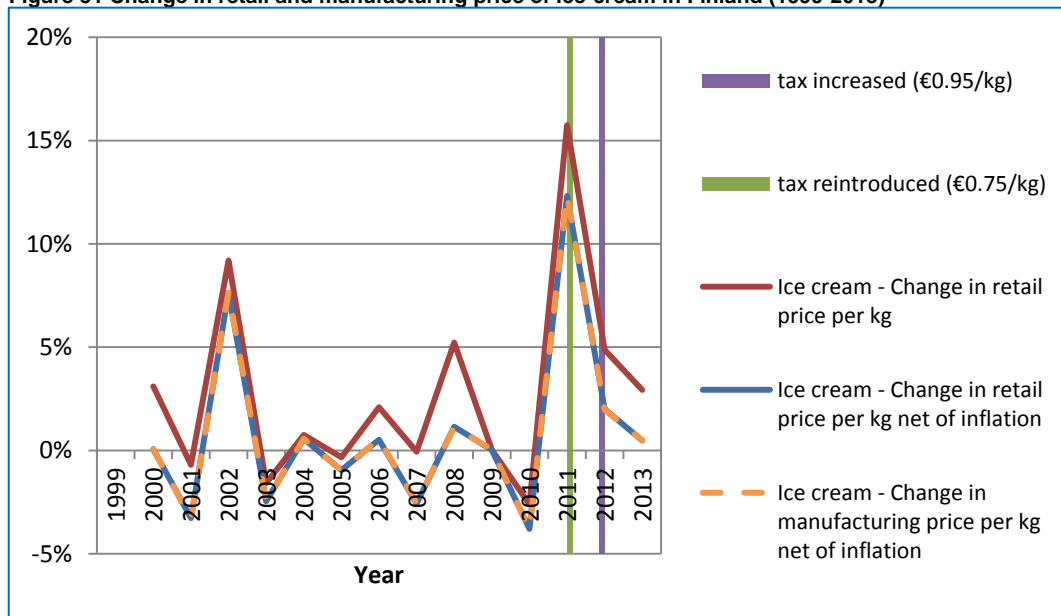
**Figure 50 Retail and manufacturing prices of confectionery and ice-cream in Finland (1999-2013)**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream.

Source: Ecorys based on data from Euromonitor/Passport.

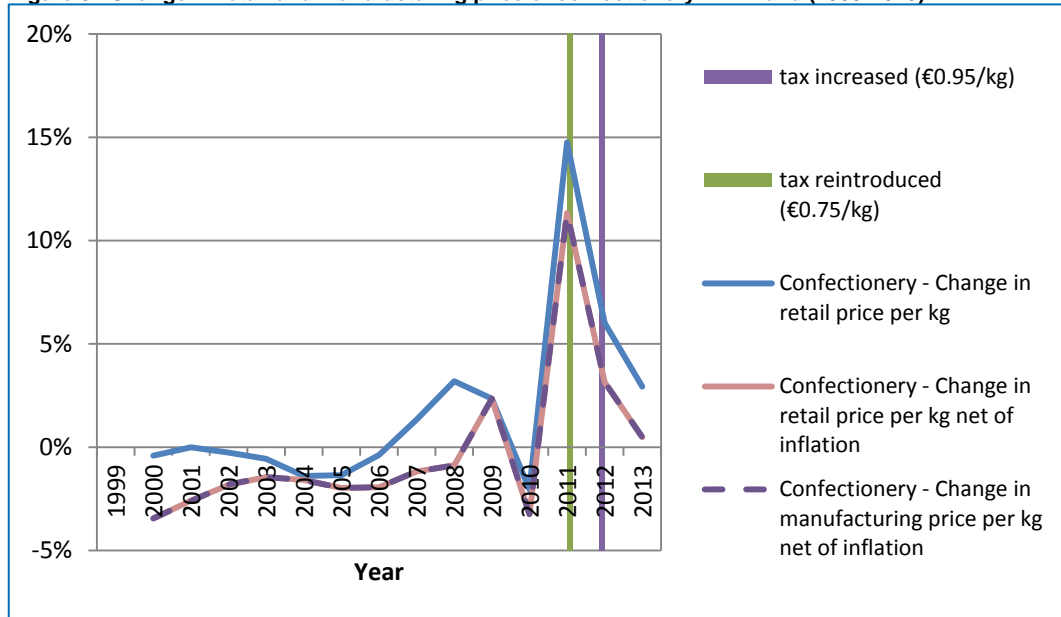
**Figure 51 Change in retail and manufacturing price of ice-cream in Finland (1999-2013)**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream.

Source: Ecorys based on data from Euromonitor/Passport.

**Figure 52 Change in retail and manufacturing price of confectionery in Finland (1999-2013)**



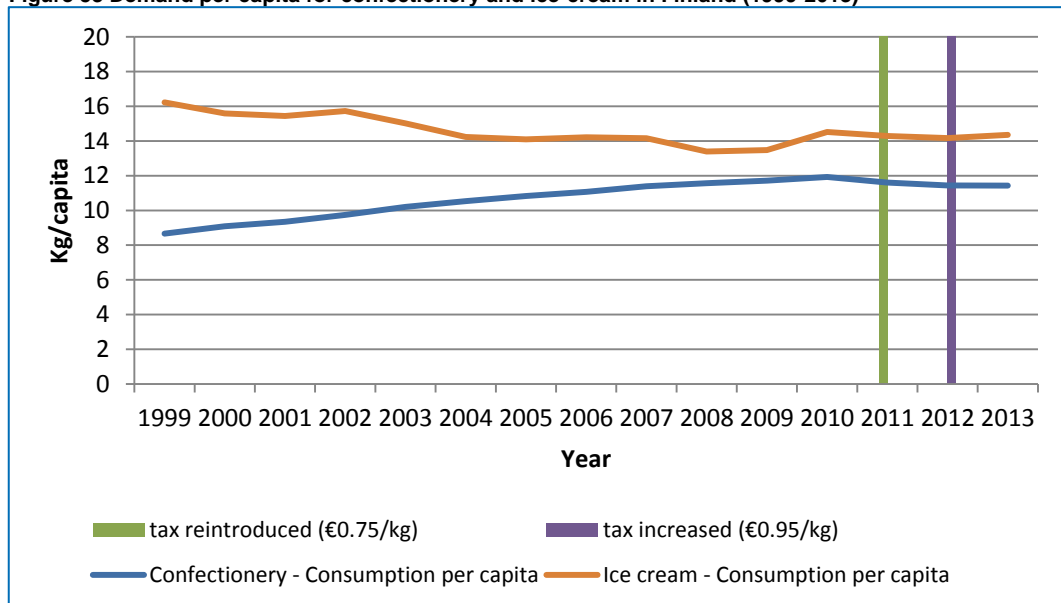
Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
 Source: Ecorys based on data from Euromonitor/Passport.

**Demand – confectionery and ice cream**

The demand for confectionery and ice-cream shows some opposing patterns. Consumers decreased their ice-cream consumption, while increased their confectionery consumption. This could be due to a substitution effect because of the very different nature of the products.

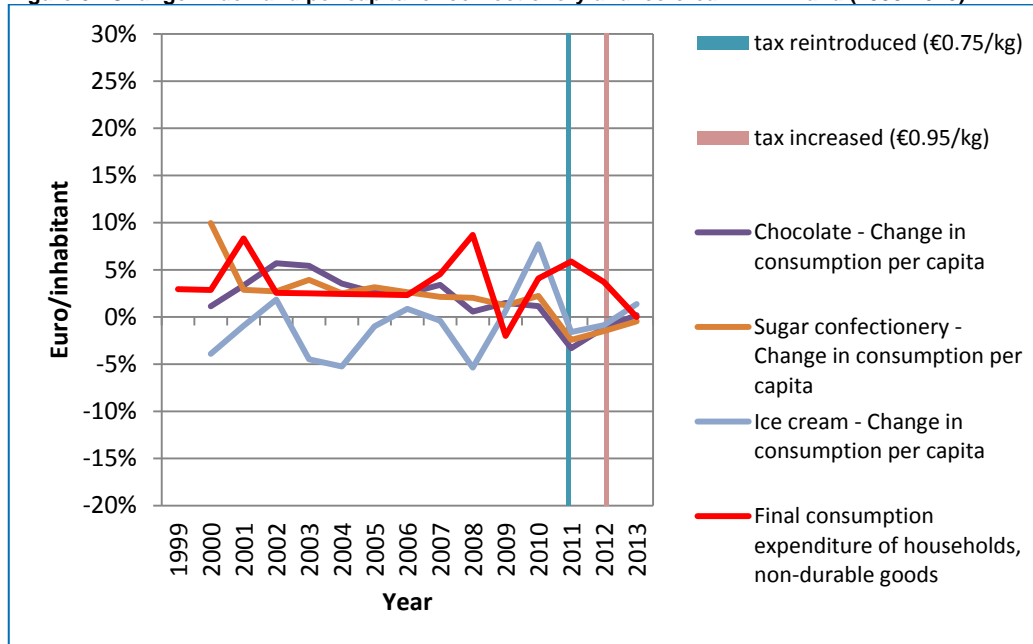
The reintroduction of the tax on confectionery and ice-cream coincides with a relatively sharp drop in the demand for both products. Also in 2012, demand for these product types decreased most likely as a result of the tax increase, and stabilised again in 2013. The demand for ice cream even started to grow in 2013.

**Figure 53 Demand per capita for confectionery and ice-cream in Finland (1999-2013)**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
 Source: Ecorys based on data from Euromonitor/Passport.

**Figure 54 Change in demand per capita for confectionery and ice-cream in Finland (1999-2013)**



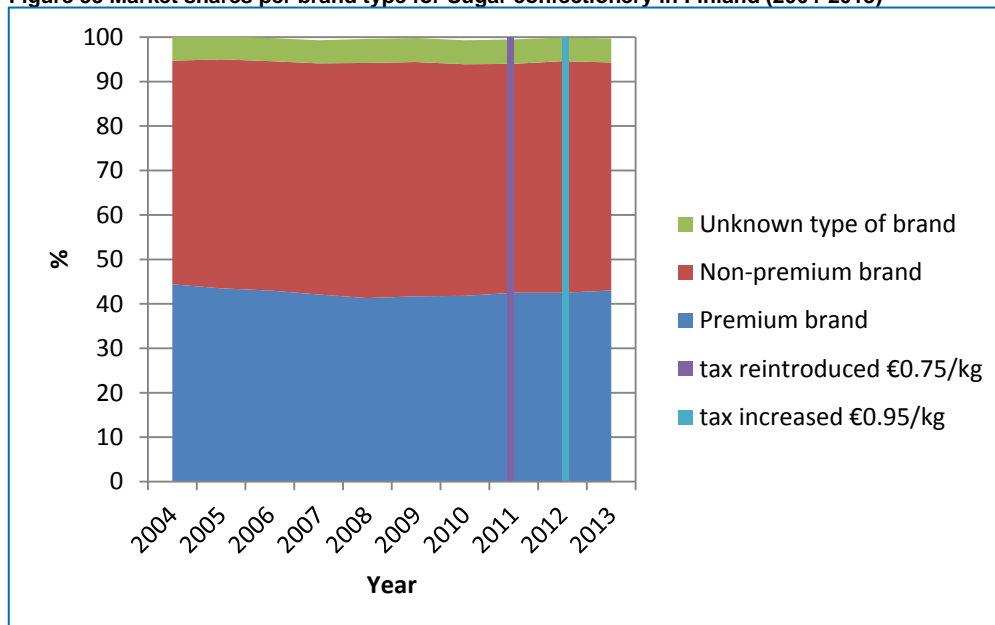
Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

### Market shares – confectionery and ice cream

For both confectionery and ice cream we see that a large minority of the market is serviced by premium brands. A small majority is being supplied by non-premium brands. This percentage has been stable over the observed period, although a small decline for the premium brands is visible in favour of the non-premium brands before 2008.

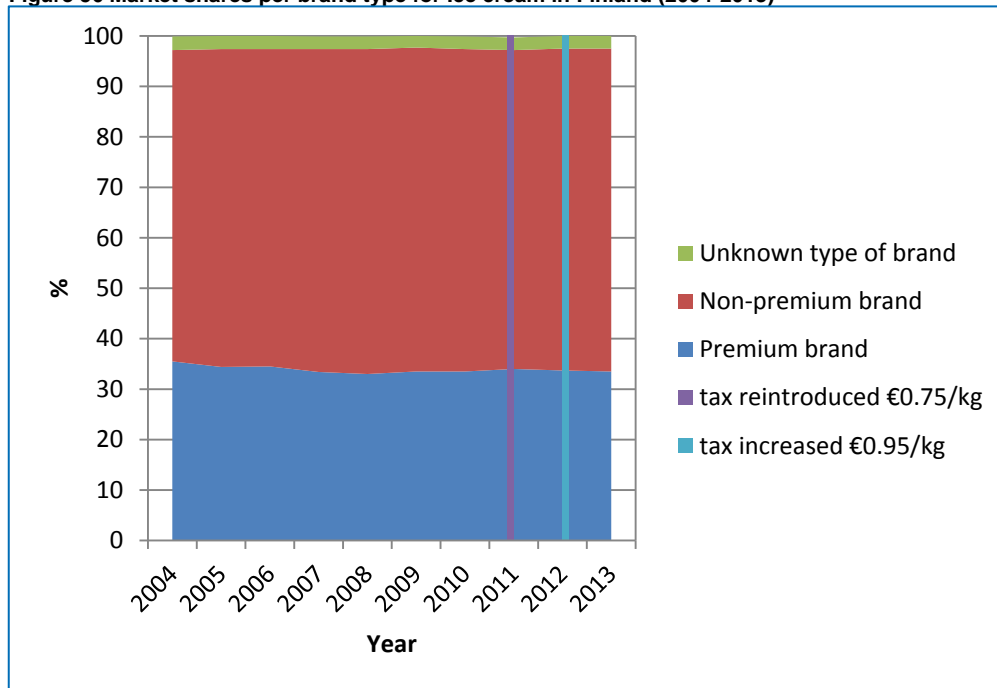
Following the tax reintroduction in 2011, we see for both product types an increase in the market share of premium brands, and a small decline in the market share of non-premium brands. However, this effect is marginal and falls in the margin of fluctuations in the previous years. The same observation can be made for 2012, the year in which the tax was further increased.

**Figure 55 Market shares per brand type for Sugar confectionery in Finland (2004-2013)**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 56 Market shares per brand type for Ice cream in Finland (2004-2013)**



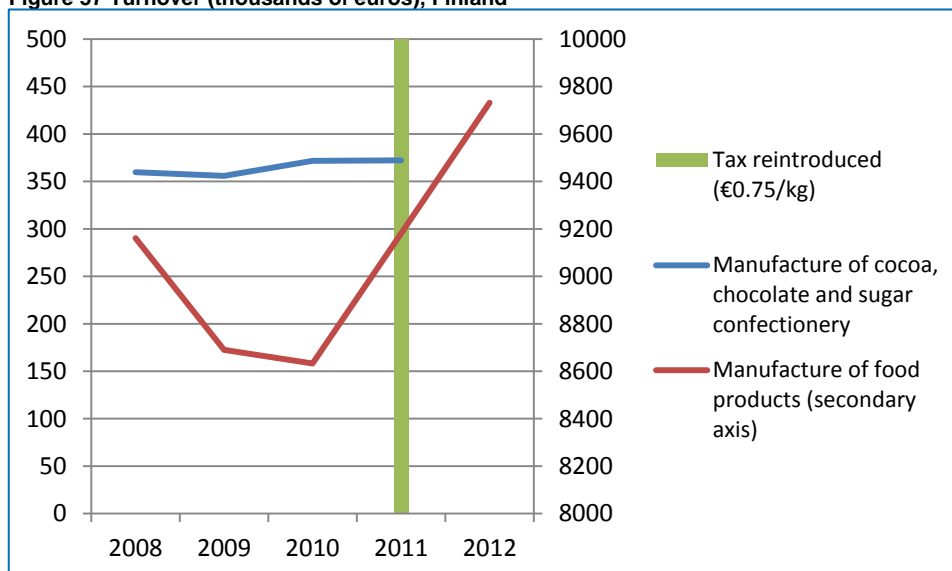
Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: Ecorys based on data from Euromonitor/Passport.

## Competitiveness – confectionery and ice cream

### Production and producers

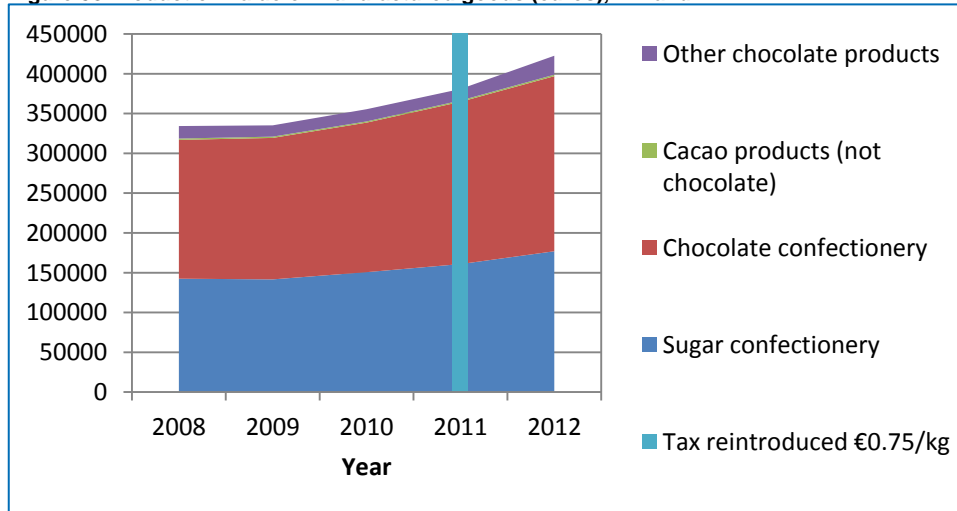
As Figure 57 shows, the revenues generated by the companies producing cocoa, chocolate and sugary confectionery remained stable. The production value, however, increased but the increase differs for the various product subgroups (Figure 58). On the other hand, turnover of the manufacturing of food products as a whole (where the confectionery manufacturing represent only one part) increased after the changes in the tax on confectionery in 2011.

**Figure 57 Turnover (thousands of euros), Finland**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: SBS Eurostat.

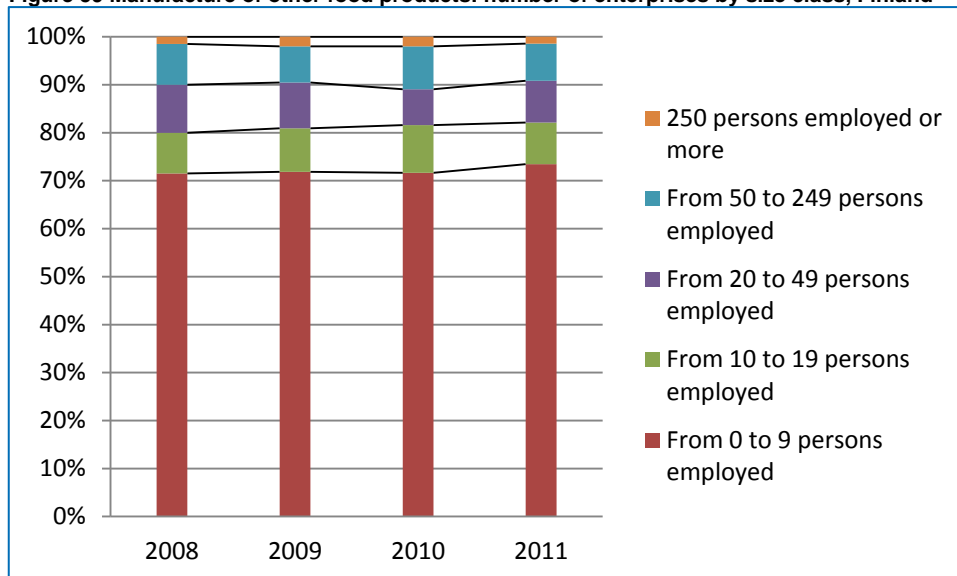
**Figure 58 Production value of manufactured goods (euros), Finland**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: Eurostat PRODCOM, Ecorys calculations.

The sector<sup>108</sup> is dominated by SMEs and self-employed (Figure 59). Eurostat data indicate that about 70% of companies in the sector have employees between 0 and 9 on average in the Finland, and a further 10% of companies have between 10 and 49 employees in 2011 after the tax was increased earlier that year. Compared to earlier period the share of micro companies present in this sector increased. The total number of enterprises producing confectionery<sup>109</sup> and ice cream slightly increased, as indicated on Figure 60 .

**Figure 59 Manufacture of other food products: number of enterprises by size class, Finland**



Source: SBS Eurostat.

<sup>108</sup> Manufacture of cocoa, chocolate and sugar confectionery is part of the sector of manufacturing of other food products. The data is only available on a higher aggregation level for manufacturing of other food products.

<sup>109</sup> Production of confectionery covers manufacture of cocoa, chocolate and sugar confectionery.



**Figure 60 The number of enterprises, Finland**

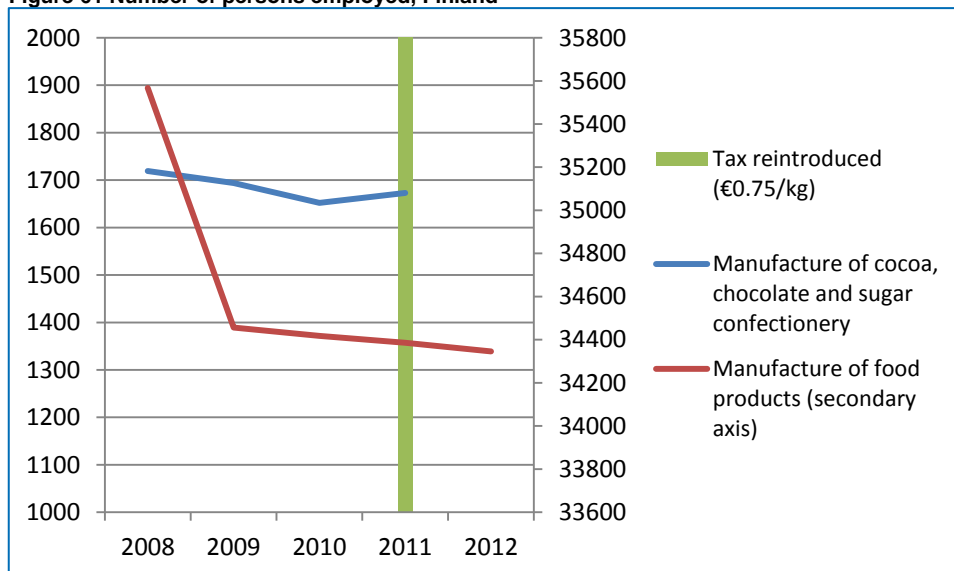


Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: SBS Eurostat.

*Employment and labour productivity*

Figure 61 presents the employment effects showing that the number of persons employed slightly increased in 2011 when the tax on sweets (confectionery, chocolate and ice cream)<sup>110</sup> was reintroduced. Even though the effect of the tax on the employment was positive, the value added of the manufacturers of cocoa, chocolate and sugar confectionery dropped leading to a decrease in the (apparent) labour productivity (Figure 62).

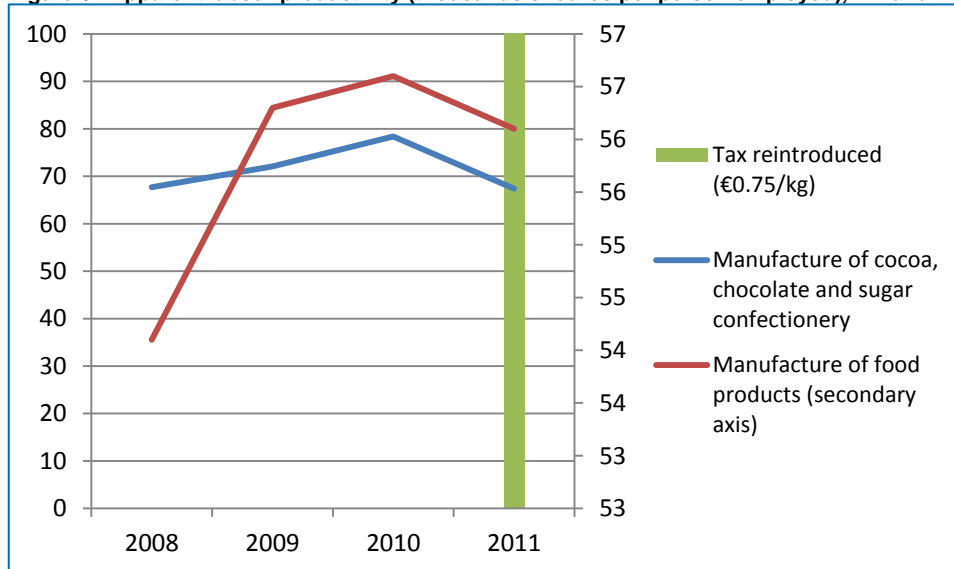
**Figure 61 Number of persons employed, Finland**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: SBS Eurostat.

<sup>110</sup> The tax on soft drinks was already in place before that.

**Figure 62 Apparent labour productivity (thousands of euros per person employed), Finland**

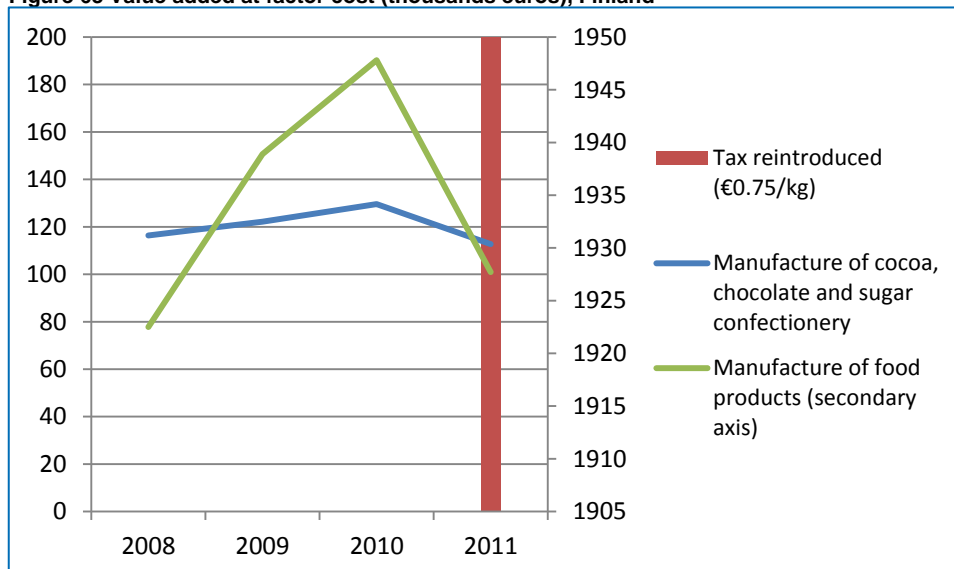


Note: Apparent labour productivity is defined as value added at factor costs divided by the number of persons employed. Tax reintroduction covers confectionery, chocolate and ice-cream. Source: SBS Eurostat.

*Value added of manufacturers*

The value added of the manufacturers has been growing until the tax on sweets was reintroduced reaching the level of 2008 as indicated Figure 63. The cocoa, chocolate and sugar manufacturing industry has been following the overall trend in the food producing industry in terms of labour productivity and the value added though it was not as volatile. The share of value added in the whole manufacturing industry (Figure 64) decreased in 2011 reaching the level of 2008 while the share value added of the food industry increased.

**Figure 63 Value added at factor cost (thousands euros), Finland**



Note: Tax reintroduction covers confectionery, chocolate and ice-cream. Source: SBS Eurostat.

**Figure 64 Share of value added in total manufacturing (%), Finland**

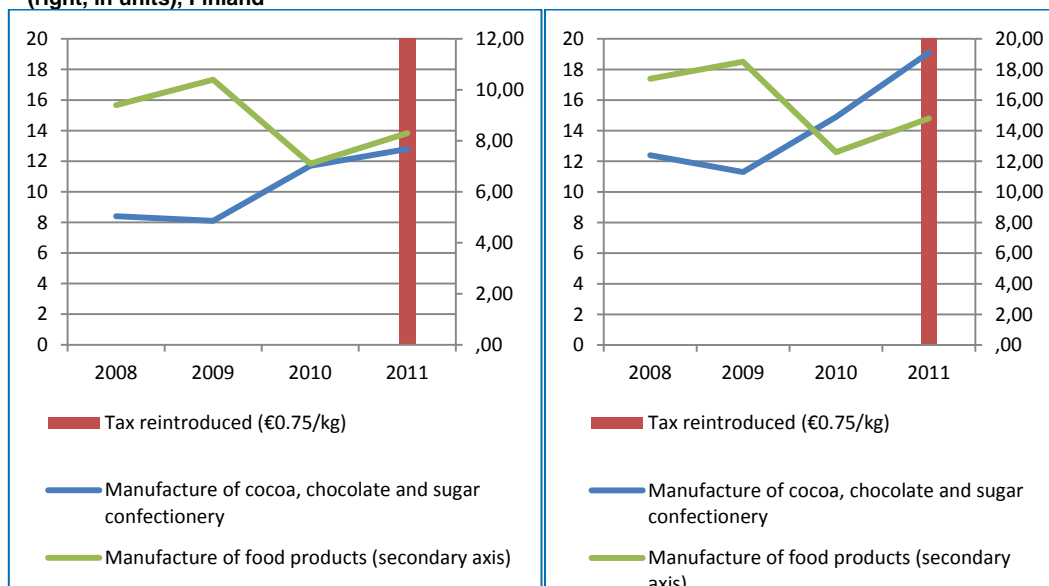


Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: SBS Eurostat.

### Investments

The investment level per person employed of the manufacturing industry of cocoa, chocolate and sugar started to grow since 2009 and the reintroduction of the tax on sweets did not change the trend set before. The investment rate which is calculated as the investment divided by the value added at factor cost has been increasing since 2009 not changing its growth rate afterwards (Figure 65). The trends in the investment activity is rather different from the manufacturing of food industry, coinciding only after 2010: when the investment rates of confectionery industry went up, that of the manufacture of food products went down (and vice versa. From 2010 onwards, the trends in manufacturing of confectionery and manufacturing of food products were upward.

**Figure 65 Investment per person employed (left, in thousands of euros per head) and Investment rate<sup>111</sup> (right, in units), Finland**



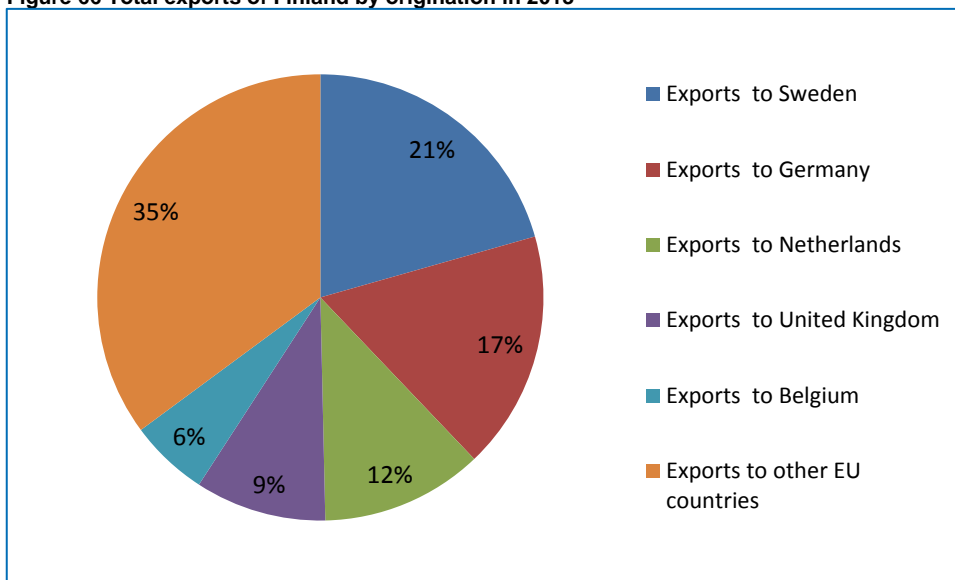
Note: Tax reintroduction covers confectionery, chocolate and ice-cream.  
Source: SBS Eurostat.

<sup>111</sup> Investment rate is calculated as investment divided by value added at factor cost.

### Trade flows

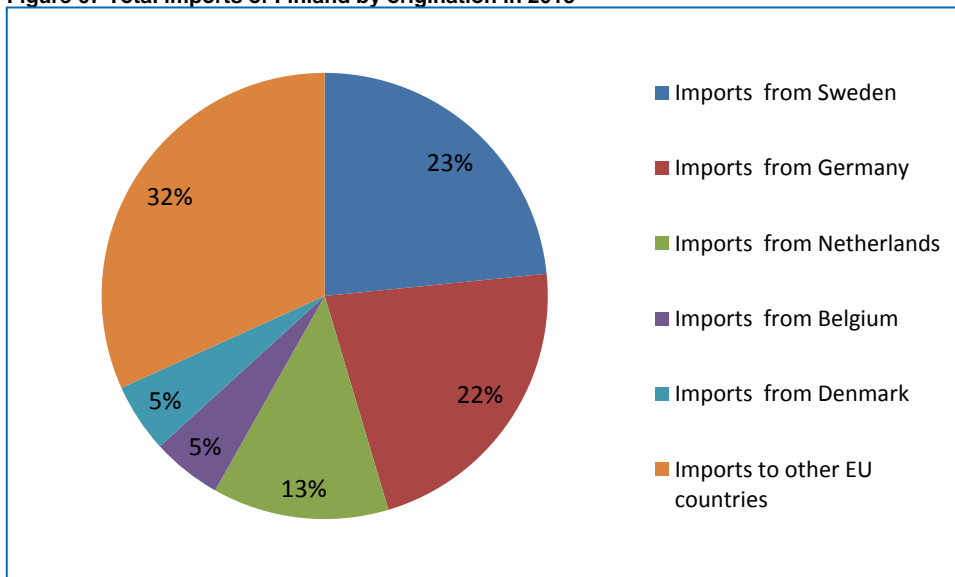
The main trading partners of Finland include Sweden, Germany, the UK, the Netherlands and France and Denmark. These partners together represent 60% and 70% of total exports and imports respectively (Figure 66; Figure 67). The overall trend of exports of sugars and sugars products has been positive over the last five years, though fluctuating some what. On the other hand, the overall trend of imports was negative. When the tax on confectionery was reintroduced the exports of sugars rose but then started to decline year after. When the tax was increased in 2012, the level of exports continued to grow. The same pattern of fluctuations is visible in the imports of sugars and sugar products.

**Figure 66 Total exports of Finland by origination in 2013**



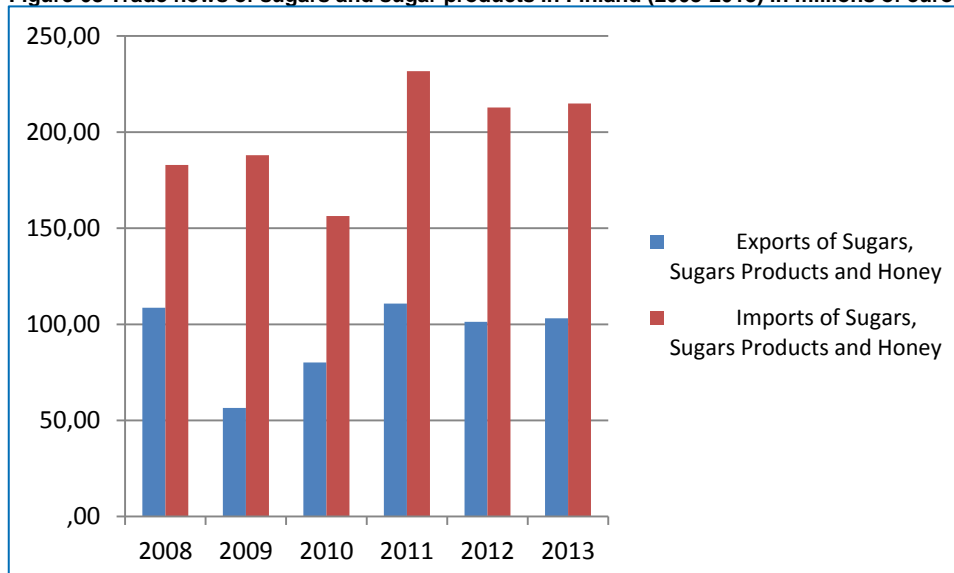
Source: International Monetary Fund (IMF), Direction of Trade Statistics.

**Figure 67 Total imports of Finland by origination in 2013**



Source: International Monetary Fund (IMF), Direction of Trade Statistics.

**Figure 68 Trade flows of sugars and sugar products in Finland (2008-2013) in millions of euros**



Source: United Nations (UN), International Merchandise Trade Statistics.

### Consolidation of findings

The main findings of the data analyses on the tax on sweets are summarised in the table below.

**Table 11 Change in various measures corresponding to change in tax**

	Confectionery	Ice cream
Tax description	In 2011, tax reintroduced on confectionery of €0.75 per kg. In 2012 increased to €0.95 per kg. The tax increases correspond to a mark-up of respectively 6.1%, and 1.3% on the average prices of the year before.	In 2011, tax reintroduced on ice-cream of €0.75/kg. In 2012 increased to €0.95/kg or €0.11/ltr. The tax increases correspond to a mark-up of respectively 14.7%, and 3.2% on the average prices of the year before.
Price change	2011: +14.8%, 2012: +6.0%, 2013: +2.9% Tax reintroduction corresponds to out of the ordinary price increases. Price changes after second tax increase are smaller and the prices continue to grow at a slower pace.	2011: +15.7%, 2012: +4.9%, 2013: +2.9% Tax reintroduction corresponds to out of the ordinary price increases. Price changes after second tax increase are smaller and the prices continue to grow at a slower pace.
Demand change	2011: -2.6%, 2012: -1.4%, 2013: -0.1% Out of the ordinary demand decreases correspond to out of the ordinary price increases. Long-term effects unknown.	2011: -1.6%, 2012: -0.9%, 2013: +1.4% Out of the ordinary demand decreases correspond to out of the ordinary price increases. In 2010 some hoarding could have occurred. Long-term effects unknown.
Demand shift to lower segment	Marginal, if any change occurring.	Marginal, if any change occurring.
Demand shift to non-taxed product	No information available.	No information available.
Employment	Slight increase in the year after the first tax increase. No information available for more recent years. No impact of tax visible in data.	No information available.

	Confectionery	Ice cream
Labour productivity	Decrease in the year after the first tax increase. No information available for more recent years.	No information available.
Profit margin retailers	No changes during the observed period.	No changes during the observed period.
Value added of manufacturers	Decreased value added directly after the introduction of the tax. No information available for more recent years.	No information available.
Investments	Continuing increase in investments in year of first tax introduction. No information available for more recent years.	No information available.
Trade flows	Both imports and exports stabilise at a higher level than in the years before the tax introduction.	No information available.

Following the tax reintroduction, we see a sharp increase in the prices of the investigated products. These price increases are far larger than could have been anticipated when looking purely at the tax tariff. This implies that other factors contribute to the large price increases such as input costs<sup>112</sup> and pricing strategies.

It is interesting to note that for the investigated products, there was an after-effect in which price increases continue in the year after the tax increased. It is unclear from the data what caused this pattern.

The price increases have a corresponding effect on the demand: price increases causes significant demand drop. However, it is less clear what the effect is on the demand, when the tax was increased in 2012.

For ice-cream we see another interesting effect taking place. In the year before the tax was introduced, we see a large increase in the demand.

For the competitiveness indicators, we see almost no change in previous trends when the tax was reintroduced. We do see some effects in terms of labour productivity, but this effect is largely connected to the lower demand for the products. However, limited data may have obscured any changes in the competitiveness after the changes in the tax regime.

### Tax on soft drinks – Finland

Finland's tax on soft drinks, including all soft drinks that are ready-to drink as well as bottled water, has been in place since 1940. In 2001 mineral waters were excluded from the tax base. In 2011, upon reintroduction of the tax on sweets, the tax on soft drinks was combined with the tax on sweets to form one tax; *Excise duty on sweets, ice-cream and soft drinks*. At this time, the tariff was increased from €0.045/ltr<sup>113</sup> to €0.075/ltr and the tax base was changed again to include mineral waters, juices and nectars. In 2012, the tariff was further increased to €0.11/ltr. Since 1 January 2014, this rate was doubled to EUR € 0.220/ltr for sugary and sweetened beverages and juices (containing more than 0.5% sugar), while it remained unchanged for sweetener-based soft drinks and waters.

<sup>112</sup> For example the price of milk or sugar.

<sup>113</sup> The tax was set at the level of 4.5 cents per litre since 1999 and was only raised in 2011.

The excise duty on sweets, ice-cream and soft drinks is being levied on confectionery, ice-cream and soft drink (including fruit juices, mineral water and lemonade) products that are sold to consumers. Only the small manufacturers are exempted when the amount of products released for consumption does not exceed 10 000 kilogrammes or 50 000 litres.

The following rate structure was adopted since 2014 for soft drink products:

Product category	Tax rate
Fruit juices (including grape must) and vegetable juices, unfermented and not containing added spirit, whether or not containing added sugar or other sweetening matter (of an alcoholic strength by volume of 0.5% vol. or less)	22.0 cent per litre
- sugar free	11 cent per litre
Food preparations not elsewhere specified or included: - products not containing alcohol or of an alcoholic strength by volume of 1.2% vol. or less used in the manufacture of soft drinks:	
- beverage materials in solid form	140 cent per kg
- sugar free	95 cent per kg
- other	22.0 cent per litre
- sugar free	11.0 cent per litre
Waters, including natural or artificial mineral waters and aerated waters, not containing added sugar or other sweetening matter nor flavoured; ice and snow	11.0 cent per litre
Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured, and other non-alcoholic beverages, not including fruit or vegetable juices of heading 2009 (of an alcoholic strength by volume of 0.5% vol. or less)	22.0 cent per litre
- sugar free	11.0 cent/l
Wine of fresh grapes, including fortified wines; grape must other than that of heading 2009 (of an alcoholic strength by volume in excess of 0.5% vol.)	
- of an alcoholic strength by volume of 1.2% vol. or less	22.0 cent per litre
- sugar free	11.0 cent per litre
Vermouth and other wine of fresh grapes flavoured with plants or aromatic substances (of an alcoholic strength by volume in excess of 0.5% vol.)	
- of an alcoholic strength by volume of 1.2% vol. or less	22.0 cent per litre
- sugar free	11.0 cent per litre
Chemical products and preparations of the chemical or allied industries (including those consisting of mixtures of natural products), not elsewhere specified or included:	
- mineral salt solutions for the manufacture of beverages	22.0 cent per litre
- sugar free	11.0 cent per litre

Source: "Taxes in Europe - Tax reforms" database, European Commission.

#### Data analysis

We investigated the effect of the tax being introduced on soft drink products (see Table 3 in the methodology section of this annex for the Euromonitor category definitions).

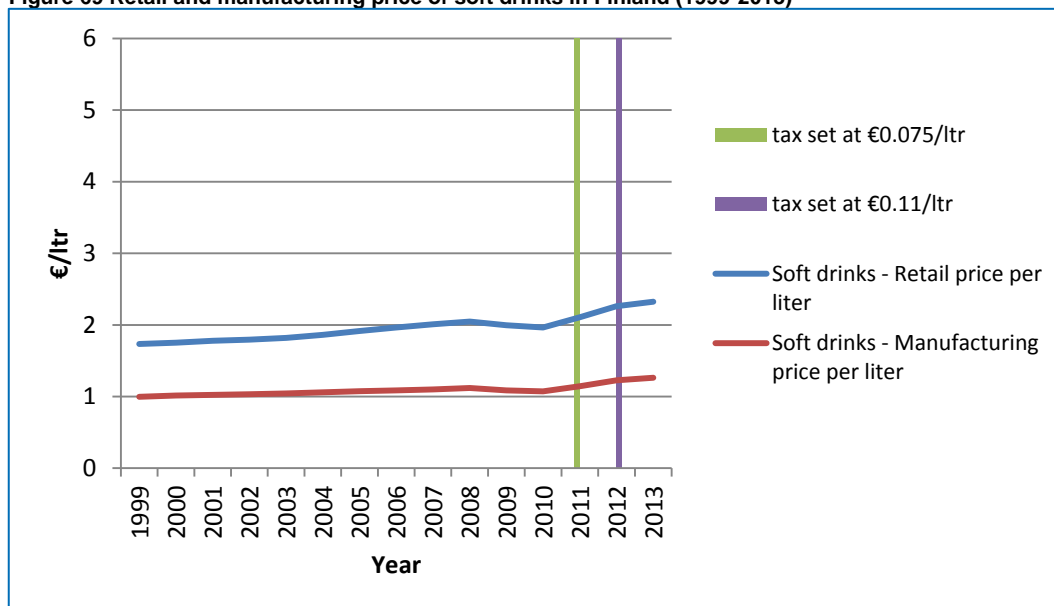
#### Prices – soft drinks

Soft drink prices have on average risen from €1.75 in 1999 to €2.25 in 2013. However, manufacturing prices have shown a slower growth pace. This means that retailers have been able to increase their profit margin over the observed period, most notably from 2004 until 2007. After 2007, the price increases of the retailer more closely match the price increases of the manufacturer.

Following the increase in the tax on soft drinks<sup>114</sup> prices rose sharply, both in 2011 and in 2012. In 2013, prices increased less than in the previous two years.

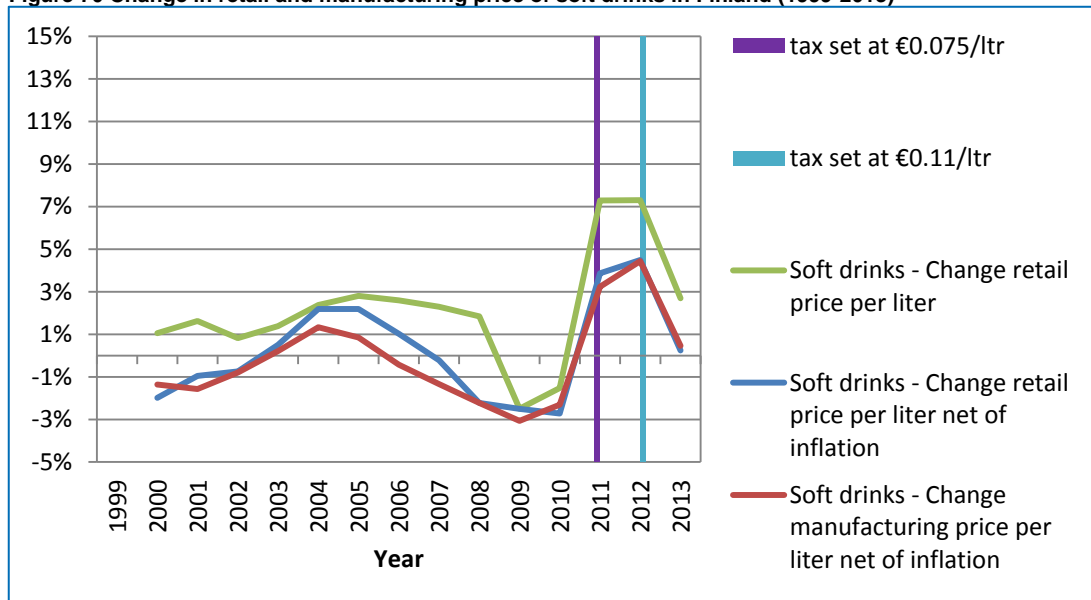
We observe that prices in 2011 and 2012 increased three to almost five times as much than can be attributed to the tax. Prices increased by 7.3% in 2011 and 2012 compared to the previous year. In 2013 the prices continued to grow with a slower pace (2.7%).

**Figure 69 Retail and manufacturing price of soft drinks in Finland (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 70 Change in retail and manufacturing price of soft drinks in Finland (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

### Demand – soft drinks

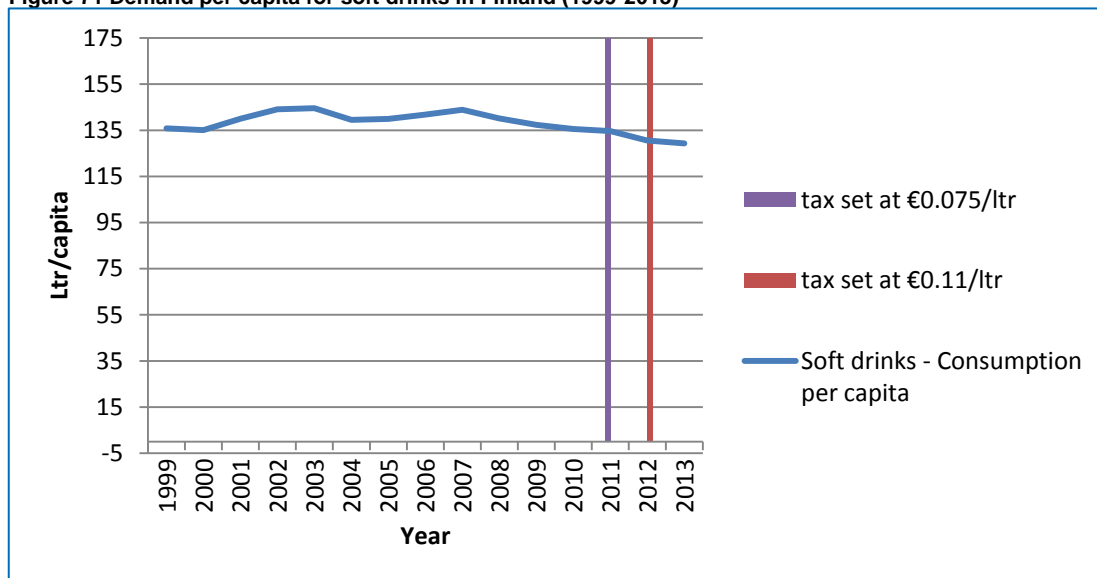
The demand per capita for soft drinks had overall a slightly downward trend from a total of 135 litre a year in 1999, to 130 litre a year in 2013. However there were fluctuations in this pattern, with both relatively sharp increases and relatively sharp decreases in the demand. Since 2007 the demand

<sup>114</sup> From 2011 soft drinks also cover the mineral waters, juices and nectars.



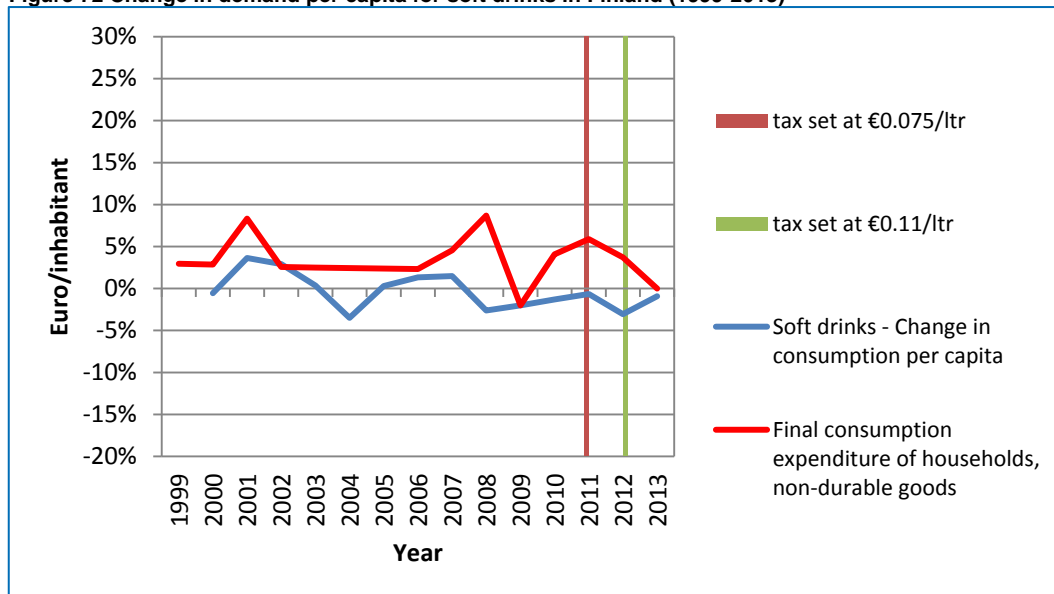
had been in decline and in 2011 we observe that demand falls at a faster pace. In 2012, demand continues to decline, although less sharply.

**Figure 71 Demand per capita for soft drinks in Finland (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 72 Change in demand per capita for soft drinks in Finland (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

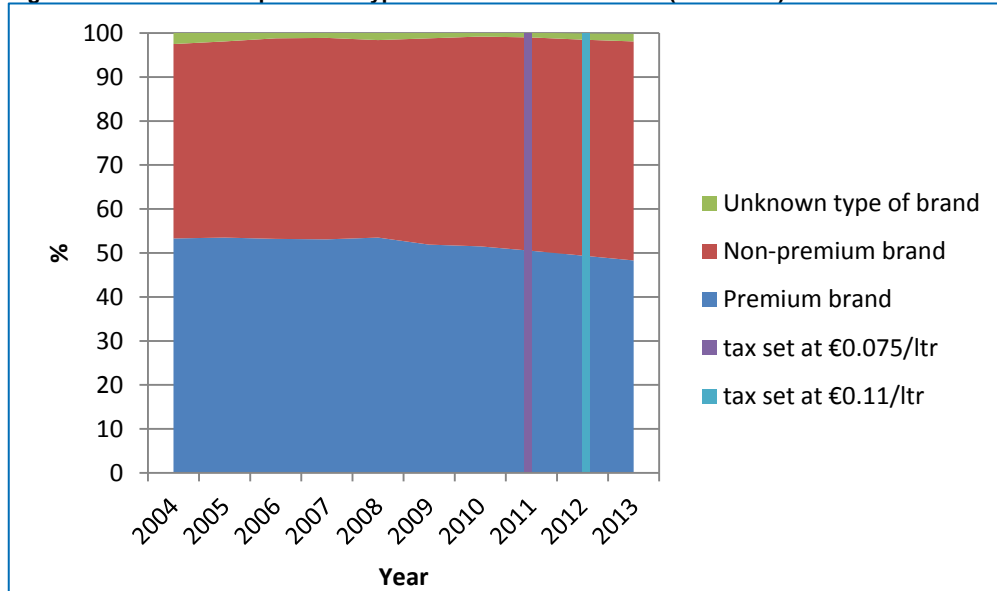
### Market share – soft drinks

In the market for soft drinks, premium brands constitute about 50% of the market, and the non-premium brands the remaining 50%. The unclassifiable have only a marginal market share.

However, between 2004 and 2013, we see a steady decline in the market share of premium brands. Between 2004 and 2008, this decline is very slow, but from 2008 onwards, we see a more rapid decline of about 1%-point per year. This decline is in favour of the non-premium brands that see an expansion of their market share by about 1%-point per year.

The tax changes in 2011 falls in the middle of the period we observed in which the premium brands' market share is relatively quickly declining. The tax in itself does not appear to change the pace in which the premium brands are losing market share. It is therefore hard to determine how the tax influences this pattern, although it is possible that the tax increases reinforced the trend or prolonged it.

**Figure 73 Market shares per brand type for soft drinks in Finland (2004-2013)**



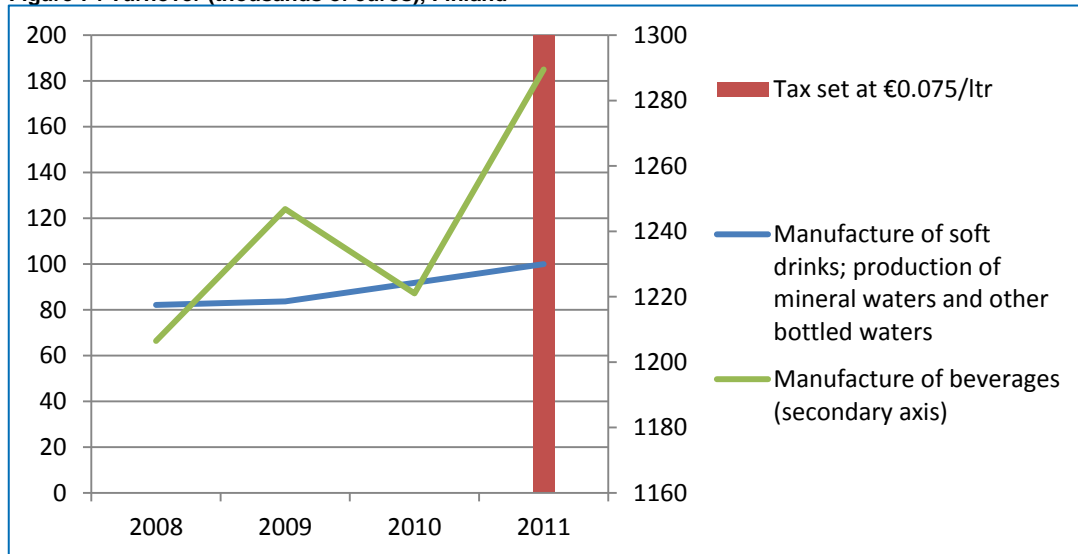
Source: Ecorys based on data from Euromonitor/Passport.

