

ANALYSING A TAX ON NEGATIVE EXTERNALITY

A case study of sugar tax in UK.



Bachelor's thesis

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ABSTRACT

The purpose of this report is to examine the effect of the newly implemented sugar tax in UK. How the recent introduced tax will affect the industries of food and sugary drinks. Therefore, the taxation types and theory will be explained in details before analysing the markets and industries.

This thesis consists a short introduction of the theoretical background. The elaborated theory will introduce definitions and the different views on the topic. Briefly it will explain why is important for government to intervene also the possible outcomes of this theory in practice.

Is important to note that this tax will affect consumers decisions, and not only the suppliers, as this is considered to be the aim of the government. The sugar levy imposed in UK is trying to tackle two major health issues: obesity and diabetes. Sugar is one of the reasons behind so many diseases, and the number of people affected is raising. So the social costs of sugar consumption is analysed from the health point of view.

Due to time constraints in this research is used only secondary data. Secondary data was collected from UK law and government agencies, EU statistics agencies , and other reliable publications available (other sugar tax related theses, articles and recommendations).

After analysing the data and comparing how the sugar tax works in Finland , the conclusion part will focus to give an answer to these two question :

1. Should this tax be introduced to European Union ?
2. Did sugar tax meet the real market needs ?

This research could be continued in future research under the topic of how taxes affect consumer behavior.

Keywords : United Kingdom(UK), government, taxation, market failure, negative externalities, government intervention, policy, producers, sugar sweetened beverages.

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1 Introduction

1.1 Background and Research Question

This thesis includes the descriptions of what is considered to be market failures, externalities and how sugar consumption affects the health of United Kingdom citizens. The result will be an identification of the market failures and how the government intervenes to fix them by introducing a tax. Moreover, it will conclude if this should be introduced to EU. Whether this tax meets the needs to fix negative externalities, that will be analyzed by using sugar consumption data.

The topic of this research is proposed by the supervisor and is chosen by the writer because of the relation of the topic with the academic background of his studies.

Studying how policies and government intervention work was a major part of the studies, it was mentioned in different subjects. This made the writer more curious on how government can be involved in changing the consumer's behavior. Also, explaining how to tackle a negative externality by introducing a tax or policy.

During the study, the author tried to understand and explain the different types of taxes, because is important to understand this report will focus only on sugar tax and how it is functioning in the UK. The reason why this thesis consists of the United Kingdom as a case study is due to the recent implementation of this tax.

The rise of obesity in the UK is significant, in a report from Cancer Research UK and the UK Health Forum is mentioned that obesity will rise from 29% in 2015 to 34% in 2025. This report claims that in the next 10 years over 3.7 million citizens will be saved from obesity with this tax. Which means that 5% rise of people considered as obese, can be reduced if this tax has a positive impact in decision making. (The Guardian 2016)

The reason behind this tax is to decrease the sugar consumption in general. And since the numbers of people who need treatment are raising. The government decided to intervene in the market with a sugar levy. (Government UK 2017)

The government in the UK made a plan for action to reduce obesity level focused more on childhood obesity, as a threat for the future generations. Industries such as food and drinks are expected to make a

reduction of sugar used in their products by 20%. (Government UK 2017)

Furthermore, this research will describe the main idea behind government intervention and why is needed to tackle this kind of issues. And will try to give an answer to these two questions :

1. Should this tax be introduced to the European Union?
2. Did sugar tax meet the real market needs?

It is recommended that readers have some background in economics so they can understand the terms and ideas discussed here. Important to note is that not every definition will be explained in details, due to time limitations and the focus of this research will be the UK and its home market. Finland will be considered as a comparison of how the sugar tax works there and the differences in the tax itself.

1.2 Research objectives

Answers to all these research objectives are provided through one research question.

Research question: - How can a tax affect a negative externality?

The objective of this research is to understand the theory of government intervention. And why some economic thinkers believe that is necessary for the economy to intervene in markets.

Taxation and its types will be described so the readers understand how the sugar tax works. The companies tend to be more careful about conducting business when the government decides to get involved in markets. Also, when a tax is introduced consumers are more aware when they purchase products. On the other hand, economists believe just because something has a negative outcome, is not enough for the government to put more taxes on it. (Wharton University 2017)

1.3 Methodology

This research includes secondary data collected from the government publications, health agency's reports, newspapers and scientific journals.

The statistics data about sugar consumption and markets will be collected by UK law and government agencies, EU statistics agencies (euro stats, EU commission etc.), and other reliable publications available (other sugar tax related theses, articles, and recommendations).