## Competitiveness – soft drinks

### Production and producers

Figure 74 shows that the revenues generated by the companies producing soft drinks were increasing, continuing the trend set earlier without visible effect in 2011 after the tax was increased. The production value has increased as well since 2009. On the other hand, turnover of the manufacturing of beverages as a whole dropped significantly in 2012.

**Figure 74 Turnover (thousands of euros), Finland**

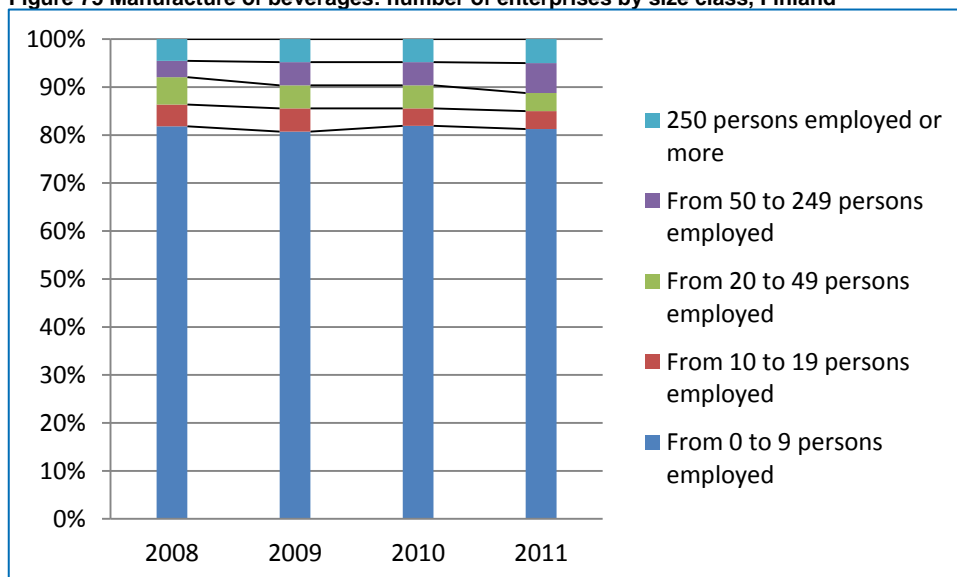


Source: SBS Eurostat.

The sector<sup>115</sup> is dominated by SMEs and self-employed (Figure 75 ). The data indicate that about 80% of companies in the sector have between 0 and 9 employees in Finland, and a further 5% of companies have between 10 and 49 employees (2011 figures).

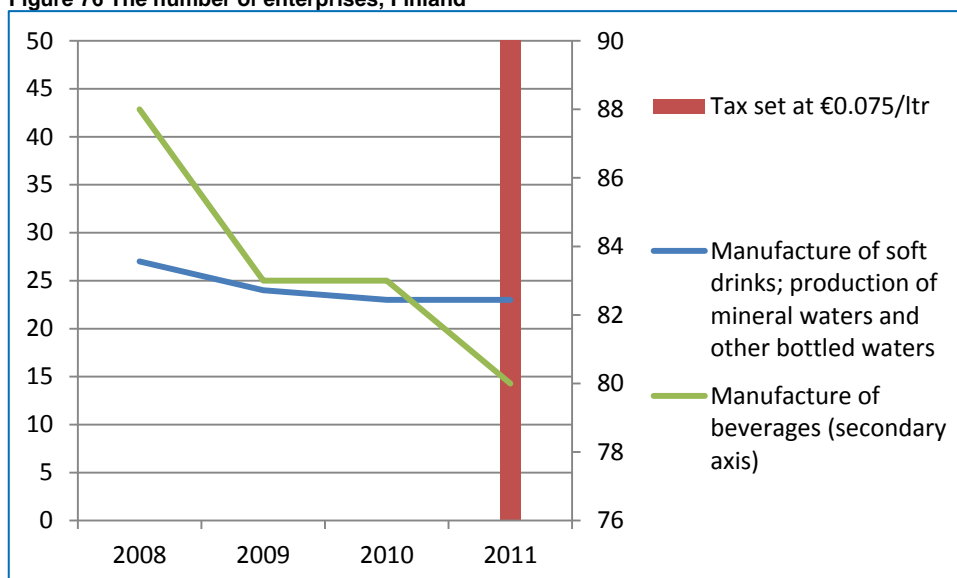
The total number of enterprises producing soft drinks slightly decreased after the tax was increased, continuing the trend set before (Figure 76 ). The number of enterprises in the manufacturing of beverages as a whole was much more volatile but after the tax was increased, the number of enterprises increased.

**Figure 75 Manufacture of beverages: number of enterprises by size class, Finland**



Source: SBS Eurostat.

**Figure 76 The number of enterprises, Finland**



Source: SBS Eurostat.

<sup>115</sup> Manufacturing of soft drinks including production of mineral waters and other bottled waters is part of the sector of manufacturing of beverages industry. Since the data is only available on a higher aggregation, the level for manufacturing of beverages is assessed to obtain an indication of the size of the industry of soft drinks.

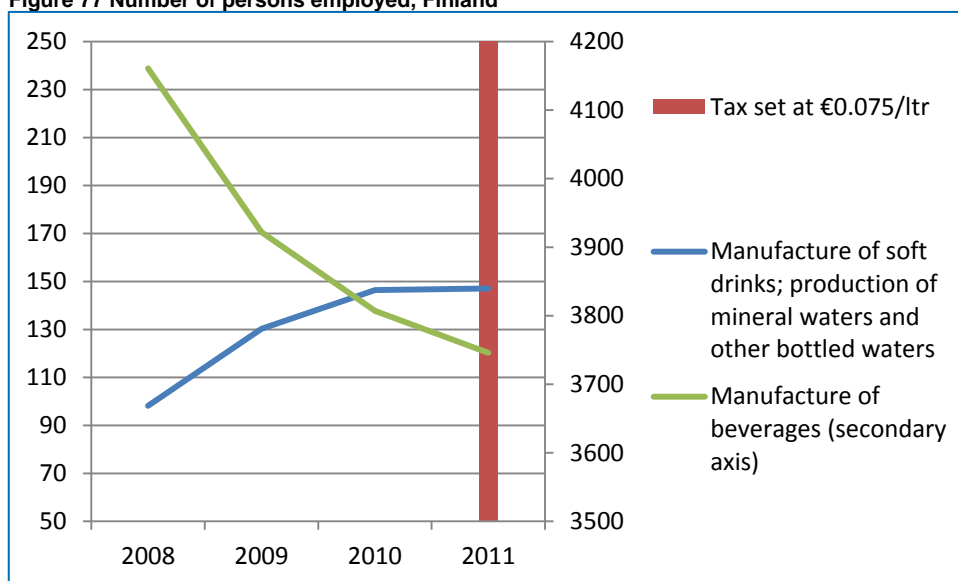
### Employment and labour productivity

Since 2008 the number of persons employed by the companies producing soft drinks<sup>116</sup> has been increasing. The increases in the tax did not change the trend, but corresponds to a significant slow-down in the growth of the employment in 2011 (Figure 77 ).

The reverse trend is visible at a higher level of aggregation: manufacturing of beverages<sup>117</sup>. For this sector, we see a very strong decline in employment over the observed period. The tax increase corresponds to a slightly less strong decline of this employment.

This effect in combination with the increasing value added of the manufacturers in the sector, resulted in decreasing labour productivity in the sector producing soft drinks, even though the situation improved in 2011 after earlier that year the tax was increased (Figure 78 ).

**Figure 77 Number of persons employed, Finland**

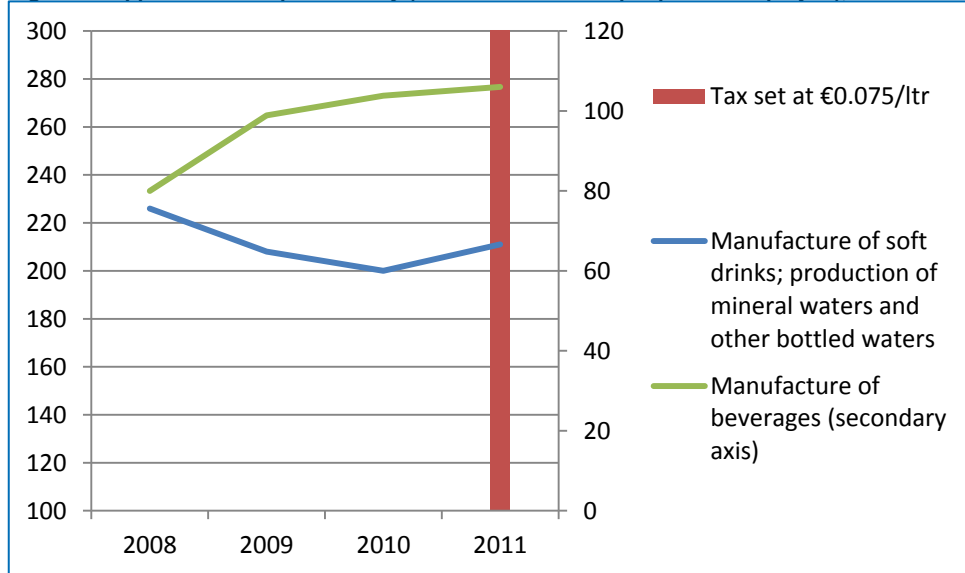


Source: SBS Eurostat.

<sup>116</sup> The SBS Eurostat data has employment figures for the sub-sector soft drinks, mineral water and other bottled waters, as well as employment on the beverage sector overall. We note that many of the companies producing soft drinks also manufacturer other beverages, including alcoholic beverages, and therefore it is very difficult for any data source to distinguish employment numbers between the different beverage products.

<sup>117</sup> Beverages includes soft drinks and mineral waters but also alcoholic drinks.

**Figure 78 Apparent labour productivity (thousands of euros per person employed), Finland**

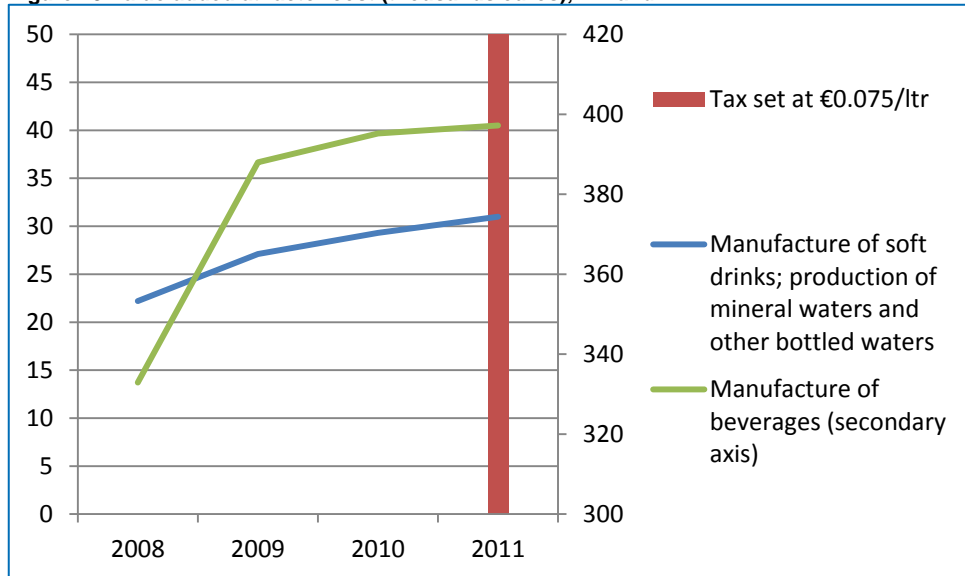


Note: Apparent labour productivity is defined as value added at factor costs divided by the number of persons employed.  
Source: SBS Eurostat.

*Value added of manufacturers*

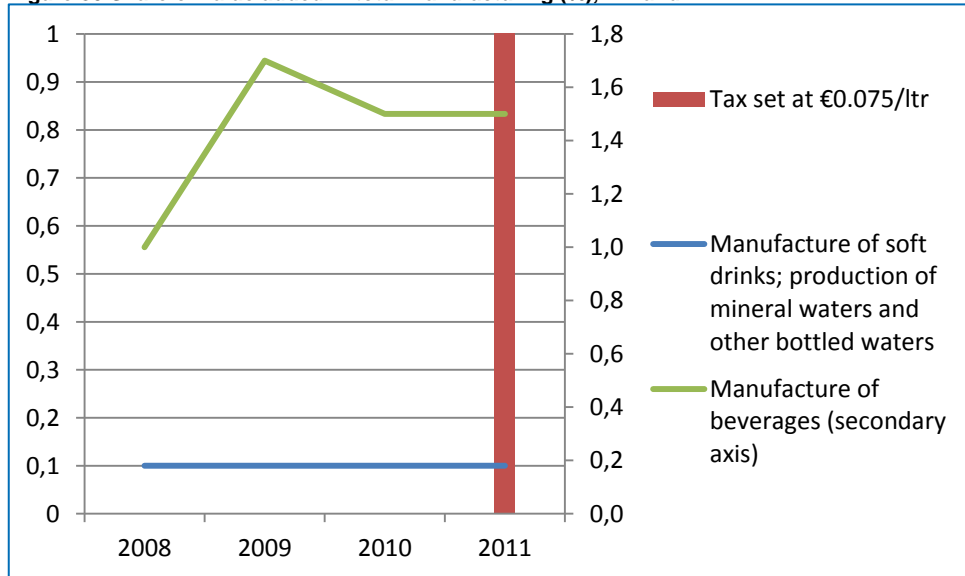
Value added of the manufacturers of soft drinks was increasing since 2008, as shown in Figure 79. The share of value added of manufacturing of soft drinks in the whole manufacturing industry (Figure 80 ) has been stable since 2009 and was not affected by the increase of the tax on soft drinks in 2011.

**Figure 79 Value added at factor cost (thousands euros), Finland**



Source: SBS Eurostat.

**Figure 80 Share of value added in total manufacturing (%), Finland**

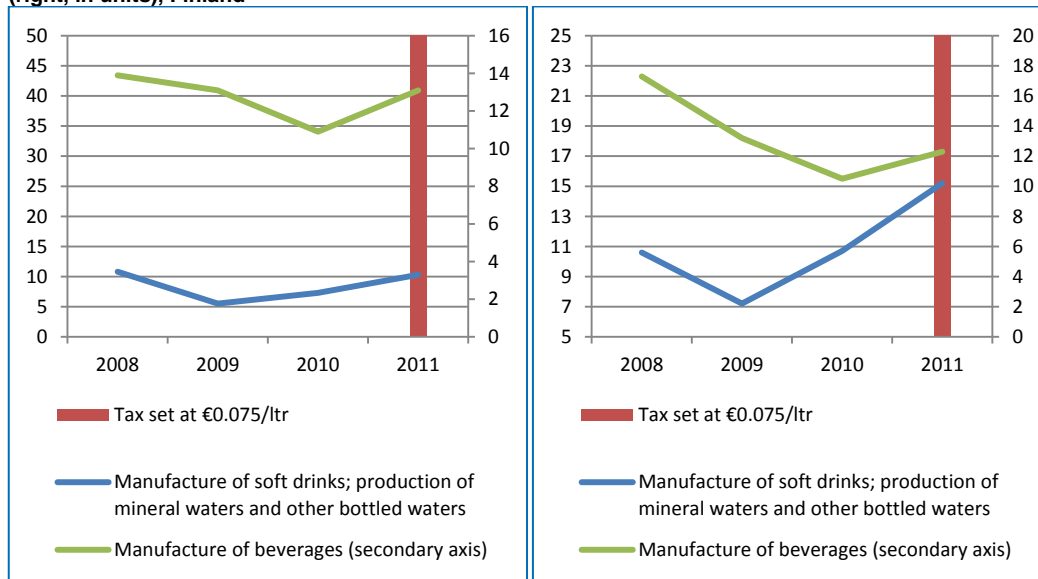


Source: SBS Eurostat.

### Investments

The investment per person employed of the manufacturing industry of soft drinks dropped in 2008 but restored to its former level in 2011. The investment rate<sup>118</sup> showed the same pattern as the investment per person employed (Figure 81). The trends in investment activity is similar to the overall beverage industry.

**Figure 81 Investment per person employed (left, in thousands of euros per head) and Investment rate<sup>119</sup> (right, in units), Finland**



Source: SBS Eurostat.

### Trade flows

The largest trading partners of Finland are Sweden, Germany, the UK, the Netherlands, France and Denmark (Figure 66, Figure 67). The overall trend of exports of beverages<sup>120</sup> has been negative over the last five years, though fluctuating some what (Figure 82 ). The imports of beverages follow

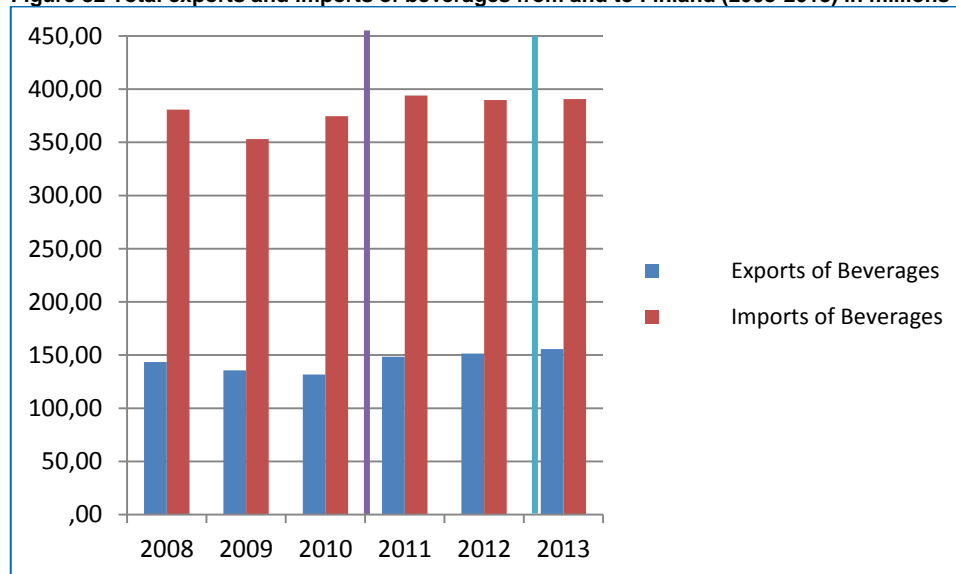
<sup>118</sup> Investment rate is calculated as the total investment divided by the value added at factor cost.

<sup>119</sup> Investment rate is calculated as investment divided by value added at factor cost.

<sup>120</sup> Note that 'beverages' include not only soft drinks as this is a higher level of aggregation.

the same pattern as the exports. It is however hard to determine if the increase in 2011 of the tax on soft drinks had any effect on the trade activity as the data are on a too high level of aggregation.

**Figure 82 Total exports and imports of beverages from and to Finland (2008-2013) in millions of euros**



Source: United Nations (UN), International Merchandise Trade Statistics.

### Consolidation of findings

The main findings of the data analyses on the tax on soft drinks are summarised in the table below.

**Table 12 Change in various measures corresponding to change in tax**

Soft drinks	
Tax description	In 2011, tax increased for soft drinks from €0.045 to €0.075 per litre. In 2012 further increased to €0.11 per litre. The tax increases correspond to a mark-up of respectively 1.5%, and 0.9% on the average prices of the year before.
Price change	2011: +7.3%, 2012: +7.3%, 2013: +2.7% Tax introduction corresponds to out of the ordinary price increases. Price changes after second tax increase are smaller and the prices continue to grow at a slower pace.
Demand change	2011: -0.7%, 2012: -3.1%, 2013: -0.9% Over the years, demand has consistently been decreasing with similar percentages before and after the tax increase. Long-term effects unknown.
Demand shift to lower segment	Since 2008 trend to switch to less premium brands. Trend continues, independent of tax increases.
Demand shift to non-taxed product	No information available.
Employment	Tax increase corresponds to an end of the growth of employment.
Labour productivity	Productivity continues to increase, but at a lower level than before after the first tax increase. No information available for more recent years.
Profit margin retailers	Marginally increased in the year of first tax increase. No changes afterwards.
Value added of manufacturers	Increasing over the observed period, including in the year of the first tax increase. No information available for more recent years.
Investments	Increasing since a low in 2009. No change in this trend visible in the year of the first tax increase. No information available for more recent

Soft drinks	
	years.
Trade flows	Both exports and imports slightly increased after the tax increase. Otherwise no change in trend visible.

Following the tax increases we see a sharp increase in the prices of the investigated products. These price increases are far larger than could have been anticipated when looking purely at the tax tariff. This implies that other factors contribute to the large price increases such as input costs and pricing strategies.

The price increases have a corresponding effect on the demand: price increases causes demand to fall. However, it is less clear what caused the fluctuations in demand before 2007 as prices were increasing at a relatively stable pace.

For the competitiveness indicators, we see almost no change in previous trends when the tax was increased. We do see some effects in terms of labour productivity, but this effect is largely connected to the lower demand for the products. However, limited data may have obscured any changes in the competitiveness after the changes in the tax regime.

### Tax on sugared and non-sugar-sweetened soft drinks – France

In 2012, a tax on all sugared and non-sugar-sweetened beverages was introduced in France. The tax rate was set at €7.16/hectolitre, or €0.0716/litre. The tax rate was raised to € 7.31/hectolitre in 2013 and a year after it was set at € 7.45/hectolitre.

#### Data analysis

For the tax on sugared and non-sugar-sweetened soft drinks, we take a close look at the prices and demand for cola<sup>121</sup>. Investigating this product allows to investigate the direct effects of the tax. In addition, we look at juices, that give us some insight in the substitution effect from taxed products to non-taxed products.

#### Prices - cola

Prices have risen over the last years, from €1.30 a litre to €1.70 a litre for regular cola, and from €1.50 a litre to €1.90 a litre for low calorie cola. This increase in price mainly occurred from 1999 to 2003 and from 2010 onward. In the period in between, prices were stable (regular cola) or declining (low calorie cola). This resulted in a smaller difference in price between the regular and low calorie cola.

On average, the margin for regular cola has increased, mainly due to price increases by retailers in the beginning of the previous decade that was not prompted by price increases by manufactures. However, in the last years of the previous decade, retailers were unable or unwilling to charge the higher prices of the manufactures to the consumers, resulting in a slightly smaller margin.

For low calorie cola, the margin has decreased. Price changes by manufacturing are almost consistently not fully met by retail prices in case of manufacturing price increases. Also in case of a price decrease of manufacturers, the retailers decrease their prices even more.

The tax constitutes 4.2% of the average price for low calorie cola in 2011. For regular cola this percentage is 4.5%. This means, if all other factors remain the same, we anticipate a price increase in 2012 of 4.2%, respectively 4.5%.

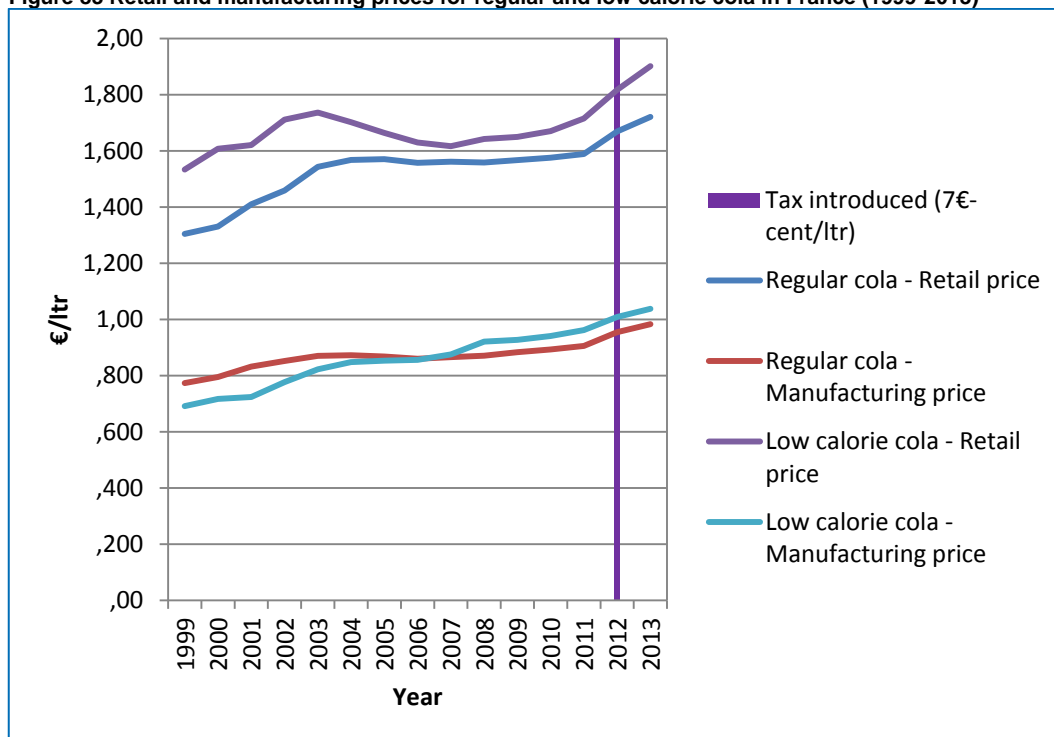
<sup>121</sup> We investigate cola, which represents only a part of the sector under scope.



Indeed, following the introduction of the tax, we see a sharp increase in the prices, both at manufacturing and at retailing level for both types of cola. At retail level, we see a price increase of 5.0%, while for low calorie cola prices increased on average with 6.0%. These percentages are more than could be expected when only the tax was a factor in determining the prices.

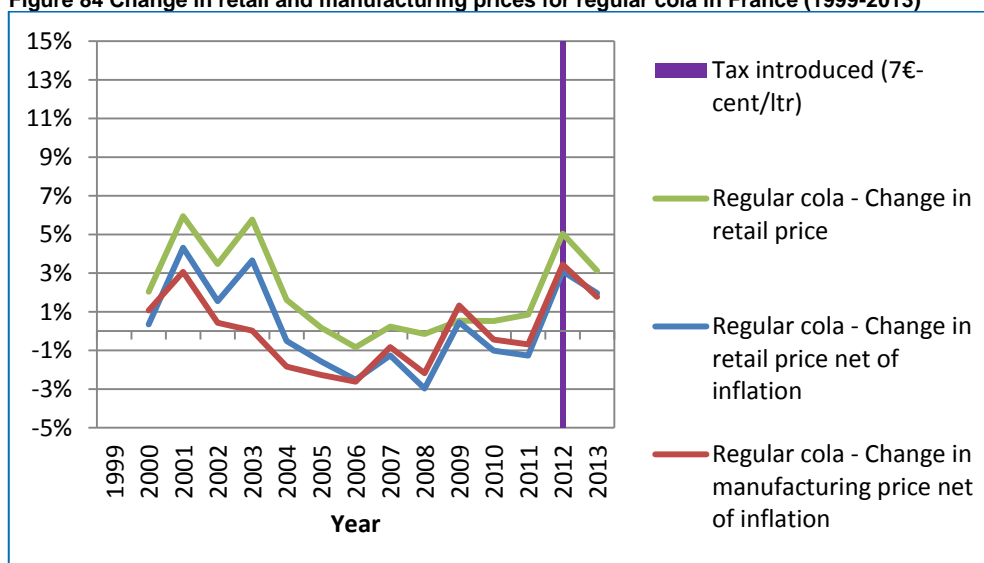
It is interesting to note that the increase of the retail prices for low calorie cola is not matched by the manufacturers, indicating an increasing profit margin for retailers for this type of cola. For regular cola, we do not observe an increasing retail margin at the time of the tax introduction, moreover, the retail margin decreases marginally.

**Figure 83 Retail and manufacturing prices for regular and low calorie cola in France (1999-2013)**



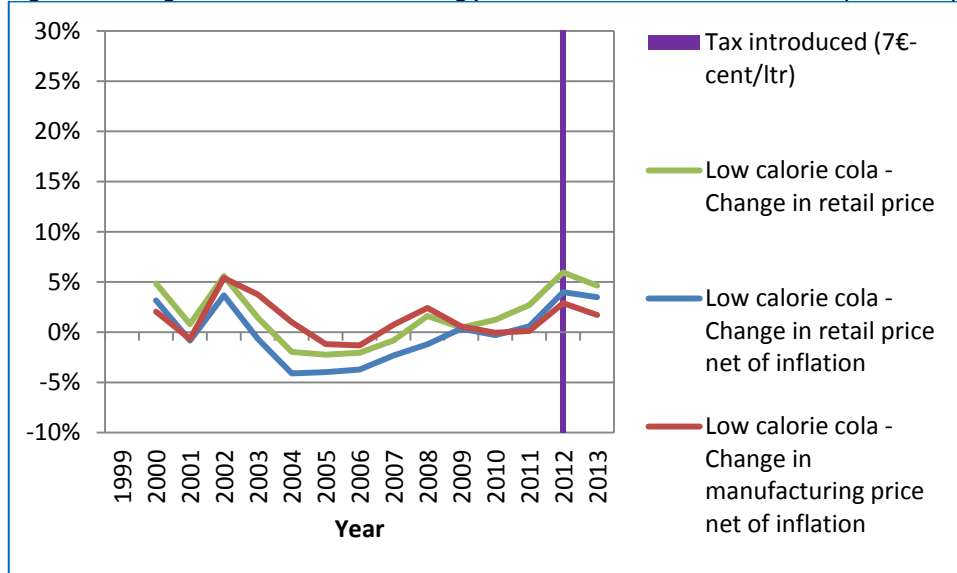
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 84 Change in retail and manufacturing prices for regular cola in France (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 85 Change in retail and manufacturing prices for low calorie cola in France (1999-2013)**



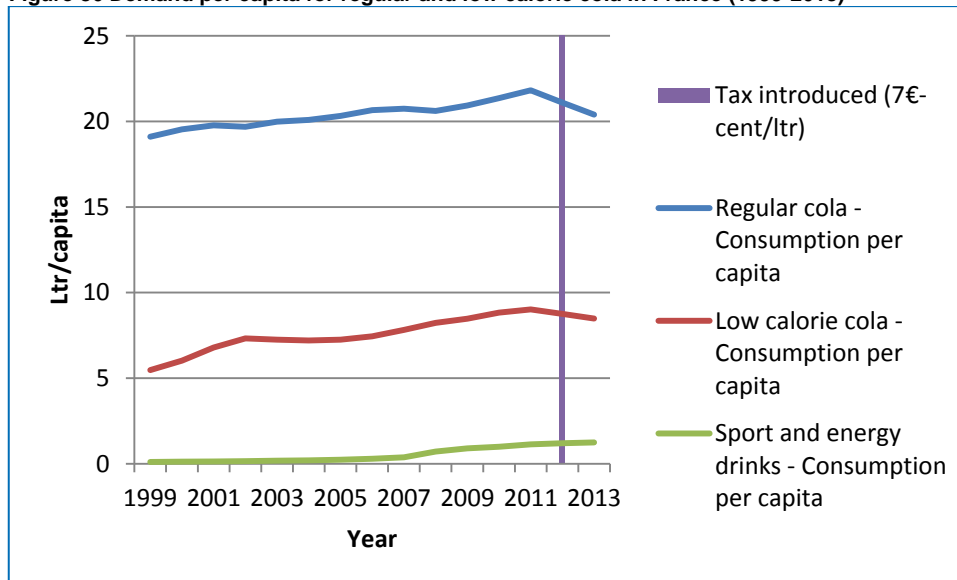
Source: Ecorys based on data from Euromonitor/Passport.

**Demand - cola**

The demand for both regular cola and low calorie cola has steadily been increasing until 2011. For low calorie cola the increase over those years has been on average 4.3%, and for regular cola 1.1%.

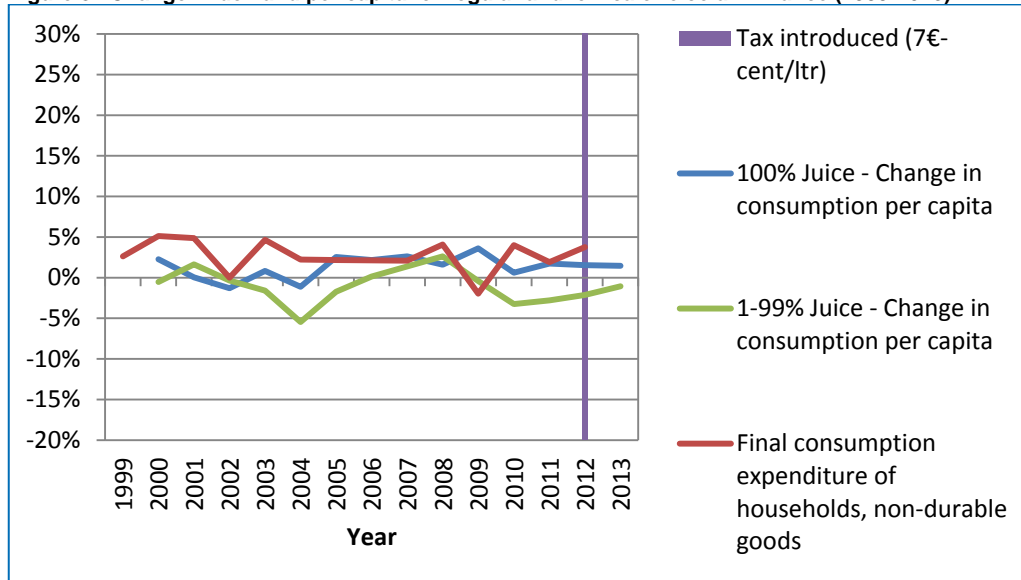
With the introduction of the tax on sugared beverages, this trend seems to have been turned. As from 2011, both beverages show a decline in demand per capita. Both types of cola have been decreasing by 3% annually in the last two years.

**Figure 86 Demand per capita for regular and low calorie cola in France (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 87 Change in demand per capita for regular and low calorie cola in France (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

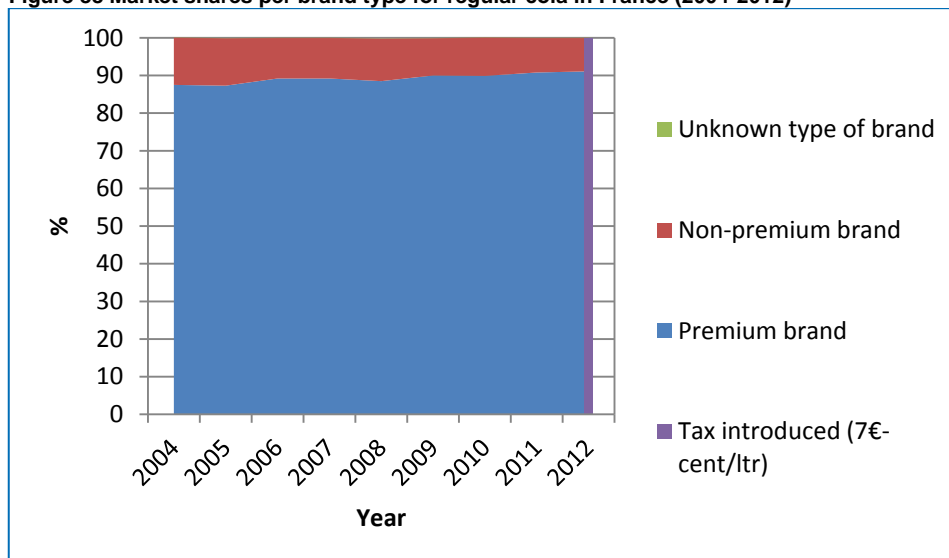
### Market shares - cola

The market for cola is heavily dominated by the premium brands. For regular cola, the premium brands have steadily increased their market share from 87% to 91% between 2004 and 2012. This transition is fully at the expense of the non-premium brands.

Similarly, for the low calorie cola, the premium brands have increased their market share from 65% in 2004 to 82% in 2012.

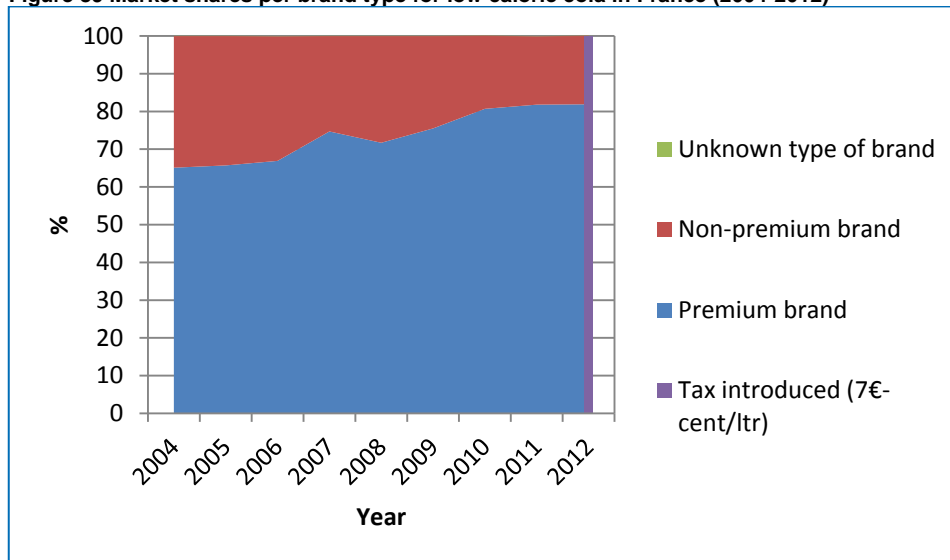
After the introduction of the tax, we observe a decline in the growth of the market share of the premium brands, for both types of cola. However, one can also argue that this is a ceiling effect, which may start already earlier in 2009 for regular cola and in 2011 for low calorie cola.

**Figure 88 Market shares per brand type for regular cola in France (2004-2012)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 89 Market shares per brand type for low calorie cola in France (2004-2012)**



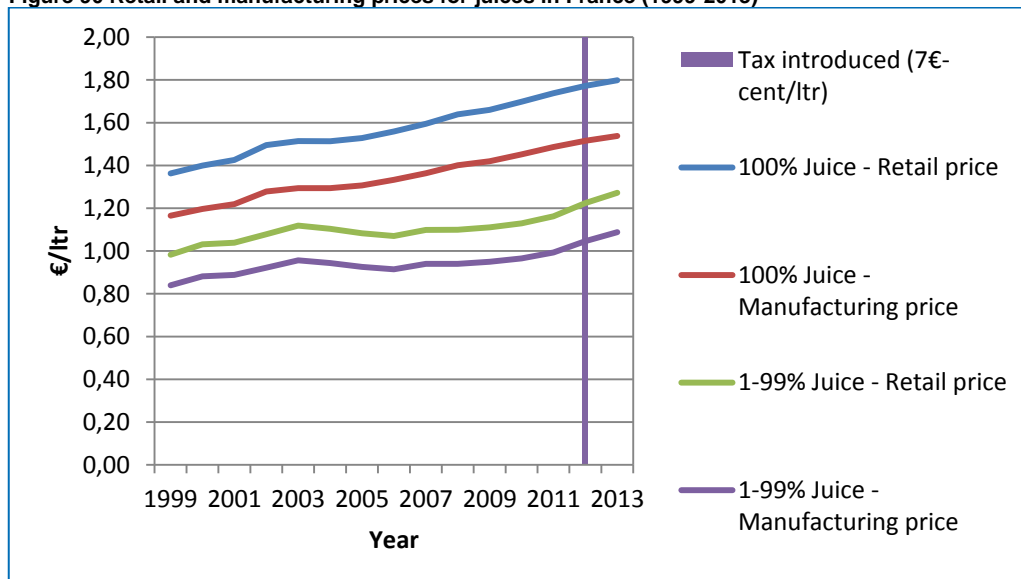
Source: Ecorys based on data from Euromonitor/Passport.

### Prices – juices

Juices can be distinguished by 100% natural juices and those partially containing natural juices (juice drinks and nectars, hereafter call 0-99% juices). Prices for 100% juices and 0-99% juices follow the same upward trend. Retailers for both types of juices change their prices closely following the manufacturers. However, retailers of 100% juices realise a higher margin than for the drinks and nectars.

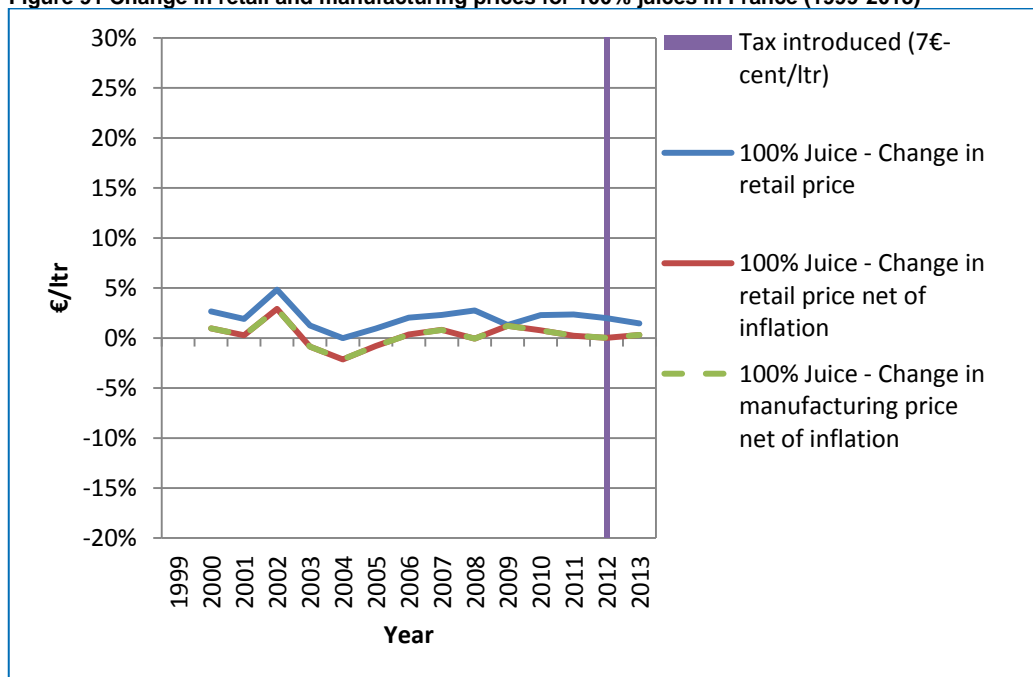
Following the tax introduction in 2012, we see only a marginal effect on the prices. The tax constitutes 6.2% of the average price for 1-99% juices in 2011. As prices have been steadily growing over the previous years, it is hard to attribute the price decreases to the tax. We see the growth rate of prices for a non-taxed product (100% juice) is smaller than that of 0-99% juices but it decreased less after the tax on sugared and non-sugar-sweetened beverages was introduced.

**Figure 90 Retail and manufacturing prices for juices in France (1999-2013)**



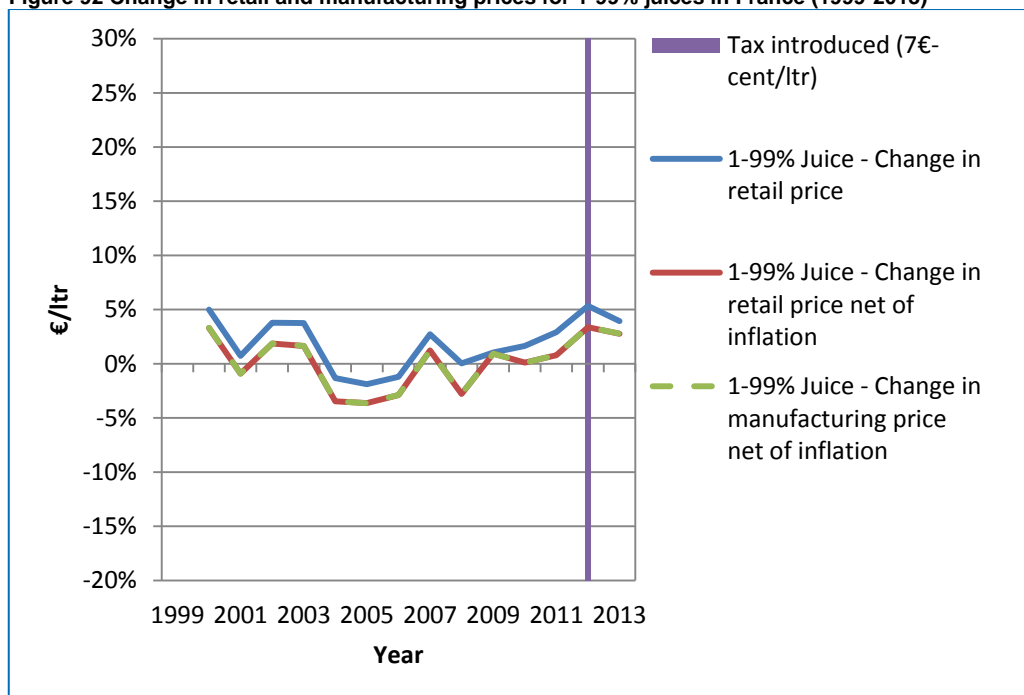
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 91 Change in retail and manufacturing prices for 100% juices in France (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 92 Change in retail and manufacturing prices for 1-99% juices in France (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

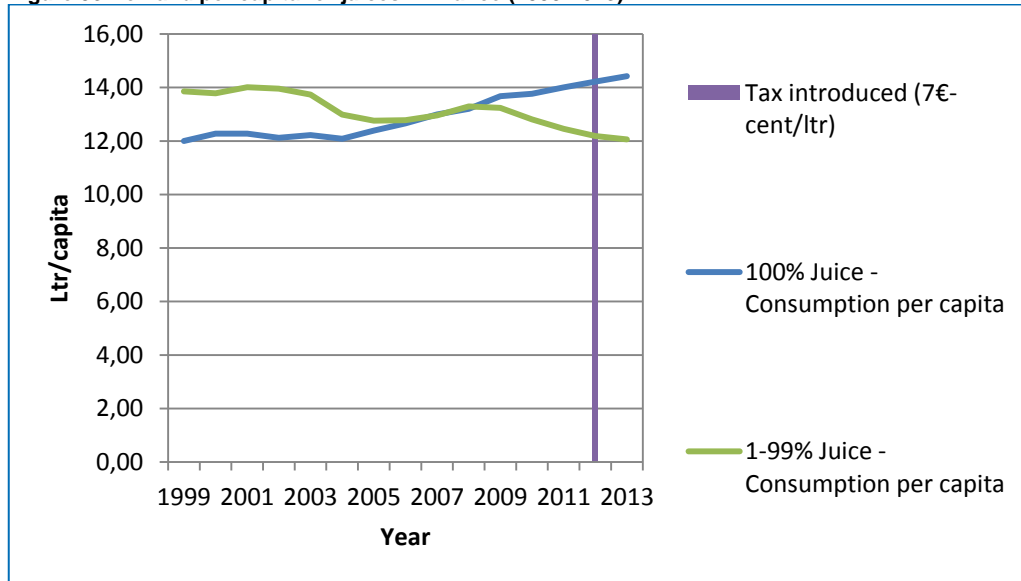
### Demand – juices

The demand for both types of juices remained between 12 and 15 litres per capita over the past 14 years. However, the trends are different: demand for 100% juices has been growing while the demand for 1-99% has been declining. In 2013 on average, a consumer drank around 14.5 litres a year of 100% juices and approximately 12 litres of partial juices.

When a tax on sugared and non-sugar-sweetened beverages was introduced, we see an increase in demand for the 100% juices by around 2%, while the demand for partial juices showed a decline by 2%. However, the demand for juice drinks and nectars was already declining, we see that it

started to decline less fast two years before the tax reduction, making it less likely that the change in the tax rate is causing the changes in demand.

**Figure 93 Demand per capita for juices in France (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 94 Change in demand per capita for juices in France (1999-2013)**

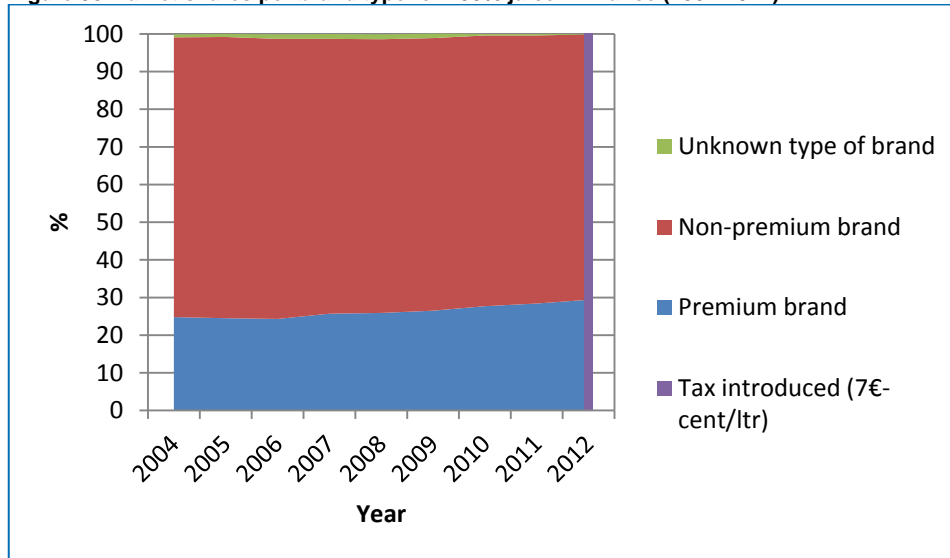


Source: Ecorys based on data from Euromonitor/Passport.

### Market shares - juices

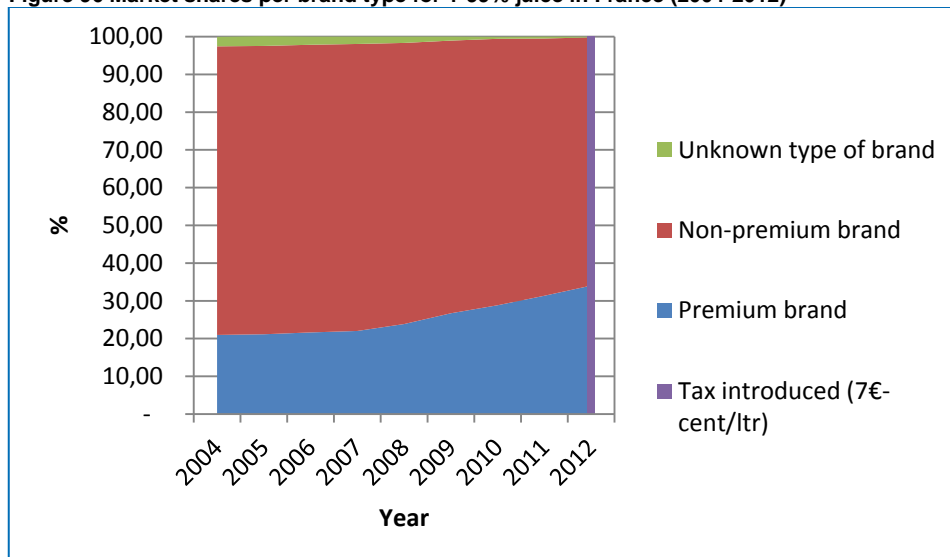
The market for juices is heavily dominated by the non-premium brands. However, for both types of juices the premium brands have increased their market shares since 2004. For 100% juice it grew from 23% to 30% while for partial juices the market share of premium brands increased from 20% to 32% between 2004 and 2013. This transition is fully at the expense of the non-premium brands. After the introduction of the tax, we do not observe changes in the upward trend that the premium brands show.

**Figure 95 Market shares per brand type for 100% juice in France (2004-2012)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 96 Market shares per brand type for 1-99% juice in France (2004-2012)**



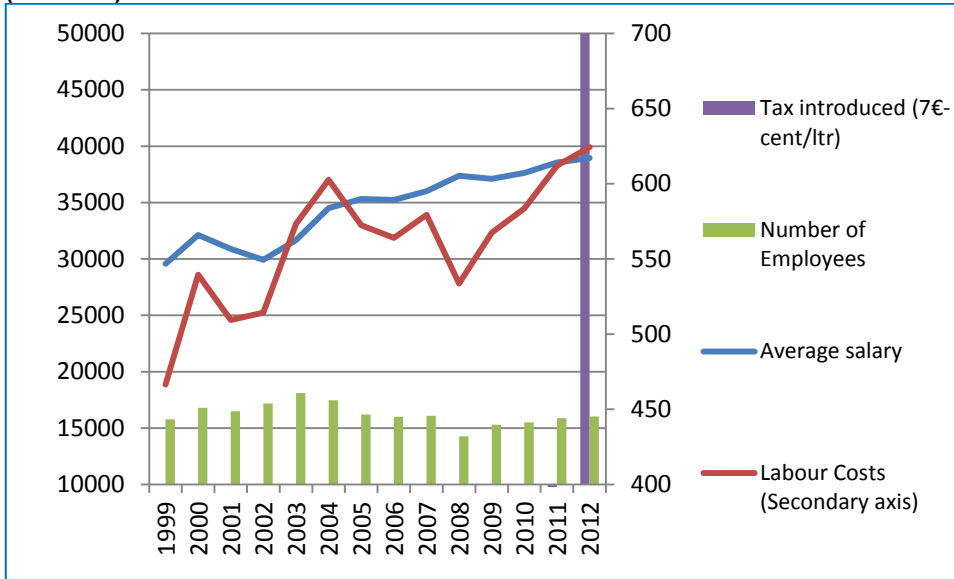
Source: Ecorys based on data from Euromonitor/Passport.

## Competitiveness – beverage industry

### *Employment and labour productivity*

The average salary has been steadily increasing over the last decade. The introduction of the tax on sugared and non-sugar-sweetened beverages did not change the trend set before in the sector. Labour costs, on the other hand, show much more fluctuation than the average salary. The number of people employed have increased since 2008. After the tax on sugared and non-sugar-sweetened beverages was introduced the number of employed persons continued to grow.

**Figure 97 Number of employees, average salary and labour costs in the beverage industry in France (1999-2012)**

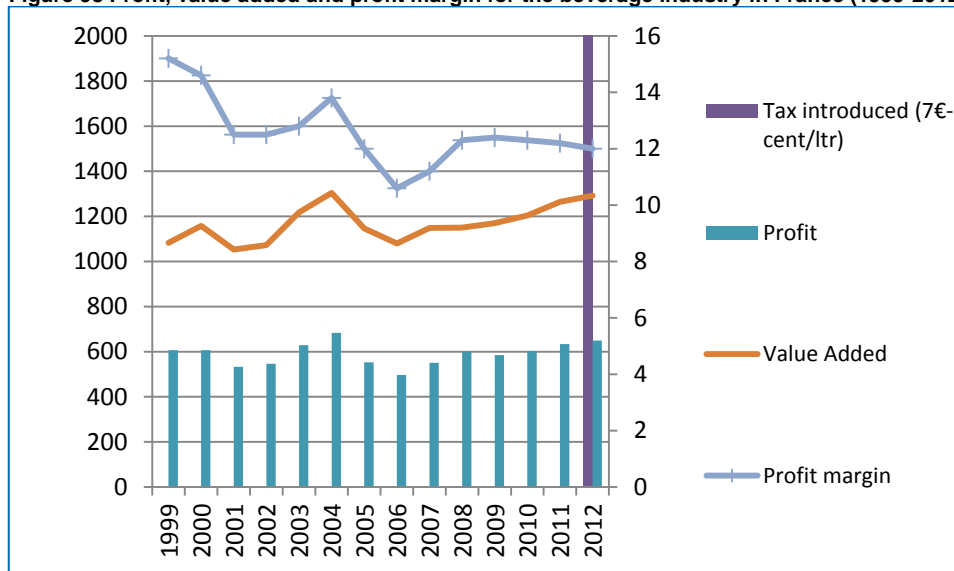


*Profit margin manufacturers*

Profit and the value added in the industry have been growing since 2006. On the other hand, the profit margin has been declining since 2008. Both of these trends stayed the same after the tax has been introduced.



**Figure 98 Profit, value added and profit margin for the beverage industry in France (1999-2012)**



Source: Ecorys based on data from Euromonitor/Passport.

### Trade flows

The main trade partners of French manufacturers of soft drinks are Belgium, Germany, the UK, Italy and the Netherlands. The introduction of the tax corresponds to Austria losing its position as one of the top-five partner importing countries.

### Consolidation of findings

The main findings of the data analyses on the tax on soft drinks are summarised in the table below.

**Table 13 Change in various measures corresponding to change in tax**

	Cola	Juices
Tax description	In 2012, a tax on sugared and non-sugar-sweetened beverages was introduced. The tax rate was set at €7.16/hectolitre, or €0.0716/litre. The tax increases correspond to a mark-up of 4.5% for regular cola and 4.7% for low calorie cola on the average prices of the year before.	In 2012, a tax on sugared and non-sugar-sweetened beverages was introduced. The tax rate was set at €7.16/hectolitre, or €0.0716/litre. The tax increases correspond to an average mark-up of 6.2% for juices containing 1-99% fruit on the average prices of the year before.
Price change	Regular cola 2012: +5.0%, 2013: +3.1% Low calorie cola 2012: +6.0%, 2013: +4.6% Tax introduction does correspond to out of the ordinary price increases. Also large price increase in year after tax introduction.	1-99% juice: 2012: +5.3%, 2013: +3.9% Tax introduction does correspond to out of the ordinary price increases. Also relatively large price increase in year after tax introduction.
Demand change	Regular cola 2012: -3.3%, 2013: -3.4% Low calorie cola 2012: -3.0% 2013: -3.1% Price increases correspond to demand decreases.	1-99% juice 2012: -2.1%, 2013: -1.1%. Price increases only weakly correspond to demand decreases.
Demand shift to lower segment	Virtually no changes in market shares of premium and non-premium brands.	No change visible in trend in year of tax introduction. No information available for more recent years.

	Cola	Juices
Demand shift to non-taxed product	No information available.	100% juice 2012: +1.5%, 2013: +1.5%. Substitution effect was already occurring. No change in this trend after tax introduction.
Employment	No change in trend after tax introduction.	No information available.
Labour productivity	No information available.	No information available.
Profit margin retailers	Retailers increase their margin for low calorie cola after the introduction of the tax, but decrease their margin for regular cola.	No information available.
Value added of manufacturers	No change in trend after tax introduction.	No information available.
Investments	No information available.	No information available.
Trade flows	No information available.	No information available.

For the soft drinks tax in France, we see a clear increase in the prices for the taxed cola after the tax is introduced. This increase correspondingly seem to cause a relative sharp decline in the demand.

A different pattern is visible for the juices, in which the taxed 1-99% juice show a relative sharp price increase, but virtually no discernable effect on the demand. Demand was already shifting from 1-99% juices to 100% juices.

Common for both products however, is the relative strong price increases continue in the year after the taxes were increased. This could be resulting from the fact that manufacturers and retailers are unable to fully pass on the full tax to consumers within one year. The two consecutive years of price increases after the introduction of the tax, makes up for more than the total anticipated price increase resulting from the tax.

On average, there is no change in the retail margin after the tax introduction. For the low calorie cola, the retailers managed to increase their margin at the same time the tax was introduced. This is not the case for regular cola, for which product the retailers are actually marginally losing profit margin. For juices, there is no change visible in the retail margin.

Other than these findings, there are no changes in the data that are coinciding with the tax introduction. There are also no changes in the indicators for competitiveness occurring at the time of the tax introduction.

#### **Tax on sugar-sweetened beverages – Hungary**

The tax on soft drinks in Hungary was introduced in September 2011 as part of the Public Health Product Tax. This tax was imposed as an indirect tax on pre-packed products in categories where products with lower levels of the targeted ingredients (sugar, fat, salt, caffeine) are available. The tax rate was 5 HUF/litre if the content of added sugar was more than 8g/100ml. In 2012, the base of the rate and the rates itself were not changed but the range of exceptions has became wider. The tax rate became 200 HUF/litre for syrups or concentrates for soft drinks and 7HUF/litre for other soft drinks. Drinks that contain more than 25% of fruit and vegetable are exempted. The tax is payable by volume on products produced in Hungary for the domestic market by manufacturers, and on imported products by the first domestic seller (whether or not this is to the final consumer).

### Data analysis

To investigate the effects of the tax on sugar-sweetened beverages, we investigate two different product types: cola and juices<sup>122</sup>. Investigating cola allows us to investigate the substitution effect of the tax on only one type of cola. The same is true for juices, where we can distinguish between taxed juices that contain less than 25% of fruit or vegetable and juices that contain more than 25% of fruit or vegetable that are not taxed.

### Prices – cola

Cola prices have steadily been increasing over the observed period. It rose from around HuF 125 in 1999 to more than HuF 250 in 2013 for low calorie cola, and more than HuF 230 for regular cola. Until 2010, the prices for both types of cola were nearly equal. However, after 2010, the prices for low calorie cola continued to increase, while the regular cola prices stabilized.

2010 is also the year when the profit margin for retailers started to change. Until 2011, retailers reduced their profit margin for regular and low calorie cola, as indicated by the diverging lines for the retail price change and the manufacturing price change. However, after 2011 retailers more than reclaimed their profit margin by raising their prices more than the manufacturing prices.

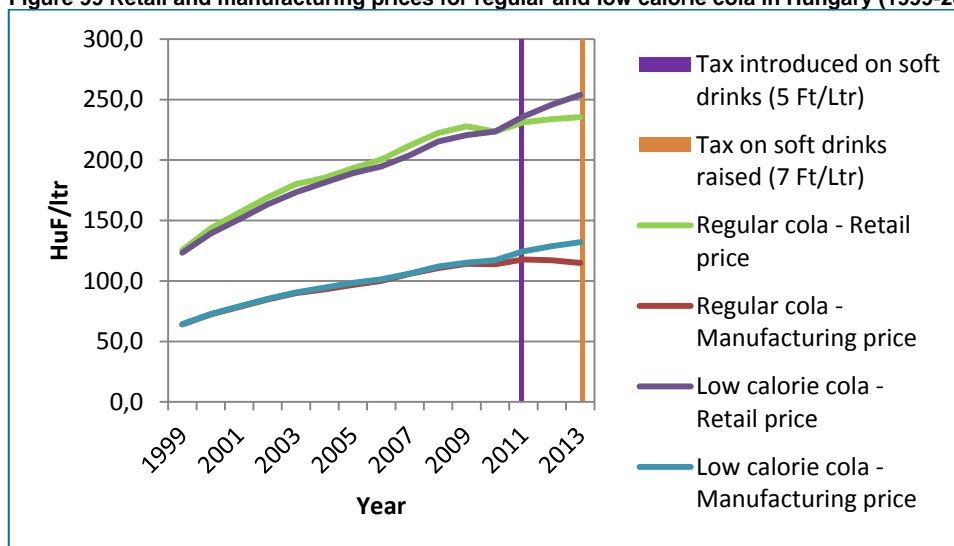
In 2011, when the tax was introduced, prices for regular cola increased more than in the previous year and in the year after. However, prices did not rise more than average prices, as indicated by the price change minus the inflation rate.

Prices did increase more than the pure tax increase. If only the tax increase was passed on to consumers, prices would have increased by 3.1% for regular cola from 2010 till 2012. However, prices increased by 4.6%, indicating that also other factors influenced the prices of regular cola.

Also low calorie cola showed a relatively large price increase when the tax was introduced compared to the year before and after. Here, prices rose more than the inflation level.

The tax increase of 2HuF per litre is not clearly visible in the prices as the change in price does not stand out from nearby observations in other years.

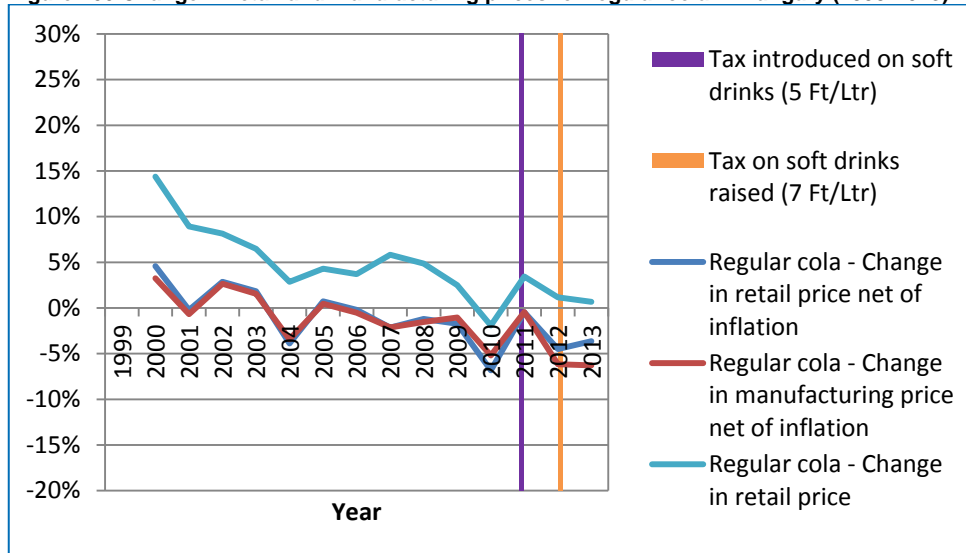
**Figure 99 Retail and manufacturing prices for regular and low calorie cola in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

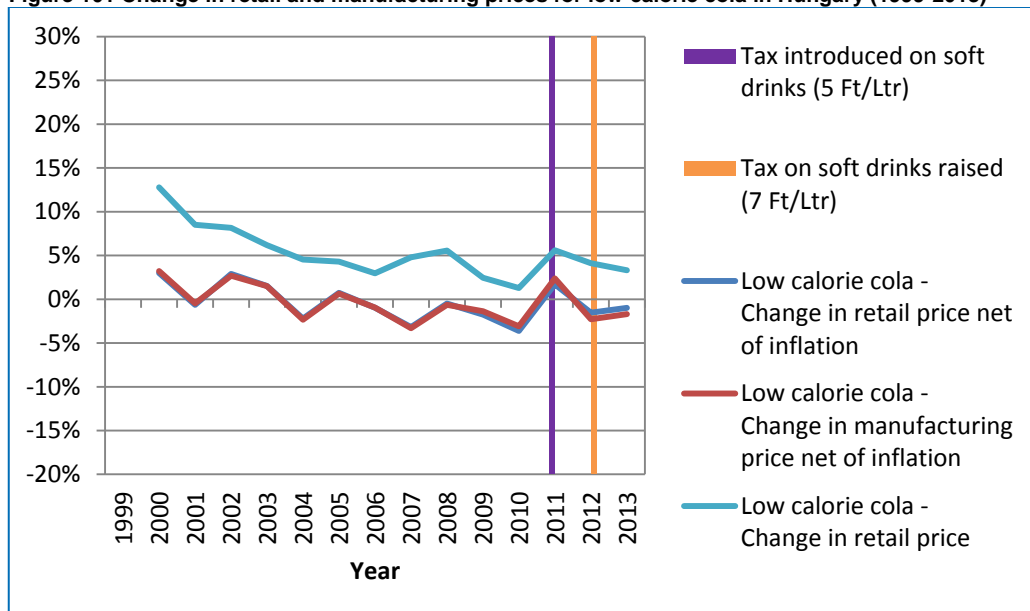
<sup>122</sup> We investigate two different product types (cola and juices), which represents only a part of the sector under scope.

**Figure 100 Change in retail and manufacturing prices for regular cola in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 101 Change in retail and manufacturing prices for low calorie cola in Hungary (1999-2013)**



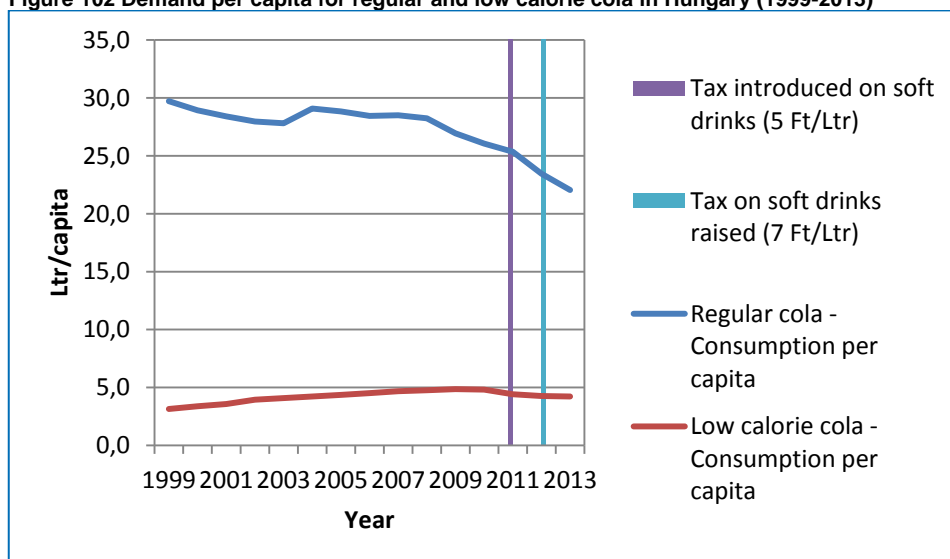
Source: Ecorys based on data from Euromonitor/Passport.

### Demand – cola

In the demand for cola, we see that regular cola is far more popular than low calorie cola. However, that said, we also see the demand for regular cola diminishing, and in the last years at an increasing rate. Whereas consumers bought around 30 litres of regular cola a year per capita at the beginning of the century, in 2013, they only bought 21 litres a year per capita. Over the same period, the low calorie cola has been relatively stable, with a very small increase of 1 litre per capita a year.

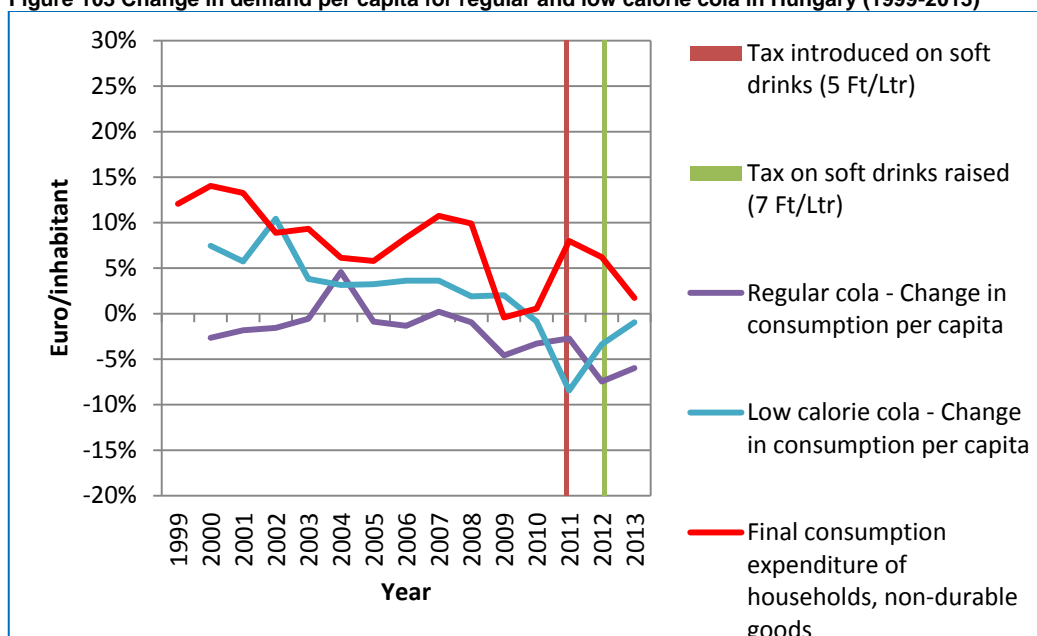
When the tax on sugar-sweetened beverages was introduced, the largest effect was visible for the low calorie cola with an almost 10% decrease in demand. This decrease continued in 2012 and 2013, but at a smaller pace. At first, there is no effect for the regular cola. The sharp decline in demand did not occur until 2012, coinciding with the tax increase.

**Figure 102 Demand per capita for regular and low calorie cola in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 103 Change in demand per capita for regular and low calorie cola in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

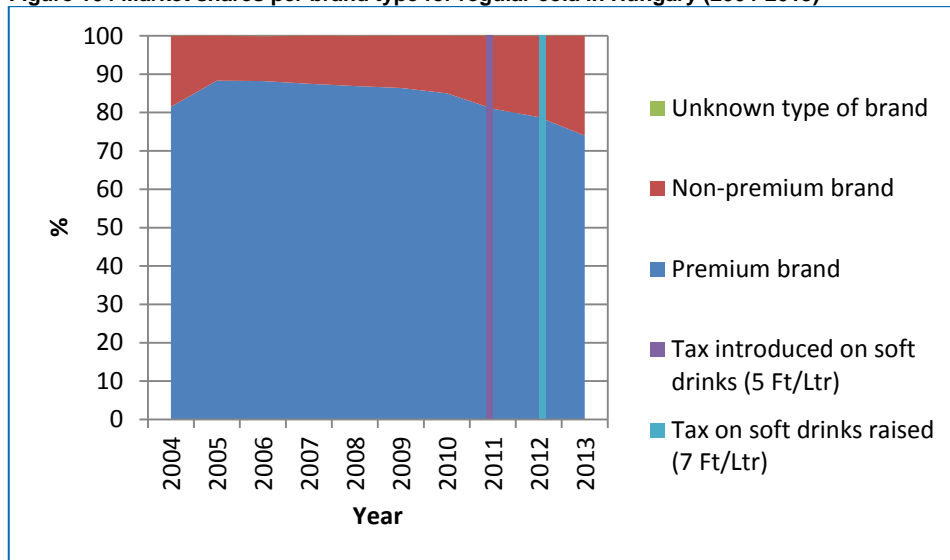
### Market shares – cola

As in all investigated countries, in Hungary too the market for cola is dominated by the premium cola brands. For both regular cola and low calorie cola the market share for premium brands was well above 80% before 2010. As from 2011, the market share for premium brands in the market for regular cola decreased to currently slightly over 70%. This decrease is benefiting the non-premium brands that simultaneously increase their market share. In the market for low calorie cola, the premium brands are able to maintain their market share above 80%, although here too, we see a decline.

The market share of premium brands as happening throughout the observed period is gradually declining. However, this trend has been reinforced for regular cola since the introduction of the tax on sugar-sweetened beverages. Before the introduction of the tax, the average decrease in market share was less than 0.5%-point per year. After the tax introduction, the decrease is more than 3%-point a year.

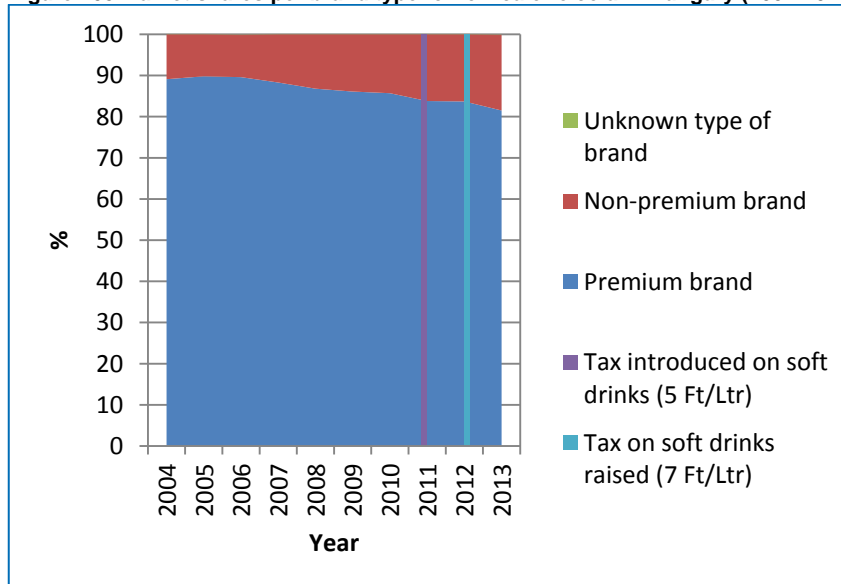
For the low calorie cola, we see a less distinct cut-off after the tax introduction. Before the tax, the average decrease of market shares for premium brands is slightly over 0.9%-point per year, while after the tax, the decrease is -1.15%-point a year on average. This latter figure is strongly influenced by the market share decrease of more than 4.4%-point in 2013, well after the introduction and increase of the tax on sugar-sweetened beverages. Without this observation, the decrease in market share for premium brands is actually stabilising with an average decrease of 0.8%-point per year.

**Figure 104 Market shares per brand type for regular cola in Hungary (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 105 Market shares per brand type for low calorie cola in Hungary (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

### Prices – juices

From 1999 to 2009, juice prices have rapidly increased with on average more than 5% per year. In 2009, the trend was interrupted, most notably for juice drinks that stabilised its retail and manufacturing prices at HuF 250 and HuF 100 respectively. This trend interruption is also visible for juices and nectars that contain more than 25% fruit, but to a far lesser extent. In 2009 and 2010 the price increases dropped to 1 and 3 percent respectively, but these growth rates are followed by a

price increase of 6%. Although the trend was interrupted in 2009, it seemed that the trend was picked up again two years later.

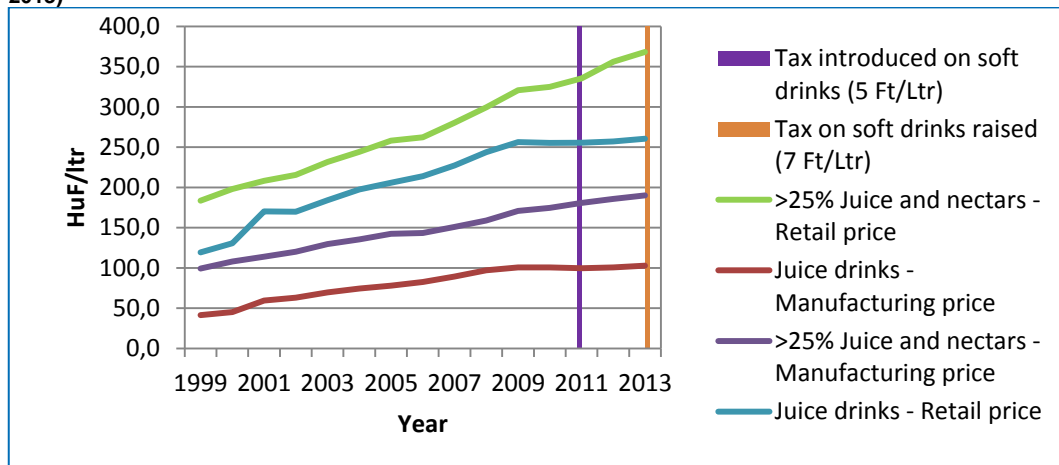
The profit margins for both juice drinks and juices with more than 25% fruit have changed considerably in the past 14 years. For juice drinks, retailers accepted a decrease in their margins, mostly in the period between 2001 and 2004 and between 2006 and 2008. After these periods, the retailer follows closely the price setting of the manufacturers.

For juices that contain more than 25% fruit, the reverse is true. Retailers more than offset any of the price increases of manufacturers in their price setting and they managed throughout the observed period to expand their profit on juices.

The effect of the tax introduction is barely noticeable in the prices of juice drinks. Prices did not change dramatically following the introduction or the increase of the tax. Also the tax exempted juices and nectars did not show any effect following the introduction of the tax. Interestingly though, at the tax increase, the prices for the juices did increase sharply, while manufacturing prices decreased.

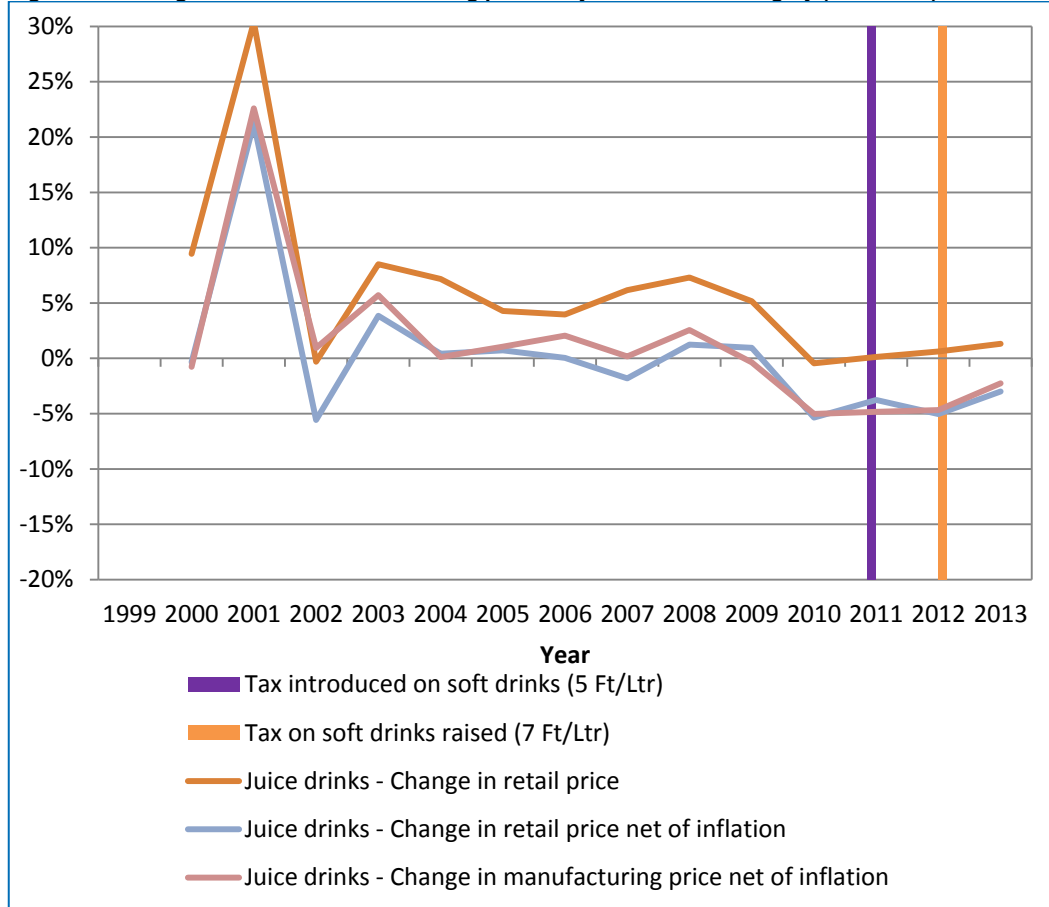
The price changes were also smaller than the taxes. If the tax was fully passed on to consumers, and other factors affecting the price would have remained equal, prices would have risen with 2.7% over a two year period from 2010 to 2012. Instead, they rose by 0.8%.

**Figure 106 Retail and manufacturing prices of various types of juices and juice drinks in Hungary (1999-2013)**



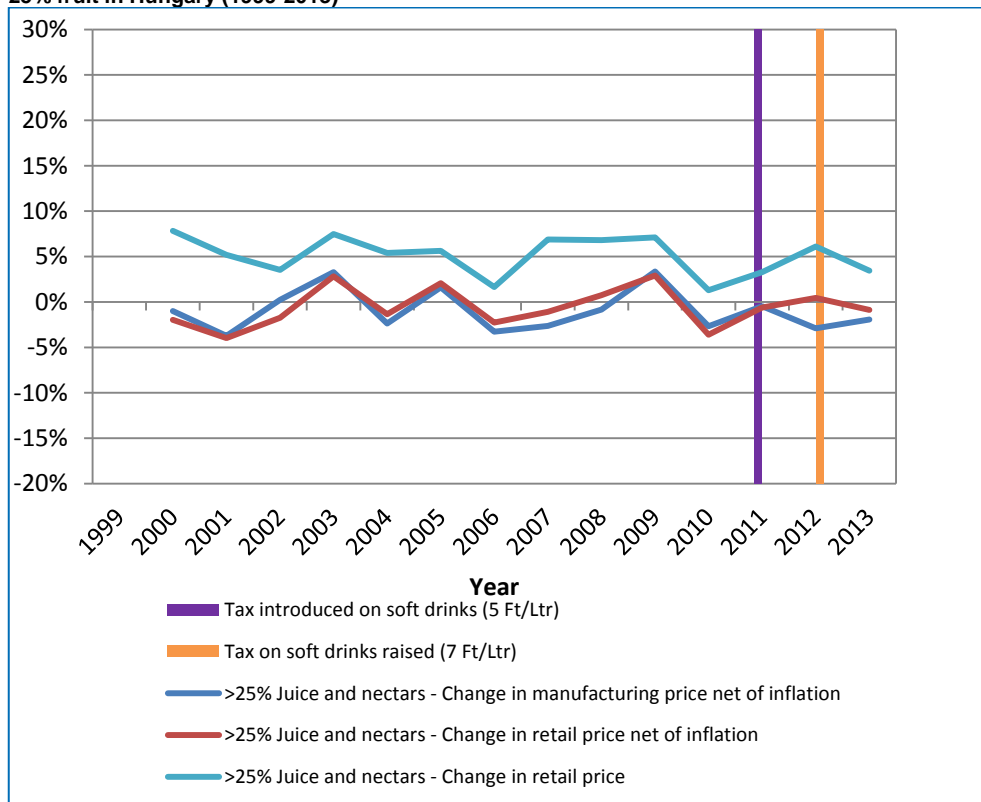
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 107 Change in retail and manufacturing prices of juice drinks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 108 Change in retail and manufacturing prices of various types of juices containing more than 25% fruit in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.



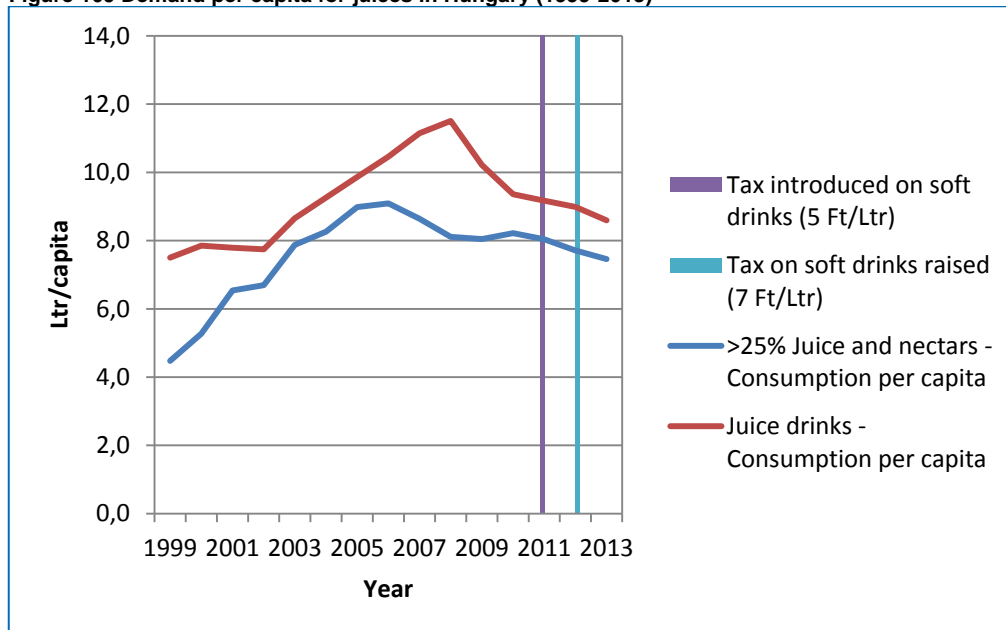
## Demand – juices

In the beginning of the century, the demand for juices strongly increased, especially for the juices and nectars that contained more than 25% fruit. However, since 2006, the demand for these types of juices slowly decreased to a level where the average consumer in Hungary purchased slightly over 7 litre of juice a year.

The demand for juice drinks shows a slightly different pattern. It also shows a rapid increase in the demand, which lasted until 2008. However, from that year, a sharp decline in the demand occurred. Juice drinks are now only slightly more popular than nectars.

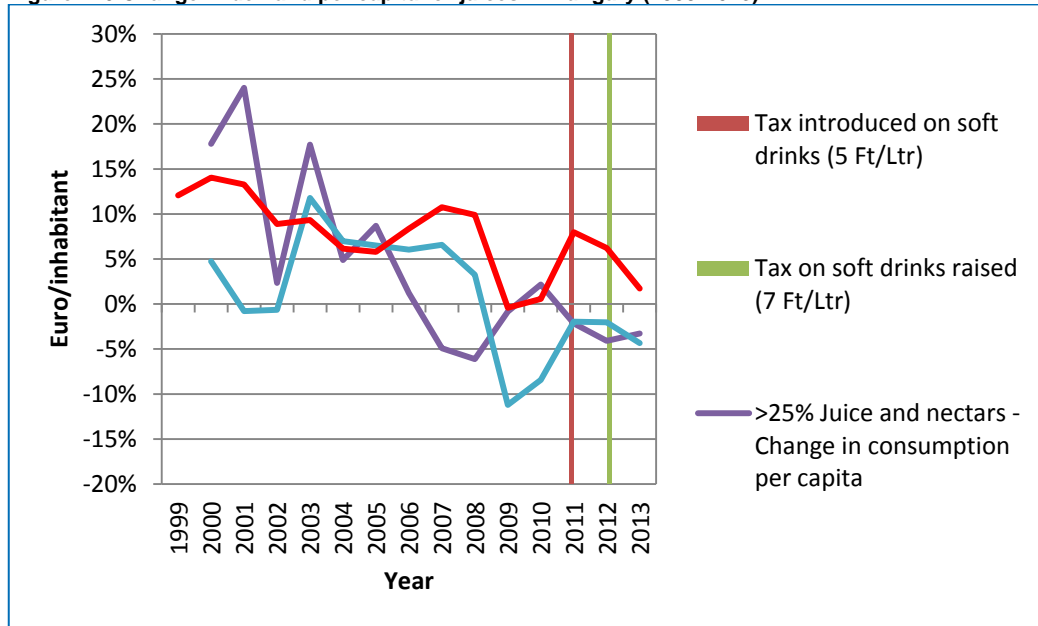
It is hard to distinguish the effect of the tax on the demand for juices. Demand is declining in the years that the tax is introduced and increased, but not at a remarkable rate compared to earlier and later years. Moreover, the effect is relatively similar for both the taxed and tax exempted juice.

Figure 109 Demand per capita for juices in Hungary (1999-2013)



Source: Ecorys based on data from Euromonitor/Passport.

Figure 110 Change in demand per capita for juices in Hungary (1999-2013)



Source: Ecorys based on data from Euro monitor/Passport and Eurostat.

### Market shares – juices

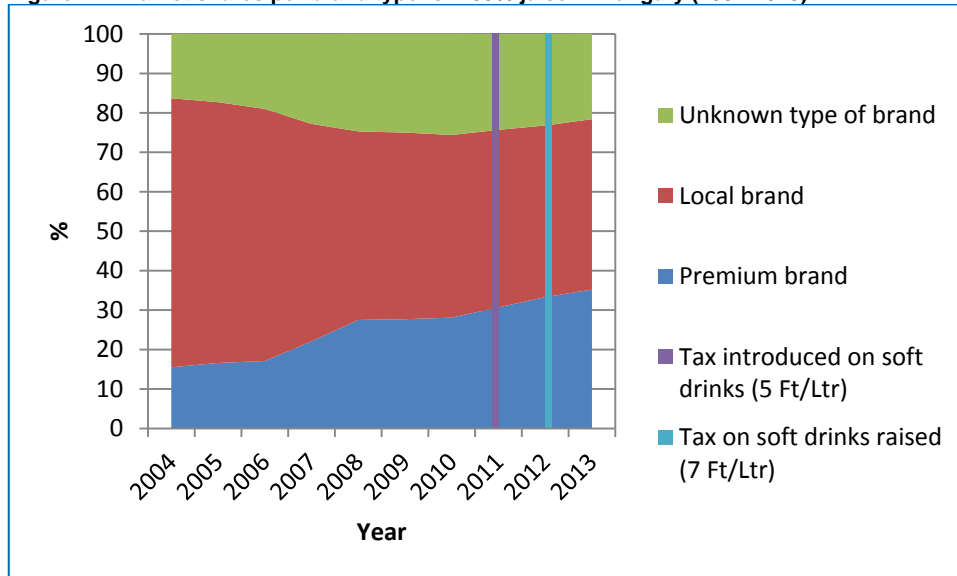
The market share development for the various juice types show remarkable similarities. Firstly, a relative large share of the juices is sold by unclassifiable brands. However, the share of unclassifiable brands is decreasing over time.

Secondly, the decline in market shares for the unclassifiable brands is benefitting the non-premium brands. For all juice types, the non-premium brands have the largest market share in 2013.

Thirdly, we observe a slow but certain increase in the market shares of the premium brands for all juice types, with the exception of juice drinks. For this juice type, the premium brands' market share remains relatively stable with small fluctuations.

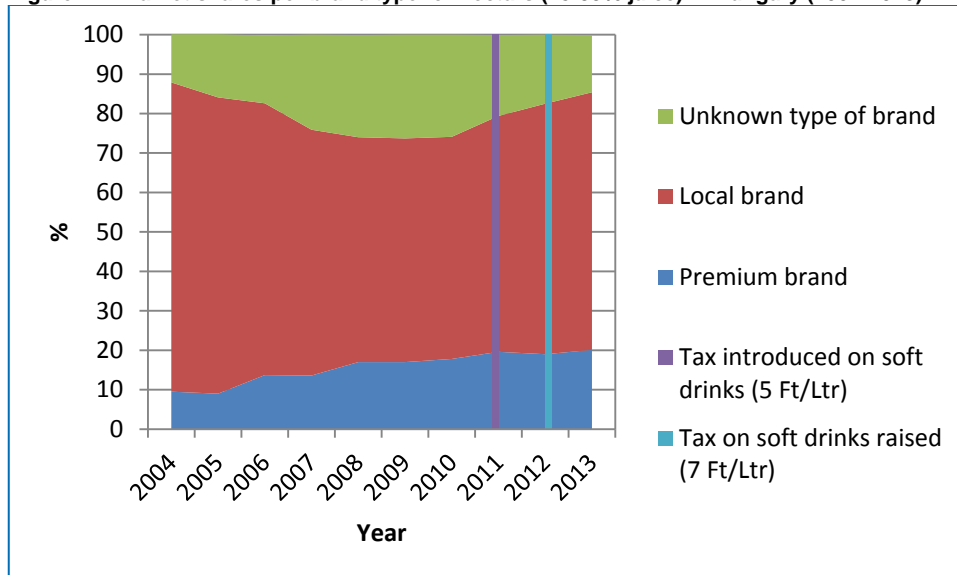
Fourth, and finally, we either see an increase (100% juice) or a steeper increase (nectars and juice drinks) in the market share of the non-premium brands. At the same time, we also see an increase in the market share of premium brands, although this effect is far less strong. These market share gains come at the expense of the unclassifiable brands.

**Figure 111 Market shares per brand type for 100% juice in Hungary (2004-2013)**



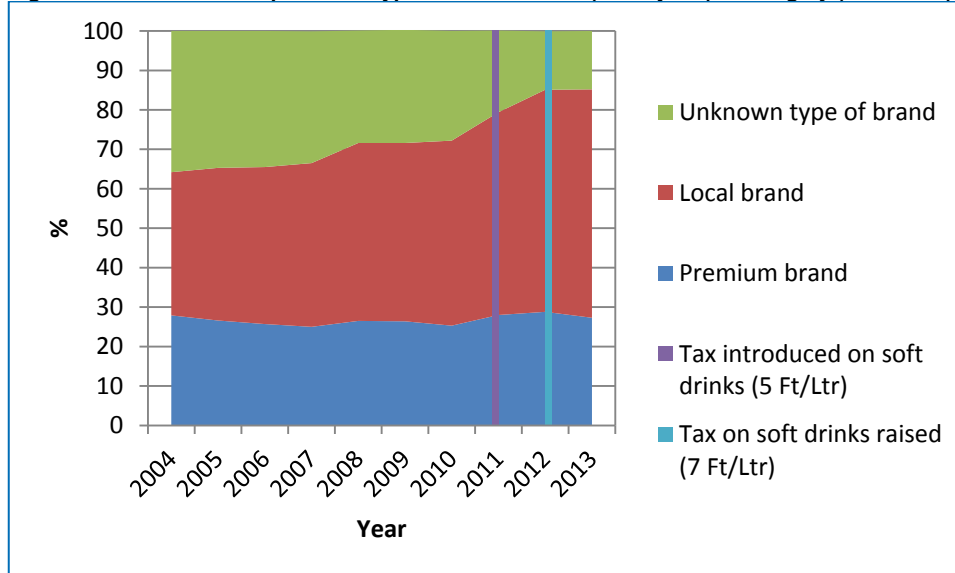
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 112 Market shares per brand type for nectars (25-99% juice) in Hungary (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

Figure 113 Market shares per brand type for Juice drinks (<25% juice) in Hungary (2004-2013)



Source: Ecorys based on data from Euromonitor/Passport.

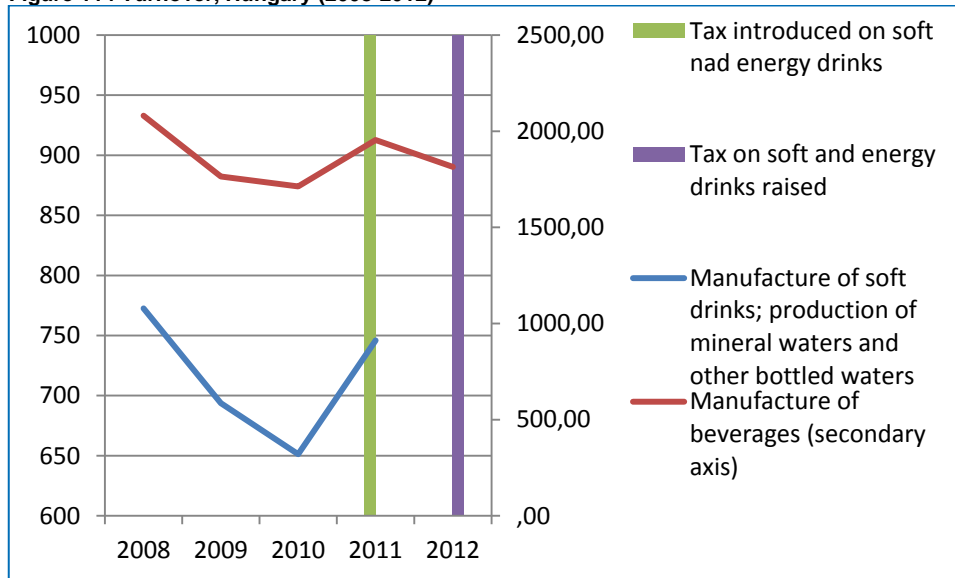
### Competitiveness of soft and energy drinks

The data are only available on higher level aggregation where soft and energy drinks are following under one category. Therefore the analysis in the section below is for both soft and energy drink.

#### Production and producers

Figure 114 shows that the revenues generated by the companies producing soft drinks increased after the tax was introduced. The production value was increasing as well, already since 2009. On the other hand, turnover of the manufacturing of beverages as a whole dropped significantly in 2012.

Figure 114 Turnover, Hungary (2008-2012)



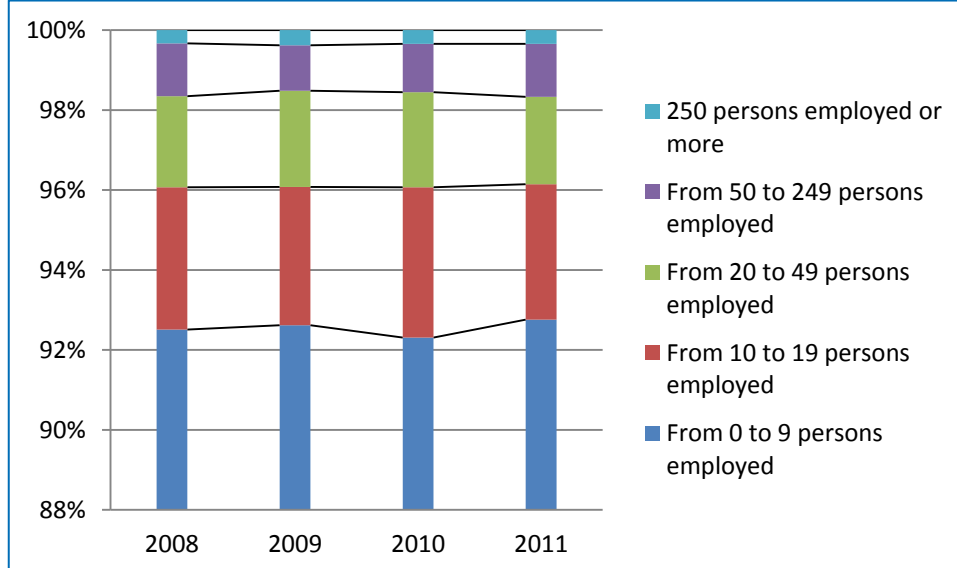
Source: SBS Eurostat.

### Employment and labour productivity

The sector<sup>123</sup> is dominated by SMEs and self-employed (Figure 115 ). The data indicate that more than 90% of companies in the sector have between 0 and 9 employees on average in the Hungary, and a further 3% of companies have between 10 and 49 employees in 2011.

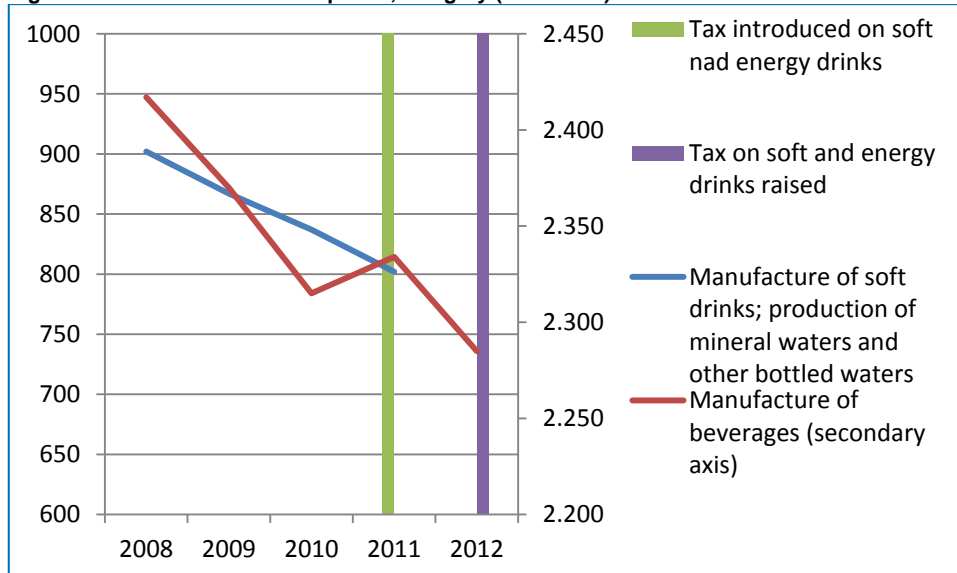
The total number of enterprises producing soft drinks however has been decreasing over the observed period. This trend did not change after the introduction of the Public Health tax, as indicated in Figure 116 .

**Figure 115 Manufacture of beverages: number of enterprises by size class, Hungary (2008-2011)**



Source: SBS Eurostat.

**Figure 116 The number of enterprises, Hungary (2008-2012)**



Source: SBS Eurostat.

The number of enterprises in the manufacturing of beverages as a whole was much more volatile but after the tax on sweets was introduced, the number of enterprises increased. In 2012, however, the number of enterprises further dropped.

<sup>123</sup> Manufacturing of soft drinks including production of mineral waters and other bottled waters is part of the sector of manufacturing of beverages industry. Since the data is only available at a higher aggregation level, the level for manufacturing of beverages is assessed to obtain an indication of the size of the industry of soft drinks.

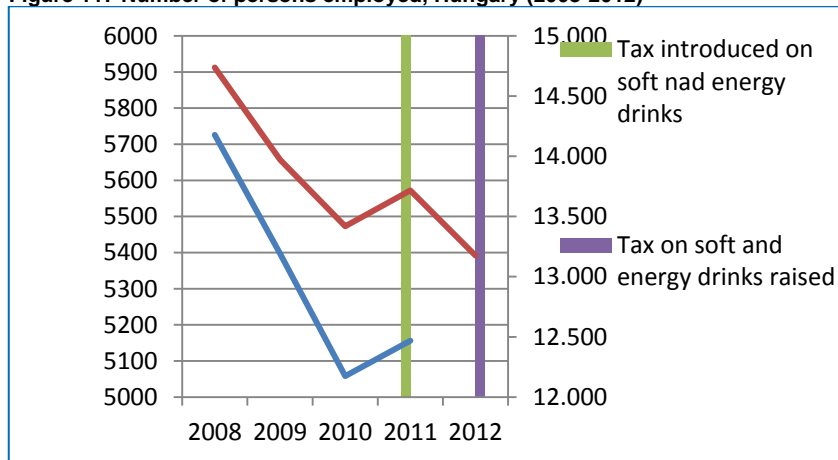
Since 2008 the number of persons employed by the companies producing soft drinks has been decreasing. In 2010, the trend reversed when the Public Health tax was introduced (**Figure 138**). The same pattern is visible at the higher level of aggregation: manufacturing of beverages.

This effect in combination with the stable level of value added in the sector resulted in rather stable level of labour productivity in the sector producing soft drinks (Figure 118 ).

#### Value added of the manufacturers

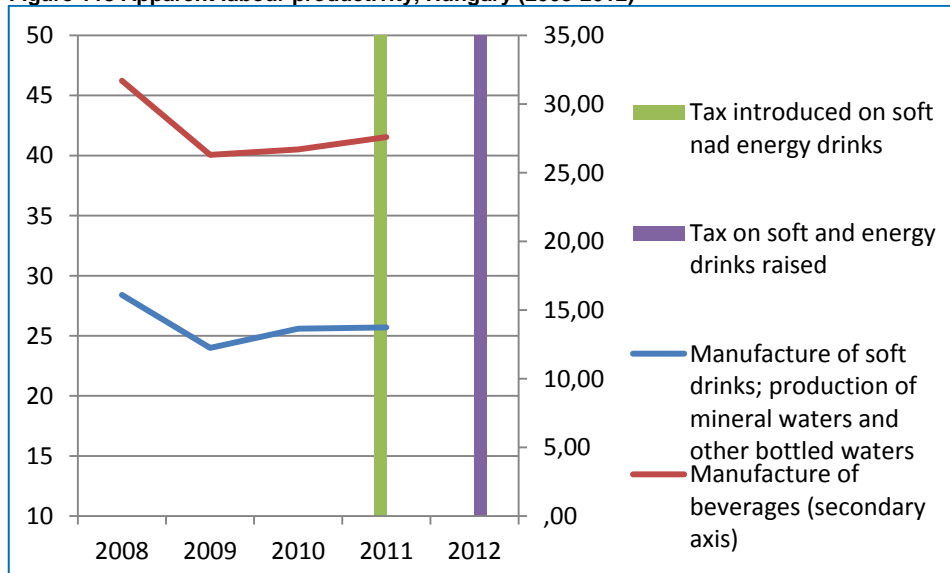
The value added of the manufacturers of soft drinks dropped significantly since 2008, as shown on Figure 119 . For the two next years the value added at factor costs remained stable in the sector but in 2011 it slightly increased when the tax was imposed. The share of value added of manufacturing of soft drinks in the whole manufacturing industry (Figure 120 ) slightly dropped between 2009 and 2010 but after that remained stable.

**Figure 117 Number of persons employed, Hungary (2008-2012)**



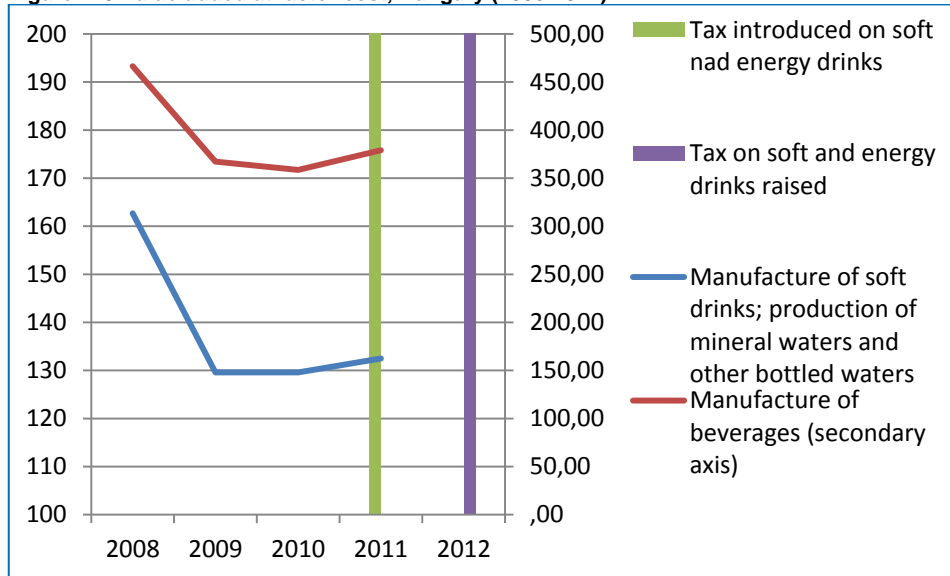
Source: SBS Eurostat.

**Figure 118 Apparent labour productivity, Hungary (2008-2012)**



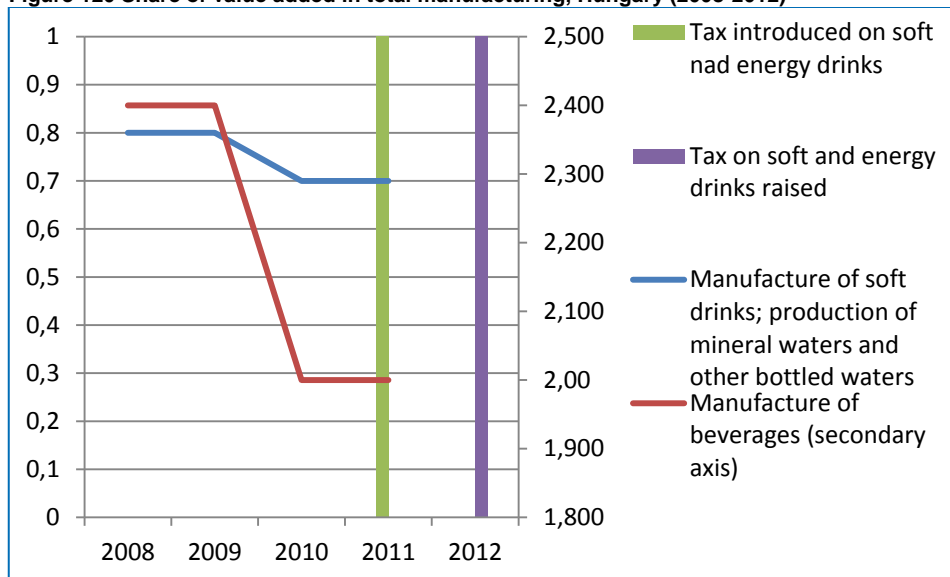
Source: SBS Eurostat.

**Figure 119 Value added at factor cost, Hungary (2008-2012)**



Source: SBS Eurostat.

**Figure 120 Share of value added in total manufacturing, Hungary (2008-2012)**



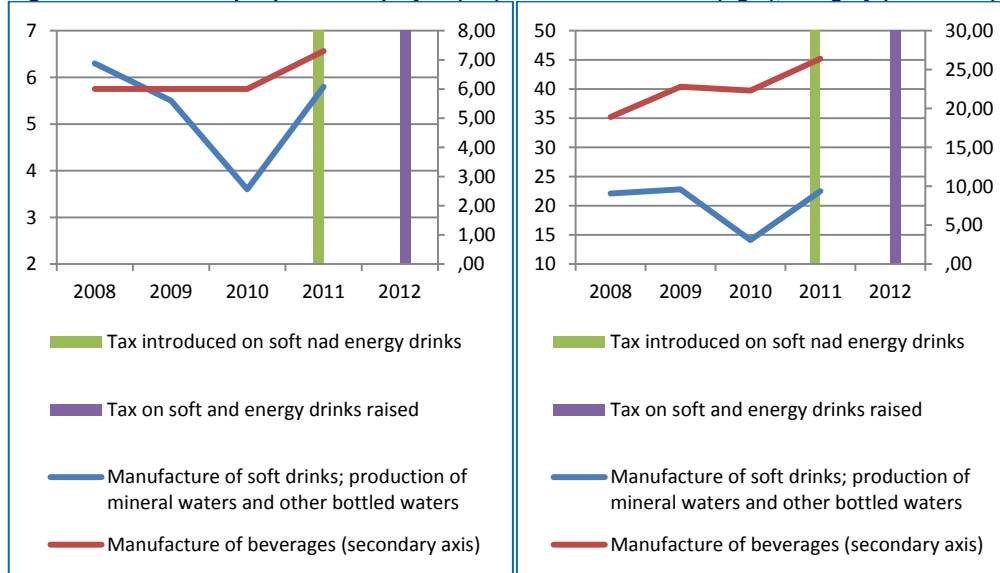
Source: SBS Eurostat.