Gathering the data for the thesis is one of the main challenges while

doing this research. Because of the limited time and not being able to gather primary data from the UK citizens. The author will rely on the data found online or gathered by other institutions and agencies.

Comparison method is used to describe the similarities and differences between the UK sugar tax and the effects to consumption, comparing sugar consumption in the UK and how it changed, this report will try to assume if the tax meets the real market needs. However, the main purpose of this report to explain the sugar levy and so the readers will have it easier to understand the differences in taxes in different countries. This research will explain how the tax on sugary foods and drinks is working in Finland compared to the newly introduced sugar tax in the UK.

In the end, for the conclusion, this report will examine if this tax should be introduced in the EU, as well, how this tax meets the needs of markets in the UK

1.3 Government Intervention

The political spectrum and economic thinkers debated this topic for many years. Some believing that government intervention is compulsory. There are two views when it comes to market intervention by the government.

Mansfield and Yohe have a definition where the market is considered as an institution, and the prices of goods and services are decided by the forces of the market(supply and demand) or government. (Ajefu J & Barde F 2015)

The forces of the market determine the prices by supply and demand, this is how the markets is supposed to correct by itself by reaching the price equilibrium. In a perfect market where resources are allocated efficiently, this is possible to occur. As in an imperfect market, the market produces too much of one good and not efficiently enough of other products. In the worst case market is not efficient enough by not allocating the resources in the right way, so the market misses to produce any of the goods with efficiency. (Ajefu J & Barde F 2015)

1.4 Adam Smith and Arguments Against Government Intervention

Adam Smith in his book *Wealth of Nations* mentioned why there should be less government interference in the economy, and more free decisions that are made by the markets. In his work is believed that government preferably should have three functions to perform. (Emon Butler 2011)

Firstly, it is mentioned that the government has to create a social security and regulations for the society. By offering social security means that government needs to provide protection for its citizens and national defense. This defense means from all forms of violence and other societies that could threaten the social security. When there is more security in a society, people are supposed to have more motivation to take part in the labour and production of goods. This could result to welfare and better decisions made by the markets (Emon Butler 2011)

Secondly, the government has to establish justice administration, who will maintain the order and rule of law. (Emon Butler 2011) This is an important part for a society to function properly. If there is no rule of law people are less protected. This allows laws to be designed to protect employees from the dangerous workplaces, bribes, and other ethical issues could be solved through a fair justice system. Rule of law is important for the equality and not only a group of people to decide in the name of the rest of citizens. Also, rule of law is believed to not allow groups of interests to influence the decision-making process by the government. So the markets could be independent and fair to compete. (Price 2012)

Thirdly, part of this role of government is to provide public goods and maintain the public institutions. The public goods created by the government should not have an interest in any specific group or individual. However, these goods are made for the individuals to use them. The best example of this kind of goods could be public transport, hospitals, education etc. (Emon Butler 2011)

The founder of the idea of free markets, Adam Smith believed that there should be little government involvement in the economy. This idea is known as *Laissez-faire* (eng. let it be), whereas individuals own the resources and goods and they decide, what is more, beneficial to produce or when is the right time to sell it. The idea of making profit works as an incentive for people to produce with quality and more efficiently. The outcome of this is believed to be a difference in the variety of goods and services. The example used in the book *Wealth of Nations* is If there are too many people who produce butter the next producer will decide to do the different economic activity so he will have higher returns. (Emon Butler 2011)

This is considered also part of “Invisible Hand” theory which is the idea

behind the laissez-faire economic philosophy. The invisible hand theory is a market force that affects the demand and supply of goods, this will function in a scenario where the market is considered to be perfect. He explained that the economy works well if the government leaves it to work on its own, as well as people do trade freely and work for their own interests to achieve better welfare. (Emon Butler 2011)

Even today these ideas are still used by economists who support the free markets economy. The idea of free markets is supported by arguments by adding to Adam Smith's theory that makes the economy more competitive. (Economywatch 2010) In the same time, it is believed this freedom is the reason behind innovation and it gives people the freedom to decide whether a product is good or not. The freedom in the market gives individuals the motivation to find more innovative products, so they can compete with others in a free economy. (Forbes 2016)

Adam Smith is the founder of the ideas about free markets and that government should observe and intervene only when is needed. The government intervention is less desired in a perfect market and the government should play no role, whilst the economy will self-correct and achieve more growth and welfare. (Emon Butler 2011)

This why government intervention is not accepted by some economists, saying that interventions do not allow innovation to grow and free markets are more desired. (Emon Butler 2011)

Nevertheless, one can argue if the free market is functioning in practice as it does in theory.