### Investments

The investment per person employed of the manufacturing industry of soft drinks was decreasing between 2008 and 2010. The introduction of the tax, however, corresponds with a strong increase in the investment activity. The investment rate<sup>124</sup> showed the same pattern as the investment per person employed (Figure 142). The trends in the investment activity are similar to that of the overall beverage industry.

<sup>124</sup> This rate is calculated as the investment divided by the value added at factor cost.

Figure121 Investment per person employed (left) and Investment rate (right), Hungary (2008-2012)



Source: SBS Eurostat.

*Consolidation of findings*

The main findings of the data analyses on the tax on sugar-sweetened beverages in Hungary are summarised in the table below.

Table 14 Change in various measures corresponding to change in tax

	Cola	Juices
Tax description	In September 2011, tax on sugar-sweetened beverages introduced of 5HUF/ltr if more than 8g/100ml of added sugar. In 2012, the rate was increased to 7HUF/ltr. The two tax increases combined correspond to a mark-up of prices from 2010 with 3.1% for regular cola.	In September 2011, tax on sugar-sweetened beverages introduced of 5HUF/ltr if more than 8g/100ml of added sugar. In 2012, the rate was increased to 7HUF/ltr. The two tax increases combined correspond to a mark-up of prices from 2010 of 2.7% for juices (<25% fruit).
Price change	Regular cola 2011: +3.4%, 2012: +1.2%, 2013: +0.7% Tax introduction does weakly correspond to out of the ordinary price increases.	<25% fruit juices: 2011: +0.1%, 2012: +0.6%, 2013: +1.3% Tax introduction does not correspond with out of the ordinary price increases.
Demand change	Regular cola 2011: -2.7%, 2012: -7.5%, 2013: -6.0% Tax introduction does not correspond to out of the ordinary changes in demand.	<25% fruit juices: 2011: -2.0%, 2012: -2.0%, 2013: -4.4% Tax introduction does not correspond with out of the ordinary changes in demand.
Demand shift to lower segment	Tax introduction and increase corresponds with reinforcement of trend toward the increased popularity of non-premium brands at the expense of premium brands.	Data hard to interpret: tax introduction coincides with higher demand for non-premium brands at the expense of unclassifiable brands.
Demand shift to non-taxed product	If any effect occurring, shift from non-taxed to taxed product	No change visible in relative market shares of taxed and non-taxed products.
Employment	Tax introduction coincided with increasing employment after years or reduction. Year to tax increase corresponds with decreasing employment. No information is available for more recent years.	



	Cola	Juices
Labour productivity	Labour productivity stabilises over the observed period. No changes visible after tax introduction. No information available for more recent years.	
Profit margin retailers	Retailers increase their margin for regular and low calorie cola after the introduction of the tax.	Retailers significantly increased their margin in the years following the tax introduction for non-taxed juices. Their margin is marginally increased for taxed juices.
Value added of the manufacturers	The value added of manufacturers recovers slightly after introduction of the tax. No information available for more recent years.	
Investments	Investments increased in the year of tax introduction. No information available for more recent years.	
Trade flows	No information available.	

There is virtually no effect visible in the prices of the new tax. In previous and following years, prices show similar increases. Demand shows correspondingly very little effect with regular cola as exception. This product shows a relative sharp decrease in demand for the first year the tax was fully in effect. In addition, we also do not observe a shift from taxed to non-taxed beverages.

We do see a change in the class of beverages being bought at the same time the tax is introduced and increased. Non-premium brands are becoming increasingly popular in Hungary, most notably for cola products, but possibly also for juices.

For the competitiveness indicators in general we see an increase at the same time of the tax introduction. This increase follows a low point in the various graphs in 2009 and 2010. It is therefore hard to conclude whether the tax had any effect on the competitiveness of the sector.

We do see, however, that the retailers for the investigated beverages increased their margin, both for the taxed and non-taxed alternative products.

### Tax on energy drinks – Hungary

The tax on energy drinks in Hungary was introduced in September of 2011 as part of the Public Health Product Tax. This tax was imposed as an indirect tax on pre-packed products in categories where products with lower levels of the targeted ingredients (sugar, fat, salt, caffeine) are available<sup>125</sup>. The tax rate was 250 HUF/litre if the content of added caffeine is more than 10g/100ml. In 2012 the base of the rate was changed: the tax rate became 250 HUF/ml if the content of a methylxanthines is more than 1mg/100ml or if the content of taurine is more than 100mg/100ml. In 2013 the base of the rate was changed again concerning the threshold of the content of methylxanthines which was set higher to 15 mg/100 ml. Thus the full tax rate is 250 HUF/ml if the content of a methylxanthines is more than 15mg/100ml or if the content of taurine is more than 100mg/100ml. The tax is payable by volume on products produced in Hungary for the domestic market by manufacturers, and on imported products by the first domestic seller (whether or not this is to the final consumer).

<sup>125</sup> Landon, J, Graff, H. (2012), What is the role of health-related food duties? National Heart Forum (<http://nhfshare.heartforum.org.uk/RMAssets/NHFreports/Health-related%20food%20duties%20meeting%20report%20FINAL.pdf>).

## Data analysis

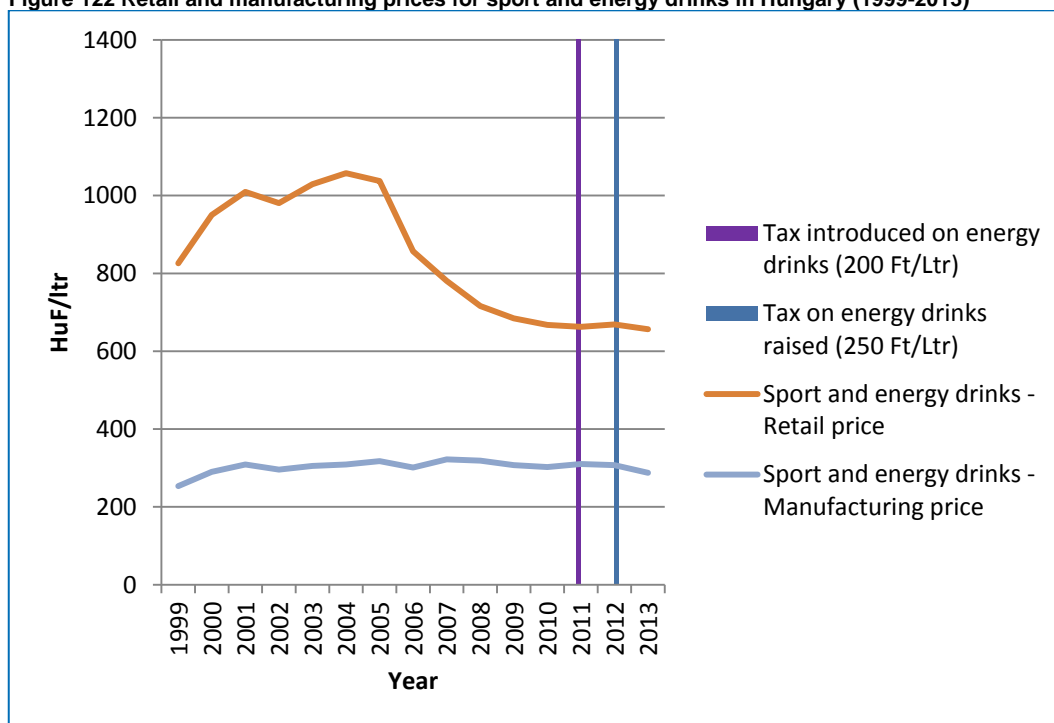
### Prices

Manufacturing prices of sport and energy drinks have been stable on the level of 300 HUF per litre. The retail price however was increasing between 1999 and 2004 and then dramatically decreased (by 20% over 5 years when corrected for the presence of inflation) to reach the level of 650 Ft per litre. An introduction of the public health product tax did not change the already occurring trend in the prices, nor did the change in the tax rate in 2012. The prices continued to gradually decline.

On average, the margin for sport and energy drinks has decreased, mainly due to retailers price decrease that was not solicited for by manufactures. However, in the last years of the previous decade, retailers were unable or unwilling to charge the higher prices of the manufactures to the consumers, resulting in a slightly smaller margin.

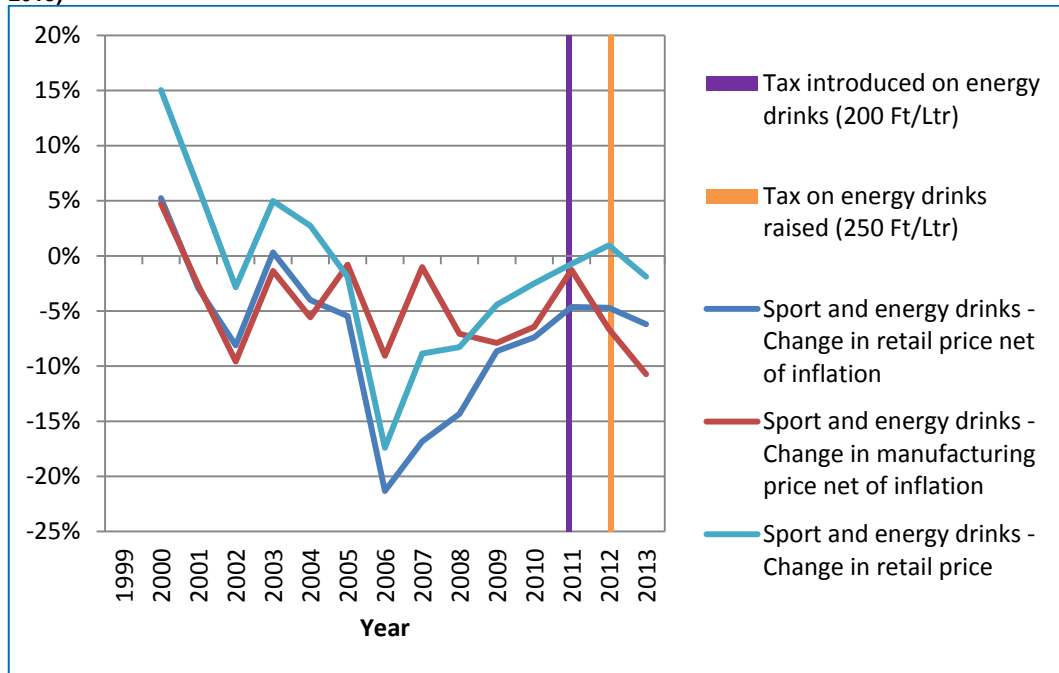
This effect is quite remarkable with a tax rate of HUF250 per litre of energy drinks as this constitutes 37.5% of the price in 2010. Despite this relatively large tax, prices only rose by 0,2% over a two year period after the introduction of the tax.

**Figure 122 Retail and manufacturing prices for sport and energy drinks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 123 Change in retail and manufacturing prices for sport and energy drinks in Hungary (1999-2013)**

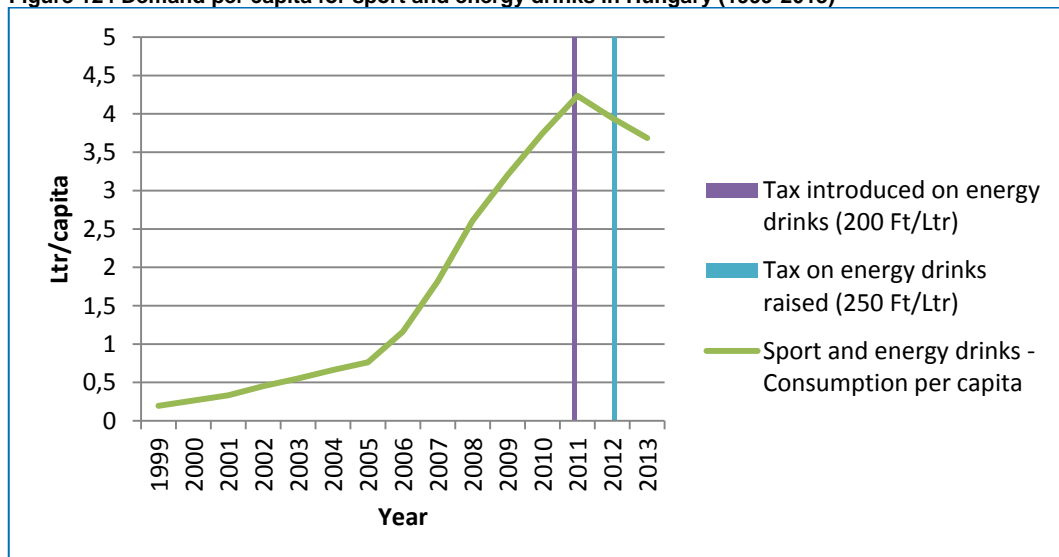


Source: Ecorys based on data from Euromonitor/Passport.

### Demand

The demand for sport and energy drinks has been increasing from 2005 up to and including 2011. Between 2005 and 2006 the growth rate of the demand was the highest reaching the level of almost 30%. The Public Health Product Tax was introduced in September of 2011 and the annualised demand figures show an overall increase in this year of 13.3%. From 2012, the first full year of the tax and the year the tax was increased and tax base altered, the demand for sport and energy drinks started to decline, with a decrease in 2012 of 6.8% and in 2013 demand further decreased by 6.6%.

**Figure 124 Demand per capita for sport and energy drinks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 125 Change in demand per capita for sport and energy drinks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

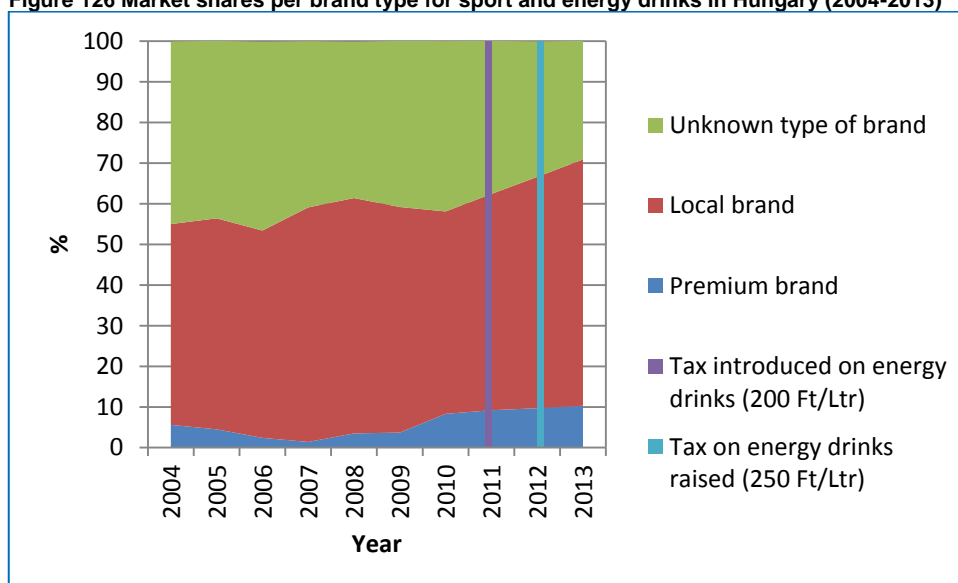
### Market shares

The large majority of the sport and energy drinks that are sold are of non-premium brands. The market share of the non-premium brands have been steadily increasing over the observed period at the expense of initially the premium brands, later at the expense of the unclassifiable brands.

It is also interesting to note that while the premium brands have an almost marginal market share, the unclassifiable brands constitute a very large minority in the market.

The market shares have been relatively volatile, up until 2010. With the introduction of the tax and the consecutive tax increase, the market share of the non-premium brands have shown a rapid and consistent increase at the expense of the unknown type of brands. The market share of the premium brands seem to be unaffected by the tax.

**Figure 126 Market shares per brand type for sport and energy drinks in Hungary (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

## Competitiveness

Due to data limitations, we cannot provide any additional information on the information presented under the previous section, describing the various competitiveness indicators for soft drinks.

## Consolidation of findings

The main findings of the data analyses on the tax on energy drinks are summarised in the table below.

**Table 15 Change in various measures corresponding to change in tax**

Energy drinks	
Tax description	In September 2011, tax on energy drinks introduced of 250HUF/ltr if more than 10g/100ml of caffeine. Further modification of the law later in 2011 resulted in a tax of 250 HUF/ltr if more than 1 mg/100 ml of methyl-xantines or 1 mg/100 ml of taurine added. In 2012, the threshold values were lowered. The tax constitute 37.5% of the average prices in 2010.
Price change	2011: -0.7%, 2012: +1.0%, 2013: -1.9% Tax introduction does not correspond to out of the ordinary price increases.
Demand change	2011: +13.1%, 2012: -6.8%, 2013: -6.6% Tax introduction correspond to a change in the trend for demand, rising before the tax, declining after.
Demand shift to lower segment	Tax introduction and increase corresponds with increasing popularity of non-premium brands at the expense of unclassifiable brands.
Demand shift to non-taxed product	No information available.
Employment	Information available under the previous section on soft drinks.
Labour productivity	No information available.
Profit margin retailers	Information available under the previous section on soft drinks.
Value added of manufacturers	Information available under the previous section on soft drinks.
Investments	Information available under the previous section on soft drinks.
Trade flows	No information available.

There is no effect visible in the prices of the new tax. This is particularly interesting given the relatively large tax of 37.5% of the average 2010 price level. A possible explanation for this observation is that the very large majority of the sold products are exempted from the tax because the ingredients do not meet the threshold value. Other explanations are absorption of the tax by producing companies and decreasing production costs.

Looking at the amount of energy and sport drinks sold per capita, we see a break in the trend. Before the tax introduction, demand for energy and sport drinks continuously increased, where as the tax introduction marks the beginning of a declining trend. We do see a trend change in the relative market share of non-premium brands that are becoming more popular at the expense of the unclassifiable brands. Because there is no change in the market share of the premium brands, it is not possible to interpret this trend.

The competitiveness indicators have been discussed under the tax on soft drinks:

For the competitiveness indicators in general we see an increase at the same time of the tax introduction. This increase follows a low point in the various graphs in 2009 and 2010. It is therefore hard to conclude whether the tax had any effect on the competitiveness of the sector.

The retailer margin however, does show some effect. After the tax is introduced, we see the retailer recapturing a fraction of the margin it lost in the previous years. However, it is hard to attribute this (solely) to the tax, as it may simply be a correction of losing a very large part of the margin in the years before.

### **Tax on confectionery – Hungary**

The tax on confectionery products in Hungary was introduced in September of 2011 as part of the Public Health Product Tax. This tax was imposed as an indirect tax on pre-packed products in categories where products with lower levels of the targeted ingredients (sugar, fat, salt, caffeine) are available. The tax rate originally was 100 HUF/kg if the content of added sugar is more than 25g/100g, or the content of added sugar is more than 40g/100g and the content of chocolate is less than 40g/100g.

Coming into force on 1 January 2012 the rate was increased to 70 HUF/kg for sweetened cocoa powder and to 130 HUF/kg for all other products if the content of added sugar is more than 25g/100g, or for chocolate if the content of added and total sugar is more than 40g/100g and cocoa content is less than 40g/100g.

The tax is payable by weight on products produced in Hungary for the domestic market by manufacturers, and on imported products by the first domestic seller (whether or not this is to the final consumer).

Below we look at different types of confectionery products: chocolate and sugar confectionery.

### *Data analysis*

#### **Prices**

Since 1999, the retail prices of the confectionery product are demonstrating an upward trend. Both retail and manufacturing prices are increasing. An introduction of the public health product tax did not change the trend in the prices. As well as the changes in the tax base and tax rate did not result in the changes in the trend. An average annual pace of growth for all types of products is 5% between 1999 and 2010.

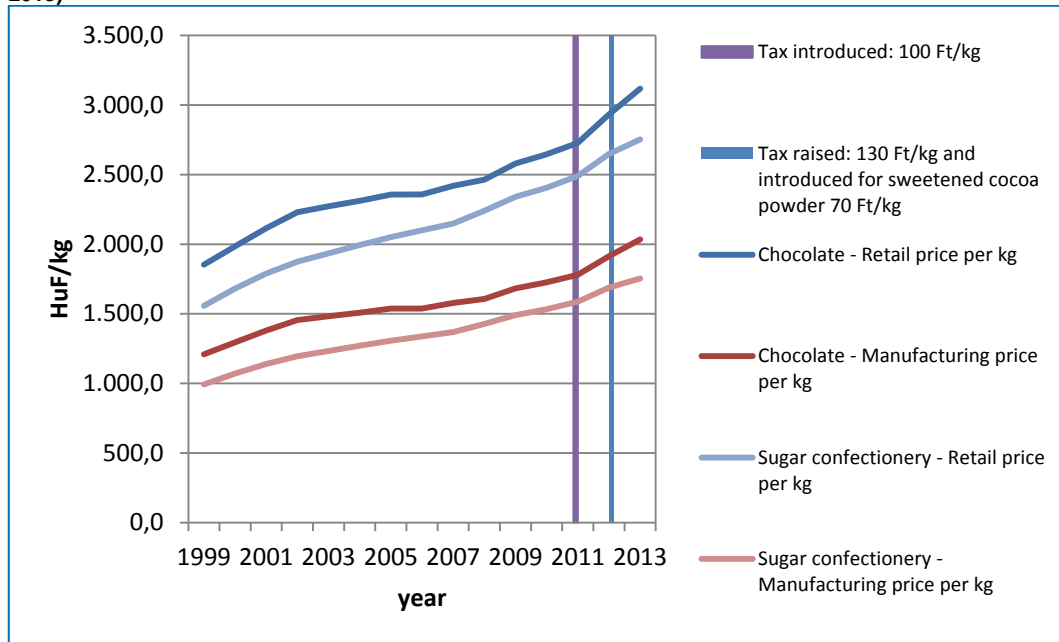
The retailers margin has remained the same throughout the observed period for all investigated product types. Also when the tax was introduced and increased, the margin did not change.

If the tax was fully passed on to consumers, and other factors affecting the price would have remained equal, prices would have risen with 5.4% for sugar confectionery and 4.9% for chocolate over the two year period from 2010 to 2012.

The percentage price increase when the tax was fully passed on was more than met by the realised price changes. Over a two year period, the prices increased by 9.9% for sugar confectionery and 10.6% for chocolate.

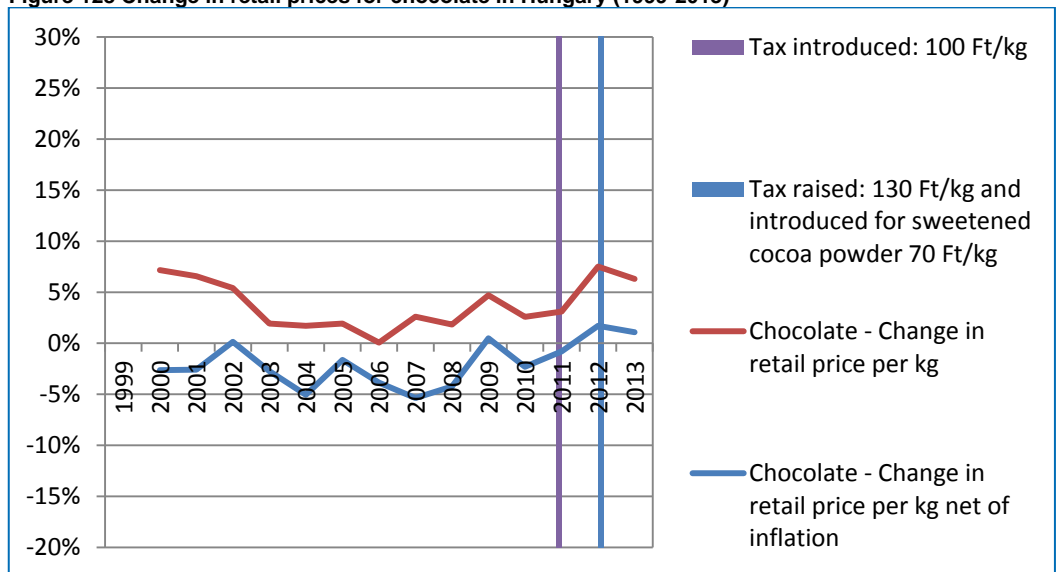
We do also see that the price increase in 2012, the first year in which the tax was fully implemented, prices rose more than in the years before, and after with a price increase of more than 5%.

**Figure 127 Retail and manufacturing prices for chocolate and sugar confectionery in Hungary (1999-2013)**



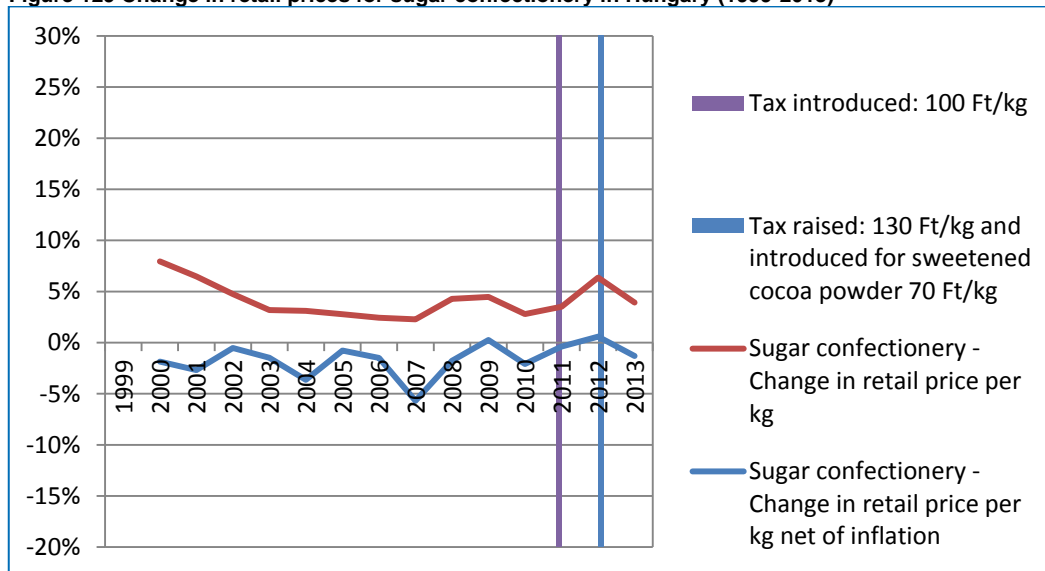
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 128 Change in retail prices for chocolate in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 129 Change in retail prices for sugar confectionery in Hungary (1999-2013)**



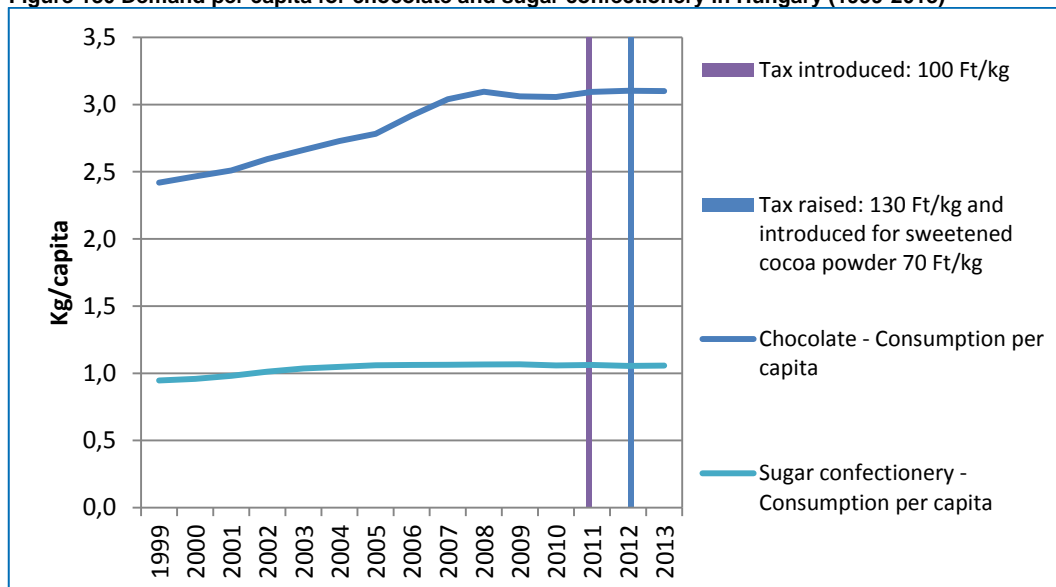
Source: Ecorys based on data from Euromonitor/Passport.

### Demand

The demand for sugar confectionery has been stable over the last 14 years, staying at the level of 1 kg per capita. The introduction of the tax on confectionery products did not influence the demand. The introduction of the tax resulted in the negative growth rate of the consumption per capita, which was anticipated a year in advance (the growth rate became negative a year before the tax was imposed).

The demand for chocolate has been growing since 1999. The demand for chocolate grew from 2.4 to 3.1 kg per capita. When the tax was imposed the demand for chocolate started to grow slower straight away after the introduction of the tax.

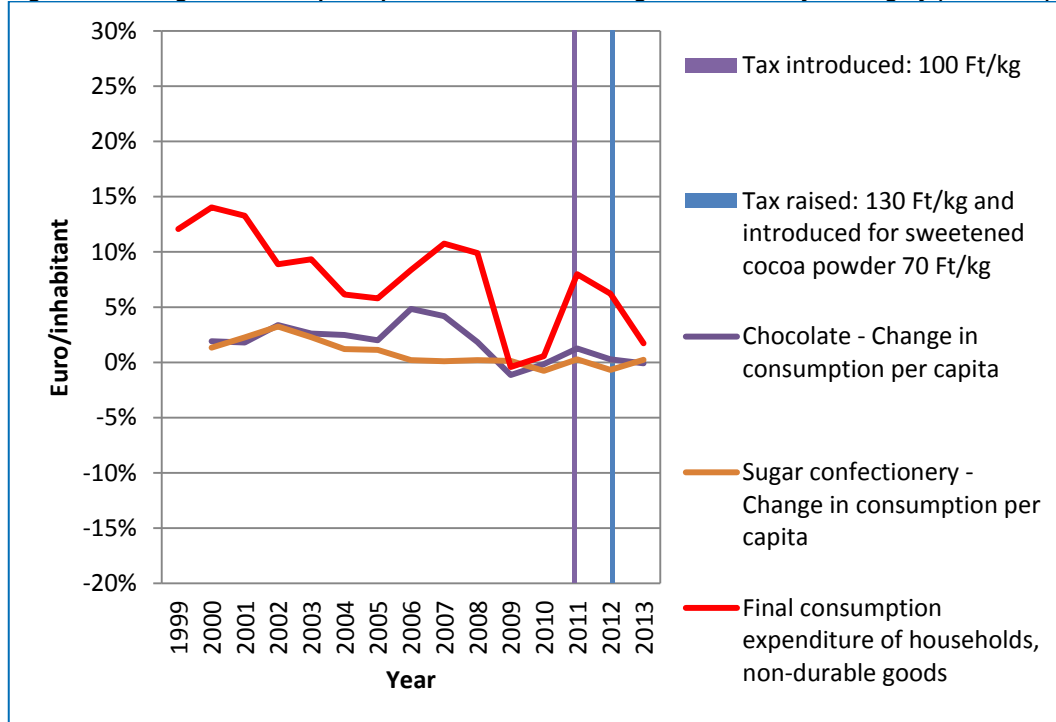
**Figure 130 Demand per capita for chocolate and sugar confectionery in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.



**Figure 131 Change in demand per capita for chocolate and sugar confectionery in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

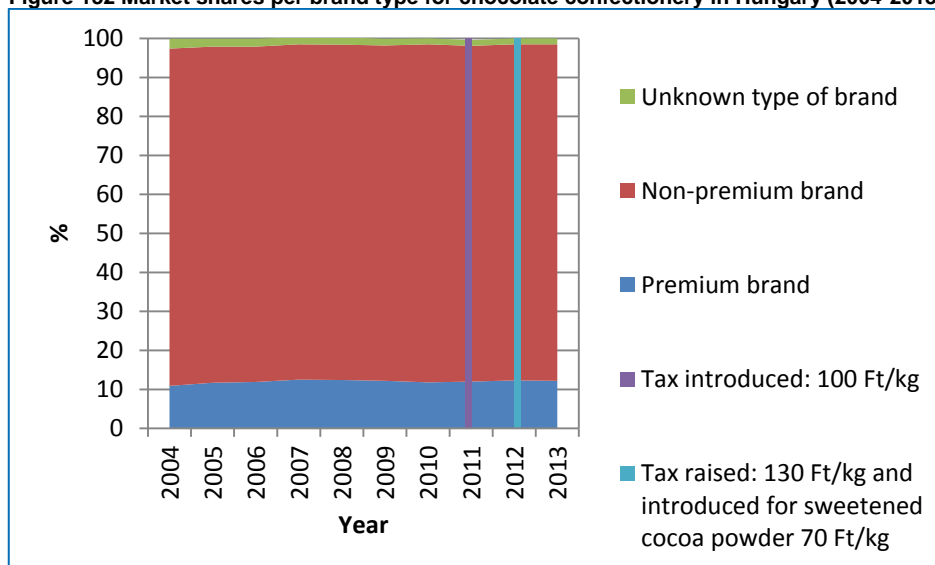
### Market shares

For all types of confectionery, a large proportion of the market is served by the non-premium brands. For the chocolate confectionery, non-premium brands constitutes more than 80% throughout the observed period. Also the other products show either an increase or stabilisation in the market share for non-premium brands.

The premium brands show on average a decline in market share. The unclassifiable brands are for chocolate confectionery and sugar confectionery marginal.

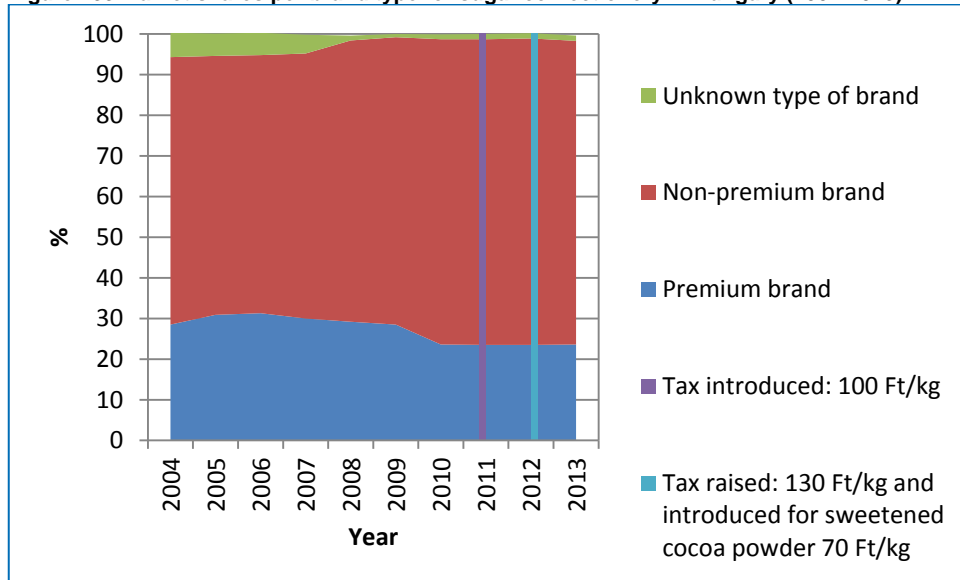
For neither of the products, we see a change in the trend after the introduction of the tax.

**Figure 132 Market shares per brand type for chocolate confectionery in Hungary (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 133 Market shares per brand type for sugar confectionery in Hungary (2004-2013)**



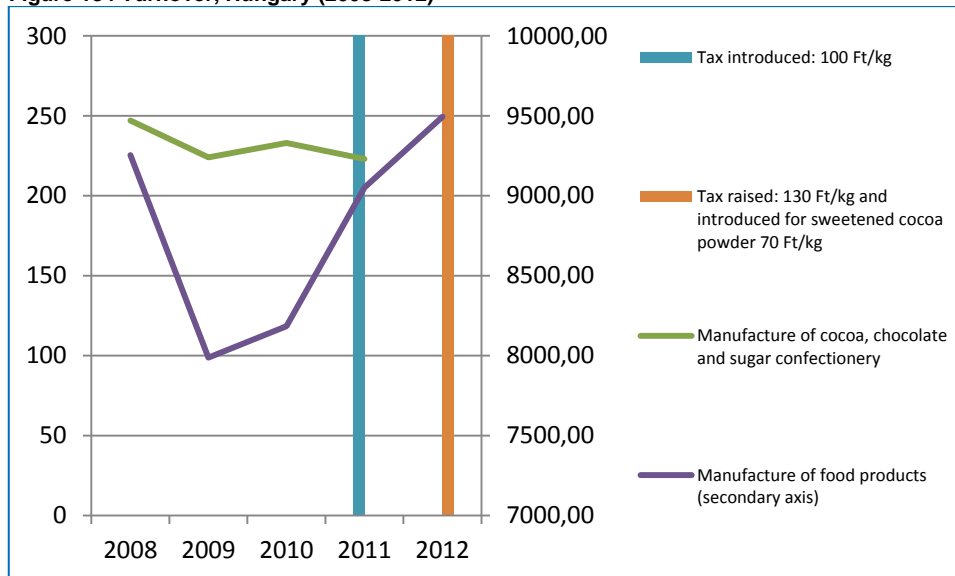
Source: Ecorys based on data from Euromonitor/Passport.

### Competitiveness

#### Production and producers

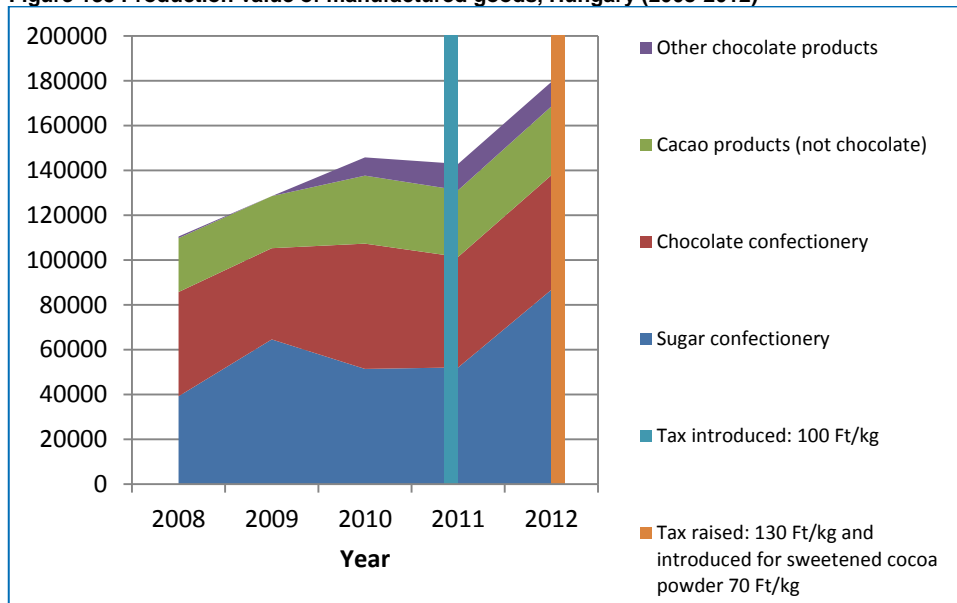
Figure 134 shows that the revenues generated by the companies producing cocoa, chocolate and sugary confectionery has slowly been decreasing, with a one-time increase in 2010. This effect, however, differs per type of product (Figure 135 ). On the other hand, turnover of the manufacturing of food products as a whole (where the confectionery manufacturing represent only one part) started to increase in 2009 and continued the trend after the introduction of the Public Health Tax in Hungary.

**Figure 134 Turnover, Hungary (2008-2012)**



Source: SBS Eurostat.

**Figure 135 Production value of manufactured goods, Hungary (2008-2012)**

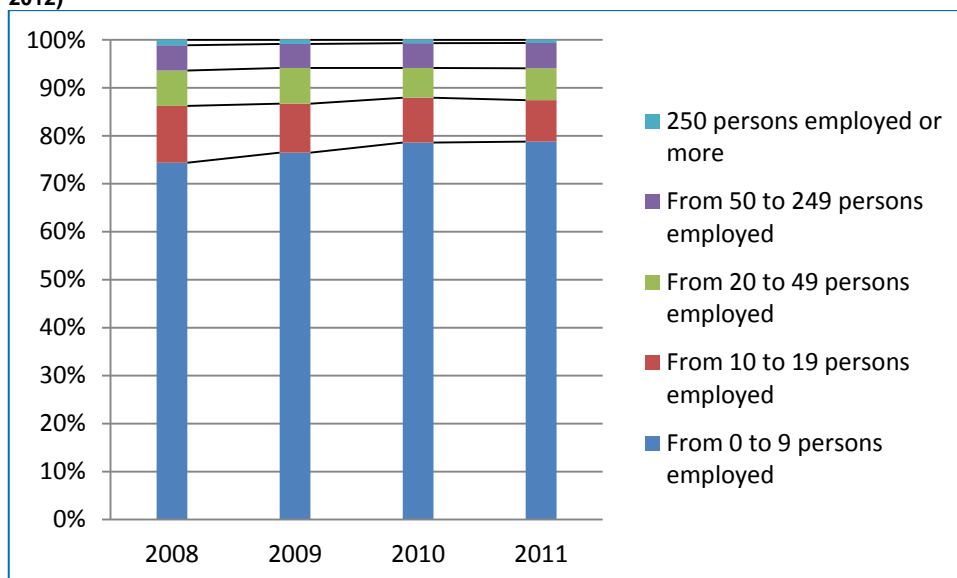


Source: Eurostat PRODCOM, Ecorys calculations.

### Employment and labour productivity

The sector<sup>126</sup> is dominated by SMEs and self-employed. The data indicate that almost 80% of companies in the sector have between 0 and 9 employees in the Hungary, and a further 8% of companies have between 10 and 49 employees in 2011. Compared to earlier period the share of micro companies present in this sector has increased. The total number of enterprises producing confectionery<sup>127</sup>, however, has gradually decreased since 2008 and this trend did not change after the tax was introduced.

**Figure 136 Manufacture of other food products: number of enterprises by size class, Hungary (2008-2012)**

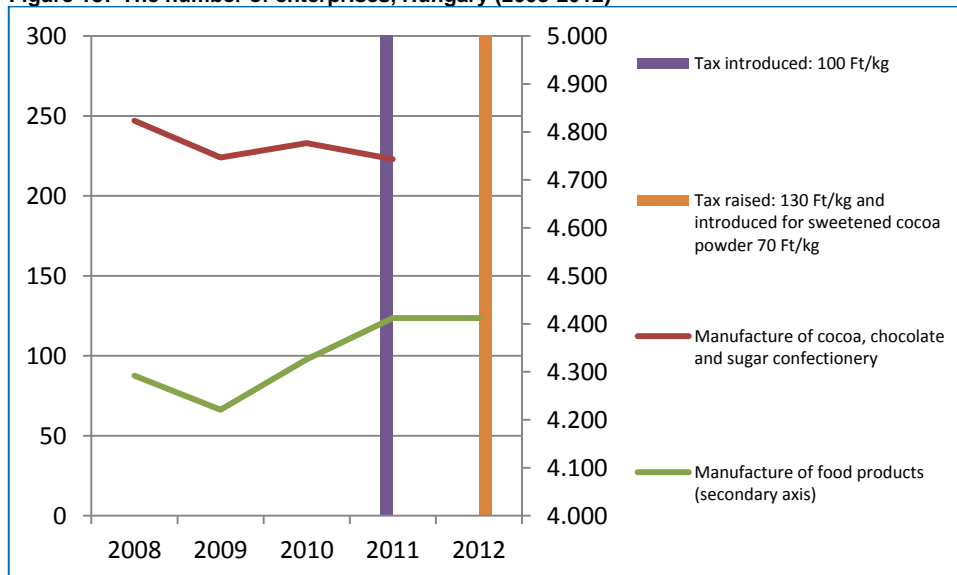


Source: SBS Eurostat.

<sup>126</sup> Manufacturing of cocoa, chocolate and sugar confectionery is part of the sector of manufacturing of other food products. Since the data is only available on a higher aggregation, the level for manufacturing of other food products is assessed to obtain an indication of the size of the confectionery industry.

<sup>127</sup> Production of confectionery covers manufacture of cocoa, chocolate and sugar confectionery.

**Figure 137 The number of enterprises, Hungary (2008-2012)**

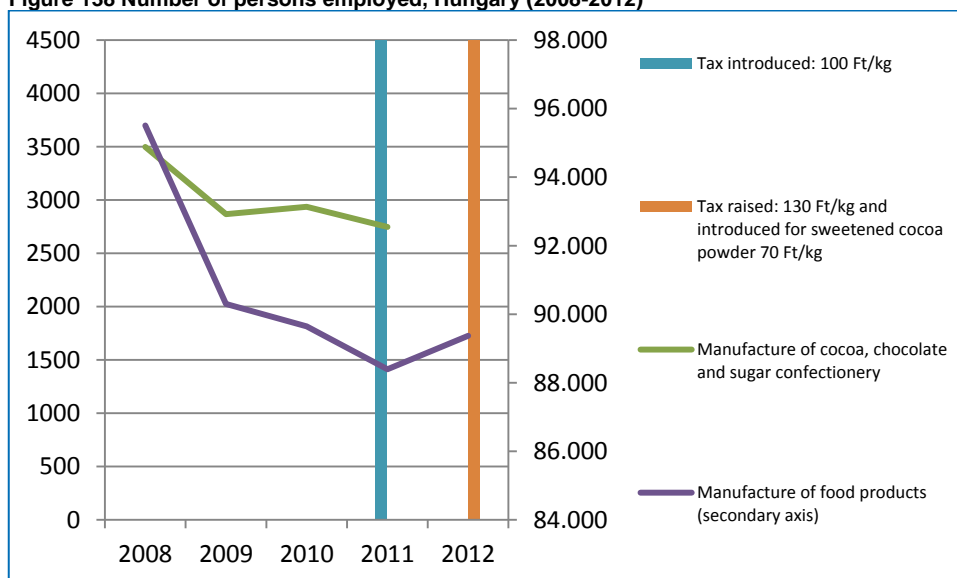


Source: SBS Eurostat.

In terms of employment effects, the reintroduction of the tax on sweets did not change the trend that the number of people employed by the companies producing cocoa, chocolate and sugar confectionery was strongly negative (Figure 138). This effect, in combination with the even sharper drop in value added by manufacturers resulted in growing labour productivity. However, this growth slowed down after the Public Health tax was imposed on the manufacturers (Figure 139).

The cocoa, chocolate and sugar manufacturing industry has been following the overall trend in the food producing industry in terms of labour productivity and the value added though at an aggregate level, the labour productivity and value added levels were not as volatile.

**Figure 138 Number of persons employed, Hungary (2008-2012)**



Source: SBS Eurostat.

**Figure 139 Apparent labour productivity, Hungary (2008-2012)**



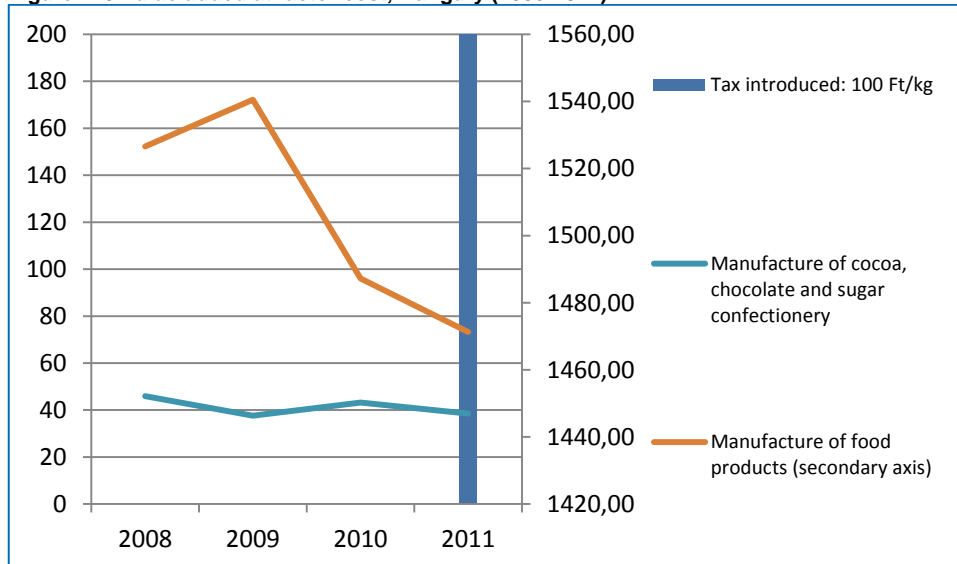
Source: SBS Eurostat.

*Value added of manufacturers*

The value added of the manufacturers in the whole food production industry has been dropping as indicated Figure 140. However, the value added of producers of chocolate and sugar confectionery has remained stable throughout the observed period.

The share of value added in the whole manufacturing industry (Figure 141) has been stable and does not seem to be affected by the introduction of the tax.

**Figure 140 Value added at factor cost, Hungary (2008-2012)**



Source: SBS Eurostat.

**Figure 141 Share of value added in total manufacturing, Hungary (2008-2012)**

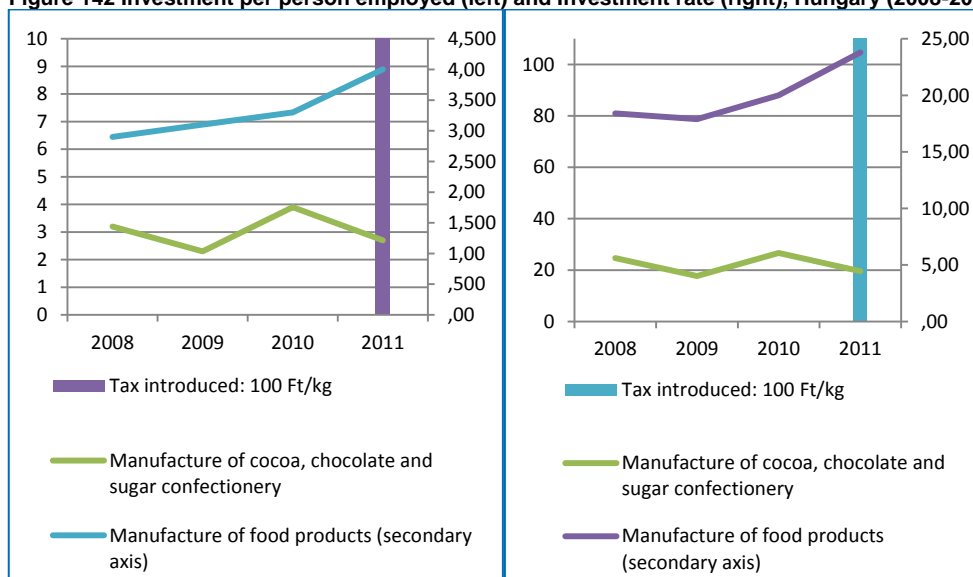


Source: SBS Eurostat.

### Investments

The investment per person employed of the manufacturing industry of cocoa, chocolate and sugar confectionery dropped in 2008 but restored its level already a year after and even increased further. The investment rate<sup>128</sup> showed the same pattern as the investment per person employed (Figure 142). The introduction of the tax corresponded with lower investment rates for the manufacturers of cocoa, chocolate and sugar products while the effect was reversed for the overall food industry.

**Figure 142 Investment per person employed (left) and Investment rate (right), Hungary (2008-2012)**



Source: SBS Eurostat.

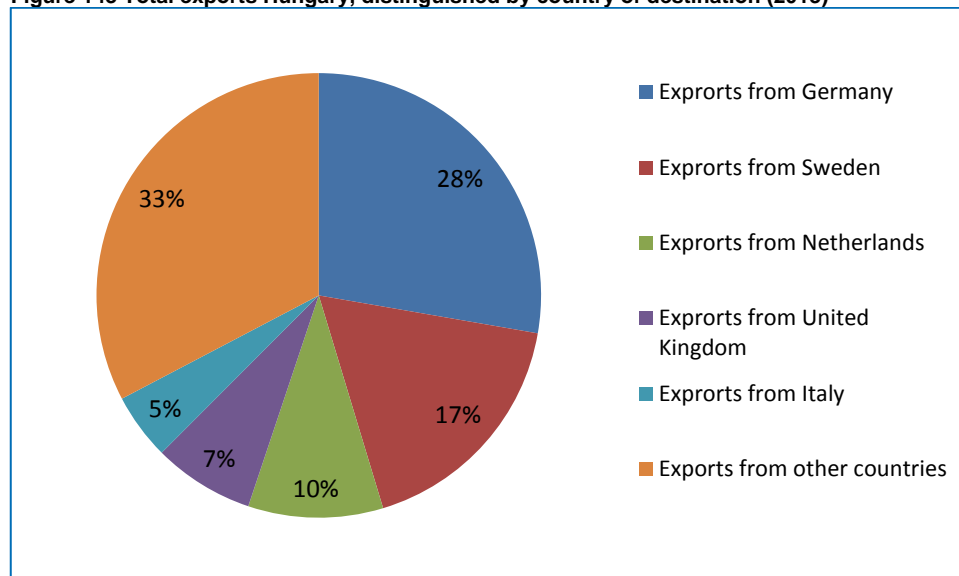
### Trade flows

The main trading partners of Hungary are Sweden, Germany, the UK, the Netherlands, Italy, Slovakia and Poland. These partners together represent 60% of the total exports and 70% of the total imports respectively. The overall trend of exports of sugars and sugars products has been positive over the last five years. The overall trend of imports shows the same pattern.

<sup>128</sup> Calculated as the investment divided by the value added at factor cost.

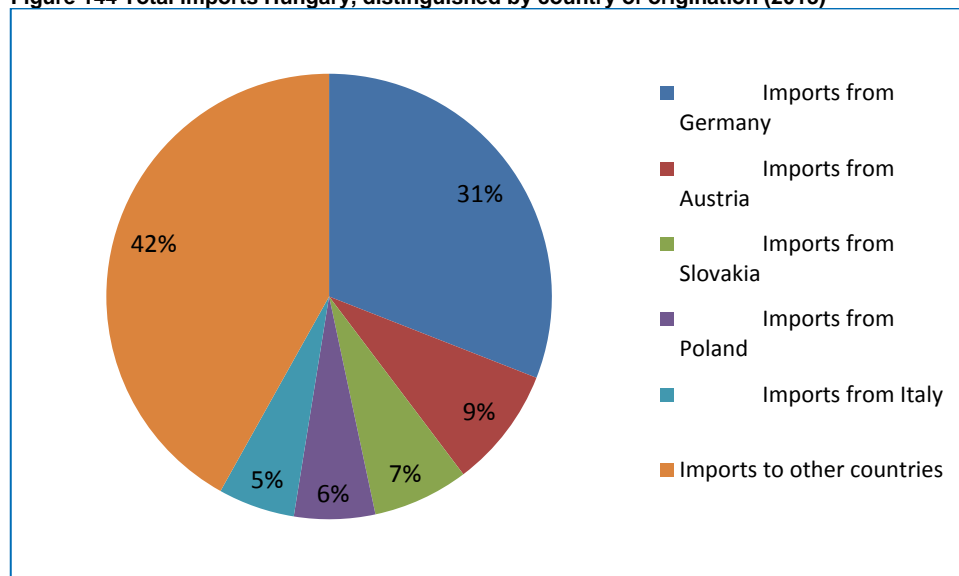
When the tax on confectionery was introduced the exports of sugars rose but then started to decline the year after. In 2013 the level of exports continued to grow. The same pattern of fluctuations is visible in the imports of sugars and sugar products, though it seems less volatile.

**Figure 143 Total exports Hungary, distinguished by country of destination (2013)**



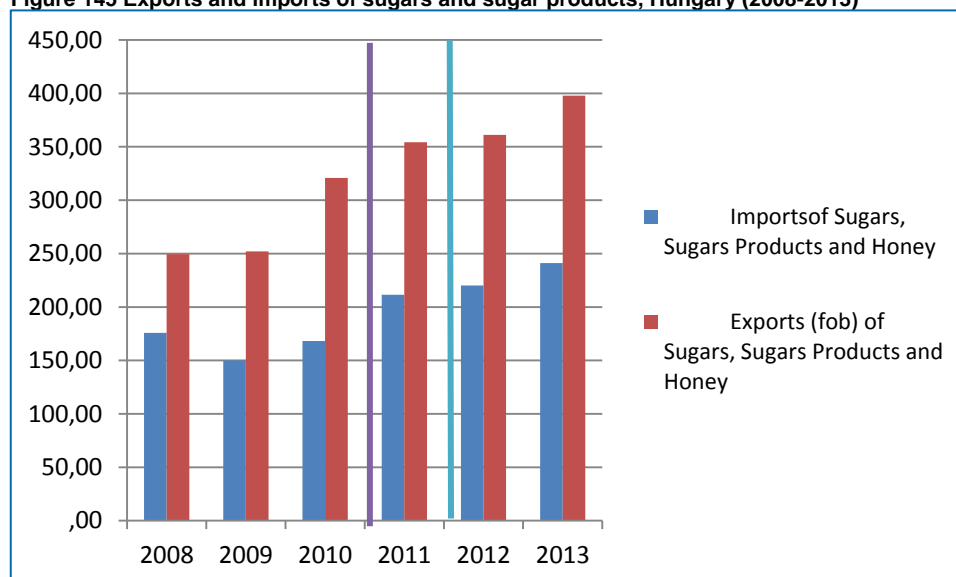
Source: International Monetary Fund (IMF), Direction of Trade Statistics.

**Figure 144 Total imports Hungary, distinguished by country of origination (2013)**



Source: International Monetary Fund (IMF), Direction of Trade Statistics.

**Figure 145 Exports and imports of sugars and sugar products, Hungary (2008-2013)**



Source: United Nations (UN), International Merchandise Trade Statistics.

### Consolidation of findings

The main findings of the data analyses on the tax on sugar confectionery and chocolate are summarised in the table below.

**Table 16 Change in various measures corresponding to change in tax**

	Sugar confectionery	Chocolate
Tax description	In September 2011, tax on confectionery introduced at a rate of 100HUF/kg. Tax is levied when more than 25g/100g sugar is added for sugar confectionery. From 1 January 2012, the tax was increased to 130HUF/kg with slightly lower threshold. The two tax increases combined correspond to a mark-up of prices from 2010 with 5.4%.	In September 2011, tax on confectionery introduced at a rate of 100HUF/kg. Tax is levied when more than 40g/100g is added for chocolate. From 1 January 2012, the tax was increased to 130HUF/kg with slightly lower threshold. The two tax increases combined correspond to a mark-up of prices from 2010 with 4.9%.
Price change	2011: +3.5%, 2012: +6.4%, 2013: +3.9% Tax introduction does correspond to out of the ordinary price increases. Price increases continues after full implementation of tax.	2011: +3.1%, 2012: +7.5%, 2013: +6.3% Tax introduction does correspond to out of the ordinary price increases. Price increases continues after full implementation of tax.
Demand change	2011: +0.3%, 2012: -0.7%, 2013: +0.2% Demand changes after tax introduction in line with fluctuations of years before.	2011: +1.3%, 2012: +0.3%, 2013: -0.1% Demand changes after tax introduction in line with fluctuations of years before.
Demand shift to lower segment	No changes visible in market shares after tax introduction.	No changes visible in market shares after tax introduction.
Demand shift to non-taxed product	No information available.	No information available.
Employment	Tax introduction coincided with slight decrease in employment No information is available for more recent years.	
Labour productivity	Labour productivity stabilizes over the observed period. Virtually no changes visible after tax introduction. No information available for more recent years.	



	Sugar confectionery	Chocolate
Profit margin retailers	No change in the retailers margin after (or before) introduction of the tax.	No change in the retailers margin after (or before) introduction of the tax.
Value added of manufacturers	Value added of manufacturers stabilizes over the observed period. Virtually no changes visible after tax introduction. No information available for more recent years.	
Investments	Investments decreased in the year of tax introduction, although given previous fluctuations, it is hard to conclude this is out of the ordinary pattern. No information available for more recent years.	
Trade flows	Both imports and exports have steadily been increasing. A slight dip in the numbers is visible in 2012, although it is hard to attribute this to the tax as it fits in the overall pattern. No information available for more recent years.	

We see a strong price increase when the tax was introduced and increased. However, demand does not seem to respond to the increased prices. Rather, demand maintained the trend it adopted in previous years of stabilisation. Also other indicators for changes in demand, such as shifting to a lower priced segment of the market is not visible.

For the competitiveness indicators in general we see either a stabilisation, or a small decrease. It itself, these decreases cannot be attributed to the tax, but together they may point toward a negative effect of the tax on the competitiveness of the sector. However, other factors may be a stronger explanation such as exchange rate or general economic forecasts. In addition, the competitiveness indicators seem to recover within a year.

Other changes that occurred at the same time as the tax was introduced are not visible in the data.

### Tax on salty snacks – Hungary

The tax on salty snacks in Hungary was introduced in September of 2011 as part of the Public Health Product Tax. This tax was imposed as an indirect tax on pre-packed products in categories where products with lower levels of the targeted ingredients (sugar, fat, salt, caffeine) are available.

The tax rate originally was 200 HUF/kg if the content of salt is more than 1g per 100g of product. In the end of 2011 and coming into force from 1 January 2012, the rate was increased to 250 HUF/kg. The tax is payable by weight on products produced in Hungary for the domestic market by manufacturers, and on imported products by the first domestic seller (whether or not this is to the final consumer).

Below we look at five types of salty snacks, as per the categories in the Euromonitor data set (see Table 3): chips, extruded snacks, popcorn, pretzels, and nuts.

### Data analysis

#### Prices

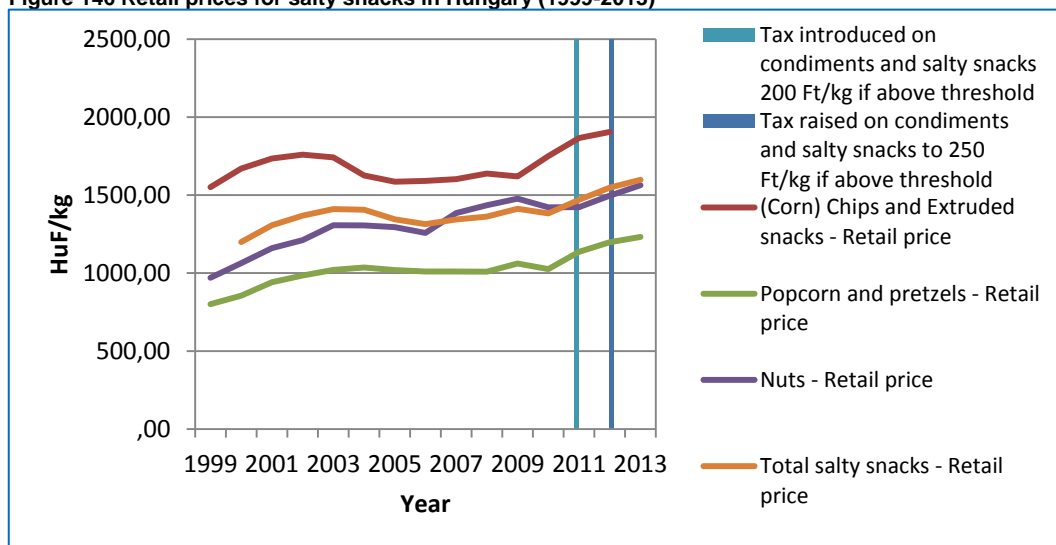
The retail and manufacturing average prices for salty snacks have increased since 1999 from on average 1200 HUF per kg to 1600 HUF per kg in 2013. The price increase slowed down between 2000 and 2003 for the (corn) chips and extruded snacks category, and until 2004 for the nuts category, with negative growth for all three categories in 2005 and 2006. Retail prices for salty snacks started to increase, though slowly, between 2006 and 2010.

In 2011, when the tax on salty products was introduced, retail prices continued to rise for all three categories (the prices for salty snacks increased sharply by more than five percent).<sup>129</sup> In 2012, the year when the excise tax was increased to 250 Ft/kg, prices continued to increase but at a slower pace than in the previous year. Also in 2013, prices continued to increase, again at a slower pace than the year before. Net of inflation, the prices were decreasing with the exception of 2011, when the retail prices grew with a higher speed than the price level in the economy.

When there are no other factors affecting the price but the tax, and the tax is fully passed on to consumers, we expect a price increase of 18.1% over 2011 and 2012 combined. However, prices rose by 11.6% over those two years and by 14.9% over the period of 2011 to 2013.

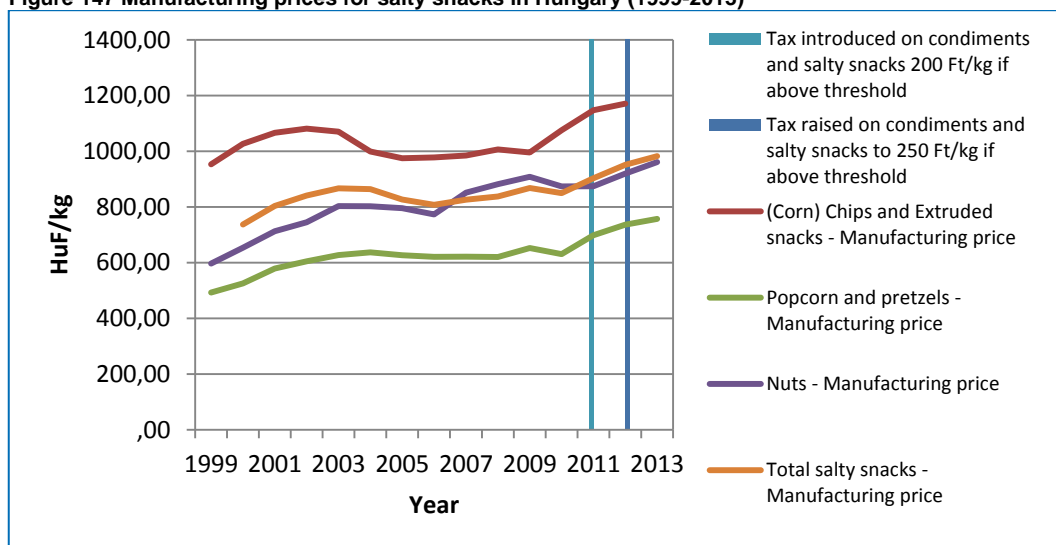
The retail margin of the products have not changed during the observed period. This is true for both before and after the tax introduction. Any price increase or decrease by manufacturers is one-on-one passed on to consumers.

**Figure 146 Retail prices for salty snacks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

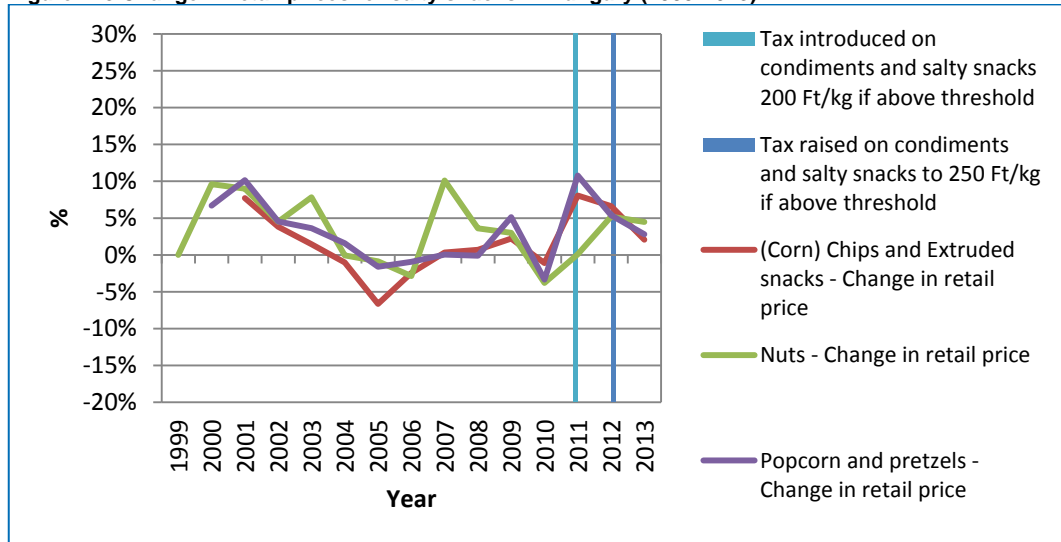
**Figure 147 Manufacturing prices for salty snacks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

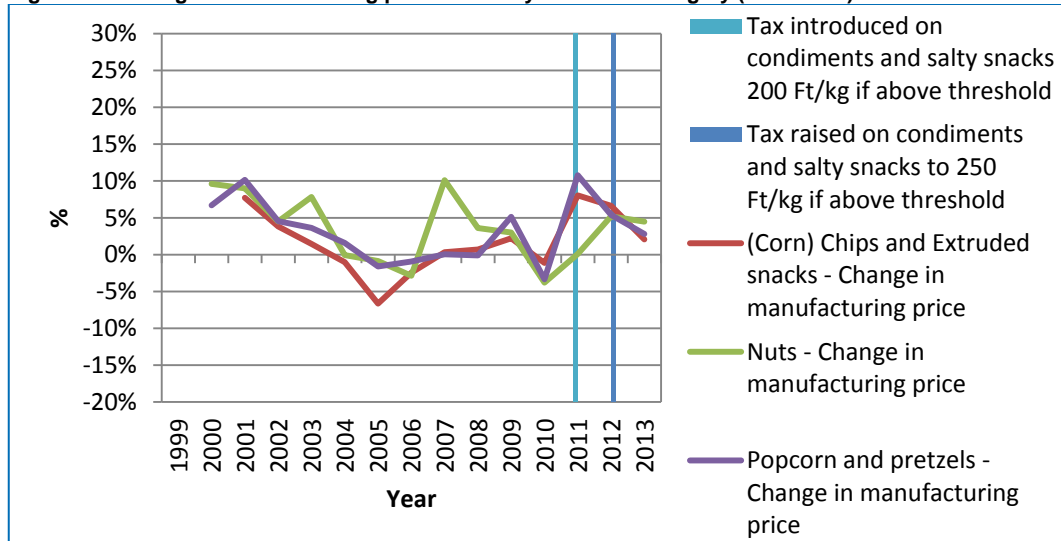
<sup>129</sup> As the excise tax was introduced in September 2011 only, and the prices are based on a full year average, it is difficult to deduct effects of the excise tax on the prices from the 2011 figures.

**Figure 148 Change in retail prices for salty snacks in Hungary (1999-2013)**



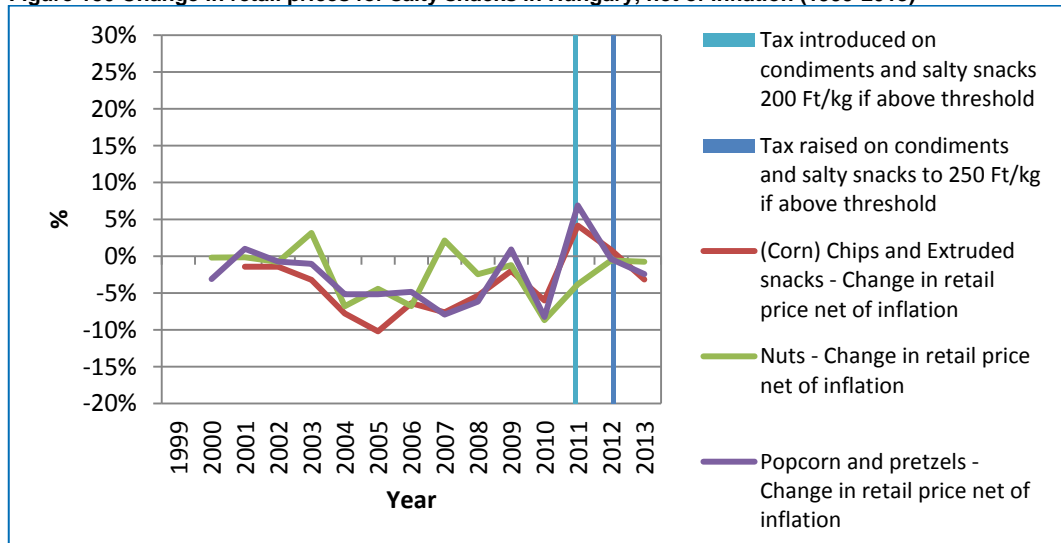
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 149 Change in manufacturing prices for salty snacks in Hungary (1999-2013)**



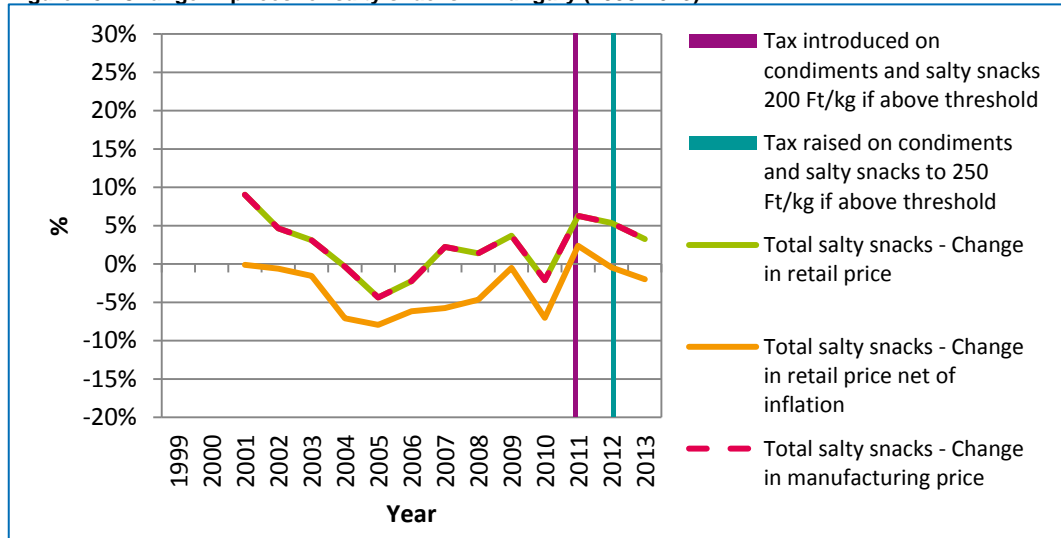
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 150 Change in retail prices for salty snacks in Hungary, net of inflation (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 151 Change in prices for salty snacks in Hungary (1999-2013)**

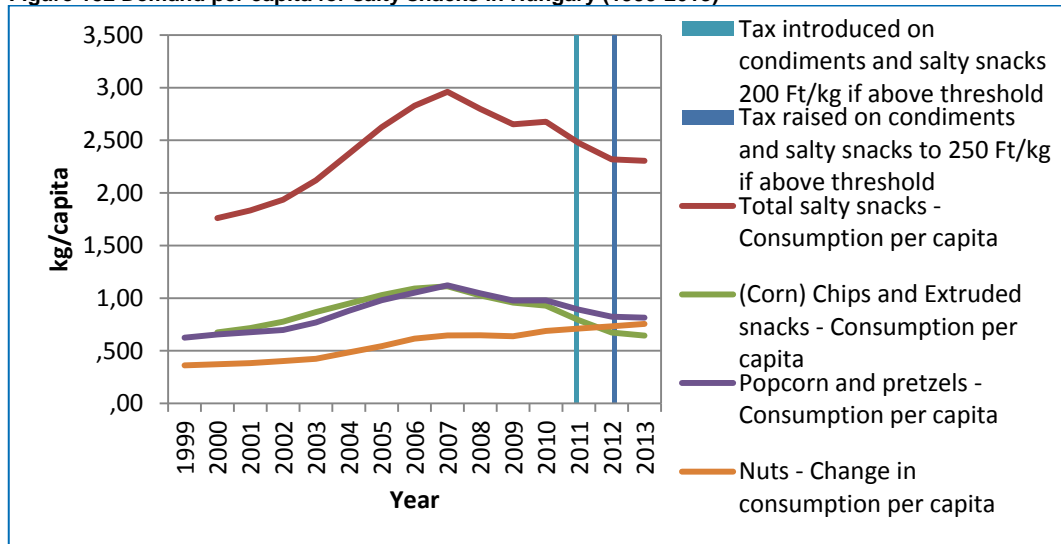


Source: Ecorys based on data from Euromonitor/Passport.

**Demand**

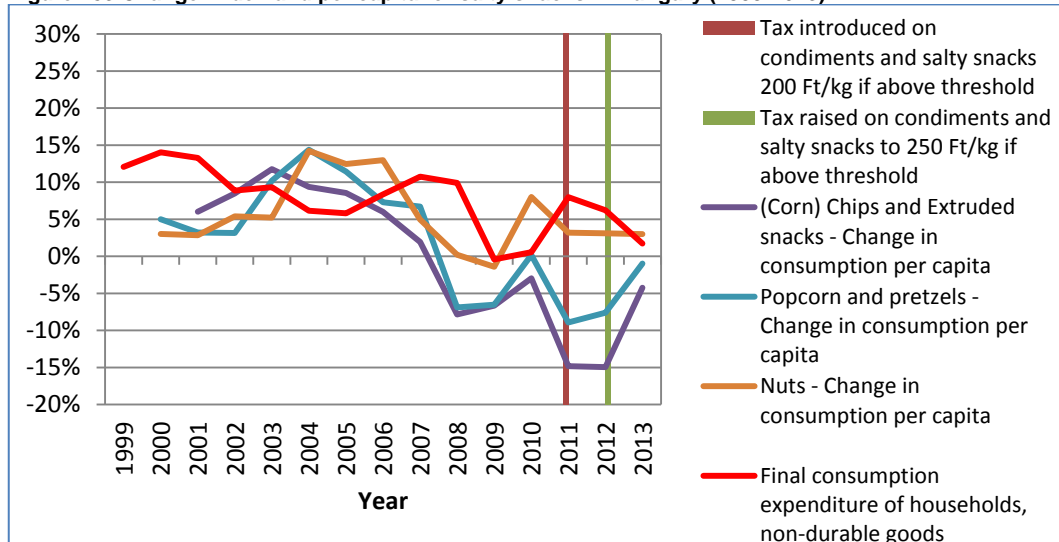
Between 1999 and 2007 the demand for salty snacks was increasing. In 2008, demand dropped across all savoury snack segments. The potato chips and extruded snacks category was most affected. Between 2009 and 2010 there was a slight recovery in the demand for the snacks. In 2011, the salty snack market experienced a drop in demand. It is important to note that the excise tax was introduced in September 2011 and below figures represent an annual average. Thus it is difficult to determine the effect of the tax in these last four months compared to trends in the full year. In 2012 and 2013, salty snacks continued to experience decreases in demand, at a declining pace.

**Figure 152 Demand per capita for salty snacks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 153 Change in demand per capita for salty snacks in Hungary (1999-2013)**



Source: Ecorys based on data from Euromonitor/Passport and Eurostat.

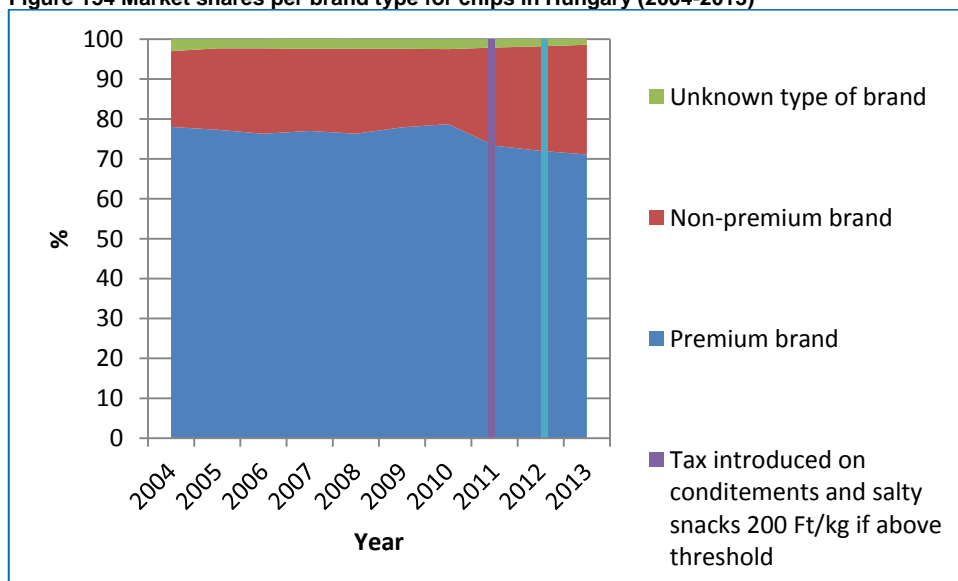
### Market shares

For the market shares we look at the five categories of salty snacks and observed that there is a different pattern for the different products. For some products, premium brands are dominant (chips and extruded snacks). For others the non-premium brands are dominant (nuts, popcorn and pretzels). For the corn chips, the division in market shares between the premium and non-premium brands is currently relatively even, but in the past years the premium brands had to give up their market share to non-premium brands.

What is similar for all the products is the relative stability to small decline for the premium brands, while the non-premium brands have been expanding their market share, usually at the cost of the premium brands, but also at the expense of the unclassifiable brands.

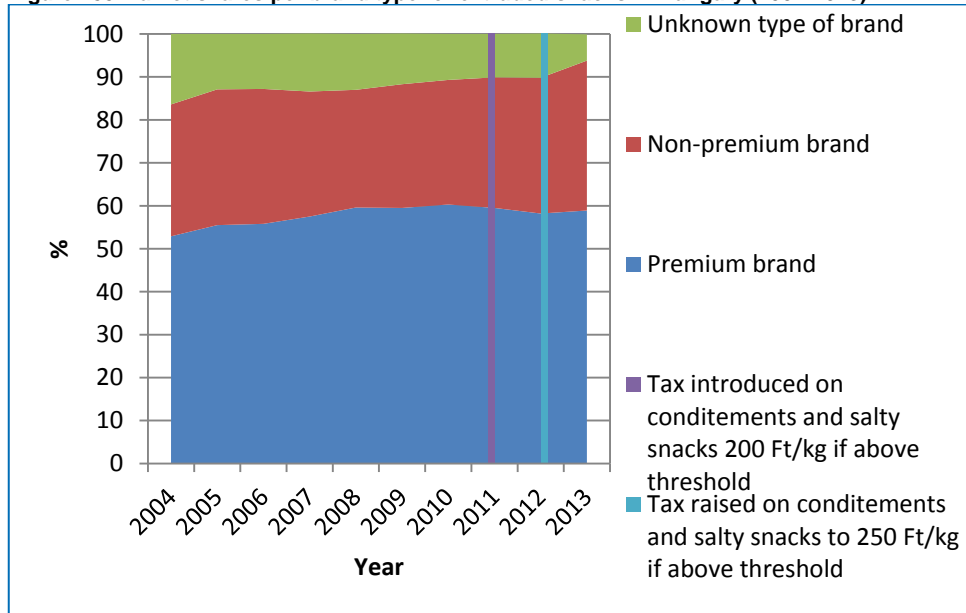
It is hard to find the effect of the tax in the market shares. Although for chips, we see a relative large decline in market share for the premium brands, for the other products we do not see a change in the trend of the market shares.

**Figure 154 Market shares per brand type for chips in Hungary (2004-2013)**



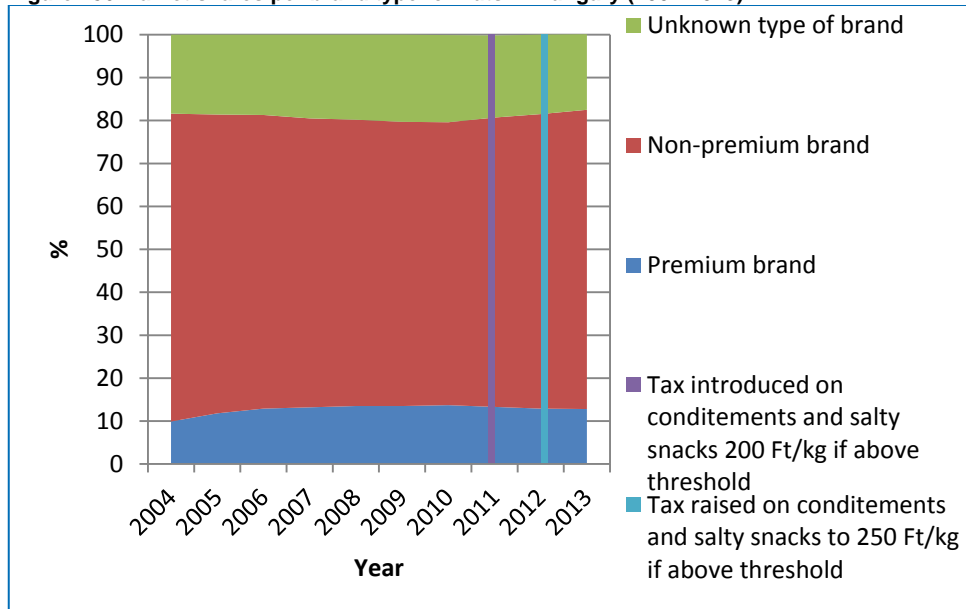
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 155 Market shares per brand type for extruded snacks in Hungary (2004-2013)**



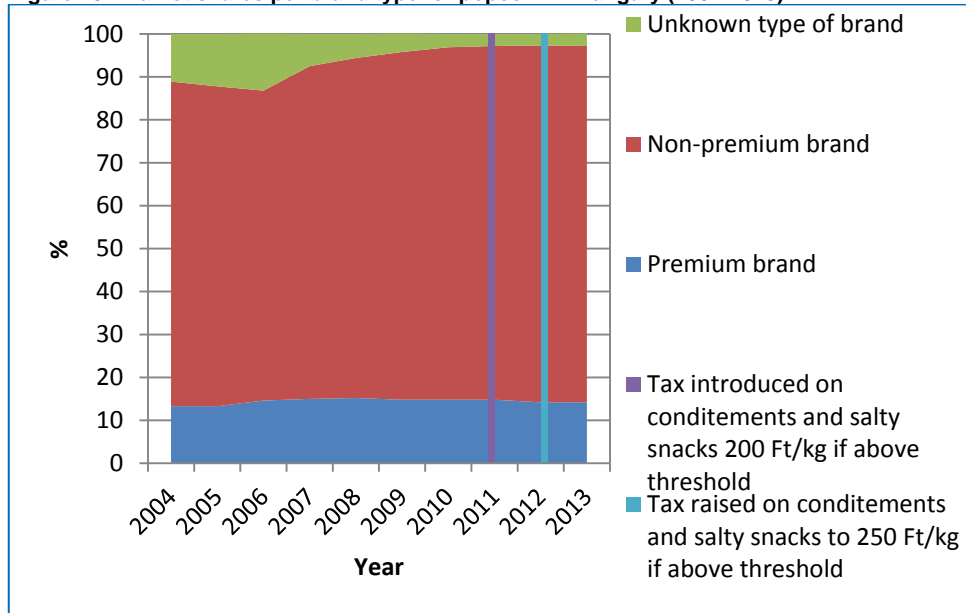
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 156 Market shares per brand type for nuts in Hungary (2004-2013)**



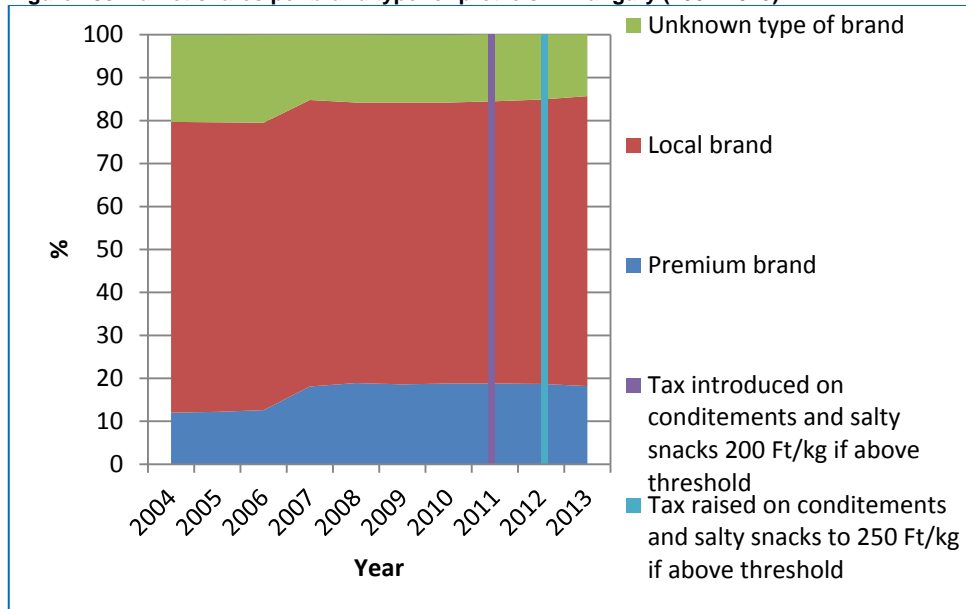
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 157 Market shares per brand type for popcorn in Hungary (2004-2013)**



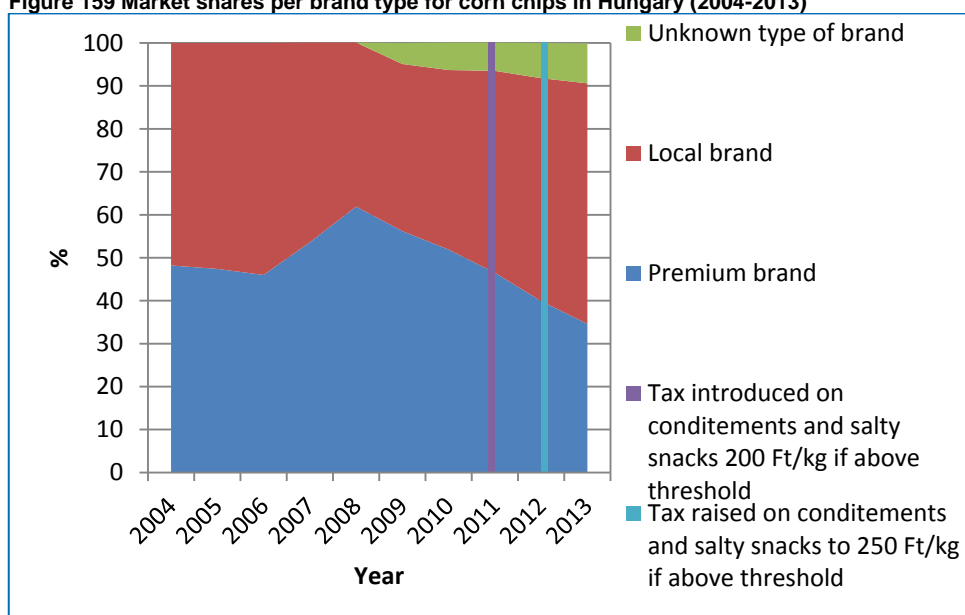
Source: Ecorys based on data from Euromonitor/Passport.

**Figure 158 Market shares per brand type for pretzels in Hungary (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

**Figure 159 Market shares per brand type for corn chips in Hungary (2004-2013)**



Source: Ecorys based on data from Euromonitor/Passport.

### Competitiveness

There is no data available for the producers of salty snacks.

### Consolidation of findings

The main findings of the data analyses on the tax on salty snacks are summarised in the table below.

**Table 17 Change in various measures corresponding to change in tax**

Salty snacks	
Tax description	In September 2011, tax on salty snacks introduced at a rate of 200HUF/kg. Tax is levied on products with salt content of more than 1g per 100g of product. In 2012, the tax was increased to 250HUF/kg. The two tax increases combined correspond to a mark-up of prices from 2010 of 18.1%.
Price change	2011: +6.3%, 2012: +5.4%, 2013: +3.3% Tax introduction does correspond to out of the ordinary price increases. Price increases continues after full implementation of tax.
Demand change	2011: -7.6%, 2012: -6.2%, 2013: -0.6% Demand changes after tax introduction are out of the ordinary pattern in the market. Demand does virtually not change in 2013, when the prices continue to increase.
Demand shift to lower segment	For almost all investigated product categories non-premium brands expand their market share. However, this pattern was to a certain extend already occurring before the tax introduction. Data seems inconclusive.
Demand shift to non-taxed product	No information available.
Employment	No information available.
Labour productivity	No information available.
Profit margin retailers	No change in the retailers margin after (or before) introduction of the tax.
Value added of manufacturers	No information available.



Salty snacks	
Investments	No information available.
Trade flows	No information available.

We see a strong price increase when the tax was introduced and increased. However, this increase is lower than the absolute price effect the tax should have. This indicates that either input prices have decreased or manufacturers are shouldering part of the tax burden.

Demand does respond to the increased prices with a rapid out of the ordinary decline. There also seems to be a tendency in the market to buy more non-premium brands. This trend, however, was already present in the years before the tax introduction. Nevertheless, the data give some weak indications that this trend has been reinforced since the introduction of the tax.

Data limitations do not allow us to investigate the competitiveness indicators, other than the profit margin of the retailers. This indicator, however, does not change throughout the observed period.

## Annex 3 Case studies

Four case studies have been carried out focusing on countries that have introduced non-harmonised food taxes, these are:

- Denmark;
- Finland;
- France; and
- Hungary.

Additionally, two other countries where food-taxes have been planned but not introduced have also been analysed, these are:

- Ireland; and
- Italy.

### Selection of the case studies

Selection criteria for the case study countries were (in order of priority):

1. Information availability: in order to make a proper analysis, availability of ample public information is essential;
2. Geographic distribution: used as a proxy for cultural differences, which might be of influence in the effectiveness of food taxes;
3. Size distribution of Member States: including both larger and smaller Member States (in terms of surface area) should allow a better analysis of cross-border effects, which are expected to be more explicit for smaller Member States;
4. Diversity in experiences: Including both countries where non-harmonised food taxes have been introduced as well as those where these taxes have been withdrawn or rejected prior to implementation. Also diversity in the taxed product.

In each country we analysed a single tax, whereby we aimed to cover as many different segments of the food industry as possible. Table 18 lists the candidate countries that have been considered for the case studies.

**Table 18<sup>130</sup> Member States with non-harmonised food taxes that have been evaluated within this study**

Country	Description of tax	Available information	Size of MS	Geographic
<b><i>Introduced or abolished taxes</i></b>				
Denmark	Duty on saturated fat	Good	Small	North
Denmark	Excise duty on chocolate and sweets	Medium	Small	North
Denmark	Tax on ice cream	Medium	Small	North
Denmark	Tax on soft drinks	Good	Small	North
Finland	Excise duty on sweets, ice-cream and soft drinks	Medium	Medium	North
France	Tax on sugary and sweetened beverages	Good	Large	West
Hungary	Public Health Product Tax	Medium	Medium	East
<b><i>Proposed taxes</i></b>				

<sup>130</sup> Table 18 lists a number of countries where our study has analysed accessibility and availability of information referring to the planned introduction of non-harmonised food taxes. We understand that there are additional European countries where the introduction of such a food tax was considered and later discarded. Therefore the below list is not meant to provide an all-encompassing view of all planned non-harmonised food taxes.

Country	Description of tax	Available information	Size of MS	Geographic
Belgium	Soda tax	Poor	Small	West
Italy	General food tax	Poor	Large	South
Ireland	Sugar-sweetened beverage tax	Good	Medium	West
Estonia	Taxes on fat, sugar, salt	Poor	Small	East
Sweden	Taxes on fat and sugar	Poor	Large	North
United Kingdom	Taxes on fat, sugar, salt	Good	Large	West

Note: Amount of available information estimated on basis of the literature review of literature in the English language.

### Evaluating the taxes as possible case studies

Applying the first criterion, availability of information, we found that the most important candidates for the case studies are:

- Denmark: Duty on saturated fat; or soft drink tax;
- France: Sugary and sweetened beverages tax.

We proposed to select both countries for the case studies. As France relates to a soft drink tax, we proposed to select the duty on saturated fat in Denmark so we cover multiple segments of the food industry.

Moving on to the second criterion, geographic distribution, we have already Northern Europe and Western Europe covered with the selection of Denmark and France. For Eastern Europe, the sole candidate offering a fair amount of literature is:

- Hungary: Public Health Product Tax.

For Southern Europe, the sole available candidate is:

- Italy: general food taxes.

With four case studies selected, the prime candidates remaining, taking into account data availability, is:

- Finland: Excise duty on sweets, ice-cream and soft drinks (used to be Excise duty on soft drinks);
- Ireland: Sugar-sweetened beverage tax;
- United Kingdom: taxes on fat, sugar, salt.

We favoured Finland due to the fact that it has actually introduced a tax, providing factual information rather than ex-ante studies on hypothetical situations. Similarly Ireland was also interesting as it has abolished a discriminatory tax (on soft drinks) in 1992, potentially providing additional study results. Instead of choosing between these two countries, we have decided to include both of them.

### Final selection of case studies

This means our final list of proposed case studies is as follows:

- Denmark: Duty on saturated fat;
- France: Sugary and sweetened beverage tax;
- Finland: Excise duty on sweets, ice-cream and soft drinks;
- Hungary: Public Health Product Tax;
- Ireland: Proposed sugar-sweetened beverage tax; and
- Italy: general food taxes.

For Denmark, France, Finland and Hungary, the case studies concern recently introduced taxes. With food taxes being implemented in these countries, the case studies were focusing on the impact on consumption, sector competitiveness and, insofar possible in the short time frame between introduction and date of this study, public health effects.

The case studies for Ireland and Italy concerned planned food taxes that have been considered, but not implemented. As a result, factual information of the impact of food taxes in Ireland and Italy was not available. The case studies have therefore mainly focused on the consideration and motivations for not implementing the taxes.



# Annex 3-A The Danish tax on saturated fat

## Executive Summary

The Danish Act on a tax on saturated fat in certain foods (the fat tax) was introduced on 17 March 2011 and entered into force on 1 October 2011. The Act established a tax on saturated fat in foods that are primary sources of saturated fat, such as butter, edible oils etc.

The official primary aim of the tax on saturated fat was to influence the purchasing patterns of the Danish population towards healthier, less fatty food, encourage better eating habits, and thus enhance the population's health<sup>131</sup>. Imposing a tax on saturated fat in meat, full-fat dairy products, animal fats, edible oils, margarine etc, was intended to encourage people to choose products with a lower content of saturated fat, such as low-fat cheese instead of full-fat cheese. The idea behind the tax was that the higher the content of saturated fat in the product in question, the higher the tax per kilo<sup>132</sup>.

With regard to the tax fulfilling its primary aim, an econometric analysis found that the introduction of the tax on saturated fat in food products had an effect on the market for the products in question, as the level of consumption of fats dropped by 10–15%. At the same time the administrative costs imposed by the tax were found to be significant for the companies. It was estimated that the tax has cost the companies in the retail and wholesale sector app. DKK 200 million<sup>133</sup> (app. EUR 27 million).

The fat tax was operational for a relatively limited period of time (15 months). The tax was abolished on 1 January 2013 with the central governments' budget proposal for 2013, citing the "administrative hassle" for Danish companies which the law had created as the main reason<sup>134</sup>.

## Description of the tax

The Danish Act on a tax on saturated fat in certain foods (the fat tax) was introduced on 17 March 2011 and entered into force on 1 October 2011. The Act established a tax on saturated fat in foods that are primary sources of saturated fat, such as butter, edible oils etc. The tax is set at DKK 16 (app. EUR 2) per kilo saturated fat contained in the foodstuff. Moreover, the tax on wine rose with 73 øre (app. EUR 0.10).

Some exemptions were presented in the Act. The Act exempted foodstuff with a saturated fat content of 2.3 per cent or less from the tax. The minimum threshold meant that standardised liquid milk was not subject to the tax. Moreover, producers or importers with an annual turnover on taxable foodstuff of less than DKK 50,000 (app. EUR 7,000) did not have to register themselves or

<sup>131</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/RIpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/RIpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

<sup>132</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/RIpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/RIpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf) og Skriftlig fremsættelse af loven 19. Januar 2011 <https://www.retsinformation.dk/Forms/R0710.aspx?id=135473>.

<sup>133</sup> Dansk Erhvervs Perspektiv 2012 #23: Fedtafgiften: et dyrt bekendtskab.

<sup>134</sup> <https://www.retsinformation.dk/Forms/R0710.aspx?id=143480&exp=1>.

calculate and pay the tax. Foods imported into Denmark were subject to the same tax on saturated fat<sup>135</sup>.

The official primary aim of the tax on saturated fat was to influence the purchasing patterns of the Danish population towards healthier, less fatty food, encourage better eating habits, and thus enhance the population's health<sup>136</sup>. Imposing a tax on saturated fat in meat, full-fat dairy products, animal fats, edible oils, margarine etc., was intended to encourage people to choose products with a lower content of saturated fat, such as low-fat cheese instead of full-fat cheese. The idea behind the tax was that the higher the content of saturated fat in the product in question, the higher the tax per kilo<sup>137</sup>.

The WHO stated in 2008 that Denmark (like many other countries) faced an increased prevalence of health problems induced by unhealthy diets, including overweight, obesity and a number of associated co-morbidities. In 2008, the then Danish government established a Prevention Commission (Forebyggelseskommissionen) which in April 2009 made a number of recommendations for an intensified preventive action. The Commission noted in particular that a high intake of saturated fat was associated with increased risk of cardiovascular diseases<sup>138</sup>. A tax on saturated fat was recommended as one of the means to prevent people from consuming too much saturated fat.

The Prevention Commission expected the tax on saturated fat to affect the life expectancy only marginally. While a tax of DKK 20 (app. EUR 3) per kilo was expected to reduce the sale (and consumption) of saturated fat by app. 3 %, and thereby reduce the risk of heart diseases by 4.5 %, the life expectancy was only expected to be prolonged by 11 days in the most optimistic scenario.<sup>139</sup>

The official secondary aim of the tax was to finance tax cuts elsewhere. The tax on saturated fat was part of a larger tax reform implemented in Denmark in 2010 ("Spring Package 2.0" and the "Service Check of the Spring Package"). The overall aim of this reform was to reduce the income taxation rates for all people actively participating in the labour market and to finance this by, among other things, increased taxes to discourage adverse health behavior<sup>140</sup>. Interviews and statements from industry organisations suggest that this was in fact perceived to be the primary aim of the tax on saturated fat, primarily so because the changes in life expectancy were modest<sup>141</sup>.

The Prevention Commission expected a revenue of app. DKK 1 billion (app. EUR 130 million) in total, based on a fat tax of DKK 20 (app. EUR 3) per kilo saturated fat. This revenue was expected to decrease with time, as a result of the increasing prices and decreasing consumption<sup>142</sup>.

<sup>135</sup> LOV nr 247 af 30/03/2011 - Lov om afgift af mættet fedt i visse fødevarer (fedtafgiftsloven) (The Danish Act on a tax on saturated fat).

<sup>136</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

<sup>137</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf) og Skriftlig fremsættelse af loven 19. Januar 2011 <https://www.retsinformation.dk/Forms/R0710.aspx?id=135473>.

<sup>138</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

<sup>139</sup> Forebyggelseskommissionen (2009): Vi kan leve længere og sundere – Forebyggelseskommissionens anbefalinger til en styrket forebyggende indsats, p. 148-149.

<sup>140</sup> Skatteministeriet (The Danish Tax Ministry): Serviceeftersyn af Forårspakke 2.0 (Service Check of the Spring Package) (2009) <http://www.skm.dk/skattetal/analyser-og-rapporter/notater/2010/maj/serviceeftersyn-af-foraarspakke-20/> and Dejgaard Jensen and Smed (2013).

<sup>141</sup> Interview with the Confederation of Danish Industries, Dansk Erhvervs Perspektiv (2012) # 23: Fedtafgiften: Et dyrt bekendskab and Landbrug og Fødevarer (2011): Høring om Forslag til Lov om afgift på mættet fedt i visse fødevarer (Response to the consultation on the fat tax, in Danish).

<sup>142</sup> Forebyggelseskommissionen (2009): Vi kan leve længere og sundere – Forebyggelseskommissionens anbefalinger til en styrket forebyggende indsats, p. 148.

According to the comments to the Act, the then government expected the tax to yield a revenue of app. DKK1.5 billion (app. EUR 200 million) in total. The difference is explained by the fact that the then government decided to include meat in the fat tax. The Prevention Commission had advised that meat should be excluded from the tax, as it was perceived to be “difficult and expensive to administer”.<sup>143</sup> Nevertheless, meat was included in the final version of the tax, as a result of the “Service Inspection of the Spring Package”, which was a tax reform. The tax thereby contributed to financing lower income taxes, in accordance with the then government’s “Spring Package 2.0” and the “Service Inspection of the Spring Package” mentioned above.

The tax was abolished on 1 January 2013 with the central governments’ budget proposal for 2013, citing the “administrative hassle” for Danish companies which the law had created as the main reason<sup>144</sup>. The budget proposal for 2013 stated that the tax on saturated fat had been criticised for increasing consumer prices, increasing the administrative costs and putting Danish jobs at risk by for instance increasing cross border trade<sup>145</sup>. But it was also argued - and according to reports proved<sup>146</sup> - that the abolishment would ensure lower prices for consumers<sup>147</sup>. The latter argument is in contrast with the original aim, considering that part of the purpose of the tax was to get consumers to buy healthier products, by raising the price of goods with a high proportion of saturated fat. The administrative burdens were already foreseen by the Prevention Commission, which stated that “since this is a new tax, there seems to be considerable administrative costs for both government and businesses”.<sup>148</sup> Consequently, a number of factors contributed to the abolishment of the fat tax, which are further explored in the following chapters.

## Sources of information

### Reviewed publications

The publications being reviewed fall in five parts:

- 1. The process and the documents preceding the tax on saturated fat, namely the work of the Prevention Commission, the tax reforms “Spring Package 2.0” and the “Service Check of the Spring Package”**

The Prevention Commission / Forebyggelseskommissionen (2009): Vi kan leve længere og sundere – Forebyggelseskommissionens anbefalinger til en styrket forebyggende indsats.

Regeringen (The Danish Government) (2009): Forårspakke 2.0 (Spring Package 2.0)  
[http://stm.dk/publikationer/foraarspakke/forarspakke\\_2\\_0.pdf](http://stm.dk/publikationer/foraarspakke/forarspakke_2_0.pdf).

Skatteministeriet (The Danish Ministry of Taxation): Serviceeftersyn af Forårspakke 2.0 (Service Check of the Spring Package) (2009) <http://www.skm.dk/skattetal/analyser-og-rapporter/notater/2010/maj/serviceeftersyn-af-foraarspakke-20/>.

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<sup>143</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministereren [http://www.ft.dk/R1pdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/R1pdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf) og Forebyggelseskommissionen (2009): Vi kan leve længere og sundere – Forebyggelseskommissionens anbefalinger til en styrket forebyggende indsats.

<sup>144</sup> <https://www.retsinformation.dk/Forms/R0710.aspx?id=143480&exp=1>.

<sup>145</sup> The central governments’ budget proposal, 2013.

<sup>146</sup> <http://www.ae.dk/kommentarer/oeconomisk-kommentar-afskaffelsen-af-fedtafgift-virker-stort-prisfald>.

<sup>147</sup> <https://www.retsinformation.dk/Forms/R0710.aspx?id=143480&exp=1>.

<sup>148</sup> Forebyggelseskommissionen (2009): Vi kan leve længere og sundere – Forebyggelseskommissionens anbefalinger til en styrket forebyggende indsats, p. 153.



## 2. The actual act and the comments to the act

LOV nr 247 af 30/03/2011 - Lov om afgift af mættet fedt i visse fødevarer (fedtafgiftsloven) (The Danish Act on a tax on saturated fat)

<https://www.retsinformation.dk/Forms/R0710.aspx?id=136314>.

Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren

[http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

## 3. Documents illustrating the effect of the tax

Econometrical analysis: Dejgaard Jensen, Jørgen, and Sinne Smed (2013): The Danish tax on saturated fat – short run effects on consumption, substitution patterns and consumer prices of fats, published in Food Policy 42 (2013), 18-31.

Effects on cross-border trade: Skatteministeriet (The Danish Ministry of Taxation) (2012): Status over grænsehandel.

The position papers or press releases of the four industry organisations, which were the most active in the debate as their members were the most influenced by the tax. These are especially concerned with the administrative burdens:

### ***The Confederation of Danish Industries (Dansk Industri, DI)***

Danish Food and Drink Federation (2011): Høringssvar vedr. bekendtgørelse om afgift af mættet fedt i visse fødevarer (Response to the consultation on the fat tax, in Danish)

<http://foedevarer.di.dk/SiteCollectionDocuments/H%C3%B8ringssvar%20bekendtg%C3%B8relse%20fedtafgift%20juli%202011%20pdf.pdf>.

Danish Food and Drink Federation, part of DI (2010): Are specific food taxes improving health?

Danish Food and Drink Federation, part of DI (2012): Problemstillinger – fedtafgiften (notat) (Challenges of the fat tax, note in Danish).

### ***The Danish Chamber of Commerce (Dansk Erhverv)***

Dansk Erhverv (2010): Høringssvar over forslag til lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven samt ændring i øl- og vinfafgiftsloven) (Response to the consultation on the fat tax, in Danish) <http://www.danskerhverv.dk/Nyheder/Documents/hoeringssvar-fedtafgift.pdf>.

Dansk Erhvervs Perspektiv 2012 #23: Fedtafgiften: et dyrt bekendtskab.

### ***The Danish Agriculture and Food Council (Landbrug og Fødevarer)***

Landbrug og Fødevarer (2011): Høring om Forslag til Lov om afgift på mættet fedt i visse fødevarer (Response to the consultation on the fat tax, in Danish)

<http://new.folketingsbilag.dk/files/946348.pdf>.

Press release:

[https://www.lf.dk/Aktuelt/Nyheder/2012/Juni/Fedtafgift\\_koster\\_1300\\_job.aspx#.UxnpSi95Meh](https://www.lf.dk/Aktuelt/Nyheder/2012/Juni/Fedtafgift_koster_1300_job.aspx#.UxnpSi95Meh).

### ***The Association of Danish Margarine Manufacturers (MIFU)***

<http://www.mifu.dk/nyheder>

MIFU (2009): Høring over lovforslag om afgift på mættet fedt (Response to the first consultation on the fat tax, in Danish).

MIFU (2010): Hearing of bill on saturated fat tax (Response to the second consultation on the fat tax, in English).

#### **4. The documents summing up the reasons for abolishing the law (especially the central governments' budget proposal 2013 and the political discussions following this**

Finansministeriet (2013): Aftaler om finansloven for 2013.

Forslag til folketingsbeslutning om afskaffelse af afgiften på mættet fedt (suggestion to the Parliament to abolish the tax on saturated fat)

<https://www.retsinformation.dk/Forms/R0710.aspx?id=143480&exp=1>.

#### **5. Any newspaper clippings, student theses etc. commenting and analysing the law (primarily used as background information)**

Information (2013): Det virker, derfor er det upopulært <http://www.information.dk/470689>.

### **Interviews**

The Danish tax on saturated fat received a lot of public attention and the process, the challenges and the effects are very well documented. So well documented, in fact, that the Danish Ministry of Taxation decided not to participate in an interview, but instead referred to the many publications documenting the tax.

Two aspects in particular should be highlighted from the tax on saturated fat:

1. That it had the desired effect on consumption of saturated fat, as illustrated by Dejgaard Jensen and Smed (2009);
2. That the administrative burdens associated with the introduction of the fat tax were very high, as analysed and discussed by several industry organisations. The Confederation of Danish Industries (DI) represents a broad range of producers and importers in the food industry through their division the Danish Food and Drink Federation.

Thus, we therefore decided to interview the following stakeholders:

- Associate Professor Jørgen Dejgaard Jensen, **Department of Food and Resource Economics, Section for Consumption, Bioethics and Governance, University of Copenhagen;**
- **Advisor Peter Bernt Jensen, the Danish Food and Drink Federation.**

In addition, Jeanette Rose Hansen and Torbjørn Christensen from the Danish Ministry of Taxation, who were responsible for drafting the Act, were approached for an interview. Mrs. Hansen declined the invitation, stating that the fat tax and the work preceding and succeeding it is so well documented that she did not feel she could contribute with additional information.

Lastly, Mondelez International (Europe's largest producer of chocolate and biscuit) and the European Snacks Association approached us, offering their assistance. Both of the organisations have been contacted with the aim of setting up an interview. The European Snacks Association was happy to participate only if we found it absolutely necessary. Mondelez were to return with

information, if they found it necessary. Both Mondelez and the European Snacks Association have been interviewed separately as part of the EU level interviews within this study.

## Findings

".. the fat tax actually worked, although it was not particularly well designed. But politicians have become enormously shocked by the economic crisis and are afraid to stifle a nascent recovery.." (Information 2013, <http://www.information.dk/470689>, own translation).

The above quote belongs to the former chair of the Prevention Commission and professor at Roskilde University, Mette Wier. The quote partly illustrates the paradox in this act: on the one hand, a scientific study from 2013 shows that the level of consumption for butter, butter-blends, margarine and oils dropped by 10-15 % after the introduction of the tax. On the other hand, the administrative costs of introducing the tax, particularly in the course of the economic crisis, were very high for the companies.

The expected effects of the tax on saturated fat are illustrated below:

	Positive consequences	Negative consequences
Economic consequences – public sector	A total revenue of app. DKK1.5 billion (app. EUR 200 million)	-
Administrative consequences – public sector	-	Transition costs: App. DKK 3 million (app. EUR 400,000). Operating costs: App. DKK 6 million/year (app. EUR 800,000).
Economic consequences – businesses	-	It is expected that the tax will be reflected in higher costs for the public. However, a decrease in consumption of 4 % for the foodstuff subject to the tax will affect the concerned industries.
Administrative consequences – businesses	-	Transition costs: App. DKK 161 million (app. EUR 22 million). Operating/administrative costs: App. DKK 35 million/year (app. EUR 5 million).
Administrative consequences - public	-	-

Source: Comments to the Act: Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren.

The tax on saturated fat was estimated to reduce the consumption of the affected foodstuff by approximately 4 %. This was expected to have a beneficial effect on the public health, but it was also expected to affect the industries concerned with the foodstuff in question.

The tax on saturated fat was also expected to create incentives for more cross-border trade, but it was not expected to be significant, since the products included in the tax must be consumed relatively fast. With regard to the economic consequences for citizens, the tax was expected to be

fully reflected in prices, meaning that the price of the products included in the tax was expected to increase<sup>149</sup>.

In terms of the level of administrative burdens, the Danish Commerce and Companies Agency's Department for Better Regulation (CKR) made an ex ante assessment of the tax and expressed the following views on the administrative consequences.

"CKR has assessed the administrative consequences for app. 160 manufacturers and app. 1450 importers. The expected implementation costs have been estimated at app. DKK 161 million (app. EUR 22 million). The costs include registration as a manufacturer / importer, preparation of the monthly payment of fees (establishment of technical solution and possibly obtaining information on the percentage of saturated fat in foods) and counting of existing stock. The expected yearly administrative costs at national level have been estimated at app. DKK 35 million a year (app. EUR 5 million), and are mainly related to the requirement for monthly statements of tax and contribution rates basis. For the individual company, these are very large transition costs and ongoing costs" (own translation)<sup>150</sup>.

### Health effects

The fat tax was operational for a relatively limited period of time (15 months). Only one academic study has been carried out, analysing the effects of the fat tax. Dejgaard Jensen and Smed (2013) made an assessment of the effects of this tax for some of the product categories most significantly affected by the new tax, namely fats such as butter, butter-blends, margarine and oils. Those were the product categories where one would expect the greatest effect on consumption, as these products have a very high amount of saturated fat in them.<sup>151</sup>

The econometric analysis was based on data from GfK Panel Services Denmark (GfK) that among other things maintains a demographically representative consumer panel from all the different regions of Denmark. The analysis suggested that the introduction of the tax on saturated fat in food products had an effect on the market for the products in question, as the level of consumption of fats dropped by 10–15%.

Hence, the analysis provided some support for previous simulation analyses suggesting that a fat tax has an effect on consumption. However, due to the relatively short data period with the tax being active (nine months, corrected for seasonality effects), interpretation of these findings from a long-run perspective should be done with considerable care<sup>152</sup>. Economic reasoning suggests behavioural adjustments and reductions in fat consumption in the long run, both for consumers, (new dietary patterns in response to a price change takes time), and for the manufacturers, for example in terms of product reformulation towards products with a lower content of saturated fat, etc.<sup>153</sup>

The aspect of substitution effects with regards to products that contain less saturated fat was not directly analysed. The substitution effects may enhance (if the substituted products are healthier) or undermine (if the substituted products for example contain a lot of sugar) the direct incentive effects

<sup>149</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

<sup>150</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

<sup>151</sup> Interview with Jørgen Dejgaard Jensen.

<sup>152</sup> Dejgaard Jensen, Jørgen, and Sinne Smed (2013): The Danish tax on saturated fat – short run effects on consumption, substitution patterns and consumer prices of fats, published in Food Policy 42 (2013), 18-31.

<sup>153</sup> Dejgaard Jensen, Jørgen, and Sinne Smed (2013): The Danish tax on saturated fat – short run effects on consumption, substitution patterns and consumer prices of fats, published in Food Policy 42 (2013), 18-31.

of the tax<sup>154</sup>. The University of Copenhagen is currently looking into these aspects, but no results are available yet<sup>155</sup>.

The Danish Chamber of Commerce asked 99 of their members (primarily retail organisations) whether they see signs that the fat tax has directed consumers towards healthier products. Only 12 % of their members can see this development<sup>156</sup>, which suggests that the substitution effects were undermining the incentive effect of the tax, but no academic analysis exists to support this as of now.

### Administrative burdens

In its initial work with the tax, the Danish Taxation Ministry wanted the tax to be imposed as early in the supply chain as possible, so that the fewest possible number of companies should be burdened with the administrative costs<sup>157</sup>, which were as mentioned calculated to be very high by CKR. The manufacturers and importers were fewer in number than the retailers, and the administrative burdens were thus imposed on them<sup>158</sup>.

The industry organisations found it strange that the tax on saturated fat focused on the fat used in the production instead of fat in the finished product, since the finished product is the one that the consumers are presented with. This means that the tax is paid on food waste as well – fat that is not consumed<sup>159</sup>. One example is the production of French fries or chips. The producer uses oil subject to the tax to fry the chips or fries, but after the production, a residual quantity of the oil is discarded. The tax on the used, discarded oil cannot be deducted or reimbursed<sup>160</sup>. The Danish Food and Drink Federation (DI) conducted a survey among its members, stating that the waste of fat varies from 1-35 %, depending on the product<sup>161</sup>.

The decision on imposing the tax in the production proved to be administratively difficult to handle, especially for the importers. Importers had to obtain suppliers' declarations for the amount of saturated fat used in the production of the imported goods and intermediate goods. For example, an importer of a ready-made pizza had to obtain a supplier's declaration from the manufacturer on the amount of saturated fat used to make the dough, the amount of saturated fat that is in the cheese on top of the pizza, and if there is pepperoni on the pizza, the producer must have a statement from the manufacturer of the pepperoni of the amount of meat used. DI members estimate that the administration of the fat tax is approx. 10% of the tax payment<sup>162</sup>.

A survey among the members of the Danish Chamber of Commerce determined the administrative costs that have been imposed on companies in relation to the fat tax. This includes the costs of new IT systems, obtaining information from foreign suppliers, calculating new prices, transmitting information to public authorities etc. It was estimated that the fat tax has cost the companies in the retail and wholesale sector app. DKK 200 million<sup>163</sup> (app. EUR 27 million). Figures from a member survey carried out by The Danish Food and Drink Federation (DI) estimated that the annual

<sup>154</sup> Dejgaard Jensen, Jørgen, and Sinne Smed (2013): The Danish tax on saturated fat – short run effects on consumption, substitution patterns and consumer prices of fats, published in Food Policy 42 (2013), 18-31 and Interview with Jørgen Dejgaard Jensen.

<sup>155</sup> Interview with Jørgen Dejgaard Jensen.

<sup>156</sup> Dansk Erhvervs Perspektiv 2012 #23: Fedtafgiften: et dyrt bekendtskab.

<sup>157</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

<sup>158</sup> Lovbemærkninger i Forslag til Lov om afgift af mættet fedt i visse fødevarer (Fedtafgiftsloven), fremsat d. 19. januar af Skatteministeren [http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101\\_L111\\_som\\_fremsat.pdf](http://www.ft.dk/Rlpdf/samling/20101/lovforslag/L111/20101_L111_som_fremsat.pdf).

<sup>159</sup> DI Fødevarer (2012): Problemstillinger – fedtafgiften (notat) and interview with Peter Bernt Jensen, DI.

<sup>160</sup> Information from the Danish Tax Authorities (SKAT) <http://www.skat.dk/SKAT.aspx?old=2048020&vld=0>.

<sup>161</sup> DI Fødevarer (2012): Problemstillinger – fedtafgiften (notat).

<sup>162</sup> DI Fødevarer (2012): Problemstillinger – fedtafgiften (notat).

<sup>163</sup> Dansk Erhvervs Perspektiv 2012 #23: Fedtafgiften: et dyrt bekendtskab.

administrative costs amounted to DKK 50 million<sup>164</sup> (app. EUR 7 million). The Danish Agriculture and Food Council estimated the yearly administration costs for its members to be around DKK 100 million (app. EUR 13 million).

### Job effects

Since the fat tax was operational for a very short period of time, the effect on jobs was limited – if present at all. However, two industry organisations, the Danish Agriculture and Food Council and the Danish Chamber of Commerce, have calculated the estimated effect of the fat tax on jobs, had the fat tax not been abolished. Using the macroeconomic model ADAM, the organisations showed that the tax on saturated fat would increase consumer food prices with app. 1.4 %. After the abolishment of the fat tax, the Danish Chamber of Commerce estimated that the fat tax alone raised the general rate of inflation by 0.16 percentage points and that food inflation rose from 3.38 to 4.66 % in the period where the fat tax was operational. The higher consumer prices for food was expected to decrease consumer spending, which was expected to result in a decline in employment of app. 1,300 people, mainly in the retail sector<sup>165</sup>.

However, the econometric analysis by Dejgaard Jensen and Smed suggested that there was a shift in consumer behavior – from high price supermarkets towards low-price discount stores, at least for some types of oils and fats. This shift in demand, the analysis points out, seems to have been utilised by the discount chains to raise the prices of butter and margarine by more than the pure tax increase<sup>166</sup>. This means that part of the higher consumer prices (which created a decline in consumer spending and subsequently job losses, according to the industry organisations) were imposed by the discount retail chains.

### Cross-border trade

According to the Danish Ministry of Taxation, the effect on cross-border trade as a result of the tax on saturated fat was limited. Figures suggest an increased cross-border trade as a result of the fat tax of around DKK 100 million (app. EUR 13 million) from 2010 to 2012<sup>167</sup>. However, an analysis by the Danish Chamber of Commerce based on a survey among app. 700 consumers points to an increase in the number of consumers having bought meat products in Sweden or Germany (from 23% in 2011 to 33% in 2012)<sup>168</sup>. Whether this is a direct effect of the fat tax is however not clear, as other taxes were raised in the period as well. These were taxes on cross-border-sensitive goods, such as cigarettes, chocolate and sweets, beer, wine and bottled water, including soda water. It might well be that cross-border trade has increased as a result of these tax increases, and people have bought meat when they were at the border shop anyway. The Danish Ministry of Taxation estimates that from 2010 to 2011, the cross-border trade in Denmark increased by DKK 2.5 billion. (app. EUR 330 million). As mentioned, around DKK 100 million (EUR 13 million) of these could be attributed to the fat tax<sup>169</sup>.

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<sup>164</sup> DI Fødevarer (2012): Problemstillinger – fedtafgiften (notat).

<sup>165</sup> Dansk Erhvervs Perspektiv 2012 #23: Fedtafgiften: et dyrt bekendtskab.

<sup>166</sup> Dejgaard Jensen, Jørgen, and Sinne Smed (2013): The Danish tax on saturated fat – short run effects on consumption, substitution patterns and consumer prices of fats, published in Food Policy 42 (2013), 18-31.

<sup>167</sup> Skatteministeriet (The Danish Ministry of Taxation) (2012): Status over grænsehandel.

<sup>168</sup> Dansk Erhvervs Perspektiv 2012 #23: Fedtafgiften: et dyrt bekendtskab.

<sup>169</sup> Skatteministeriet (The Danish Ministry of Taxation) (2012): Status over grænsehandel.

## Conclusions

Market impacts of the tax included a drop in consumption for taxed products and consequently a drop of consumption of saturated fat by 10-15%. Direct impacts on health were not observed mainly due to the limited time period of the tax being active. In terms of administrative costs the tax was estimated to have cost the companies in the retail and wholesale sector between DKK 50- 200 million (app. EUR 7-27 million).

Regarding cross-border trade there were contradictions in the reported impacts. According to the Danish Ministry of Taxation, the effect on cross-border trade as a result of the tax on saturated fat was limited with figures suggesting an increased cross-border trade as a result of the fat tax of around DKK 100 million (app. EUR 13 million) from 2010 to 2012. However, an analysis by the Danish Chamber of Commerce based on a survey among app. 700 consumers points to an increase in the number of consumers having bought meat products in Sweden or Germany (from 23% in 2011 to 33% in 2012) .

All in all, there are indications that the fat tax did achieve both its primary and secondary aim (to influence purchasing patterns and to finance tax cuts elsewhere), but it did so at great administrative costs for the affected companies. The administrative costs and the great pressure from the industry organisations were the main reasons for the abolishment of the fat tax.

# Annex 3-B Excise duty on sweets, ice cream and soft drinks in Finland

## Executive summary

In 2010, a sweet tax was re-introduced in Finland entering into force on January 1<sup>st</sup>, 2011 (Act no. 1127/2010)<sup>170</sup>. This sweet tax was thus a re-instatement of the old sweet tax (introduced in 1926 on luxury such as chocolate and candy) combined with the existing tax on soft drinks, plus addition of new taxable categories such as ice cream. In 2010, 2011, and 2013 government propositions have been put forward to adjust the tax rate and the tax base<sup>171</sup>.

The motivation for introducing the sweet tax was first to increase the tax revenue of the State, second to drive food and drink consumption towards a more healthy diet<sup>172</sup>. The target revenues to be gained from the sweet tax were set at 100 million EUR for the first year (2011). By increasing the tax rate in 2012, the aim was to gain 204 million EUR, and from the increase in 2014, the expected revenues are 250 million EUR (76 million EUR from sweets; 34 million EUR from ice cream; and 140 million from soft drinks)<sup>173</sup>.

The impacts of the tax on the relevant product categories have been manifold. Consumption of the products in the tax base has declined. The strongest decline has occurred for ice cream and soft drinks, whereas confectionery has not been so strongly impacted from increasing prices. Prices on the taxed categories have increased between 5 and 30 % depending on product and year. For producers of branded goods the sweet tax has caused loss of market shares and reduced sales volumes, and the retailers have gained similarly. Sales of taxed sweets under the cheaper private labels have increased.

The sweet tax has already led to cuts in jobs in ice cream production and the manufacturing of fruit based and carbonated soft drinks<sup>174</sup>. Some companies have also stated that plans for investments in the Finnish food industry may be revised because of the tax and the unprofitable business environment. These changes point to a decreasing competitiveness of the Finnish producers.

## Description of the tax

### History and date of introduction

This case study is about the excise duty on sweets, ice cream and soft drinks in Finland. Hereafter, in this report, the excise duty is mentioned as the “sweet tax”.

The sweet tax was introduced in Finland in 1926 as a tax on luxury such as chocolate and candy generating revenues of approx. 26 million EUR annually. Following Finland’s membership of the European Union, some taxes had to be abolished as they were considered incompatible with EU regulations due to the way the taxes were implicated<sup>175</sup>. So, in 2000 the 1926-sweet tax was abolished.

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<sup>170</sup> [www.finlex.fi](http://www.finlex.fi).

<sup>171</sup> [www.vm.fi](http://www.vm.fi) and [www.finlex.fi](http://www.finlex.fi).

<sup>172</sup> ETL complaint, 2013.

<sup>173</sup> Ibid.

<sup>174</sup> Interviews Nestlé, ETL (Eckes-Granini and Finnish Brewery Association) 2014.

<sup>175</sup> ETL, 2014.



Soft drinks have been taxed since 1940. The 1940-tax included all soft drinks that were ready-to-drink including bottled water. Milk, tap water and water in volumes of more than 5 litre containers were excluded from the tax<sup>176</sup>.

Then, in 2010, a sweet tax was re-introduced in Finland entering into force on January 1<sup>st</sup>, 2011 (Act no. 1127/2010)<sup>177</sup>. This new sweet tax was thus a re-instatement of the old sweet tax combined with the existing tax on soft drinks, plus addition of new taxable categories such as ice cream. In 2010, 2011, and 2013 government propositions have been put forward to adjust the tax rate and the tax base<sup>178</sup>. These amendments of the sweet tax were applied during 2012 and 2014.

### Motivation for the sweet tax and its revenues

The motivation for introducing the sweet tax was primarily to increase the tax revenue of the State, and secondly to drive food and drink consumption towards a more healthy diet<sup>179</sup>. The latter goal has been implicitly published in the legal documents (such as government propositions, [www.finlex.fi](http://www.finlex.fi)) but official statements of the sweet tax as a motivator for a more healthy diet are generally not present<sup>180</sup>. The Finnish economy has been in recession since 2008 and the idea of the sweet tax as a means to provide revenues was considered feasible by the Government<sup>181</sup>.

Target revenues to be gained from the sweet tax were set at 100 million EUR for the first year (2011). By increasing the tax rate in 2012, the aim was to gain 204 million EUR, and from the increase in 2014, the expected revenues are 250 million EUR (76 million EUR from sweets; 34 million EUR from ice cream; and 140 million from soft drinks)<sup>182</sup>. To put this figure into a macroeconomic perspective it is important to look at the Finnish GDP in 2013 which was 193.4 billion EUR, and the total tax income which was 39.7 billion EUR. Therefore, the expected revenues of 250 million EUR from the sweet tax is expected to contribute with less than 1 % of the total tax income<sup>183</sup>. Figures from the food industry show the following data for the sweet tax revenues, (See table below).

**Table 19 Sweet tax revenues (confectionery, chocolate, ice cream, soft drinks), million EUR**

	2011	2012	2013
Sweet tax revenues	133	181	202

(ETL presentation, 2014).

As stated above, the incentive for introducing the sweet tax was to provide revenues to the Finnish government. Hence the sweet tax was motivated by financial issues and not public health issues. This statement is supported by the fact that no campaigns or other follow-up activities within healthy eating or public health in general are or will be carried out. Therefore, this case study will focus on the impacts of the sweet tax on the competitiveness of the agro-food chain, and only marginally analyse health issues in relation to the sweet tax.

### The tax base and tax rates

The 1926-sweet tax was based on the CN code system which is used for customs tariff. When re-introducing the sweet tax in 2011 (effective January 1<sup>st</sup>, 2012), the Finnish government decided to use the previously applied CN code system for defining the tax base. In the 2011 sweet tax more CN codes were included into the tax base than was the case under the 1926 sweet tax. Following

<sup>176</sup> Interview Ministry of Economic Affairs, 2014.

<sup>177</sup> [www.finlex.fi](http://www.finlex.fi).

<sup>178</sup> [www.vm.fi](http://www.vm.fi) and [www.finlex.fi](http://www.finlex.fi).

<sup>179</sup> ETL complaint, 2013.

<sup>180</sup> Interviews, ETL, Nestlé and Ministry of Economic Affairs, 2014.

<sup>181</sup> Ibid.

<sup>182</sup> Ibid.

<sup>183</sup> Interview, Ministry of Economic Affairs, 2014.

this approach, all products falling under the CN codes defined as part of the tax base would be liable for taxation. Calculating the tax is based on consumer ready products (in contrast to concentrated or dried products). The amount to be paid is calculated from volume in kg or in litres. In the case of ice cream, if volume is given in litres then it is re-calculated to kg to determine the tax base. Producers with an annual production volume of less than 10,000 kg or 50,000 litres are exempted from the tax<sup>184</sup>.

Prior to the introduction of the sweet tax, a tax rate of 4.5 cents per litre was used for soft drinks and mineral water. In 2010, the Finnish Government decided to increase revenues by introducing the sweet tax and increasing the tax rate of already taxed categories such as soft drinks. This came into force by January 1<sup>st</sup> 2011<sup>185</sup>. Since the implementation of the sweet tax the tax rate has been increased and the tax base enlarged. The enlargement of the tax base has focused on taxation of sugar-free products at lower tax rates than similar sugary products. The tax rate and its development are given in the following Table.

The tax is to be paid by the producer when products enter into the market. Imported products are taxed similarly to domestically produced products, if they are for sale in the Finnish market. Exported products are not taxed.

**Table 20 Tax rate (cents per litres or per kg)**

CN codes	Product description	2011	2012	2013	2014
1704	Sugar confectionery without cocoa	75	95	95	95
1806	Chocolate and products with cocoa	75	95	95	95
2105	Ice cream	75	95	95	95
1901	Ice cream mass	75	95	95	95
2009	Fruit and vegetable juice with (natural) sugar	7.5	11	11	22
	Fruit and vegetable juice, sugar free				11
2201	Bottled water	7.5	11	11	11
2202	Bottled water with added sugar	7.5	11	11	22
	Bottled water, sweetened, but sugar free				11
2204, 2205, 2206, 2208	Alcoholic beverages, ciders, grape wine, max 1.7 % alcohol, sweetened	7.5	11	11	22
	Alcoholic beverages, ciders, grape wine, max 1.7 % alcohol, sugar free				11
2016	Other drink preparations, powders for drinks	75	75	95	140
	Other drink preparations, powders for drinks, sugar free				95

([www.finlex.fi](http://www.finlex.fi), 2010 to 2013).

### Challenges with the tax base

The CN codes are international codes used for customs tariff. The codes specify which products that fall under the heading. But, for some product categories the CN codes are not very specific and therefore it is not in all cases crystal clear which products fall under the CN code in question. An example are, breakfast cereals, and cereal bars. There is no CN code for this specific kind of products, thus the products has to be placed under the most appropriate CN code. This implies that for some product categories like cereal bars and breakfast cereals there are no clear CN codes, and therefore such products may be subject to discussion of whether they are included in the tax base or not.

<sup>184</sup> RP 148/2010, [www.finlex.fi](http://www.finlex.fi).

<sup>185</sup> Interview Min. Econ. Affairs, 2014.

When products are traded between nations, or internally in the EU market, it is common to obtain a “Binding Tariff Information” (BTI). This document issued by customs authority in the exporting country and certifies which CN code the specific product is subject to. An example documents this challenge: A multinational company produces breakfast cereals containing cocoa. In 2005 the company had obtained a BTI classifying the product under CN code 1904 by the customs authorities in France, Poland and Norway. Additionally they have obtained a BTI classification for this product from Poland again in 2013 showing the CN code 1904. Finnish customs authorities would not accept this 1904-BTI but rather classify the product under CN code 1806 (Chocolate and other food preparations containing cocoa); thus the product would be liable to tax under the Finnish sweet tax. This is a pending case in Finland.

Another challenge is that with the existing system of the CN codes forming the backbone of the tax base it will be very difficult to expand the tax base without including more CN codes. This is foreseen to cost much administrative work for Government as well as industry.

## Sources of information

### Sources applied for this case study

This case study is based on documents, interviews, and visit to a supermarket in Helsinki.

The following documents have been used:

Eckes-Granini, Excise tax development in fruit juice/nectar/drinks/syrups category in Finland. Presentation prepared for meeting at ETL, February 24, 2014, Helsinki, 4 pp.

Finnish Food and Drink Industries Federation (ETL), Food taxes and their impact on competitiveness of the agri food sector in Finland. Presentation prepared for meeting at ETL, February 24, 2014, Helsinki, 19 pp.

Finnish Food and Drink Industries Federation (ETL); Form for the submission of complaints concerning alleged unlawful State aid (Complaint on the excise tax on sweets, ice cream and soft drinks). Helsinki, June 2013, 11 pp.

Finnish Food and Drink Industries Federation (ETL), Statistics on imports and exports of food. Retrieved from [www.etl.fi](http://www.etl.fi), February 2014, 10 pp.

Finnish Competition Authority, Effects of excise duty on candy, ice cream and soft drinks. Letter to Ministry of Finance, Memorandum no. 31.8.2011. Helsinki, 2011. 4 pp.

Government Propositions for adjusting the sweet tax, RP 148/2010; RP 55/2011; RP 109/2013. Retrieved from [www.finlex.fi](http://www.finlex.fi), February 2014.

Xavier Irz and Jyrki Niemi, The effectiveness of differentiated food taxes in promoting dietary quality and nutritional health – A review of the international and Finnish evidence. MTT Report no. 32, Helsinki, 2011, 30 pp.

Kaisa Kotakarpi, Tommi Härkänen, Pirjo Pietinen, Heli Reinivuo, Ilpo Suoniemi and Jukka Pirttilä, The Welfare Effects of Health-based Food Tax Policy. Labour Institute for Economic Research, discussion papers no. 271. University of Tampere, 2011, 24 pp.

Ulla Luhtasela, Sakari Kotka and Johanna Sewon-Kievvari, Sweet tax and Nestlé Finland. Presentation prepared for meeting at Nestlé, February 24, 2014, Espoo, 28 pp.

Ministry of Finance, Fact sheet about the excise duty on sweets, ice cream and soft drink. Retrieved from [www.vm.fi](http://www.vm.fi), December 2013, 1 pp.

Newsletters from the Finnish Brewery Association, Tax increases are a blow to the domestic brewing industry; Domestic sales of brewery beverages fall – tax increases move trade to Estonia; Sales figures. Retrieved from [www.panimoliitto.fi](http://www.panimoliitto.fi), December 2013 to February 2014, 8 pp.

Suomen Nestlé Oy, Impact of the sweet tax on ice cream industry activities. Confidential paper prepared for the Competition Authority (and made available for the Ecorys study group). Espoo, 2014, 10 pp.

Tapani Yrjölä and Perttu Pyykkönen, Food taxes and their impact on competitiveness in the agri-food sector in Finland. A literature review prepared for ETL. Pellervo Economic Research, Finland, February 2014, 15 pp.

The following table provides an overview of the interviewees who have contributed with information.

**Table 21 Respondents from interviews**

Name and position	Affiliation
Sakari Kotka, Managing Director	Nestlé Finland Ltd
Ulla Luhtasela, Manager, Regulatory Affairs	Nestlé Finland Ltd
Johanna Sewon-Kievvari, Business Executive Manager, Ice Cream	Nestlé Finland Ltd
Marleena Tanhaunpää, Director, Food Legislation	Finnish Food and Drink Industries' Federation ETL
Heli Tammivuori, Director, Commercial Policy	Finnish Food and Drink Industries' Federation ETL
Karri Kunnas, Branch Manager	ETL
Mari Jääskeläinen, Branch Manager	ETL
Elisa Piesala, Branch Manager	ETL
Tom Lindblad, Managing Director	Fazer Confectionery and Bakery Oy
Torsti Hurmerinta, Commercial Director	Eckes-Granini Finland Oy
Saara Kalin, EU Product Regulation Manager	Altia Plc.
Elina Ussa, Managing Director	Finnish Brewery Association
Jukka Ojapelto, Senior Vice President, Grocery Trade Chain Management	S-Group
Ilkka Alarotu, Grocery Chain Manager	S-Group
Veli Auvinen	Ministry of Economic Affairs, Excise duty unit
Sanna Ala-Mantila	Ministry of Economic Affairs, Excise duty unit

### Data availability

Compared to other EU countries, the availability of data on food consumption and food sales in Finland is quite limited. The retail market in Finland is highly consolidated as the two largest retail groups together hold 80 % or more of the retail market, and no scanner data are collected<sup>186</sup>. Finnish retailers are very reluctant to provide information about sales including information about branded vs. private label products, sales volumes and prices. Following this, most data about food consumption and food sales are estimated by industry sources or researchers. This is confirmed in

<sup>186</sup> Additional information from one producer suggests that scanner data are being collected at the level of retailers, however the information is not passed on.

interviews. Some data on household consumption patterns are available from public surveys such as The Findiet Survey (Finravinto) 2007 ([www.julkari.fi](http://www.julkari.fi)).

## Findings

### Finnish food consumption

#### *Consumption of taxed and non-taxed products*

Some have argued<sup>187</sup> that the sweet tax could push Finnish food consumption in a more healthy direction. These arguments are supported by findings from literature, where it is stated that when prices of products increase the consumption will decline.

The reduction in consumption is dependent on the price increase and the price elasticity of the product investigated<sup>188</sup>. In literature it is suggested that the price elasticity of sugar is -2.5 meaning that a price increase of 10 % would lead to a reduction in demand of 25 %<sup>189</sup>. Other scholars find the price elasticity for sugar of -0.8 indicating a much smaller decrease in consumption of sugary products<sup>190</sup>. So, findings from literature agree on the fact that there is a correlation between increasing prices on sugary products and a declining consumption of such products. The key question here is how strong the correlation is, and this issue still needs more research<sup>191</sup>.

The table below shows that the products which are liable to the sweet tax only account for 14 % of the daily total sugar intake of the Finnish population.

**Table 22 Daily intake of taxed and non-taxed products containing sugar**

Product	Men (gram/day)	Women (gram/day)
<b>NON taxed products</b>		
Buns, donuts	20	14
Biscuits	5	4
Cakes, sweet pastries	10	12
Pancakes, crepes	4	4
Berry and fruit pies	6	5
Yoghurt	73	83
Milk puddings	9	12
Sugar, honey	6	4
<b>Total consumption, non-taxed products</b>	<b>133</b>	<b>138</b>
<b>TAXED products</b>		
Sweets	8	9
Ice cream	6	7
Chocolate	7	7
<b>Total consumption, taxed products</b>	<b>21</b>	<b>23</b>

(Nestlé presentation Feb. 2014 based on data from [www.julkari.fi](http://www.julkari.fi), [Finravinto survey 2012](#)).

<sup>187</sup> Interview ETL and Ministry of Economic Affairs, 2014.

<sup>188</sup> PER, 2014.

<sup>189</sup> Kotakarpi et al, 2011.

<sup>190</sup> Irz and Niemi, 2011.

<sup>191</sup> ETL, 2014.

Beverages (juice, soft drinks and alcoholic beverages) contributed to 16 % of the intake of sucrose among females, and 24 % among males<sup>192</sup>. Based on these consumption data the sweet tax will only have an insignificant impact on the total consumption of sugar and can therefore not be considered to push the Finns' diet towards more healthy choices<sup>193</sup>.

#### *Impact on food consumption – substitution among categories*

After the sweet tax was imposed, prices on the taxed categories have increased on average 30 % or more. According to general economic theory this should lead to a declining consumption and/or shifting of consumption to competing products. During the first year of the sweet tax, sales of competing products have increased as follows<sup>194</sup>:

- Frozen desserts: +4%;
- Frozen baked goods: +3%;
- Breakfast bars: +10%;
- Stable desserts: +4%;
- Dairy-based desserts: +3.7%;
- Yoghurts: +1.6%.

The growth in demand for the above-mentioned categories indicates a substitution effect, where demands for the taxed products (particularly ice cream and sweets) have declined. An example: chocolate bars are subject to the sweet tax whereas chocolate cereal bars are not. In this perspective the sweet tax has contributed to changes in consumer demand but not an overall reduction in the demand for sweet and sugary products. Hence, the sweet tax has had an impact on the competitiveness of Finnish food producers and this has led to discrimination between products.

The discriminatory nature of the sweet tax has resulted in a complaint to the European Commission filed by the Finnish Food and Drink Industries' Federation in June 2013. The complaint's key issues are<sup>195</sup>:

- The sweet tax is imposed on single products based on their customs nomenclature (CN codes) while products which are similar in their nutritional value and consumer needs escape the tax;
- The sweet tax favours some products' (and by this) some companies' growth opportunities; and
- The sweet tax transfers consumer demands towards products that are not taxed.

The complaint is not settled yet, so the present situation is not known. But, it is beyond doubt that the sweet tax has an impact on the consumers' choice of products and through this the substitution of taxed for not-taxed products (even though non-taxed products may not necessarily contain less sugar).

#### **Impact on food consumption – the taxed categories**

##### *Ice cream*

In Finland, ice cream is considered as an every-day treat, and it is a product that is purchased by all consumer groups. The most common ice cream product in the market is the one litre brick ice cream which comes as a branded as well as a private label product. Obviously, ice cream sales depend on the weather, so a good and long summer leads to higher sales. Finns have a high per capita consumption of ice cream compared to the European average. Since the sweet tax came into effect in January 2012 prices of ice cream have increased 30-60 %, and the consumption has decreased approx. 20 %, figure 5. This equals a drop in consumption of approx. 2 litres per capita,

<sup>192</sup> Nestlé presentation, Feb. 2014 (with data from Euromonitor).

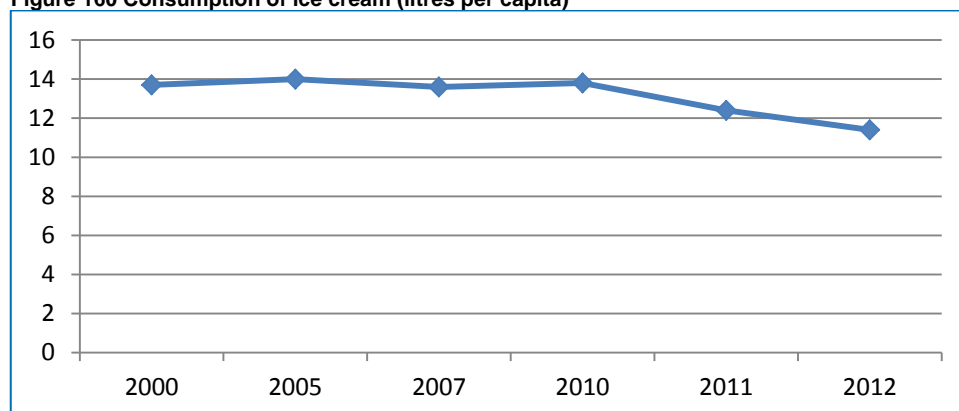
<sup>193</sup> Confirmed in interviews with ETL, Nestlé, SOK and Ministry of Economic Affairs, 2014.

<sup>194</sup> Euromonitor data (2011) from Nestlé presentation, Feb. 2014.

<sup>195</sup> ETL complaint, 2013.

and the total ice cream market has dropped 10 million litres since the introduction of the sweet tax<sup>196</sup>.

**Figure 160 Consumption of ice cream (litres per capita)**



(Data from Nestlé presentation, Feb. 2014).

#### *Sweets, chocolate and products containing cocoa*

From interviews it has become clear that the consumption of sweets and chocolates is not strongly affected by the tax<sup>197</sup>.

Finnish consumers stay with candy and other sweets even if prices have increased. Instead consumers prefer to save money on other more expensive foods such meat. Overall, a decline in candy consumption of 1-2 % per year has been reported by a retailer, but is not evident that this drop is linked to the sweet tax<sup>198</sup>. Other sources mention a decrease in chocolate and confectionery consumption of 5 % or 6 % since 2011<sup>199</sup>.

#### *Soft drinks*

Drinks affected by the tax include soft drinks (carbonated drinks, syrup), mineral water, and fruit based drinks (e.g. fruit juice, syrups, and nectars), and some alcoholic beverages, too. In 2012, Finns consumed 124.1 million litres of soft drinks, and in 2013 this had decreased to 119.4 million litres; equalling to a drop in consumption of soft drinks of 3.8 %<sup>200</sup>.

Sales figures provided by industry shows a clear consumer response to the increases in the tax rate, please see figure 1.2 below. Thus, an increase in tax on soft drinks has definitely caused a drop in consumption. The doubled excise tax in 2014 to 22 cents per litre is expected to have a dramatic impact on consumption as prices are foreseen to increase between 10 % and up to 30 %. This will overall reduce the category volume<sup>201</sup>.

<sup>196</sup> IFAU assumption, 2014.

<sup>197</sup> Interviews Nestlé, ETL and SOK, 2014.

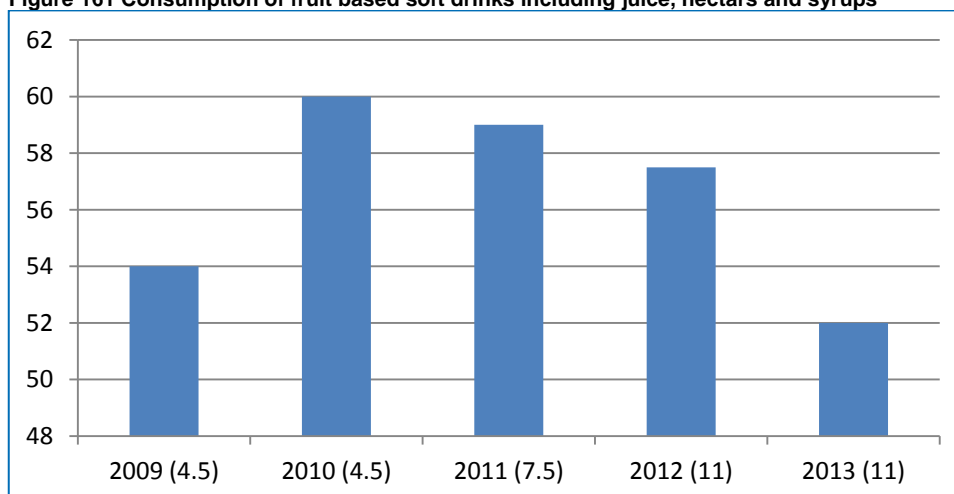
<sup>198</sup> Interview, SOK, 2014.

<sup>199</sup> ETL presentation, 2014 and ETL complaint, 2013.

<sup>200</sup> Finnish Brewery Association, August 2013 ([www.panimoliitto.fi](http://www.panimoliitto.fi)).

<sup>201</sup> Eckes-Granini, 2014.

**Figure 161 Consumption of fruit based soft drinks including juice, nectars and syrups**



(In brackets the tax rate in cents per litre).  
(Eckes-Granini, 2014).

There is a link between consumption and prices. So, when the sweet tax on soft drinks is increased it had at certain price points have a negative effect on consumption. The Finnish market for juice showed growth, but when the sweet tax was introduced in 2011 and increased in 2012, this led to a decline in consumption of juice of between 15 % and 35 %. For soft drink it is anticipated that the sweet tax has caused a drop in consumption of 9 %<sup>202</sup>.

Table 4.23 below shows the development in consumer prices following an increase in the sweet tax. The prices are from a supermarket (S-Market) and given as retail prices in EUR. It can be seen that from December 2013 to January 2014, consumer prices on fruit juices and other soft drinks increased from 10-30 %.

**Table 23 Consumer prices before and after doubling the tax on soft drinks**

	Retail price EUR Dec. 2013	Retail price EUR Jan. 2014	Consumer price increase, EUR	Consumer price increase, %
Marli juice	0.99	1.13	0.14	14
Mehukatti fruit and berry syrup	2.49	3.27	0.78	31
Mehukatti fruit syrup	3.55	4.59	1.04	29
Marli PET syrup with sugar	2.95	3.57	0.62	21
<b>Tropic juice</b>	<b>1.19</b>	<b>1.35</b>	<b>0.16</b>	<b>13</b>

(Eckes-Granini, 2014).

## Impact on stakeholders

### Impact on food industry

From 2008 to 2010, the Finnish ice cream market has presented sales of 71 to 73 million litres with slight fluctuations between years. Following the introduction of the sweet tax in January 2011, sales of ice cream dropped to 65 million litres in 2011 and further down to 58 million litres in 2012. This trend has continued since then. This indicates that the introduction of the sweet tax has imposed a loss in terms of sales volume onto the manufacturers of ice cream.

<sup>202</sup> ETL presentation, Feb. 2014.



An example: Nestlé holding 50 % of the Finnish ice cream sales (i.e. 28 million litres by 2012) claims to have suffered a loss of 5 million litres (= 25 million EUR in sales) as a consequence of the sweet tax; this equals a reduction in sales volume of 18-20 %<sup>203</sup>. The reduced sales volume inevitably leads to higher overhead costs, and this is claimed to have cost Nestlé a 5 % decrease in the company's competitiveness in the ice cream market. As a multinational company, Nestlé has the options of investing elsewhere than Finland in ice cream production capacity. Since Nestlé took over the Turenki factory (where the company's ice cream for the Finnish market is produced) in 2004, more than 15 million EUR has been invested in this plant. The investments were carried out to improve the company's competitive situation; to meet future growth expectations; and to produce so close to the market as possible. The sweet tax has led to lost sales volumes, and the outlook to increasing tax rates as of 2015 are not regarded as a promising environment for future investments in ice cream production capacity.

If a decision of ceasing production of ice cream in Finland should be made, then it will have a negative effect on employment and innovation, too<sup>204</sup>. Since the introduction of the sweet tax, Nestlé has decreased employment in the ice cream business of 150 FTE<sup>205</sup>. These jobs have been cut from production, distribution, ice cream vans and in kiosks. Furthermore, the seasonal employment is the lowest ever in its history<sup>206</sup>.

The implementation of the sweet tax has caused the food industry much administrative work and related costs. Nestlé claims that the costs derived from the sweet tax administration amount to 80,000 EUR since 2011 including costs for system maintenance; monitoring and matching payment of taxes; and interpreting unclear legislation (CN codes)<sup>207</sup>. Other sources mention, that the ice cream industry in Finland pays as much in taxes as the candy industry in spite of the fact that the net sales of the ice cream industry are about a third of the net sales of the candy industry<sup>208</sup>.

As baked goods are not subject to the sweet tax (despite the products may contain cocoa or chocolate), interviews prove that there is a growing competition from baked goods onto chocolate and cocoa-containing sweets. A few examples have been provided<sup>209</sup>:

1. The famous Finnish confectionery company Fazer had pulled out of the biscuit business some years ago, but bought this business back in 2013. Fazer produces chocolates under the "Geisha" brand, and wanted to produce chocolate-enrobed biscuits under the "Geisha" brand;
2. The chocolate company Marabou has introduced chocolate spread (similar to "Nutella") and chocolate coated biscuits.

The brewery sector has also suffered from reductions in employment. In Finland the breweries are the main producers of soft drinks (carbonated drinks and mineral water). By 2010, the employment in the Finnish beer and soft drink industry was 2,269 persons, and in 2013 this had been reduced to 1,980 persons. This equals a reduction of 12 %<sup>210</sup>. It is claimed that taxes on alcoholic beverages and the sweet tax are the most important factor for the loss of jobs in Finnish breweries, but the impact from the sweet tax on its own is not clear<sup>211</sup>. From an interview it is clear that 20 people have lost their jobs in a fruit drink manufacturing company, and this is claimed to be because of the sweet tax<sup>212</sup>.

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<sup>203</sup> IFAU calculation based on the interview with Nestlé, 2014.

<sup>204</sup> Nestlé, 2014.

<sup>205</sup> FTE: Full Time Employees.

<sup>206</sup> Nestlé presentation, Feb. 2014.

<sup>207</sup> Nestlé presentation, Feb. 2014.

<sup>208</sup> Finnish Competition Authority, 2011.

<sup>209</sup> Interviews, ETL, 2014.

<sup>210</sup> Finnish Brewery Association, 2014.

<sup>211</sup> Newsletters from the Finnish Brewery Association; [www.panimoliitto.fi](http://www.panimoliitto.fi) (2013-2014).

<sup>212</sup> Eckes-Granini in the ETL interview, 2014.

The breweries and the soft drink industry claim that, border trade between Finland and Estonia impacts Finnish retail sales of soft drinks liable to the sweet tax. Data from the Finnish Brewery Association reveals that about half of the imports from Estonia are Finnish brands (beer and soft drinks) and the other half are foreign brands. It is also revealed that the retail price for 1 litre syrup in a Helsinki supermarket is 3.40 EUR, and the same product can be bought at the Tallinn harbour for 1.99 EUR<sup>213</sup>. No further information is available specifically for soft drinks, and the consequences for sales of soft drinks in Estonia have not been investigated for this case study.

#### *Impact on retailers*

The Finnish retail market is highly consolidated as the two largest groups (K-group and S-group) together hold 80 % of retail trade. The retailers make extensive use of private labels across categories. It is estimated that in 2010, private labels across categories accounted for 16 % of the grocery trade, and in 2012 this share had increased to 20 %<sup>214</sup>. Private labels are widely used for ice cream, and in this category private labels accounted for just over 20 % in 2013. As private labels are subject to smaller margins than branded goods, then private labels can be marketed to the consumer at a lower price. This increases the retailers' share of the grocery trade and strengthens their bargaining power. Following this, the branded food industry including ice cream producers have lost competitiveness.

Retailers strive to maximise profit per square meter retail outlet, and surface area is allocated to different product categories according to a profit maximisation model. This means that the retailer will select other products or even other categories, if the ones on the shelf today do not perform as well as expected. Following the introduction of the sweet tax and the subsequent price increases, consumer preferences have shifted towards the more economical private label products or alternative product categories. Particularly for ice cream the substitution effect has been visible. Sales of the more expensive branded ice cream products have declined and less shelf space has been allocated to this product group in retail stores in favour of e.g. frozen gateaux or frozen desserts. This pattern is particularly critical for frozen foods as the freezing containers are the most expensive shelf space in retail stores<sup>215</sup>.

Retailers generally want at least four months of notice when prices are subject to change. When the Finnish government decided to increase the sweet tax rate in November 2013, it left the retailers (and food suppliers) with only 6 weeks of time available for filling and/or emptying stocks and adjusting prices. This timeframe was considered to be inadequate to react properly<sup>216</sup>.

#### *Impact on consumers*

Researching consumer behaviour in the Finnish food market is hampered by the lack of exact data such as scanner data. Most information available on consumer behaviour is based on estimates<sup>217</sup>. Research has proven that it is the low income groups that are affected the most from the sweet tax<sup>218</sup>. This is due to the fact that for low income groups food purchasing account for a proportionally larger share of income than for high income groups. A retailer states that consumers, despite low income levels, still demand candy but when prices increase the consumer will choose a cheaper product and maybe cut down on other food items<sup>219</sup>.

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<sup>213</sup> Interview ETL, Feb. 2014.

<sup>214</sup> Nestlé presentation, Feb. 2014.

<sup>215</sup> Nestlé, 2014.

<sup>216</sup> Interview, SOK, 2014.

<sup>217</sup> Confirmed by ETL, Nestlé, SOK and Ministry of Economic Affairs, 2014.

<sup>218</sup> ETL, 2014.

<sup>219</sup> Interview, SOK, 2014.

Manufacturers of branded food products add the sweet tax when the product is sold to a retailer. The retailer adds a margin plus the VAT, therefore, the consumer price includes the full value of the sweet tax, VAT, the retailer's margin and the producer's price. Thus, the consumer pays the full value of the tax; 100 %<sup>220</sup>. Other sources claim that when the sweet tax was introduced in 2011, it was calculated that consumers paid 93 % of the sweet tax. These figures are not confirmed elsewhere, and the lack of reliable data does not support deeper investigations into this matter<sup>221</sup>.

Private label products and branded products are subject to the same tax, but still the private label products can maintain a lower and more affordable price in the retail market due to the smaller margins on the private label products. A retailer underlines that the private labels in their stores are generally more economical products, and therefore demanded by the consumers<sup>222</sup>. Interviews point to the fact that the private labels' share of the taxed categories has increased since the tax was introduced. For ice cream private labels' share of sales has increased from 16 % in 2011 to 20 % in 2013<sup>223</sup>.

#### *Impact on the food chain and competitiveness*

To date, no research has been carried out about the effect of food taxes on the economic situation and employment of food industry and agriculture in Finland<sup>224</sup>. This paragraph will thus provide some information about the assumed impact from the sweet tax on the food chain in Finland; about international trade; and the consequences for Finnish food producers in a global context.

It is estimated that only 2 % of the Finnish milk production is used in the ice cream industry<sup>225</sup>. This shows a link between Finnish dairy production and ice cream manufacturing. Thus, the impact from a declining ice cream demand from Finnish consumers will only have an insignificant impact on the domestic dairy production.

The Finnish dairy and sugar industries are not subject to any taxes, and this is a strong principle in Finland<sup>226</sup>. The dairy industry supplies desserts, yogurt and dairy-based drinks, and many of these products contain sugar. In this light the dairy industry has a preferential position in the competitive environment where also manufacturers of ice cream operate. Table 4.24 shows examples of dairy based products that are liable or non-liable to the sweet tax<sup>227</sup>.

**Table 24 Examples of dairy based products liable or non-liable to sweet tax**

Liable to sweet tax	Non-liable to sweet tax
Dairy ice cream (made with cream)	Dairy based puddings
Milk ice cream (made with milk or milk powder)	Fruit yoghurt and yoghurt drinks

(Nestlé, 2014).

#### *Impact the competitiveness of European stakeholders in the global market*

The products liable to the sweet tax are mainly produced for the domestic market. In case the products falling under the CN codes of the tax base are exported, then the products are not liable to the sweet tax. Interviews<sup>228</sup> have revealed that producers of e.g. confectionery or soft drinks store the tax-liable products in specific warehouses before the products are exported. This procedure

<sup>220</sup> Interviews Nestlé, ETL, 2014.

<sup>221</sup> Interview, Ministry of Economic Affairs, 2014 based on research by T. Kosonen (2013); Government Institute for Economic Research, report no. 21.

<sup>222</sup> Interview, SOK, 2014.

<sup>223</sup> Interview, Nestlé, 2014.

<sup>224</sup> ETL, 2014.

<sup>225</sup> Nestlé, 2014.

<sup>226</sup> Interviews ETL and Ministry of Economic Affairs, 2014.

<sup>227</sup> Nestlé presentation, Feb. 2014.

<sup>228</sup> ETL, Feb. 2014.

demands extra work and additional costs for warehousing, and it imposes extra costs for customs inspections. It is not clear if this additional warehousing procedure has a linked impact on exporting companies' competitiveness.

Imported products which fall under the CN codes of the tax base are subject to taxation when these products enter into the Finnish food market. If such products are marketed at lower costs than domestically produced products this may have an impact on the competitiveness of the Finnish producers.

The Finnish food market is dominated by domestically produced products. But, there seems to a trend for a growing international food trade. In 2000, total imports of food and agricultural products stood at 1.3 billion EUR, whereas this figure had increased to a value of 2.85 billion EUR in 2011. Exports amounted to 828 million EUR in 2000 and have increased steadily to reach 1.3 billion EUR by 2011. The European Union is the most important market for Finnish food exports followed by Russia.

Table 25 shows import and export of product categories relevant for the sweet tax. Only few conclusions can be drawn from Table 25 as there are just three years of data available. There seems to a declining import of the products liable to the sweet tax, whereas exports of the taxed products appear to be fluctuating around a share of 8-9 % of total food exports. This could indicate that Finnish exporters of products liable to the sweet tax (if traded in Finland) have maintained their competitiveness in export markets. The sweet tax is imposed on products when entering into the Finnish market. Finnish producers having the domestic market as their core market are subject to a stronger impact from the sweet tax than Finnish producers targeting export markets. Thus, the companies targeting the domestic market are imposed a competitive disadvantage due to the sweet tax, as their net sales are dependent on the demands of the Finnish consumers<sup>229</sup>.

**Table 25 Import and exports of products liable to sweet tax 2009-2011 (1,000 EUR)**

	Exports			Imports		
	2009	2010	2011	2009	2010	2011
Ice cream	7,469	2,869	3,347	29,371	36,486	35,381
Confectionery	30,384	30,650	33,941	49,359	57,114	47,140
Chocolate	48,368	47,686	49,843	76,849	87,695	80,151
Other products containing cocoa	7,140	8,595	9,253	49,256	55,453	51,201
Orange juice	1,967	1,776	1,987	21,733	25,283	29,962
Other fruit juice	2,321	2,388	2,555	32,726	32,470	38,026
Soft drinks and mineral water	5,181	5,792	6,842	43,841	49,212	50,031
<b>TOTAL, all above-listed categories</b>	<b>102,830</b>	<b>99,756</b>	<b>107,768</b>	<b>410,903</b>	<b>343,713</b>	<b>331,892</b>
Share of total foreign food trade	9,2 %	8,2 %	8,1 %	16,9 %	13,3 %	11,6 %

(Data collected by Finnish Customs, prepared by ETL, 2012).

<sup>229</sup> ETL, 2014.

Due to the limited number of years with statistical information it is not possible to draw strong conclusions about the impact of the sweet tax in an international perspective. But, findings in section 3.3 show that the Finnish food producers have lost competitiveness and retailers have gained, and this may impact the food producers' international competitiveness negatively<sup>230</sup>.

## Conclusions

### The sweet tax and its impact on the food value chain

Since the introduction of the sweet tax consumption of the products in the tax base has declined. The strongest decline has occurred for ice cream and soft drinks, whereas confectionery has not been so strongly impacted from increasing prices. Prices on the taxed categories have increased between 5 and 30 % depending on product and year. The sweet tax is imposed onto products when they enter into the Finnish market, thus leading to higher prices on food products traded in Finland. For producers of branded goods the sweet tax has caused loss of market shares and reduced sales volumes, and the retailers have gained similarly. Sales of taxed sweets under the cheaper private labels have increased. As the Finnish retail market is highly concentrated and private labels are widely used the sweet tax has supported the shift of power in the food chain to the retailers' advantages.

In interviews it is has been claimed that Finnish consumers want to continue enjoying the products liable to the sweet tax, but figures for consumption of ice cream and fruit based soft drinks (refer to Figure 160 and Figure 161) indicate a declining volume. In order to cope with the increasing prices due to the tax and still enjoy the taxed products, consumers choose products from competing categories (ice cream vs. frozen desserts) or trade down (choosing private labels over branded goods). The substitution effect is visible for the frozen food category and reported for the sweets as well.

The basis for the sweet tax is the CN codes used for customs tariff, thus products falling under these specific CN codes are liable to the sweet tax. This system implies that it is the specific product – not the producer or the category – that is liable for taxation. It has come clear from interviews and literature reviewing that this system creates a discriminatory business environment where companies cannot be sure whether a product is liable for taxation or not. Furthermore, the decision of liability to taxation is made by the Customs Lab; thus this laboratory can apply a very strong impact on a company's competitiveness and market position. Interviews and literature have identified a range of examples of this discriminatory system and its impacts including pending cases and official complaints.

The sweet tax has already led to cuts in jobs in ice cream production and the manufacturing of fruit based and carbonated soft drinks<sup>231</sup>. Some companies have also stated that plans for investments in the Finnish food industry may be revised because of the tax and the unprofitable business environment. These changes point to a decreasing competitiveness of the Finnish producers.

Interviews reveal that no studies have been conducted by Government or industry to assess the impact on competitiveness, employment, investments, consumption, or health<sup>232</sup>. But, all stakeholders agree that such impact studies are needed. It is also revealed that a major challenge for conducting such impact assessment studies is the serious lack of data about the retail market and consumer behaviour.

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<sup>230</sup> ETL presentation, Feb. 2014.

<sup>231</sup> Interviews Nestlé, ETL (Eckes-Granini and Finnish Brewery Association) 2014.

<sup>232</sup> Interviews ETL, Nestlé, Ministry of Economic Affairs, 2014.

### The food tax and its contribution to improving public health

Many scholars agree on the fact that food taxes can impact consumer choices and through this have an effect on consumer health<sup>233</sup>. However there is disagreement regarding the extent to which a food tax (or a tax on sugary products) would actually impact demand. The core issue here is how much consumption will decrease following a price increase of the product in question. Research has suggested that a price increase of 10 % on products high in sugar and fat would lead to a reduction in consumption of fat by 0.55 % and sugar by 1.07 %<sup>234</sup>. Another suggestion is that a price increase of 10 % on sugary products would diminish their consumption as much as 25 %<sup>235</sup>. These findings underline the coherence between price and consumption (or intake) and indicate that a tax on sugary foods can contribute to improve public health.

In December 2013 the Working Group on the Sweet Tax published an evaluation of the sweet tax and its effects on public health and as a means of generating tax revenues. The main conclusions from this report are<sup>236</sup>:

- Sugar consumption plays a significant role in promoting obesity and other health-related diseases;
- Tax on sugar can contribute to reduce consumption of sugary foods;
- A tax on sugar rather than sugary foods does not prove to be more effective in promoting a healthy diet;
- Other tools such as nutritional recommendations, awareness raising and information should be used together with taxation if improved public health is the goal;
- EU regulations state that as of 2017 it will be a duty to declare sugar content in food and drinks;
- The sweet tax model is the most practical way of imposing and handling a sugar tax today.

It has been argued that the overall consumption of sweets and sugary foods will not decline but only substitution effects would occur<sup>237</sup>. This pattern would not lead to an improved public health, and people in the low income groups would carry more of the tax payments than people from high income groups.

The analysis for this case study has not identified any studies proving the sweet tax's contribution to improving public health. Rather, the analysis has identified several sources suggesting that the Finnish State could earn more revenues from increasing VAT on food; and revenues for the State is the core objective of the sweet tax. Today VAT on food is 14 %, and alone from food retail sales a VAT income of 1.2 billion EUR was generated compared to 202 million EUR from the sweet tax<sup>238</sup>. In this perspective and based on the analysis it must be stated that the sweet tax may contribute to improving the public health but, more awareness raising is needed; improved data sets for monitoring consumption changes are required; and a solution to the substitution effect needs to be established.

### Has the food tax achieved its aim?

The overall aim of the sweet tax was first to provide revenues to Government, second to improve public health. The first goal of generating revenues must be considered as achieved. The fulfilment of the second goal (improving public health) is more doubtful. The analysis shows that consumption of the taxed products has declined, but it is not proven how much consumers have lowered their overall consumption of sweets and sugary products. Furthermore a wide number of competing and substituting products are not liable to taxation, thus consumers favour such products over the taxed

<sup>233</sup> ETL, 2014, Irz and Niemi 2011, and Kotakarpi et al, 2011.

<sup>234</sup> ETL, 2014 (based on research from Irz 2010).

<sup>235</sup> Kotakarpi et al, 2011.

<sup>236</sup> [http://www.vm.fi/vm/en/03\\_press\\_releases\\_and\\_speeches/01\\_press\\_releases/20130131SugarT/name.jsp](http://www.vm.fi/vm/en/03_press_releases_and_speeches/01_press_releases/20130131SugarT/name.jsp).

<sup>237</sup> Interviews ETL and Nestlé, 2014.

<sup>238</sup> ETL presentation, 2014.

products. Finally, the potential beneficial effect on public health from a tax on sweets does not occur instantly. More time and definitely more research are needed before conclusions about this issue can be made.

# Annex 3-C Tax on sugar and non-sugar sweetened beverages in France

## Executive summary

The tax under the scope is the one on sugar and non-sugar sweetened beverages. Launched in August 2011, this tax has been effectively implemented since January 1<sup>st</sup> 2012 and applies to drinks and liquid preparations for human consumption (such as non-alcoholic and non-fermented juices with or without added sugar or sweetener as well as water with added sugar or other sweetener or aroma).

While many stakeholders denounced an attempt by the French government to cover the social security deficit<sup>239</sup> (see Petkantchin, 2011), the official rationale underlying the tax were health-related objectives: the tax was to contribute to the discouragement and eventually reduction of the consumption of sweetened beverages. The key objective here was to fight obesity. However, it has been articulated by the French senate that this tax was to be considered a performance tax<sup>240</sup> - with the primary aim to collect revenues<sup>241</sup>. The financial rationale associated with the tax indeed relies on the idea that all products that lead to negative health externalities (and therefore social security costs<sup>242</sup>) should be charged in order to compensate those costs.

According to their simulations and analyses, as a result of the tax soft drink consumption decreases by 3 to 3.5 litres/person per year, representing between 12% and 15% of the initial consumption. Interviews confirmed this trend in practice, but as was mentioned by one of the interviewees, segmented data would be needed in order to effectively assess the changes in consumption for specific groups of consumers; on average, the decrease remains low according to all interviewees, who do not consider that the evidence available shows any change in consumption behaviours.

Overall, the industrial performance of the soft drink sector appear to be negatively affected<sup>243</sup> according to industry representatives but only to some extent (threats regarding specific products that might not survive the tax and its potential increase, unemployment risks, as well as a risk of a developing black market), while health objectives are not fully achieved.

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<sup>239</sup> As a few examples, see the following articles illustrating the controversy:

- “Coca-Cola accuse la taxe soda de peser sur ses ventes”, Le Figaro - <http://www.lefigaro.fr/societes/2012/10/03/20005-20121003ARTFIG00316-coca-cola-accuse-la-taxe-soda-de-peser-sur-ses-ventes.php>;
- « La taxe soda ne fait pas le poids », Le Monde - [http://www.lemonde.fr/economie/article/2011/08/26/la-taxe-soda-ne-fait-pas-le-poids\\_1563734\\_3234.html](http://www.lemonde.fr/economie/article/2011/08/26/la-taxe-soda-ne-fait-pas-le-poids_1563734_3234.html);
- « French ‘Cola Tax’ Approved: Paris Vows to Fight Deficit and Obesity », Der Spiegel - <http://www.spiegel.de/international/europe/french-cola-tax-approved-paris-vows-to-fight-deficit-and-obesity-a-806194.html>.

<sup>240</sup> See the Senate report on <http://www.senat.fr/commission/fin/pilf2012/articles/05octies/05octies2.html>.

<sup>241</sup> The tax was initially provided in the 2012 Budget Bill on Social Security, before shifting to the 2012 Budget Bill.

<sup>242</sup> The revenues generated by the tax are allocated to the social security, and in particular to the CNAM – Caisse Nationale d'Assurance Maladie.

<sup>243</sup> Public Senate website: <http://www.publicsenat.fr/lcp/politique/rapport-senat-pr%C3%A9conise-hausse-paquet-cigarette-11.30-euros-5-ans>.



## Description of the tax

The tax under the scope is the one on sugar and non-sugar sweetened beverages. Launched in August 2011, this tax is being effectively implemented since January 1<sup>st</sup> 2012 and applies to drinks and liquid preparations for human consumption. The modalities of the tax are defined by an official circular<sup>244</sup>. The drinks targeted by the circular are all beverages with added sugar or sweetener<sup>245</sup>. Initially supposed to specifically target sodas, the tax was extended to sweetened drinks (including 'light drinks'). The main reason for such extension was the fact that no specific category in the French customs codification is dedicated to sodas. Therefore, the tax was applied to all soft drinks. No specific timeline or quantified targets were mentioned in terms of the expected effects and further impacts of the tax.

### “Soft drinks”: 4 key criteria

The drinks under the scope should respond to 4 cumulative criteria:

1. They have to fall under the NC 2009 and NC 2202 customs tariff codes (and therefore should correspond to the relevant drink categories such as non-alcoholic and non-fermented juices with or without added sugar or sweetener as well as water with added sugar or other sweetener or aroma);
2. They have to contain added sugar, or sweetener, whatever the quantity;
3. They have to be packed into containers aimed to the retail market (direct or with an intermediary);
4. They have to present an alcohol strength equal or below 1,2%vol. (0,5% vol. in the case of beers).

### Characteristics of the tax in numbers

The tax basis for each contribution is constituted by the quantity of the product, whether this product is to be sold or delivered for free (in France). The tax rate established by the French legislator was €7.16 per hectolitre of the product in 2012. This rate is adjusted every 1<sup>st</sup> of January in order to be in line with the growth rate of the consumption's price index of the second year preceding the levy. In 2013, the rate was €7.31 while in 2014, it reached €7.45<sup>246</sup>. While the initial objective in terms of revenue generation was €280 million, €375 million were effectively collected in 2013 and targeted social security<sup>247</sup>.

### Economic actors under the scope

The tax is levied on the suppliers (producers, importers and merchants) of the drinks under the scope. Its implementation modalities were set by the 2012 circular “Contributions sur les boissons et préparations liquides pour boissons sucrées et édulcorées”<sup>248</sup>. This circular sets the conditions and characteristics of the « legal persons » falling under the tax, who are:

- Producers established in France and delivering the relevant drinks on the French market;
- Persons importing the relevant drinks from abroad and delivering on the French market;
- Persons delivering relevant drinks in the context of their commercial activities (restaurants, etc.) – though only when producing such drink according to the relevant criteria; this clause mainly concerns fast food chains in practice.

<sup>244</sup> Ministère du budget, des comptes publics, et de la réforme de l'Etat, [http://circulaire.legifrance.gouv.fr/pdf/2012/01/cir\\_34494.pdf](http://circulaire.legifrance.gouv.fr/pdf/2012/01/cir_34494.pdf).

<sup>245</sup> It is interesting to note that milk-based drinks, soups, as well as drinks delivered on medical prescription do not fall under this tax regime.

<sup>246</sup> Source: <http://vosdroits.service-public.fr/professionnels-entreprises/F31871.xhtml>.

<sup>247</sup> And more precisely the CNAM – Caisse Nationale d'Assurance Maladie.

<sup>248</sup> The official legal document is available on [http://circulaire.legifrance.gouv.fr/pdf/2012/01/cir\\_34494.pdf](http://circulaire.legifrance.gouv.fr/pdf/2012/01/cir_34494.pdf) - Circulaire du 24. janvier 2012 Contributions sur les boissons et préparations liquides pour boissons sucrées et édulcorées Contributions indirectes NOR: BCRD 1202351C.

Exports to countries in or outside the European Union are exempted. A producer exporting soda to Germany would for instance not pay the tax on the exported products. This is also the case for the French Oversea Territories (and Oversea Departments), fiscally considered as export destinations from a metropolitan perspective. A monthly statement on tax returns should be provided to the State administration (customs) by each entity falling under the tax regime.

### Health improvement rationale

While many stakeholders denounced an attempt by the French government to cover the social security deficit<sup>249</sup> (see Petkantchin, 2011), the official rationale underlying the tax were health-related objectives: the tax was to contribute to the discouragement and eventually reduction of the consumption of sweetened beverages. The key objective here was to fight obesity.

However, it has been articulated by the French senate that this tax was to be considered a performance tax<sup>250</sup> - with the primary aim to collect revenues<sup>251</sup>. The financial rationale associated with the tax indeed relies on the idea that all products that lead to negative health externalities (and therefore social security costs<sup>252</sup>) should be charged in order to compensate those costs.

The secondary aim of the tax was therefore to contribute to broader objectives described in the national nutrition plan (Programme Nutrition Santé).

### Sources of information

Several sources of information were used for the present analysis. The tax itself triggered important political debates in France, leading to a mediatisation of the issues and discussions around the tax; media sources were however used only to the extent they allowed targeting relevant actors and reports – legal texts. The evidence used in this case study was essentially derived from three types of sources:

#### Public documents and relevant legislation, and in particular:

- Legifrance (2011), «JORF n°0301 du 29 décembre 2011 page 22441 texte n° 1 - Loi n° 2011-1977 du 28 décembre 2011 de finances pour 2012»;
- Legifrance (2012), «Circulaire du 24 janvier 2012. Contributions sur les boissons et préparations liquides pour boissons sucrées et édulcorées. Contributions indirectes. NOR: BCRD 1202351C»;
- Legifrance (2013), «LOI n°2013-1279 du 29 décembre 2013 - art. 54»;
- Legifrance (2013), «Article 1613 ter» from the Code Général des Impôts, CGI;
- Legifrance (2013), «Article 1613 quater» from the Code Général des Impôts, CGI;
- Direction de l'information légale et administrative (Premier ministre) (2012), «Comment appliquer la nouvelle taxe sur les boissons sucrées et édulcorées?».

<sup>249</sup> As a few examples, see the following articles illustrating the controversy:

- "Coca-Cola accuse la taxe soda de peser sur ses ventes", Le Figaro - <http://www.lefigaro.fr/societes/2012/10/03/20005-20121003ARTFIG00316-coca-cola-accuse-la-taxe-soda-de-peser-sur-ses-ventes.php>;
- « La taxe soda ne fait pas le poids », Le Monde - [http://www.lemonde.fr/economie/article/2011/08/26/la-taxe-soda-ne-fait-pas-le-poids\\_1563734\\_3234.html](http://www.lemonde.fr/economie/article/2011/08/26/la-taxe-soda-ne-fait-pas-le-poids_1563734_3234.html);
- « French 'Cola Tax' Approved: Paris Vows to Fight Deficit and Obesity », Der Spiegel - <http://www.spiegel.de/international/europe/french-cola-tax-approved-paris-vows-to-fight-deficit-and-obesity-a-806194.html>.

<sup>250</sup> See the Senate report on <http://www.senat.fr/commission/fin/pjlf2012/articles/05octies/05octies2.html>.

<sup>251</sup> The tax was initially provided in the 2012 Budget Bill on Social Security, before shifting to the 2012 Budget Bill.

<sup>252</sup> The revenues generated by the tax are allocated to the social security, and in particular to the CNAM – Caisse Nationale d'Assurance Maladie.

### Analytic and research-based reports (see annexes), and in particular:

- CEDUS Le Sucre, “Boissons sucrées: qui consomme quoi?”, January 2012;
- Nicoletta Berardi, Patrick Sevestre, Marine Tepaut and Alexandre Vigneron, «The impact of a ‘soda tax’ on prices. Evidence from French micro data», December 2012;
- Cécile Bonnet and Vincent Réquillart, «Tax incidence with strategic firms in the soft drink market», *Journal of Public Economics* 106 (2013) 77–88;
- Valentin Petkantchin, «La taxe « sodas », une mesure inefficace pour régler les problèmes d’obésité et de déficit public», *Note économique de l’IEM* • OCTOBRE 2011;
- Cécile Bonnet and Vincent Réquillart, «Les effets de la réforme de la politique sucrière et des politiques de taxation sur le marché des boissons sucrées», *Cahiers de nutrition et de diététique* (2012) 47, 35—41.

### Interviews with 8 key actors:

- Camilia Maïdi and Frédéric Américo, MINEFI (Ministry for Economy, Finance and Industry);
- Béatrice Adam, SNBR (Syndicat National des Boissons Rafraîchissantes);
- Céline Bonnet, Toulouse School of Economics (INRA, GREMAQ);
- Valentin Petkantchin, Institut d’Etudes Molinari;
- Thomas Gautier, UNIJUS;
- Nicoletta Berardi and Patrick Sevestre, Banque de France.

After an exploratory literature review and a first round of protocolled interviews, a second round of interviews as well as a complementary literature review were conducted. Synthesis, analysis and final reporting constituted the next (and last) steps of the case study process.

## Findings

### Context

#### *Conditions preceding the introduction of the tax*

Existing regulations (such as the 1938 law on vegetable and fruit juices, syrups and fruit beverages<sup>253</sup>, or the 2012-12 regulation on nectar products<sup>254</sup>), as well as measures such as the prohibition of automatic distributors in schools (2004 public health law), were part of the context in which the tax has been set up. Those conditions appear to have a very small impact on the competitiveness of the soft drinks sector.

#### *Link established with health objectives*

The tax was presented by the French government as a way to fight against obesity and its related health costs. The rationale underlying the tax was indeed based on the idea of provoking behavioural changes in consumption patterns. The tax initially aimed to break people’s habit to drink beverages with sweet tastes<sup>255</sup>.

#### *Enlarging the scope of the tax*

The initial tax was to target sodas. Under the pressure of industrial stakeholders threatening to withdraw their investments from France, but also because of customs codification constraints, the tax was eventually broadened to all (non-alcoholic) soft drinks<sup>256</sup>. No specific timeline or quantified

<sup>253</sup> See [http://www.legifrance.gouv.fr/affichSarde.do?jsessionid=37F121B17F5550865A213B337D2C21E6.tpdio05v\\_3?reprise=true&page=1&idSarde=SARDOBJT000007106467&ordre=null&nature=null&q=ls](http://www.legifrance.gouv.fr/affichSarde.do?jsessionid=37F121B17F5550865A213B337D2C21E6.tpdio05v_3?reprise=true&page=1&idSarde=SARDOBJT000007106467&ordre=null&nature=null&q=ls).

<sup>254</sup> See the European Directive relating to fruit juices and certain similar products intended for human consumption on <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:115:0001:0011:EN:PDF>.

<sup>255</sup> Studies in the field show a correlation between sweet drinks consumption and obesity; the tax rationale was therefore expected to reduce the consumption of those drinks, in order then to affect the weight of individuals and by consequence the health (and related costs) of those individuals.

<sup>256</sup> Sirup and pure fruit juices are not concerned by this extension.

objectives were associated to the tax, which as such generated revenues of about €375 million in 2013 to be allocated to the French social security. Interviews confirmed that both pressures from industry and the customs codification constraints led to the extension of the tax.

## **Main impacts of the tax on the food industry**

### *General trends*

The French market for soft drinks is highly concentrated as two main manufacturing alliances<sup>257</sup> were sharing about 88.6% of the total market production in 2004 (Bonnet and Réquillart, 2013); the authors underline that soft drinks constituted 11% of the French consumptions of beverages in 2004, even if this consumption remained under the European Union average.

According to their simulations and analyses, as a result of the tax soft drink consumption decreases by 3 to 3.5 litres/person per year, representing between 12% and 15% of the initial consumption. Interviews confirmed this trend in practice, but as was mentioned by one of the interviewees, segmented data would be needed in order to effectively assess the changes in consumption for specific groups of consumers; on average, the decrease remains low according to all interviewees, who do not consider that the evidence available shows any change in consumption behaviours. The extension of the tax to a broader set of products (light soft drinks in particular) reduces the impact on soft drinks consumption of soft drinks such as sodas (Bonnet and Réquillart, 2012)<sup>258</sup>.

### *Sub-sectors and stakeholder groups affected: distinction between sodas and nectars*

But in terms of competitiveness, while the soda industry seems to have found a way to buffer the tax effects, the nectar value chain appears to continue on a pessimistic path and a concentration of the sector is being observed today.

None of the interviewees representing industry agreed to communicate information about the strategies of the companies to buffer the effects of the tax. Integration mechanisms are therefore not known yet. But organizations representing the industry mentioned that their members were negatively affected by the tax, impacting also the consumers. In the nectar sector, the sales were marked by an increase in prices and a decrease in the consumed volumes on the retailing market (-9% in 2012 and -7,5% in 2013).

### *Differences between retailers and producers*

Retailers' brands are more affected (especially nectars) by the price levels and as the excise tax is based on a fixed percentage, the prices are therefore more affected in absolute terms. Bonnet and Réquillart came to the conclusion that the impact of the tax on the sales of retailers' brands was larger compared to the main brands. Stakeholders mentioned that negotiations were on-going between producers and retailers regarding this issue, without further details though.

## **Substitution effects created by the introduction of this tax**

### *Absence of reformulation and no substitution towards other food product categories*

The available literature shows that the demand and supply for soft drinks were not influenced by the tax and that no substitution effect is observed from soft drinks towards other food product categories. This was confirmed during the interviews.

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<sup>257</sup> «(the alliance, which occurred in 1999, between Coca Cola Enterprises and Cadbury Schweppes, and the alliance, which occurred in 2003, between Unilever and Pepsico » (Bonnet and Réquillart, 2013).

<sup>258</sup> «L'extension de la taxe aux produits allégés réduit l'impact de la taxe sur la consommation de produits sucrés d'environ un quart » (Bonnet and Réquillart, 2012).

According to the interviewees, the tax did not lead to any reformulation trend. Beyond the importance of brands (mainly for sodas, less for nectars), another factor which also explains the absence of reformulation<sup>259</sup> is the role of the taste associated to the products and the strength of this taste. One of the interviewees mentioned indeed that the taste is indeed a key element for soft drinks. In the case of soft drinks, substitution is very difficult as sugar has a more impactful taste in drinks than it can have in food. Stakeholders made clear that the existing reformulation processes in the soda sector were not related to the tax but dated from agreements made in 2006.<sup>260</sup> Additionally one industry association mentioned that the nature of the tax, namely that it applies to soft drinks regardless of their sugar content may have contributed to the lack or absence of reformulation.

#### *Substitution effects: towards fruit juices*

Following the analyses from Bonnet and Réquillart (2012 and 2013), while the effects expected from the tax were to be in line with its key objectives when only applied to sweetened beverages and sodas in particular, its application to all soft drinks led to a substitution effect. The consumption of sodas partly shifted to fruit juices, considered as worst in terms of sugar proportion. However interviews showed that the structures and trends were different depending on the products under the scope. A distinction should indeed be made between sodas and nectars. The importance of the brand associated to key sodas is not found in the nectars sector for instance, which are therefore more affected by the negative tax impacts<sup>261</sup>.

#### *Spill-overs*

Counter-effects have also been evoked by some interviewees, such as the threat from the industry to stop its voluntary efforts to reduce sugar rates in soft drinks (the proportion of sugar or sweetener as soft drink component might be reinforced in order to secure the consumption by strengthening the taste of the product). Opportunities for cross-border shopping as well as for black market development have also been mentioned as possible negative side-effects.

#### **Absorption and price shift to the consumer**

##### *Absorption is observed at the industry level*

The strong importance of the brands' value in the soft drinks sector allowed the main producers to benefit from the window of opportunity offered by the tax and increase their margin per unit (not their general profits) in order to compensate for potential losses in terms of market shares (while in fact the ranking in terms of market shares between soft drinks brands remained the same<sup>262</sup>). Again no information could be collected on the ways companies used to absorb the tax, but what could be confirmed is that benefits did not increase over the period during which the tax has been running.

It has been noticed by Bonnet and Réquillart (2012) that industry was and still is strategically responsive to the tax, shifting more than the price of the tax to the consumers (about 110%). In their simulations, prices increased from 8.7% to 11% on average. On the other hand, Berardi et Al. (2012) noticed that the shift was in practice less important<sup>263</sup>. They conclude that "on average, the tax has been fully shifted to prices of sodas, a category of products for which no close untaxed substitute product exists". They also note that with regard to flavoured waters and fruit drinks,

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<sup>259</sup> The existing reformulation processes started in 2006 with the development of new 'light' drinks (with less sugar or sweetener), with a decrease of sugar rate of about 7% since 2006.

<sup>260</sup> Additional comments from industry pointed out that a lack of product reformulation could also be the result of the tax which targets all drinks regardless of their sugar content.

<sup>261</sup> Due to technological and raw material constraints, the tax reinforced the price increase of the nectars which depend from an industry with a strong local anchorage on the French territory.

<sup>262</sup> However, a shift has been observed from soft drinks to fruit juices.

<sup>263</sup> "results only point to a full pass-through of the tax to soda prices (the average increase in prices for this group of products reached the expected euro cents 7.16 cents in May 2012). Regarding flavoured waters and fruit drinks, the pass-through is only about 85%. (6.1 cents) for the former group of products and about 60% (4.4 cents) for the latter group" (Berardi et Al, 2012).

“results show a slight under-shifting of the tax to prices: their prices increased by slightly more than 6 cents per litre, on average, to be compared with a tax set at 7.16 Euro cents per litre. The existence of untaxed substitutes may be an explanation of this under-shifting”. The authors also note an important heterogeneity among retailing groups and brands, French retailing groups over-shifting the amount of the tax into the prices of their private label products<sup>264</sup>. On a longer term perspective (the analyses of Berardi et Al. being limited to the year 2012), the over-shift has been acknowledged by some of the stakeholders, putting into question the rationale of the tax itself. The over-shift would however vary from a producer to another. Information about the net effects of the tax is still lacking, though one interviewee insisted on the idea that the tax had both direct and indirect negative effects impacting the prices.

#### *...for limited effects in terms of sugar consumption, and negative effects in terms of industrial competitiveness*

The impacts of the tax on the average consumption of sugar remains very low (though the general volumes decreased in quantity<sup>265</sup>) and do not seem to concern risky populations such as overweighted people or children (segmentation analyses remain to be conducted in order to assess this question more precisely<sup>266</sup>).

The issue now faced by sodas and nectars (nectars getting closer to fruit juices in terms of purchasing prices) because of the tax is indeed that consumption shifted to fruit juices, containing more sugar (even if presenting nutritional benefits thanks to fibres). Therefore the sugar and sweetener consumption-related objective seems to be unfulfilled. The tax even proves to be counter-effective to the extent that prices are over shifted to consumers (windfall) and that sugar consumption was not reduced in line with initial targets<sup>267</sup>. It appears important to mention here that the increase in prices corresponds to a decrease in purchasing power, especially for the lower-level income households (which are also the ones consuming the more sugary drinks). Interviewees also mentioned the role of influencing factors such as the price of raw materials or the meteorological conditions which have important impacts on prices and consumption.

Stakeholders interviewed during this case study were clearly concerned about the effects of the tax on the industry. One of the interviewees identified potential threats such as in terms of black market development that could be due to the increasing price of the final products. Another interviewee pointed that specific products could be economically destroyed by the tax and therefore have a negative impact on employment.

### **Assessment of the tax: a challenge**

#### *Potential influencing factors: other initiatives*

The influences of other public initiatives on the changes in consumption are considered as very limited. Awareness campaigns (such as “Manger-Bouger”, etc.) do usually not target sweetened beverages and have proven not to be effective: assuming that those campaigns are heard, their effect is not visible on the risk-associated targets mentioned above. A tax on non-alcoholic drinks (of 54 cents per hectolitre) dating back from 1968 pre-existed the soda tax, and the soda tax itself was extended to energy drinks (an additional tax also called Red Bull tax and implemented since January 1<sup>st</sup> 2014). However, those potential influencing factors remain very diffuse by nature and it is difficult to assess their real effectiveness or influence on the changes in consumption behaviours.

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<sup>264</sup> See Berardi et Al., 2012.

<sup>265</sup> Which might also be due (partly at least) to other factors such as the weather which negatively impacted fresh drinks consumption over the past year.

<sup>266</sup> Information is indeed available on the average consumption, while segmentation would be needed in order to observe the changes (or absence of changes) in risky populations' consumption.

<sup>267</sup> Interviewees note that the impact in terms of behavioural change in sugary or sweetened drinks consumption was most likely to be inexistent.

### *Evaluation of the tax*

An evaluation is currently being conducted by a group of researchers in order to assess the net impacts of the tax in terms of economic and health terms. Challenges remain in terms of analysis: beyond conclusions focusing on average consumption, segmentation should go further and for instance emphasize risky populations (mainly children and obese people, including of course those who are strong consumers of sweetened beverages).

### *Data and information needs*

This implies that more disaggregated data should be gathered and used. Indicators used to evaluate the tax in terms of health effects are difficult to find when related to the Body Mass Index (BMI) or food-related diseases. But variations in terms of calories ingested could be considered. Indicators on consumers' surplus, prices, and fiscal revenue can be used (consumers can be unhappy to pay more taxes but also healthier).

## Conclusions

The information gathered in the context of this case study seems to support the conclusion made by the Council that the soda tax under the scope was and still is a performance tax – which primary aims to generate revenue. The industrial performance of the soft drink sector appear to be negatively affected<sup>268</sup> according to industry representatives but only to some extent (threats regarding specific products that might not survive the tax and its potential increase, unemployment risks, as well as a risk of a developing black market), while health objectives are not fully achieved.

In terms of competitiveness, the relative position of French industry compared to foreign companies active in the soft drinks sector still remains unknown. However, one interviewee noticed the diminishing margins and losses in terms of private investments for companies working on specific segments and product groups. This would be one of the factors leading to the concentration of the nectar sector for instance. Another interviewee mentioned that since the tax was launched, the volumes produced and sold in the soda sector were decreasing.

Regarding the non-achievement of consumption and health-related objectives, several interviewees made reference to the idea of the necessity of a clear-cut choice: a real decrease in consumption would require a much higher taxation rate; however, such rate would also heavily impact industry in a negative way.

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<sup>268</sup> Public Senate website: <http://www.publicsenat.fr/lcp/politique/rapport-senat-pr%C3%A9conise-hausse-paquet-cigarette-11.30-euros-5-ans>.



# Annex 3-D Public Health Product Tax of Hungary

## Executive summary

The Public Health Product Tax (PHPT or TAX or Act), generally referred to as “chips tax”, was passed by the Hungarian Parliament on 11 July 2011. PHPT was promulgated on 19 July 2011 and it became effective as of 1 September 2011. The tax - according to the preamble of the Act – is aimed at products that are carrying proven health risks by containing significant amounts of sugar and salt, as well as caffeine, methylxanthine, taurine and for which healthier alternatives are available. The categories of products impacted by the tax are pre-packaged foodstuff such as soft drinks, energy drinks, confectionery, salted snacks, condiments, flavoured alcohol and fruit jams.

According to the Act the objectives of the tax are to restrict the consumption of foods that do not provide a benefit to public health, to promote healthy nutrition, and to improve the financing of health services, including in particular programs with public health objectives.

The tax had a serious impact on price as well as on the consumption of the relevant products and the competitiveness of the companies. However, according to manufacturers it is important to emphasize that “the tax is not the only factor in influencing consumption trends and competitiveness of companies, although an important one”.

Practically, all companies of the sector subject to PHPT are negatively affected. According to the interviews domestic companies in general are more affected by the tax than multinational ones whose productions are sold in other countries as well (the reason is that exports are exempt from the tax). The impact is the highest for those companies that produce only for the Hungarian market and all their products are impacted by the PHPT.

At the same time from budgetary point of view the tax has achieved its aims since the planned income has largely been realised and in total 44 billion HUF was paid by the companies (HUF 3.27 billion in 2011, HUF 19.5 billion in 2012 and HUF 18.9 billion in 2013 versus the expected 5, 20 and 20 billion HUF).

## Description of the tax

### Social and economic environment

First, a brief social and economic overview is provided in order to better understand the reasons of the introduction of the tax and the opinion of the stakeholders:

- Several national and international health records and surveys (e.g. the National School Canteen Overview<sup>269</sup>, OTAP2009<sup>270</sup>, National Survey on Public Nutrition in Nursery Schools 2009<sup>271</sup>, OECD reports) indicated that the nutrition habits and the general health status of the population in Hungary is among the lowest in Europe. Therefore, in case of several diseases Hungary has

<sup>269</sup> Országos Iskolai Menza Körkép 2008 (National School Canteen Overview 2008), [http://oeti.hu/download/iskolai\\_taplalkozas-egeszsegugyi\\_kornyezet\\_felmeresenek\\_első\\_eredmenyei.pdf](http://oeti.hu/download/iskolai_taplalkozas-egeszsegugyi_kornyezet_felmeresenek_első_eredmenyei.pdf).

<sup>270</sup> National Diet and Nutritional Status Survey, National Institute for Food and Nutritional Science, 2010., <http://www.oeti.hu/?m1id=16&m2id=169>.

<sup>271</sup> <http://www.oeti.hu/download/ovodaitaplalkozas2009.pdf>.



the worst rating or ranks among worst Member States in this regard. Moreover, records and surveys indicate a stagnating or even a decaying trend;

- Treatment of diseases requires increasing funding year by year;
- Hungary was under Excessive Deficit Procedure (EDP) since 2004. The deficit of the budget was over 4 % (in % of GDP) and sovereign debt was the highest in the region. The global financial crisis reached and had a significant impact on Hungary. Restructuring of the taxation system resulted in a deficit of HUF 100 billion in Hungarian healthcare system;
- At the same time doctors and resident physicians collectively demanded a salary adjustment as a precondition of not leaving the country for Western Europe for higher wages.

The worrying results on the health status of the Hungarian population, and the insufficient results of the voluntary programs (run by government, manufacturers, NGOs, etc.) urged the Government to act and to apply a legally binding tool to improve the situation.

Introduction of the act was also justified by the new approach presented by the Prime Minister in the Parliament: „We have to take brave steps both to rescue and renew the health care cause. Cultural renewal is important in this area also. We should not start out from the disease, but from health. The culture of common sense and responsibility can be enforced in this area only if we work out new solutions in recognition that human health is the same valuable personal capital as an apartment, assets, or a car. Therefore whoever wastes this capital through an unhealthy way of living should contribute to our expenditure on health preservation to a larger extent.”<sup>272,273</sup>.

Good international examples<sup>274</sup>, recommendations<sup>275</sup> and initiatives<sup>276</sup>, also encouraged the introduction of the tax.

Introduction of the tax was followed by other initiatives (e.g. awareness raising, education campaigns, regulations) with the same or similar objectives than those of the PHPT. At the same time, a shift from voluntary actions towards strict regulations<sup>277</sup> can be considered. However, initiatives are rather perceived as separate actions, than a part of a comprehensive program.

Introduction of the tax and of the other measures indicates the efforts and strong commitment of the Hungarian Government, and especially those of the Ministry for Human Resources (Ministry), responsible for the functioning of the national healthcare and welfare system.

#### Date of introduction:

- The Act on the so-called Public Health Product Tax (PHPT or TAX or Act), generally referred to as “chips tax”, was passed by the Hungarian Parliament on 11 July 2011. PHPT was promulgated on 19 July 2011 and it became effective as of 1 September 2011;
- Since its introduction the law was amended several times. The aim of the amendments was to increase the tax on certain products, to make additional products subject to the tax, to keep

<sup>272</sup> A speech by Viktor Orbán at the opening of the Parliamentary session in the spring (14. February 2011.).

<sup>273</sup> Comment: This approach is identical to the „polluter pays principle”.

<sup>274</sup> Denmark, several states in the USA, successful practices on salt reformulation from members states such as England, Finland or Ireland.

<sup>275</sup> The recommendation of WHO (2003), 2010/C 305/04 Conclusion of the EC.

<sup>276</sup> Salt Reduction Programme of the EC, Strategy on Nutrition, Overweight and Obesity-related Health Issues of the EC, Action Plan of WHO for the period 2007-2013 on Salt Reduction, Action plan for the prevention and control of noncommunicable diseases 2013–2020 of WHO, Vienna Declaration on Nutrition and Noncommunicable Diseases in the Context of Health 2020, Strategy for Europe on nutrition, overweight and obesity related health issues. Implementation progress report, December 2010.

<sup>277</sup> Examples: (1) Recommendation to promote healthy diet in public catering. Since the recommendation was not widely used and its use was not effective, the recommendation was replaced by an order. (2) Regulation on the foods and drinks that can be sold in school canteens. (3) Regulation on foods and drinks that can be sold in vending-machines in the schools. (4) Introduction of five days per week (everyday) physical education in schools. (5) Regulation on the energy drink consumption of the child and youngsters.

certain products (e.g. energy drinks) taxed, as well as to extend the scope of the tax to the purchase of the products and to specific products to be used in vending machines in schools.<sup>278</sup>

### Tax base

- The tax - according to the preamble of the Act – is aimed at products that are carrying proven health risks by containing significant sugar and salt, as well as caffeine, methylxanthine, taurine, and for which healthier alternatives are available. The categories of products impacted by the tax are pre-packaged foodstuff such as soft drinks, energy drinks, confectionery, salted snacks, condiments, flavoured alcohol and fruit jams;
- Limits of tax ingredients are set on products as it is sold although in many cases products are consumed in a different way (diluted with milk or other components);
- The main elements of the Tax are summarised in the table below.

Category	Products	Threshold	Tax Amount
Sugar-sweetened beverages	Syrups or concentrates for soft drinks with added sugar content exceeding 8 g sugar / 100 ml	drinks with >25% fruit or vegetable content, products produced with at least 50% of milk-based raw material, syrups in line with the Codex Alimentarius Hungaricus exempt	HUF 200/l
	Other soft drinks with added sugar content exceeding 8g sugar / 100 ml		HUF 7/l
Energy drinks	Containing Methylxanthines and	>1mg/100ml	HUF 250/l
	Containing Taurine	>100mg/100ml	HUF 250/l
	Containing Methylxanthines	>15mg/ 100ml	HUF 40/l
Confectionery	Sweetened cocoa powder	containing added sugar, and total sugar: >40g/100g and cocoa content <40g/100g	HUF 70/kg
	Chocolate	containing added sugar, and total sugar: >40g/100g and cocoa content <40g/100g	HUF 130/kg
	Other products	containing added sugar, and total sugar: >25g/100g	HUF 130/kg
Salted snacks	Containing salt	>1g/100g	HUF 250/kg
Condiments	Containing salt	>5g/100g (mustard and ketchup exempt)	HUF 250/kg
Flavoured alcohol	Alcohol containing added sugar	>5g/100ml	HUF 20/l
Fruit jams	Fruit jams	containing added sugar, and total sugar: >35g/100g, extra jam, extra jelly, marmalade and special quality jams exempt.	HUF 500/kg

<sup>278</sup> It was noted by the manufacturers that the tax was introduced and amended without any prior formal consultation with industry representatives, in spite of their attempts.

- Tax liability is payable on the:
  - first domestic sale of the product;
  - purchase of the product subject to taxation if the tax subject uses it within the country to produce its own product.
- Exemptions:
  - volume based exemption (the tax subject selling the product sells less than 50 litres or 50 kilograms of the tax liable product in the given calendar year);
  - sales based exemption;
  - purchase based exemption.
- The tax subject:
  - the person selling the tax liable product for the first time on the domestic market;
  - the person or the organisation purchasing the tax liable product.
- The tax base is the amount of the purchased tax liable product sold by the tax subject expressed in kilogram or litre. Therefore, the tax results into a proportionally higher price increase of cheaper products than that of the more expensive ones;
- By virtue of legislation the Tax has to be made part of the net price of the product, i.e. theoretically it has to be paid by the consumers;
- Staple (basic) foods (bread, meat, etc.) making part of the everyday diet are not subject of the tax.

#### Primary and secondary objectives of the tax:

- According to the Act the objectives of the tax are to restrict the consumption of foods that have no benefit from a public health perspective, to promote healthy nutrition, and to improve the financing of health services, including in particular programs with public health objectives;
- Opinions are divided over the primary and secondary objectives (and in general the objectives) of the Act:
  - According to the representatives of the Ministry, the objectives of the act were to promote both healthier food consumption by individuals and product reformulation by manufacturers, the latter resulting in healthier nutritional choices at the food market, as well as to improve the financing of health services, including in particular programs with public health objectives. It was added that any small shift towards a healthier diet is considered to be a good result by the Ministry;
  - In the eyes of the population the objectives of the tax concerning public health have blended with the measures aiming at the reduction of budget deficit and the increase of wages of doctors<sup>279</sup>;
  - In the eyes of the producers the impression created was clearly that the introduction of the tax aimed at the reduction of tax deficit and the funding for the pay rise of doctors.
- According to the official communication the revenue generated by the tax was spent both on the pay rise of doctors and nurses, as well as on development programs<sup>280</sup>. This suggests that among the objectives specified in the Act emphasis has been put on improving the financing of health services.

<sup>279</sup> "...almost 60% of the population assumed that the objectives of the PHPT were the restriction of the consumption of unhealthy foods, the promotion of healthy eating, and the improvement of the health of the population. A similar percentage thought that the objective was to improve the balance of the state budget", NIHD study.

<sup>280</sup> "...22 new ambulance stations have been built, 60 have been reconstructed, and 200 new ambulance vehicles have been put into service, and thanks to the wage-resettlement in the health care system we have managed to make it easier for about 100 thousand doctors and nurses. The resources necessary for the pay rise and the development were not withdrawn from elsewhere, but they were mostly generated from the health care product taxes", said the Prime Minister <http://www.kormany.hu/hu/miniszterelnokseg/hirek/elo-kozvetites-orban-viktor-beszedet-mond-a-kanizsai-dorottya-korhaz-atado-unnepsegen>.

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- Zsuzsanna Szűcs (dietitian)-20.02.2014. (presentation during the interview with Hunbisco);
- Introduction and Effects of Public Health Product Tax in Hungary, Nestlé Hungary Ltd., 20.02.2014. (presentation during the interview);
- Studies on certain impacts of the Hungarian public health product tax, PwC, 20.02.2014. (presentation during the interview with Hunbisco).

## Findings

### Impact of the food tax on consumption

The tax had a serious impact both on the consumption of the relevant products and the competitiveness of the companies. However, according to manufacturers it is important to emphasize that “the public health product tax is not the only factor in influencing consumption trends and competitiveness of companies, although an important one”.

As a result of the introduction of the tax price of PHPT products has increased, and their consumption – in average – has decreased by 10-15%<sup>281</sup>. Introduction of the TAX has – to a certain extent - contributed to the replacement of taxed products by substitute ones and to their reformulation.

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<sup>281</sup> Industry Memorandum issued by Hunbisco in relation to the interview.

### Price increase

The tax had a serious impact on the price of the impacted products. According to the study of NIHD the average price of PHPT products increased by 27%, while according to the manufacturers the direct price increase caused by the PHPT varied between 10% and 30%.

It has to be noted that besides the PHPT many other factors have contributed to the price increase of the impacted products, as discussed later.

### Consumption decrease

The National Institute for Health Development (NIHD) investigated the issue and found that<sup>282</sup> “26-35% of the people consuming products subject to the PHPT currently consume less of the products subject to the PHPT than one year ago. The smallest ratio of people who reduced their consumption was found among those consuming alcoholic refreshments and energy drinks (35% and 32%). In the case of the other products, 26%-28% of the consumers changed their consumption habits in a positive way”. (It is to be noted that the methodology and conclusions of the study prepared by the NIHD are considered as inadequate by the industry representatives).

Data provided by the manufacturers also indicates a significant decrease of the consumption:<sup>283</sup>:

- Almost **all sweets categories** have experienced a slump in sales (e.g. candies, biscuits, wafers). The decrease in case of candies was 15.1%;
- Virtually all products classified by the PHPT Act as “**seasoning**” suffered a drastic decrease of sales between 2011 and 2013. The losers were the cook-up and instant soups that lost nearly one third or fourth of their sales (seasoning: 14.29%, cook-up soups: 32.19%, bouillion: 10.60, instant soup: 23.72%, fixes: 3.73%);
- Decrease in case of **countlines** and **dragées** 13.31%, **dessert** 10.88%. Only selling of **tablet chocolates** has increased slightly, by 3.02%. Tablets gained volumes from other confectionery product categories such as countlines and gifting;
- A decrease of 14.48% from 2011 to 2013 for **non-alcoholic beverages**: This sub-sector already suffered a decrease of 14.88% from 2007 to 2011;
- Consumption of **beverages** also declined significantly between 2011 and 2013. However, these categories also suffered meaningful decrease from 2007 to 2011. The values for the two periods respectively (2013/2011; 2007/2011) were as follows: carbonated soft drinks: 15.1% and 13.51%; fruit juices, drinks: 14.24% and 22.71%, juice: 2.7% and 22.92%, nectar: 11.11% and 52.63%, fruit drinks and teas: 15% and 25.75%, ice tea: 10% and 17.1%, energy drinks: 31.4% and 38.6%);
- Based on the data of a leading snack production company after the negative impacts of the global crisis in 2008-2009 suffered by the whole **savoury snack** market, it has embarked upon an upward trend in recent years. The level of sales even grew by an annual 10% between the second half of 2009 and the first quarter of 2011. Following the introduction of the public health product tax consumption had a drastic fall in almost all the product groups of the savoury snack market. Based on half-yearly data, the level of the drop fluctuated between 15% and 25% in some of the segments. The consumption of chips dropped by 15.4%; this drop was 22.2% for nuts, and 15.3% for floury products (salty sticks, pretzels, bread chips, etc.);
- According to GfK and Nielsen data provided by an industry player in the case of certain categories (e.g. cocoa based beverages, confectionery, milk and white tablet market) high number of consumers left the category in the first year. However, after a year, this trend stopped, and the category volumes remained stable, in some cases slightly increased.

<sup>282</sup> Impact study of the Public Health Product Tax - National Institute for Health Development, 2013.

<sup>283</sup> Public Health Product Tax Study- PriceWaterhouseCoopers Ltd. 2012., Studies on certain impacts of the Hungarian public health product tax, 20 February 2014, PWC (presentation)., Nestlé presentation.

Representatives of industry players think that the turning of the trend is likely the result of a combination of several factors, including consumers getting used to higher prices and price adaptations by manufacturers and retailers that neutralized the taxes to some extent.

#### *Replacement of taxed products*

On the basis of information provided by the manufacturers reaction of consumers was multifold:

- Consumers can replace the taxed products with ones that do not contain the taxed ingredients;
- Consumers can compensate for the reduced consumption of taxed products in all product categories with other products, which although are produced using nutrients just like products subject to product tax, do not have product tax levied on them (as a result of not being pre-packed or subject to tax based on their customs tariff codes);
- Home-cooking from scratch is continuously increasing and the growth is enhanced as an effect of the price increase. Moving consumption towards basic product categories (Flavoured Powder Sugar, Vanilla Sugar, Dried Yeast, Baking Powder categories, Wet sauces increased) is an indicator of increasing home cooking. This could even lead to higher intake of salt and sugar with the loss of portion control;
- Consumers switched to cheaper brands, mainly to Private Labels (PLs), therefore – in some cases – to lower quality products;
- Manufacturers can (and perhaps in certain cases do) separate certain ingredients (salt and mono spices or sugar and cocoa powder) to simply avoid taxation. However, the public health effects of this solution might be questionable as portion control over the taxed ingredients might be lost during the preparation/consumption of such products.

A few examples based on GfK and Nielsen data are presented below:

- Dry mixes: Consumers do not leave the category, there is no abandonment! Consumers switch to cheaper brands, mainly to Private Labels (PLs);
- Seasonings: Volume decline and also consumption decline on seasoning market. Seasonings category competes strongly with mono-spices, mono-spices gaining volume from seasonings. This is a sign of return to cooking from scratch that were not taxed;
- Confectionery: Consumers reacted with temporary downtrading, slight movement to PLs within the first year after launching PHPT, but “A” brands are rising up again, gained growth again from PLs in the second year;
- Cocoa powdered beverages: Significant volume decline of the category (not only due to the Tax). High number of consumers left the category in the first year (-17% in 2011 vs 2012). Consumers left the category, part of the consumption went to fruit juices, milk & tea products etc. After a year, this trend stopped, and the category volumes remained stable (2012 vs. 2013 slow recovery of the category);
- Snacks: The recently developed “snacks” with 100 percent fruit content are already on the shelves. These are prepared on a fruit purée basis, and contain no preservatives or added sugar;
- Beverages: production of light products (the share of light products increased, but in reality the total consumption dropped by 15 %);
- Soft drinks: Sugar-free, low-calorie and mineral water based products having natural sweeteners (e.g. stevia) are gaining importance in the range of soft drinks;
- Chocolate: Milk chocolate might be substituted with dark chocolate (however it is more expensive and most of the consumers would not purchase it as a substitution product).
- Salted goods (snacks): In the salted goods category consumption was shifted to popcorns (non-taxed).

According to the manufacturers the significant decrease in consumption of taxed products is evident, however the positive health effect is questionable due to the (i) discriminatory selection criteria of the taxed products, (ii) the undesired substitution, (iii) the loss of portion control, or (iv) to the consumption of cheaper (sometimes lower quality) products with same or higher content of the taxed nutrient. Therefore, they say, the introduction of that tax may have an opposite effect as intended since it does not shift consumption towards “healthier” products<sup>284</sup>.

### *Reformulation*

Based on the manufacturers’ survey, the study of NIHD concludes that “40% of the manufacturers changed their recipe, 30% of them completely removed the targeted ingredient, and 70% of them reduced the amount of the targeted ingredient”.

According to manufacturers, many products have already been reformulated prior to the implementation of the tax to meet consumer demands for ‘lighter’ versions (and an increased choice/availability in portion sizes is also being provided). However, introduction of the tax has contributed this process, and to a certain extent accelerated it.<sup>285</sup>

According to the manufacturers the way and cost of reformulation greatly differ from product to product. In certain cases the change is very easy and cheap (e.g. less salt is added to the product). In other cases it requires the execution of a comprehensive R&D programme, and/or the extension of the existing technology or even the installation of a new one. These might be costly and might take several years. Reformulation carried out as a result of the introduction of the tax generally falls in the first category.

Producers note that “the Hungarian food tax is not an incentive to innovate, due to either (i) not being based on nutritional profile (limits are set as products as sold instead of as consumed not taking into account the addition of other ingredients i.e. milk), or (ii) applying too severe nutrient profile criteria”. The absence of an incentive to innovate has contributed to the loss of competitiveness.

A few examples for reformulation – provided by the manufacturers - are presented below:

- Salt reduction:
  - As a result of the tax, several companies have decreased the salt content of the products. For example, in case of peanuts almost all producers came out with a non-salted version;
  - It is to be noted that in this category taste has especially high importance. By decreasing the salt content products become “tasteless” for the average Hungarian consumers.
- Immediate reformulation was induced in case of energy drinks, too and taxed components were replaced by others. Regulators quickly reacted to this situation and made the new components also subject of the tax;
- Sweets industry also tried a reformulation on a smaller scale. This did not initiate immediate modification of the act, however at the end the regulation was changed, so the reformulation turned out to be useless (from the point of view of taxation).

### *External influencing factors*

Overall, the decrease of consumption cannot be linked only to the introduction of the PHPT since there were several other factors having effect on price and consumption.

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<sup>284</sup> Industry stakeholder presentation (on the basis of a survey carried out by Gfk).

<sup>285</sup> The NIHD study does not represent the view of the food manufacturers.



By virtue of legislation the tax has to be included in the net price of the taxed product. This was enforced initially. It resulted in an increase of the retail prices to be paid by the consumers.

In parallel to the introduction of PHPT the VAT rate was increased (from 25 to 27%), retail and other sector-specific taxes were levied, price of raw materials increased (e.g. sugar, energy, fuel,), road toll has been introduced in Hungary. All of these measures had a serious impact on the prices of PHPT affected products and consequently on their consumption. These effects were partly compensated by the promotions and price policies of the manufacturers and retailers.

In a case study presented by an industry player during the interview on cocoa powdered beverages it was demonstrated that in 2012 retail price increase in the category was 35%, PHPT was responsible only for 6.1%. The remaining 28.9% of price increase was necessitated by other factors listed above.

According to the calculations of Agrár Európa Ltd.<sup>286</sup>. “the examined special taxes have given rise to an extra cost of over 50 billion HUF in the food industry for the last three years. The largest item in all this is NETA (44%), which has a direct impact. Next in rank comes the banking tax (21%), the retail tax (20%), energy (12%) and telecommunication (3%). If we take the distribution of this amount over the years, then the proportional distribution was 21, 25 and 54% for the last three years”.

Consumption trends at the time of the introduction of the tax have also to be taken into account. Consumption trends for certain products were declining, while increasing for others (trends are presented in chapter “consumption decrease”). Therefore, the impact of PHPT on certain products is smaller, while on others is higher than presented by the figures.

Impact of PHPT on some trends was as follows<sup>287</sup>:

- The market share of „private label” confectionery and salty snack products has significantly increased;
- The drop in consumption of certain products (juice, nectar) in Hungary was much higher than in other countries between 2011 and 2012;
- The rate of the decrease in consumption of non-alcoholic beverages has increased since the introduction of the public health product tax compared to previous periods;
- The consumption mainly – but by a small rate only - has shifted to non-taxed product groups, e.g. dark chocolates, juices, nectars, popcorn.

The NIHD has examined the reasons for the decrease of consumption. They have found *that* „in case of all products subject to the PHPT, the consumers provided the price increase as the main reason of the reduction. Of those consuming less pre-packaged sweets and salty snacks, 80% indicated the increase of prices as the reason, and 20% indicated that they became aware of the fact that the consumption of such products is unhealthy. In case of the drinks subject to the PHPT, the ratio of those who explained the decrease of consumption by the increase of prices was somewhat lower (60-70%), but they still represented a majority, and the second most frequently indicated reason was the harmful effect of such products to the health. This reason appeared in the largest ratio among energy drink consumers. About every tenth person reducing their consumption changed their habits at the recommendation of a friends, acquaintance or family member. The ratio of those who reduced their alcoholic refreshment consumption due to diseases or a physician’s

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<sup>286</sup> The impact of special taxes and the minimum wage on the costs and employment of the food industry, *Agrár Európa Ltd.*, June 2013.

<sup>287</sup> Introduction and Effects of Public Health Product Tax in Hungary, Nestlé Hungary Ltd., 20.02.2014. (presentation during the interview).



recommendation was similar. In case of the other products, less than 10% of the consumers explained the reduction of their consumption by the recommendation of a physician”.

Manufacturers noted that the tax might have a misleading effect, suggesting that:

- non-taxed products are all healthy (otherwise they would be taxed);
- taxed products are all non-healthy, in spite of their quality and nutritional value.

According to several studies taste and price - and not health consciousness - are still the most important factors when selecting and purchasing foodstuff. This is confirmed by the study prepared by NIHD. According to their findings “the consumers most frequently indicated the taste, the price, and the brand as an important / very important factors in selecting the consumed products: almost 90% of the consumers (92% in case of sugared soft drinks) considered taste as the main factor in buying a product and almost 80% of them considered the price as such factor - in the second place. The calorie value and nutrient composition characteristic of products, such as sugar or salt content were important / very important to 35-50% of the consumers. In case of alcoholic refreshments and flavoured beers, the alcohol content, and in case of energy drinks, the caffeine content were important / very important factors in the choices made by the consumer.”

According to the opinion of manufacturers, summarised by Nestlé Hungary due to the importance of taste “*reformulation needs to be carefully designed and gradually implemented by all stakeholders offering food solutions to consumers. Doing this in isolation may put the competitiveness of such product at risk as consumers would simply leave the product and buy competitive products (having higher contents of salt or sugar) meeting their taste preference more. To overcome this situation the taste expectations of consumers should be changed gradually that can only be done in a coordinated way and in collaboration with the stakeholders (e.g. awareness raising campaigns with government health authorities). This requires holistic approach and might take several years.*”

#### **Impact of the food tax on the sector**

Practically, all companies of the sector subject to PHPT are negatively affected. According to the interviews domestic companies in general are more affected by the tax than multinational companies whose productions are sold in other countries, too (the reason is that exports are exempt from the tax). The impact is the highest for those companies who produce only for the Hungarian market and all their products are impacted by the PHPT.

According to the PwC study „it is difficult to quantify the impact of the public health product tax on tax revenues (same for value added tax and product tax), because the vast majority of companies does not produce and market taxable products exclusively, therefore, their profit/loss, the corporate tax and local business tax paid also include their profit/loss from operations related to both taxable and non-taxable products”. Concerning the revenue of taxed products both the study of NIHD and PwC provides some data.

According to the study of NIHD “the turnover of the manufacturers’ products subject to the PHPT decreased by 27 %”.

The PwC study gives a more detailed overview on the change of the revenue of taxed products, comparing data of 2011 and 2013. „According to market research data, the inevitable price increase and the declining sales prompted domestic retail sales revenue growth expressed in consumer prices in the overall market for salty snacks, sweets and seasonings of the products under review, while revenues of instant soups and fixes declined.”

The sales revenue earned in the salty snacks (5.61%), countlines (3.29%), desserts (0.52%) and fixes (-1.61%) markets has changed only slightly. The inevitable price increases drove an outstanding revenue growth on chocolate tablets 17.13%), seasoning sales (34.28%) and bouillon (9.77%), while instant soups (-13.2% and -21.17% in case of cook-up soups and instant soup, respectively) suffered a significant slump.

They also conclude that „although the product groups under review produced a slight increase in overall sales revenues at consumer prices (including VAT and the public health product tax) during the two years compared, this revenue growth failed to cover the public health product tax payments of even the industries concerned. It means that companies suffer considerable losses due to the public health product tax and are forced to fund from other sources. Companies selling a limited or no amount of products not subject to the PHPT Act, i.e. whose profits realised in other markets cannot counterbalance their losses generated in the market of products subject to public health product tax due to said tax are in a particularly difficult situation.”

The major impacts and consequences of the tax on the companies are as follows (on the basis of PwC study and presentation):

- As companies are not able to charge their costs to the customers and the sales numbers continue to decline, the profitability of the businesses decreases (or their losses increase);
- According to information provided by Hunbisco around 1,000 people have been laid off in the industries since the public health product tax was introduced, and a number of companies have gone bankrupt;
- The market share of private label confectionery and salty snack products, which are produced mainly abroad, has increased significantly since the public health product tax was introduced;
- The public health product tax puts most local businesses at a disadvantage, because they cannot compensate their losses with revenues from other markets or other products;
- The permanent (and significant) drop of sales diminishes the efficiency and competitiveness of Hungarian plants, and has a detrimental effect on the whole industry.

Some additional impacts are also presented in the NIHD study: “the manufacturers’ answers show that most of them indicated the cancellation of planned investments (23%), the reduction of production (19%), and redundancies (17%) as the main changes to the business policy because of the Public Health Product Tax.”

The tax had a significant impact on the competitiveness of the companies<sup>288</sup>:

- As a result of the price effects of PHPT, topped with a decreasing consumption, most of the cost of the other cost increasing elements had to be absorbed by the manufacturers that significantly reduced their profitability. EBIDTA of the affected sectors – in the best case – is around 1-2% compared to net revenue;
- The market share of private label confectionery and salty snack products, which are produced mainly abroad, has increased significantly since the public health product tax was introduced;
- The public health product tax puts most local businesses at a disadvantage, because they cannot compensate their revenue losses from other markets or other products;
- Between 2011 and 2013 approximately 1000 employees have been laid off in PHPT affected industries in Hungary, a number of small and medium size companies were shut down;
- Tax leads to unnecessary supply chain complexity: companies - in many cases - should use different product formulas for the local market and for export markets;
- The tax is not an incentive to innovate, due to applying too severe nutrient profile criteria and not being broad enough in product base. An incentive to innovate would be a very important aspect of competitiveness;

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<sup>288</sup> Interview with an industry association, 20.03.2014.

- Food tax increases administrative burden and cost, which also impact competitiveness (e.g. in case of one company implementation required 1800 manager hours, 500 working hours for IT system development and HUF 5 million was also paid for external consultancy).

The bargaining power in the food supply chain is affected and amplifies a shift towards stronger bargaining power for the retail sector.

As a result of the tax in total 44 billion HUF was paid by the companies (HUF 3.27 billion in 2011, HUF 19.5 billion in 2012 and HUF 18.9 billion in 2013).

“Producers pay the most, almost 23 billion HUF on pre-packaged sugary products like candies and wafer biscuits. The producers of savoury snacks are only in the second place followed by seasonings with a high salt composition. Soft drink manufacturers have paid 4.8 billion HUF to the budget. The almost 1.3 billion HUF paid on energy drinks is primarily thanks to the timely realisation of the government that producers tried to avoid the tax liability by changing the composition of products. After the legislative change in 2013 in addition to taurine containing energy drinks, caffeine containing soft drinks are also subject to taxation, which contributed an extra 913 million HUF payment to the central budget. According to the National Tax and Customs Administration (NAV) the ‘PHPT’ liability affects 400-500 companies on average per month. The group of companies carrying the largest burden includes pre-packaged sugary product manufacturing companies followed by the producers of savoury snacks. NAV expects a revenue of 19 billion HUF also this year from the public health product tax”<sup>289</sup>.

“According to producers all import products legally sold in Hungary are also subject to PHPT and VAT, therefore substitution with products by legal import cannot be significant. However, the high level of VAT and PHPT could lead to a significant increase of purchase of the targeted products in informal trade, where VAT and PHPT are not applied”<sup>290</sup>.

“On the basis of producers’ estimates, confectionery products marketed in the black economy without paying VAT and/or product tax may total up to 10% of legal sales. If this is the case, unpaid VAT and public health product tax may be over HUF 8 billion considering the level of legal confectionery sales figures”<sup>291</sup>.

## Conclusions

By introducing the Public Health Product Tax (PHPT) the government has ventured out on a relatively uncharted terrain, as similar taxes had been few and far between.

A perhaps undisputed outcome of the tax was that it has clearly directed the attention of the food industry towards public health problems and towards the ambitions of the government. Furthermore, the tax has contributed to a number of initiatives such as reduction of the amount of taxed ingredients or substitutes in case of certain products; preparation of impact assessments; conducting negotiations in the industry sectors concerned etc. Industry claims that they are not aware of preparations for impact assessments nor of negotiations in the concerned sectors. At the same time the opinion of the Ministry and of the manufacturers is divided concerning the achievement of the objectives of the tax and particularly about its contribution to the public health aspirations.

<sup>289</sup> [http://www.penzcentrum.hu/adozas/az\\_edessegyartok\\_jartak\\_a\\_legrosszabbul\\_milliardokat\\_fizetnek.1039451.html](http://www.penzcentrum.hu/adozas/az_edessegyartok_jartak_a_legrosszabbul_milliardokat_fizetnek.1039451.html).

<sup>290</sup> Nestlé Hungary interview.

<sup>291</sup> PwC, 2012.

From a budgetary point of view the tax has achieved its aims since the planned income has largely been realised and in total 44 billion HUF was paid by the companies (HUF 3.27 billion in 2011, HUF 19.5 billion in 2012 and HUF 18.9 billion in 2013 vs the expected 5, 20 and 20 billion HUF).

According to the study prepared by NIHD (a background institute of the Ministry) „*the PHPT achieved its objectives because:*

- the product range and turnover of products containing ingredient(s) that are verifiably harmful to health decreased;
- *the population reduced the consumption of products containing ingredient(s) that are verifiably harmful to health;*
- *The PHPT has proven itself to be successful on an economic level too*<sup>292</sup>.

The tax - through the decrease of consumption of the harmful ingredients - has achieved its objective also in the view of the Ministry's representatives. It must be added that they appreciate the decrease itself (the trend) as an achievement, regardless of its extent.

The summary of the study points out the inadequacy of communication as a shortcoming related to the introduction of the tax: “*a more efficient public communication would improve the results of the PHPT*<sup>293</sup>”.

The lack of efficient communication is highlighted by the finding of the study, and it is also an ironic feature of the situation, that the medical doctors have contributed only by a relatively small margin to changing the consumer habits (the doctors were supposed to be beneficiary of introducing the tax, by enabling the increase of their revenue)<sup>294</sup>.

The representatives of manufacturers and the authors of the studies are of conflicting opinions as to whether the tax has achieved its objectives. The representatives of manufacturers criticised - and not completely without reason - the study made by NIHD.

They believed that the public health objectives had been achieved to an extremely limited extent, if at all. In accordance with the study of PwC: „*The decline in consumption of certain products subject to product tax has only a minimum influence on decreasing sugar and salt consumption in Hungary.*”<sup>295</sup> Furthermore, „*A longer term comparative calculation would presumably indicate that the declining salt and sugar consumption caused by drop in the consumption of products subject to product tax represents a higher rate of the total salt and sugar consumption of the population in the long run (due to the seemingly permanent negative consumption trend). On the other hand, not even a longer term comparison, in our view, would presumably present significantly higher rates.*”

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<sup>292</sup> According to the study „The main balance sheet data of the “large payers” of the PHPT improved from 2010 to 2011 while the projected tax revenue was almost fully realised.”

<sup>293</sup> The conclusion was drawn on the basis of the following findings of the NIHD study: „Almost a third of the population have not heard of the introduction of the PHPT, a significant part of them did not know the scope of the products subject to the PHPT at all or correctly, and a third/fourth of them was not familiar with the objectives of the introduction of the PHPT.”

<sup>294</sup> „About every tenth person reducing their consumption changed their habits at the recommendation of a friends, acquaintance or family member. The ratio of those who reduced their alcoholic refreshment consumption due to diseases or a physician's recommendation was similar. In case of the other products, less than 10% of the consumers explained the reduction of their consumption by the recommendation of a physician” (NIHD study, page 10.).

<sup>295</sup> „According to the calculations we made using the above methods, the salt consumption decrease attributable to the annual drop in salty snack consumption comes down to 0.1477% of the total salt consumption of the adult population. This indicator represents 0.6895% decrease in the annual consumption of products in the “seasonings” category. The same two rates with respect to the population over 6 are 0.1373% and 0.6412%, respectively. This rate for sweets is 0.4906%-0.5964% (and 0.649%-0.789% including sweetened instant cocoa powders) compared to total sugar consumption. The drop in the sugar quantity consumed through the taxable products – contingent on the baseline group (adult population or population over 6) – reduces daily energy intake by 2.1-2.4 kcal (considering that one gram of sugar = 3.87 kcal/21). Projected to an average 2,000 kcal diet, the impact it has on energy intake reduction is measurable in per mills.”

PwC's findings and the limitations of the tax are not surprising in view of the point, that with respect to salt, for instance, the tax covers a scope of products, which accounts for a few per cent (6%) of the salt intake only. Clearly, should the consumption of these products be totally discontinued, the desired reduction of the salt input by a rate of 60-70% could not be achieved either.

By the judgement of the study and the manufacturers, the tax has also directed consumption towards such products (e.g. home-made), in case of which the composition of the targeted components are not controlled or known. As a result the targeted ingredients could have been consumed in volumes greater than the reduction achieved by the tax.

The ultimate public health impact of the tax, i.e. the overall consumption trends of harmful ingredients cannot be determined lacking relevant analyses and data. The tax has had an impact on price which in turn was affecting / influencing the decision of consumers with some consumers selecting untaxed products with similar ingredients to the taxed ones.

In view of the findings above, it can be stated that the tax (the Act) - in itself and in its actual form - is not sufficient to significantly decrease the intake of the taxed ingredients. Therefore, the implementation of additional measures and initiatives are required.

Taking into account that in Hungary taste is the *most important factor affecting the decision of consumers when buying a product*, it seems to be the key issue to be addressed. Due to the complexity of the issue this can definitely be done only in a coordinated way.

In order to select the appropriate tools, and to avoid the non-desired impacts (e.g. downgrading, increase of black market, loss of interest to speed up reformulation) lessons learned from the introduction of PHPT, from other measures, initiatives or even from other sectors (e.g. environmental protection in relation to the "polluter pays principle") should or could be taken into consideration.

Due to the low awareness of consumers, in line with the conclusion of the NIHD study and of the producers, a high emphasis should be put on awareness raising and communication.

In order to multiply (strengthen) their impact, the integration of the different measures and initiatives into a single, overall program should also to be considered.

Finding the proper role and balance of instruments to be applied, as well as the appropriate level of openness and willingness of stakeholders to cooperate can - with high probability - decrease the timespan required for the achievement of the public health objectives.

# Annex 3-E Proposed Food tax in Italy

## Executive summary

Although proposed in 2012, no food tax measure was introduced in Italy. The proposed tax was targeting soft drinks with added sugar/sweeteners and was foreseen for the period 2013-2015.

The main reason and ultimate objective for the introduction of the tax would then have been the improvement of health conditions and its revenues would have been earmarked for public health purposes.

The tax was seen by stakeholders as an instrument to limit the competitiveness of foreign multinational companies. Moreover, the conditions to justify its implementation seemed to be absent, as the Italian level of consumption of these beverages is among the lowest in the EU and their caloric contribution does not exceed 1% of the average daily caloric intake. Industry stakeholders have expected negative impacts from the introduction of the tax including an increase of the prices, and negative effect on small producers who would have reduced the number of their staff in order to compensate the effect of a diminishment of the production, with consequences on the labour market and the economy in general.

The tax was never applied. According to interviewees there were various reasons substantiating that the food tax would have not been able to achieve its aims related to public health. The main points raised by the interviewees at this respect were the following:

- Many factors affect public health, such as genetics, the physical activity, etc. In reality, different factors are interrelated and it would be complicated to isolate the effects of the tax;
- Studies that have been carried out in the UK demonstrate that, in order to achieve a real effect on consumption habits, food taxes would need to be very high (an increase of at least 20% of the price of the product). This means that, unless the fee is very high, only an economic burden is perceived, with no effects on health;
- The World Health Organisation talks about a "healthy and balanced diet". The categorisation of single food products creates a wrong perspective for the consumer, leading him/her to consider and consume only certain types of food, thus limiting his/her diet. As a consequence, the approach to be followed should be a categorisation of diets, and not of the food ("good and bad diet" instead of "good and bad food").

## Description of the tax

### Date of introduction

The tax was originally included in the draft Decree Law on "Urgent measures to promote the development of the country by a higher level of health protection" (August 2012), promoted by the former Minister of Health Renato Balduzzi, under the Monti administration. It was then excluded from the following (draft and final) versions of the Decree Law, whose first draft included more than 20 articles, while the last version only maintained 16<sup>296</sup>.

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<sup>296</sup> Sanita: "Decreto" Balduzzi oggi in Cdm con testo "svuotato" (Health: "Balduzzi big decree" today in the Cabinet with an "emptied" text), 05.09.2012 <http://www.altalex.com/index.php?idnot=58733>.

The tax was initially included under Article 11, in the section related to the “Promotion of healthy lifestyles and reduction of health risks related to nutrition and veterinary emergencies”, and was foreseen for the period 2013-2015.

The last version of the Decree Law was published in the Official Gazette of 13 September 2012 (n. 214) and entered into force through the conversion law of 8 November 2012.

#### Tax base: what does the tax target?

It targets soft drinks with added sugar/sweeteners. Complementarily, a tax was also proposed for spirits. The following amounts were foreseen:

- 7.16€ for every 100 litres of sugary/sweetened carbonated beverages placed on the market;
- 50€ for every 100 litres of alcoholic beverages (spirits) placed on the market, allowing to collect an expected revenue of around 250 million € per year during the years 2013-2015.

#### Primary and secondary aims of the tax

The tax was originally foreseen as part of a series of “Urgent measures to promote the development of the country by a higher level of health protection”. The main reason and ultimate objective for the introduction of the tax would then have been the improvement of health conditions and protection, and the tax would have contributed specifically to the “Promotion of healthy lifestyles and reduction of health risks related to nutrition”<sup>297</sup>. In fact, as stressed by Mr. Balduzzi in an interview<sup>298</sup>, the tax should have raised awareness among consumers, and especially youth, about the need for healthier and more balanced dietary habits.

Furthermore, its revenues would have been earmarked for public health purposes. Precisely, the proceeds of the tax would have been allocated to finance part of the “Essential Levels of Assistance” (LEAs) referred to in Article 5 of the draft Decree law (essential levels of care for people suffering from chronic diseases, rare diseases, as well as pathological gambling addiction)<sup>299</sup>. LEAs comprise of all the activities, services and benefits that the National Health Service (*Sistema sanitario nazionale*) provides to all citizens for free or by paying a ticket, regardless of their income and place of residence.

Apart from the formal aims of the taxes, according to the industry sector representatives<sup>300</sup>, also other indirect purposes existed. First of all, the relation between the tax and the health sector costs did not seem to be evident, since no clear information was provided on how the revenues would have been linked to the State budget and expenditures. Furthermore, apart from its public function, the tax was seen by different stakeholders as an instrument to limit the competitiveness of foreign multinational companies. Moreover, the conditions to justify this tax seemed to be absent, as the Italian level of consumption of these beverages is among the lowest in the EU and their caloric contribution does not exceed 1% of the average daily caloric intake.

#### Date of withdrawal

The tax was proposed in one of the first draft versions of the Decree Law, but it encountered a strong opposition and criticism from the industrial sector and the public that led, first, to the

<sup>297</sup> Decreto Balduzzi. Sintesi delle norme, articolo per articolo (Balduzzi decree. Summary of terms, article by article), 27 August 2012. [http://www.quotidianosanita.it/scienza-e-farmaci/articolo.php?approfondimento\\_id=2515](http://www.quotidianosanita.it/scienza-e-farmaci/articolo.php?approfondimento_id=2515).

<sup>298</sup> Salute: Balduzzi, su bibite comunque soddisfatto, si è aperto dibattito (“Health: Balduzzi, on soft drinks still satisfied, a debate has started”), 06.09.2012 <http://www.altalex.com/index.php?idnot=58742>.

<sup>299</sup> Draft version of the Decree Law (27 August 2012), then modified. [http://archivio.lavoce.info/binary/la\\_voce/documenti/decreto\\_legge\\_sanita\\_10\\_agosto.1346403412.pdf](http://archivio.lavoce.info/binary/la_voce/documenti/decreto_legge_sanita_10_agosto.1346403412.pdf).

<sup>300</sup> See both interviews.



postponement of the Council of Ministers analysis of the tax and, and ultimately, to the removal of the contested measure from the text of the Decree Law<sup>301</sup>.

## Sources of information

The main sources of information used for the analysis are the following:

### Public documents:

- Testo coordinato del decreto-legge 13 settembre 2012, n. 158. Testo del decreto-legge 13 settembre 2012, n. 158, (pubblicato nella Gazzetta Ufficiale 13 settembre 2012, n. 214), coordinato con la [legge di conversione 8 novembre 2012, n. 189](#), recante: «Disposizioni urgenti per promuovere lo sviluppo del Paese mediante un piu' alto livello di tutela della salute» [GU n. 263 del 10-11-2012 - Suppl. Ordinario n. 201](#):  
(Coordinated text of decree-law 13 September 2012, n. 158. Text of Decree-Law of 13 September 2012, n. 158 (published in the Official Gazette of September 13, 2012, n. 214), coordinated with the conversion law of 8 November 2012, n. 189, entitled: "Urgent measures to promote the development of the country by a higher level of health protection");
- Draft version of the Decree Law (27 August 2012), then modified  
[http://archivio.lavoce.info/binary/la\\_voce/documenti/decreto\\_legge\\_sanita\\_10\\_agosto.13464034\\_12.pdf](http://archivio.lavoce.info/binary/la_voce/documenti/decreto_legge_sanita_10_agosto.13464034_12.pdf);
- Massimiliano Trovato, *Obesità e tasse: Perché serve l'educazione, non il fisco* ("Obesity and taxes: Why we need education, and not taxes"), 2013  
[http://www.brunoleonimedia.it/public/IBL-Libri/Books/Obesita\\_Tasse-Introduzione.pdf](http://www.brunoleonimedia.it/public/IBL-Libri/Books/Obesita_Tasse-Introduzione.pdf);
- Margherita Marzario, *Lo sviluppo del Paese mediante un più alto livello di tutela della salute* ("The country's development through a higher level of health protection"), 24.06.2013  
<http://www.altalex.com/index.php?idnot=63458>;
- *Livelli Essenziali di Assistenza* ("Essential Levels of Assistance")  
[http://www.salute.gov.it/portale/salute/p1\\_5.jsp?lingua=italiano&id=111&area=Il\\_Ssn](http://www.salute.gov.it/portale/salute/p1_5.jsp?lingua=italiano&id=111&area=Il_Ssn);
- *Sanità: bozza decreto, da tassa bibite a revisione prontuario farmaci* ("Health: from the draft decree to tax soft drinks to the revised drugs handbook"), 25.08.2012  
<http://www.altalex.com/index.php?idnot=58560>;
- *Decreto Balduzzi. Sintesi delle norme, articolo per articolo* ("Balduzzi decree. Summary of terms, article by article"), 27.08.2012  
[http://www.quotidianosanita.it/scienza-e-farmaci/articolo.php?approfondimento\\_id=2515](http://www.quotidianosanita.it/scienza-e-farmaci/articolo.php?approfondimento_id=2515);
- *Sanità: Balduzzi, da tassa su bibite gettito da 250 mln annui* ("Health: Balduzzi, revenue from tax on soft drinks of 250 million per year"), 28.08.2012  
<http://www.altalex.com/index.php?idnot=58569>;
- *Sanità: "Decreto" Balduzzi oggi in Cdm con testo "svuotato"* ("Health: "Balduzzi big decree" today in the Cabinet with an "emptied" text"), 05.09.2012  
<http://www.altalex.com/index.php?idnot=58733>;
- *Salute: Balduzzi, su bibite comunque soddisfatto, si è aperto dibattito* ("Health: Balduzzi, on soft drinks still satisfied, a debate has started"), 06.09.2012  
<http://www.altalex.com/index.php?idnot=58742>.

### Interviewees:

- Paolo Patrino, European Policies Manager, FEDERALIMENTARE;
- Alessandro Cagli, EU Public Affairs Director, FERRERO Group.

<sup>301</sup> Massimiliano Trovato, *Obesità e tasse: Perché serve l'educazione, non il fisco* ("Obesity and taxes: Why we need education, and not taxes"), 2013 [http://www.brunoleonimedia.it/public/IBL-Libri/Books/Obesita\\_Tasse-Introduzione.pdf](http://www.brunoleonimedia.it/public/IBL-Libri/Books/Obesita_Tasse-Introduzione.pdf).



## Findings

### Impact of the food tax on consumption

The positions of the public and industry sectors were rather discordant with respect to the impact of the tax on consumption:

- According to the former Minister Balduzzi, the concern on the economic effects of the tax on consumers was unfounded, since it would have implied a limited increase of the final price of the products, amounting to, at most, three cents per bottle<sup>302</sup>. The main aim and added value of the tax, instead, would have been to raise awareness among consumers, and especially youth, on the need for better dietary habits;
- On the other hand, the industry sector stressed that this tax could have had consequences on consumption as a whole, thus not necessarily implying a deterrent effect with respect to the consumption of the taxed goods. More specifically:
  - The tax would have caused an increase in prices, implying a reduction of the consumers' purchasing power;
  - It would have affected the poorest part of the population, that dispose of a more inelastic amount to buy food; and
  - It could have affected the consumption of other goods, since most of consumers (except the less affluent ones) would have probably continued to consume the same amount and type of food products despite the tax and would have eventually renounced to buy other types of products.

### Impact of the food tax on the sector: which stakeholder was affected how?

According to the interviewees, the main effects of the food tax (and of similar food taxes) on the sector would have been the following:

- Negative effects on the entire value chain - manufacturers, retailers and consumers:
  - All consumers would have been affected by the tax, but the effect would have been especially high among less affluent consumers, who dispose of a more inelastic amount to buy food (contraction of consumption);
  - Increased effect of the crisis for small producers, who would have reduced the number of their staff in order to compensate the effect of a diminishment of the production, with consequences on the labour market and the economy in general.
- Reduction of employment: as a whole, the tax could have affected 2200 jobs (eliminated/reduced);
- Negative effects on commerce and agriculture, in addition to industry;
- Negative impact not only on foreign multinational companies, but also on Italian companies throughout the entire value chain: the existence of an additional tax burden would have implied a difficulty for companies to compete in the market;
- Distortion of competition:
  - Discouragement of foreign purchases;
  - At national level, distortion of competition especially within each consuming opportunity (normal pattern of the 5 meals: breakfast, morning snack, lunch, afternoon snack, dinner). If within the same occasion of consumption only some products are taxed (e.g. Nutella is taxed, the yoghurt is not), then the competition in this space becomes unbalanced<sup>303</sup>.
- Possible substitution with products made in another country, but impossible reformulation by the same producer and impossible substitution with other products from the same producer. Since in Italy there is a strong production of natural juices, it was analysed whether the natural fruit juices production could have benefited from a positive compensation after the introduction of the

<sup>302</sup> *Sanità: Balduzzi, da tassa su bibite gettito da 250 mln annui (Health: Balduzzi, revenue from tax on soft drinks of 250 million per year)*, 28.08.2012. <http://www.altalex.com/index.php?idnot=58569>.

<sup>303</sup> Interview to Mr. Alessandro Cagli, Ferrero.

tax. The result was negative, since the targets and consumption opportunities were different from the ones of sugary/carbonated drinks, and the products were not substitutes;

- Negative and perverse effect on the protection and promotion of local food products with quality labels (quality schemes). Since typical products need to meet some production standards that cannot be altered, the “punishment” of certain ingredients would have affected the domestic typical production<sup>304</sup>;
- Reduction of R&D investment;
- Possible inflationary effects, because the tax would have had a domino effect affecting the whole chain, with unclear overall effects on public revenues. It should then be checked whether the net final effect would have been positive or negative;
- Promotion of concentrations<sup>305</sup>: this kind of taxes can be used by large groups as a justification to move their production to other countries, to merge or even to close plants.

## Conclusions

The tax was never applied. Nevertheless, the interviewees provided various reasons to substantiate that the food tax would have not been able to achieve its aims related to public health. The main points raised by the interviewees at this respect were the following:

- Many factors affect public health, such as genetics, the physical activity, etc. In reality, different factors are interrelated and it would be complicated to isolate the effects of the tax;
- Studies that have been carried out in the UK demonstrate that, in order to achieve a real effect on consumption habits, food taxes would need to be very high (an increase of at least 20% of the price of the product). This means that, unless the fee is very high, only an economic burden is perceived, with no effects on health;
- The World Health Organisation talks about a “healthy and balanced diet”. The categorisation of single food products creates a wrong perspective for the consumer, leading him/her to consider and consume only certain types of food, thus limiting his/her diet. As a consequence, the approach to be followed should be a categorisation of diets, and not of the food (“good and bad diet” instead of “good and bad food”).

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<sup>304</sup> Interview to Mr. Paolo Patrino, Federalimentare: “A clear example of the possible consequences is what happened in the UK: a recent benchmarking exercise showed that a French brie with a protection label cost 3:29 pounds and had negative values in the assessment (the traffic light was almost entirely red), while another cheese sold as “Brie”, produced by a private label and reformulated with serum, only cost 0.99 pound and had an almost entirely green traffic light.

<sup>305</sup> Interview to Mr. Paolo Patrino, Federalimentare.



# Annex 3-F Proposed Food tax in Ireland

## Executive summary

Ireland has not yet implemented a non-harmonised food tax on specific food product categories. However, in 2012 the Irish Department of Health proposed a 10% tax on sugar-sweetened beverages (SSBs). The proposed tax was rejected by the Minister of Finance during the budget as the case for its introduction on economic or health grounds wasn't proven. Prior to any further consideration of the tax being implemented a Health Impact Assessment (HIA) was requested by the Special Advisory Group on Obesity (SAGO).

The HIA concluded that there is a suggestive, but not conclusive, link between SSBs and weight gain. The HIA found that obesity does not have a single cause but is a result of a complex mix of factors including environmental, physiological, genetic and lifestyle elements. As such, the report recommends the solution to obesity be multifaceted, with the food environment being an integral part of the solution. The key point of contention is whether consumption of SSBs does in fact contribute to obesity. Industry stakeholders point out that SSB consumption has been decreasing in Ireland over the past decade, whilst obesity rates have been increasing. There is no conclusive evidence of a causal relationship between SSBs and obesity<sup>306</sup>. The HIA found that meta-analysis of studies on SSB consumption and increased energy intake show consistent positive relationships, while the link between SSB consumption and weight gain is suggestive but inconclusive. The report notes that the studies in the meta-analysis are generally low quality and have design flaws.

Moreover, owing to the fact that the beverage industry is such a large employer, directly and indirectly, in Ireland – there is concern among both industry and health stakeholders around the effect of an SSB tax on jobs.

Consequently, the proposed 10% tax on SSBs has so far not been implemented in Ireland mainly due to the uncertainties surrounding the effectiveness of the tax in terms of achieving its health objectives and the concerns around negative consequences on employment and investment. Instead a voluntary approach has been encouraged based on voluntary industry participation and initiatives.

## Description of the tax

Between 2010 and 2013, “fat taxes” received considerable public attention in Ireland’s policy discussions around strategies to improve population health. In 2012, the Irish Department of Health proposed, a 10% tax on sugar-sweetened beverages (SSBs). Their primary, and singular, aim was to reduce obesity in the Irish population. The proposed tax was rejected by the Minister of Finance during the budget as the case for its introduction on economic or health grounds wasn't proven.

The proposed 10% SSB tax would apply to all pre-packaged, non-alcoholic, sugar-sweetened beverages i.e. products with added sugar (products with naturally occurring sugar, such a milk, would not attract the tax). It was not outlined whether the 10% tax would be based on price, volume or sugar content, nor was it stipulated if the tax would be payable by manufacturer’s or retailers, or how exports and imports would be treated.

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<sup>306</sup> Gibney, Mike. n.d. "Obesity: Down a road less traveled." University College Dublin.

The idea of fiscal policies as a tool to reduce obesity first arose in Ireland in 2005 whereby a report by the National Obesity Taskforce included a recommendation to carry out research, “to examine the influence of fiscal policies on consumer purchasing and their impact on overweight and obesity.” ‘Fat taxes’ as a fiscal policy to reduce obesity gathered momentum in Ireland from around 2010, in a context of increased interest internationally in such measures for combatting diet-related non-communicable diseases. The general notion of ‘fat taxes’ evolved into a tax specifically targeting sugar-sweetened beverages in 2011 with the incoming of a new Health Minister, Dr James Reilly, who strongly advocated for such a tax.

The 10% SSB tax was proposed by the Department of Health to the Department of Finance in 2011 for inclusion in the fiscal budget. Prior to any further consideration of the tax being implemented a Health Impact Assessment (HIA) was requested by the Special Advisory Group on Obesity (SAGO). The HIA<sup>307</sup> was conducted by the Institute of Public Health during 2012. The 10% SSB tax was subsequently proposed by the Department of Health for inclusion in the fiscal budget, however the proposal was unsuccessful.

It is important to note that Ireland has a 0% VAT rate on foodstuffs, except for sugar-sweetened beverages and confectionary which attract the standard VAT rate of 23%.

## Sources of information

The sources of information used for the Ireland case study analysis include academic and grey literature, as well as stakeholder interviews.

### Literature:

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- Gibney, Mike. n.d. "Obesity: Down a road less travelled." University College Dublin;
- Food and Drink Industry Ireland (FDII). 2014. "Food and Drink Industry Ireland Position On Proposed SSB Tax" FDII.

### Interviews:

- Institute of Public Health Ireland, Ms Noelle Cotter, Public Health Development Officer (Policy);
- Food and Drink Industry Ireland, Mr Shane Dempsey, Head of Consumer Foods.

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<sup>307</sup> The Institute of Public Health in Ireland. 2012. "Proposed Sugar Sweetened Drinks Tax: Health Impact Assessment" The Institute of Public Health in Ireland. [http://www.dohc.ie/publications/Health\\_Impact\\_Assessment\\_PSSDT.html](http://www.dohc.ie/publications/Health_Impact_Assessment_PSSDT.html).

## Findings

### Health findings

The Health Impact Assessment undertaken by the Institute of Public Health on the proposed 10% SSB tax included a population profile, polling, stakeholder consultation, literature review of international 'food tax' academic literary sources and modelling by a team of economists at Oxford University. The HIA concluded that there is a suggestive, but not conclusive, link between SSBs and weight gain. The HIA found that obesity does not have a single cause but is a result of a complex mix of factors including environmental, physiological, genetic and lifestyle elements. As such, the report recommends the solution to obesity be multifaceted, with the food environment being an integral part of the solution.

The modelling exercise<sup>308</sup> conducted as part of the HIA simulated a 10% tax on SSBs and estimated the impact on obesity prevalence in the Irish adult population. The study estimated that a 10% tax on the price of SSBs would reduce the percentage of obese adults by 1.25%, equivalent to 9,900 less obese adults, and the overweight and obese adults by 0.7%, or 14,380 adults. No significant difference in consumption reduction between income groups was found, but it was found that the tax would mostly affect young adults who are the main consumers of SSBs. The study concluded that the proposed tax would have a small but meaningful effect on obesity in Ireland. The modelling study assumes a pass-through rate of the tax to consumer prices of 90% and an own-price elasticity of SSBs of -0.9, which is not based on empirical data from Ireland but is a conservative estimate based on elasticity findings of US studies. Cross-price elasticity estimates were not available and as such product substitution could not be analysed. A widely published model (PRIME), based on a validated set of equations for how energy intake affects BMI, was used to estimate how the predicted reduction in SSB consumption impact obesity.

### The link between SSBs and weight

In the stakeholder consultation process of the HIA, as well as the stakeholder interviews conducted for this case study, concern around the effectiveness of an SSB tax in achieving its health aims were raised. The key point of contention is whether consumption of SSBs does in fact contribute to obesity. Industry stakeholders point out that SSB consumption has been decreasing in Ireland over the past decade, whilst obesity rates have been increasing. There is no conclusive evidence of a causal relationship between SSBs and obesity<sup>309</sup>. The HIA found that meta-analysis of studies on SSB consumption and increased energy intake show consistent positive relationships, while the link between SSB consumption and weight gain is suggestive but inconclusive. The report notes that the studies in the meta-analysis are generally low quality and have design flaws.

Health and industry stakeholders commented that a further limitation to the predicted health effects of the SSB tax is that weight loss is not linear but plateaus, and is therefore difficult to predict. An additional consideration is that the reduction in consumption of sugar-sweetened beverages may come from those consumers who are not obese, and the targeted obese consumers may continue to purchase the same amount of sugar-sweetened beverages despite the tax. For these reasons, weight loss as a result of the SSB tax is difficult to ascertain.

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<sup>308</sup> Briggs, Adam, Oliver Mytton, David Madden, Donal O'Shea, Mike Rayner and Peter Scarborough. 2013. "The potential impact on obesity of a 10% tax on sugar-sweetened beverages in Ireland, an effect assessment modelling study" *BMC Public Health* 13: 860. doi:10.1186/1471-2458-13-860.

<sup>309</sup> Gibney, Mike. n.d. "Obesity: Down a road less traveled." University College Dublin.

### Consumer behaviour and health outcomes

The Oxford University modelling study assumed that the own-price elasticity of demand for SSBs was -0.9 i.e. that a 9% increase in price would result in a decrease of consumption by slightly less than 9% (8.1%). The evidence base for elasticity of demand of SSBs in Ireland is limited<sup>310</sup>. An empirical study<sup>311</sup> of the soft drink taxes in place in Ireland between 1990 and 1992, found the own-price elasticity of demand for soft drinks to be -1.10 i.e. that a 9% price increase would cause a slightly greater decrease in consumption (9.9%). Given that the latter study considered only soft drinks and thus consumers in this case could switch to other sugary beverages, it is logical that in the former study where the tax affects all sugar-sweetened beverages, consumers are less responsive to the price increase as they have fewer alternatives. The HIA concluded that the SSB tax would likely result in decreased demand for SSBs, but the exact degree was variable and dependent on consumer behaviour.

Product substitution was also found to be highly relevant to the health outcomes of a SSB tax in Ireland. The modelling exercise by Oxford University did not take product substitution into account. A position paper<sup>312</sup> by Food and Drink Industry Ireland considers product substitution as the biggest oversight of the proposed SSB tax, stating that "A tax would not prevent consumers from purchasing similar untaxed products or less expensive products in the same food category with the same nutritional quality." The HIA acknowledges that consumer purchasing behaviour in response to the propose tax, both within and outside of SSB category, is difficult to predict. Consumers may switch to other sugary products, such as chocolate, to products with less sugar, or simply cease consumption with no substitution. Another possibility is that reduction in SSB consumption stimulates a reduction in foods that are high in sugar, fat or salt (e.g. such as popcorn, pizza and chips) and are usually consumed together with sugary drinks, and thus have a magnifying effect on reducing calorie intake. However, due to the uncertainties around consumer behaviour, the health effects of a SSB tax are debatable and the results of the modelling exercise must be viewed cautiously.

### Industry response and health outcomes

In the Oxford University modelling exercise it was assumed that 90% of the tax was passed-through to consumers i.e. that a 10% tax resulted in a 9% price rise. Industry stakeholders point out that any absorption of the tax by manufacturers or retailers, which they believe will be very high in order to prevent losses in sales, lowers the health benefits that were designed to be achieved by an increase in price of SSBs. If the price increase is not passed onto consumers, or only marginally so, industry stakeholders argue that the incentive to reduce consumption of SSBs is near non-existent and the tax is rendered ineffective in reducing obesity.

### Social and economic findings

Further to issues around the health outcomes of the proposed SSB tax, impacts on the competitiveness of the beverage industry in Ireland and flow on social and economic effects were particular concerns of both industry and health stakeholders. In Ireland the agri-food industry is a key employer, providing around 1 in 8 jobs. The tax represents a cost to the industry, either by absorbing<sup>313</sup> the tax in the supply chain, or by reduced sales resulting from the increased product prices. There is unease that the additional cost may effect the competitiveness of the SSB sector relative to neighbouring countries and markets, as well as potentially impacting on investment and employment.

<sup>310</sup> Delargy, Clare, Kevin Denny, and Colm Harmon. 2012. "The economics of fat taxes. Fat and sugar taxes: will they solve the problem?" Geary Institute University College Dublin.

<sup>311</sup> Bahl, Roy, Richard Bird, and Mary Beth Walker. 2003. "The uneasy case against discriminatory excise taxation: soft drink taxes in Ireland" *Public Finance Review* 31 (5): 510-533. doi: 10.1177/1091142103253753.

<sup>312</sup> Food and Drink Industry Ireland (FDII) 2014. "Food and Drink Industry Ireland Position On Proposed SSB Tax" FDII.

<sup>313</sup> Depending on how the tax is levied the industry may not be able to absorb the tax at its own discretion.

With regard to social effects, a common criticism of the proposed SSB tax is that it would disproportionately affect the poorer segments of society (be regressive). Indeed, there is wide academic evidence to show that food taxes are generally regressive. Even so, the actual impact is estimated to be relatively modest and the regressivity of food taxes could possibly be reduced by a combined tax/subsidy policy<sup>314</sup>. Moreover, food taxes can be considered progressive in health terms by targeting the people who would gain the most from obesity prevention measures.

### **Competitiveness and cross border trade**

Cross border trade between Ireland and Northern Ireland generally flows in favour of the latter, with shoppers from Ireland purchasing goods in Northern Ireland to take advantage of lower product prices. The difference in price is driven primarily by the euro-pound exchange rate with cross border shopping fluctuating between 100 and 500 million pounds, generally in line with exchange rate fluctuations. Figures on cross border shopping from the twelve months between Q2 2009 and Q2 2010 (a period with very strong cross border trade in favour of Northern Ireland), showed that 14% of households in Ireland made at least one shopping trip to Northern Ireland in the 12 month period. Of the 14% of the households who shopped in Northern Ireland, 34% were from border regions, 29% from Dublin area and the lowest proportions were in the regions at furthest distance<sup>315</sup>. In 2012 when the Euro fell to a four year low, it was estimated that the number of Ireland's households shopping in Northern Ireland had roughly halved since 2010, and that total sales had fallen from 370 million pounds to around 100 million pounds.

SSBs are the third largest product category in cross border purchases. Industry predicts that an increase in the prices of SSBs as a result of an SSB tax would only exacerbate trade flow losses. Given that SSBs already attract a high VAT rate of 23%, it is considered that further taxation would impact on the competitiveness of the SSB sector. On the other hand, some argue that as SSBs are a relatively cheap product, a price rise may not be large enough to motivate consumers to purchase these goods outside of Ireland. Moreover, health stakeholders highlighted the fact that there is no definite proof that people will cross the border to purchase SSBs just as there is no definite indication on what future consumer responses might be (e.g. consumer switching to more/less healthful products) if a tax on SSBs would be introduced.

### **Employment**

Given that the beverage industry is such a large employer, directly and indirectly, in Ireland – there is concern among both industry and health stakeholders around the effect of an SSB tax on jobs. Health stakeholders are also concerned about the potential for negative health effects associated with unemployment, such as mental health issues. Impacts on employment are however difficult to determine, especially because many of the manufacturers and retailers of SSBs in Ireland produce or supply more than just sugar sweetened drinks. Market evidence suggests that zero sugar beverages are a key growth area, hence loss of sales for producers and retailers in some products may be compensated by growth in other product lines.

### **Investment**

The beverage industry has observed that consumption of SSBs in Ireland has been in decline in recent years, replaced in part by increases in sales of diet and zero sugar product varieties but not entirely. This indicates that some consumers are reducing or stopping purchases within the SSB category all together. Many manufacturers are already investing in reformulating products and new product development in order to meet changing consumer preferences. Examples include using stevia as a sweetening substitute and positive marketing of diet and zero sugar products. Industry stakeholders point out that a SSB tax which places a cost burden on the industry provides less

<sup>314</sup> Madden, David. n.d. "The poverty consequences of a food tax" University College Dublin.

<sup>315</sup> Central Statistics Office. 2010. Quarterly National Household Survey - Cross Border Shopping - Quarter 2 2010.



funds for investment in such initiatives. The example of the combined government-industry effort to reduce salt in food in Ireland, is highlighted as an initiative which may provide learnings and an alternative solution to food taxes in encouraging healthier diets.

## Conclusions

The proposed 10% tax on SSBs has so far not been implemented in Ireland. A pivotal reason that the tax was not implemented is thought to be due to the uncertainties surrounding the effectiveness of the tax in terms of achieving its health objectives and the concerns around negative consequences on employment and investment.

Stakeholders interviewed identified that another key factor in the tax not being implemented was the political unpopularity of introducing taxes during a period in which Ireland was experiencing a severe recession. A related issue may have been the fact that revenues from the proposed tax were not likely to be ring fenced for health initiatives, adding further difficulties in gaining public support for the tax.

The HIA and Oxford University modelling study, as well as stakeholders, press the importance of a multi-pronged approach to tackling obesity. Some foreshadow an approach which encourages voluntary industry participation and initiatives, rather than prescriptive legislation and regulation.

## Annex 4 Interviews with European stakeholders

In order to gain an understanding of the cross-border and European level implications of the various food tax measures, and in an effort to complement and verify the findings of the desk-based research, we have carried out a number EU level interviews. Stakeholders interviewed were identified during the first phase of the study and the final list of interviewees was selected in agreement with the European Commission. Altogether 14 stakeholders were interviewed, representing all stakeholder groups impacted by the introduction of food taxes including producers, retailers, public health authorities and consumers. The following table gives an overview of the interviews by stakeholder group.

**Table 26 Interviews carried out by stakeholder group**

Stakeholder group	Number of interviews
Industry association <sup>316</sup>	8
Food producers	2
Public health stakeholders	3
Research institutes <sup>317</sup>	1
Consumer organisations	0

Following the interviews, stakeholders have been sent a preliminary version of the minutes which they have been asked to comment on. In some cases interviewees did not respond to the draft minutes in which case we have considered the minutes to have been accepted.

Interviews questions were shared and agreed with the Commission. The four main subject areas of the interview were:

- impacts on consumers;
- impacts on industry competitiveness;
- impacts on public health; and
- other issues (mainly regulatory aspects).

Some data and information shared during the interview process have been labelled as confidential. Such data exchange was based on a confidentiality agreement with the interview partners which guarantees that while the information can be used to countercheck and validate findings, it will not be explicitly named. The following table lists those organisations that participated in the interviews.

**Table 27 Stakeholders interviewed**

Organisation	Category	Description
FoodDrinkEurope	Industry Association-producers	Representative organisation for the European food and drink industry.
UNESDA (Union of European Soft Drinks Associations)	Industry Associations-producers	Representative organisation for the European soft drinks industry.
Nestle	Industry - producers	Largest global Nutrition, Health and Wellness Company.

<sup>316</sup> Included associations for producers as well as retailers.

<sup>317</sup> Economic research, taxation focus.

Organisation	Category	Description
Mondelēz International	Industry - producers	Global food producer (Cadbury, Milka, Côte d'Or, Toblerone, Jacobs, Tassimo, Carte Noir, LU, Belvita, Oreo, Halls and Trident).
European Snacks Association	Industry Association	Representing European savoury snack manufacturers and their suppliers.
EU Vegetable Oil and Protein meal Industry (FEDIOL)	Industry Association	Industry representation.
Euro Coop	Industry association	Private cooperative retailers.
EuroCommerce	Industry Association-Retailers	Representing retailers.
The Brewers of Europe	Industry Association	European Trade Confederation representing its national associations composed of brewers.
Independent Retail Europe	Industry Association-Retailers	
European Public Health Alliance	Health	NGO focused on advocating better health.
World Health Organisation (WHO)	Health	Mr Breda's team is responsible for the world's largest and most comprehensive surveillance mechanism for childhood obesity.
British Heart Foundation Health Promotion Research Group (BHFHPRG)	Health / Research	Current research includes the interactions between nutrition, health, and sustainability, and the role of fiscal interventions in changing eating habits.
Oxford Economics and the International Tax and Investment Centre	Research	Research into the economic impact of selective food and drink taxes across a wide range of countries around the globe.

## Information from the stakeholder interviews

### Impacts on consumption

One of the points in which all stakeholders agree is that the direct impacts of non-harmonised food taxes are not entirely predictable. In fact according to industry stakeholders there is no definite data connecting the introduction of food taxes to any reductions in consumption. At the same time stakeholders agree that following the introduction of food taxes, consumption of certain tax levied products has dropped.

According to economic research groups, typically the impact of price changes on consumption depends on both the price elasticity of demand for each product and the cross-price elasticity of demand (i.e. the effect on consumer demand for a product of price changes in other products). Researchers point out that cross price elasticity of demand generally varies by country as there are a variety of factors (prices of raw materials, retailer agreements, promotion campaigns, VAT changes etc.) that can contribute to a fluctuation of consumer demand at any given time, thus making it difficult to draw a direct link to one single source. For example, in the case of Hungary where there has been a drop in consumption of the taxed products, this can only be partially

attributed to the introduction of the tax as at the same time the full impacts of the financial crises surfaced alongside other factors such as increases in the price of raw materials.

Stakeholders representing the research groups have also drawn attention to academic literature, according to which, most foods and non-alcoholic beverages are price inelastic, and more price inelastic in developed countries than in developing countries (Searle et al. 2003). An inelastic price of demand suggests that tax changes will be ineffective in shifting consumption patterns. Impact can be further blurred by substitution effects (and trans-border trade). These are not always obvious and are inherently difficult to estimate.

### Product substitution

Examples with regard to substitution effects are not conclusive. An example for this is highlighted by the contrasting views related to the Danish food tax. Industry related research points out that Denmark experienced lower sales of its domestic product Lurpack, and a corresponding increase in lower-priced alternatives such as butter imported from New Zealand, which had the same or similar fat content. In contrast to this, public health stakeholders say examples from Denmark had shown a 6% decrease in the consumption of the taxed products (no product categories were named).

Interviewees suggest that there are underlying differences between the substitution effects of food and soft drinks. Soft drinks are being targeted with taxing as – according to some health stakeholders - they contain minimal to no nutritional value whereas their substitution products (milk, tea and coffee and fruit juices) tend to have a higher nutrient content. According to public health stakeholders, a real and directly relatable impact on soft drink consumption could only be seen if taxes were about as high as 20%, in which case the impact on consumer preferences could be clearly linked to the price increase of the products.

In the case of foodstuff, substitution is more complex and it is assumed that consumers would eventually have the same calorie intake overall by increasing calorie intake elsewhere in their diet. Therefore the health impact of various micronutrients (salt, different types of fats etc.) can become more important.

Industry has also pointed out that there is a more negative aspect of substitution which can be connected to alcohol, where the impact of taxes could potentially lead to a change in purchasing behaviour e.g. turning to cheaper drinks, buying more in shops and less in bars, or switching to other drinks categories. Therefore product substitution may not be solely restricted to the products themselves but the outlets from which the products are purchased from.

One of the most frequently reoccurring statements made by the industry is that there are no bad and good products, only healthy and unhealthy diets. In contrast to this health stakeholders say there are products that contain rather limited nutritional value but are high in saturated fat, sugar and/or salt which could have detrimental impacts on health in case of particular consumption patterns and dietary habits. Industry stakeholders highlight that the underlying question is whether these products (which can include certain ready made meals, frozen products) are the ones being targeted by the non-harmonised food tax measures.

One comment from industry stakeholders pointed to the limited public health impacts of the tax levied products in Hungary and Finland. In the case of Hungary salty snacks that are levied with the tax represent 1% of the overall dietary intake of the population while culinary products are estimated to represent an additional 5-6%. Data for Finland has shown that about 13% of sugar in the Finnish diet was taxed. At the same time it is worth noting that there might be differences in the dietary habits and consumption patterns between different groups (according to age, income or

even gender) and it is likely that for some people the above mentioned salty and culinary products would make up a somewhat higher percentage of their diet.

### Socio-economic effects

The regressive nature of food taxes has been noted by all stakeholders, however there are varying interpretations with regard to the extent and impact that this might have. It is understood that low income socio-economic groups typically spend more of their disposable income on food than high-income groups, and are thus more affected by price increases. However, some health stakeholders state that food taxes are no more regressive than other flat taxes applied on many other products and have the additional benefit of being progressive in terms of health impacts, although no data was provided to substantiate this statement. Public health officials also pointed out that by subsidising healthy products the regressive effect could be counteracted. Industry stakeholders debated this stating that the money people will save on presumably healthier products (fruits and vegetables) that are subsidised will be spent on the higher priced unhealthy products.

At the same time as pointed out above, in the case of specific product categories e.g. alcohol, tax increases may lead to a switch from hospitality sector purchases to retail sector purchases. This may imply wider socio-economic effects since, taking the example of beer, one job in a brewery generates a further one job in retail but a further 11 in the hospitality sector. Whilst tax revenue and value added to the wider economy are also greater for a sale through hospitality than a sale through retail<sup>318</sup>.

### Impacts on competitiveness

According to most stakeholders, impacts on competitiveness differ by firm, by industry and by country and are likely to include factors such as:

- how companies choose to absorb the tax (pricing policies);
- their ability to reformulate products to meet changing consumer demand;
- brand strength (brand loyalty which might differ by income group therefore the original price category of a product will be a determining factor);
- market share (both domestic and international);
- portfolio of products bought and sold;
- the intensity of competition between firms in that category; and
- tax burden differentials between neighbouring states/countries.

With regards to the economic impacts industry stakeholders pointed out that large manufacturing companies (soft drink as well) are the most visible in the sector and it is often assumed that production of beverages takes place in countries external to the EU while in reality they often produce in the Member States using local employment. Moreover, there are large numbers of local SMEs that they work with. These companies are mostly active in bottling, packaging, advertising and retail. The impact of the food tax can have a trickle down effect on employment through the value chain.

There was limited information from stakeholders on the extent to which job or investment losses came about as a result of the tax. In the case of Finland figures were cited relating to one particular food producer (where at least 150 FTEs were lost across the supply chain). In the case of Denmark 5.000 jobs were lost (reported by an industry association).

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<sup>318</sup> EY (Ernst & Young) and Regioplan 2014 report on the Contribution made by Beer to the European Economy" - [http://www.ey.com/Publication/vwLUAssets/EY-The\\_Contribution\\_made\\_by\\_Beer\\_to\\_the\\_European\\_Economy/\\$File/EY-The-Contribution-made-by-Beer-to-the-European-Economy.pdf](http://www.ey.com/Publication/vwLUAssets/EY-The_Contribution_made_by_Beer_to_the_European_Economy/$File/EY-The-Contribution-made-by-Beer-to-the-European-Economy.pdf).

While industry stakeholders did not provide specific examples for a reduction in investments<sup>319</sup> some references were made to sales figures. In Hungary, for example, sales figures registered a 10% decline for confectionary products and a 15% for salty snacks. Unfortunately, these data sets did not include similar figures for substitute products and their producers therefore it is not possible to deduce to what extent producers were able to retain some of the profit losses through the sales increases of substitute products.

The tax increases on beer have been found, according to an EU wide industry association, to damage the brewing sector's competitiveness<sup>320</sup>. Even though the brewing industry seems to have encountered fluctuations in consumption before the introduction of taxes there was a noticeable impact on employment between 2010-2012<sup>321</sup>.

Public health stakeholders point out that the claim that food taxes have a negative impact on the overall competitiveness of the industry would need to be substantiated with robust evidence (to a similar degree that public health is required to produce robust evidence on their likely impact on consumer behaviour). According to their view there is evidence that manufacturers and retailers may increase the price of foods above the rate of tax increase, enhancing the profitability of products<sup>322</sup>. Furthermore, an assessment of impact on industry should always be considered in the context of productivity gains among the population – and thus the workforce - resulting from improved health.

An often cited example for the negative impact of non-harmonised food taxation is the increase in cross border shopping. Industry stakeholders say that the Danish fat and soft drinks taxes have led to a registered a 30% increase in cross-border shopping. This figure and the statement itself were not confirmed by public health officials or the Danish case study. In fact the Danish case study has shown that increased administration costs and difficulties to calculate the taxes had equal weight behind the withdrawal of the tax as cross-border trade.<sup>323</sup>

Overall, stakeholders assumed that impacts on competitiveness would be stronger for SMEs especially in cases where they only produce for the local market, or have rather limited product lines. One of the decisive factors for maintaining competitiveness is product variability which means large producers and retail chains would have a greater variety of products on the shelves in different price categories.

According to industry associations, there is also an on-going dynamic interaction between retailers and producers with regard to the final price of the products. Retailers are continuing to pressure producers in order to keep prices down and in some cases private labels emerge as winners in the price competition. Additionally in some cases private labels also come out with low-calorie, low-fat products which drive product reformulation for the producers. An example from the UK suggests that one soft drink manufacturer has reduced its sugar content and was likely driven by the fact that private label products are being introduced as a lower calorie, lower sugar content alternative. This does not only puts pressure onto food producers but is also contributing to a changing consumer

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<sup>319</sup> According to industry this, in some cases, might be due to the relatively short time period since the implementation of the tax.

<sup>320</sup> Between 2010 and October 2013, 14 EU Member States increased beer excise duties and 12 EU Member States increased VAT (as an example, in Poland in 2009, the 13.6% excise duty increase on beer led only to a 6.5% increase in the beer excise duty revenues, due to the declining sales).

<sup>321</sup> 8% fall in beer consumption between 2008 and 2010, followed by a 1% increase from 2010 to 2012, coincided with a 15% fall in the number of jobs created by brewing, the vast majority of these being in the hospitality sector.

<sup>322</sup> No data was provided to substantiate this statement.

<sup>323</sup> According to the Danish case study the increase in cross-border shopping for meat products was around 10% (increasing from 23% in 2011 to 33% in 2012).

demand (the same argument resurfaces in the Hungarian case study as an argument in favour of such taxes).

As pointed out by health stakeholders, another UK example shows that retail chains are also introducing their own policies e.g. TESCO policy to fight obesity<sup>324</sup> or Morrison's ban under 16 to buy energy drinks<sup>325</sup>. Historically in the UK, food producers voluntarily committed to improving public health through salt reduction. The new public health responsibility deal has seen key industry players signing up to for a similar arrangement for saturated fat.

#### *Innovation and product reformulation*

Stakeholders are divided in their opinion regarding the impacts that food taxes might have on innovation. While some stakeholders say that there has been a reduction of innovation in food simply as a result of less capital available due to taxation, other sources seem to suggest that product reformulation has continued<sup>326</sup> and in some cases may even have increased in response to the introduction of taxes. According to reports of one industry association in 2012, about one third of all products (by tonnes) were reformulated with reduced sodium/salt and about two thirds (by tonnes) of all products were reformulated with reduced saturated fat, compared to traditional mainstream products. It must be noted though that reformulation is not possible across all categories e.g. chocolate bars need to contain a minimum level of sugar or cocoa etc. Other industry representatives note that in many instances the criteria of the tax schemes were too severe to promote reformulation e.g. ice-creams in Finland.

Furthermore, according to a member survey by the Danish Chamber of Commerce shows that one in three of businesses affected had to prioritise devoting time and resources to the practicalities of the tax over innovation. From the responses, the average cost was estimated at 1.636 DKK per employee. This corresponds to a total cost of approx. 200 million DKK. In other words, fat tax have cost business around 200 million /30 mill € in the retail and wholesale sector.

Moreover, the tax did not take into account that the food sector is extremely dynamic, continually developing new product variants and reformulating existing products, which would require constant revision of calculations. In somewhat of a counterargument public health officials point out that consideration should be given to the fact that there are sectors of the agro-food industry that may benefit, including SMEs and local manufacturers producing minimally-processed foods that may be lower in sugar and fat. Thus the food tax may have positive supply-side effects for certain sectors.

#### **Impacts on public health**

According to public health stakeholders the health benefits of food taxes for now are linked to reduced consumption of the taxed products as for changes in obesity, diabetes and cardio-vascular diseases more time would be needed. Food taxes that have the effect of increasing price of targeted products at point of purchase contribute to a reduction in purchase and consumption of targeted products. They can thus be useful to reduce specific foods high in fats, sugar and salt. The strongest evidence relates to sugary and sweetened beverages, where there are close healthier substitutes. In addition to the immediate effects of food taxes in reducing purchase and consumption, in the longer-term they can encourage larger behavioural adjustments as a result of the formation of new dietary patterns and preferences.

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<sup>324</sup> <http://www.thegrocer.co.uk/companies/supermarkets/tesco/tesco-unveils-10-point-soft-drinks-plan-to-tackle-obesity/351448.article>.

<sup>325</sup> <http://www.theguardian.com/society/2013/nov/22/morrisons-bans-high-energy-drinks-children>.

<sup>326</sup> Reformulation efforts and achievements have been on-going in the industry prior to the introduction of any of the tax measures.

Health stakeholders stated that their long-term impact in terms of altering consumer behaviour will also be amplified through changes in social norms (e.g. reduced consumption leads to reduce opportunities for behavioural modelling) and changes in knowledge and attitudes (e.g. consumers will be aware that foods/drinks are subject to tax for health reasons).

Also pointed out by health stakeholders is the fact that food taxes are more complex than tobacco or alcohol tax due to the many substitute products available. Therefore results emerging from similar taxes for tobacco and alcohol products are not always relevant. There is limited evidence on what substitute products consumers choose. This also means there is no evidence to back the claim that people simply substitute one high fat/salt/sugar product with another. In fact examples from Denmark had shown a 6% decrease in the consumption of the taxed products.

Health stakeholders highlighted the fact that distinction will need to be made between soft drink and food products. According to UK data consumption patterns of soft drinks is not evenly distributed among the population therefore statistics that highlight the fairly low level sugar intake from soft drinks is not an accurate reflection of the importance of soft drinks within diets. The data shows that sugary soft drink consumers are generally consuming large amounts which are very much impacting on obesity trends. In fact a 100 calorie increase per day is enough to explain the rising obesity trends.

One suggestion from health economists to further substantiate the effectiveness of food taxes is to give subsidies for vegetables and fruits making them cheaper and possibly more appealing to consumers. In response to this producers argue that people would possibly not consume more of the "healthy" products they would simply spend the difference on snacks. An important aim from health perspective is to continue the dialogue with companies and the product reformulation.

A broad range of interventions were suggested from public health stakeholders including taxes, subsidies for "healthy" products, corporate responsibility from producers, education and awareness raising campaigns. Food taxes (or some other type of legislative support) need to be in place as means to support health professionals and consumers in making the right choice and promoting public health. Public health stakeholders say that voluntary measures are not enough as food producers are focusing on profit maximisation and the focus of their operation is not to benefit the public. Stakeholders across the board agree that education, raising awareness and community-based programs are good, helpful and more should be done.

According to health stakeholders evaluation of data and gathering results would be the first and very important step to assess and optimise the effect of food taxes – otherwise it is impossible to know what type of tax structure will work.





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