1.5 Arguments for Government Intervention

The main reason why this debate has been around for so many years is that markets are not efficient enough. But also the government can fail to intervene at the right time. This why government intervention is not accepted by some economists, saying that interventions do not allow innovation to grow and free markets are more desired. But some organizations in recent years have abused their power in the economy, creating less fair competition manipulating with prices etc. And the government is there to intervene with regulations, taxes or use of different authorities, in order to maintain the fair competition in the markets. (Joseph Stiglitz 2015)

Nevertheless, one can argue if the free market is functioning in practice as it does in theory. When the markets fail is that considered to be the right time for the government to get involved and how it affects the economy, all this will be elaborated further in this research. This

involvement of government in the economy is known as government intervention. (Joseph Stiglitz 2015)

Government intervention is considered to be any kind of action taken by the government. If these actions affect the decisions made by any other individuals or a businesses from social and economic point of view. (Business Dictionary Online)

The reason behind the intervention could be explained as a sports game, whereas, the economy is a game and there two players. Companies in one team and the consumers on the other team. There is always a need for someone to monitor and decide when something is going wrong. For the process to be fairer let's can consider the government as a referee who tries to maintain the game more competitive. (Brodwin 2012)

Lots of ideas for government interventions came from the economists, the involvement is needed due to individuals trying to achieve maximal profits. Government is needed to be involved, as Joseph E. Stiglitz states in many ways could be beneficial for the economy. Starting from the reason that countries need to protect their domestic businesses from others. Another issue is that markets do not self-correct until a regulation is imposed by authorities. (Joseph Stiglitz 2013)

Three major problems for a countries executives to be involved in economy are:

- 1- Wealth distribution, the markets fail to redistribute the incomes.
- 2- When markets are not efficient enough to produce desired goods.
- 3- Monetary policies and fiscal policies. (Joseph Stiglitz 2013)

This thesis will focus on one big issue, how markets fail and what are the sources of market failure. In this case, the Uk government came across with the problems of obesity and diabetes, and they decided to intervene by applying a taxation policy that can lead to the correction of these failures. (Government UK 2017)

Further the reader can understand how this tax will affect the producers and consumers. As well as, giving answer to question if this tax is working and is it effective enough to tackle these obstacles.

2 Theory

2.1 Government Failure

A country's administration can fail to produce positive outcomes from market intervention. When from this involvement the society does not allocate its resources effectively, this may lead to misuse of scarce resources. In other words, this situation is known as the government's failure to correct the inefficiency in the market. (Schiller 2011)

The three examples behind the government failure. The first example is when businesses are granted to be more competitive and they still fail to reach a good pricing in the market. This makes the grants from the government as ineffective. The second case is taxation when the government introduces a tax on goods this may discourage consumers from purchasing a product. This can affect the businesses that are producing that particular well and also state fails to correct the economy. The third example is fixed prices, whereas they may intervene in the market by introducing minimum or maximum prices. This leads to a surplus of goods and nobody wants to buy them because the consumers believe is overpriced. Or in the other hand may lead to shortages of goods because they are underpriced and everyone wants to have it, the issue here is a known fact that most of the goods are scarce so governments need to consider these terms when they decide to intervene in the economy. (Schiller 2011)

As for the conclusion, governments need to be careful with the information they have when they want to regulate the market. They need to understand what are the needs of society and presume that they will not affect negatively the market. There is always a place for government intervention, but being careful especially toward consumers will not have negative consequences on the economy. (Economicsonline n.d)

2.2 Market Failure

Because markets tend to be imperfect in reality this is one of the main arguments why the government should intervene. This reason is not enough for the state to intervene in markets. The markets work on its own as Adam Smith says there will be self-correction in the economy, but many economists think that in reality, this is not always the case. They argue about if the invisible hand rule if it will fix the markets since the markets sometimes fail to correct itself.(Fortune 2014)

The economics professor Bradley R.Schiller in his book Essentials of Economics gives a definition to market failure as :

“We use the term market failure to refer to less than perfect(suboptimal) outcomes. If the invisible hand of the marketplace produces a mix of output that is different from the one society most desires than it has failed. Market failure implies that the forces of supply and demand have not led us to the best point on the production-possibilities curve.” (Schiller p.184)

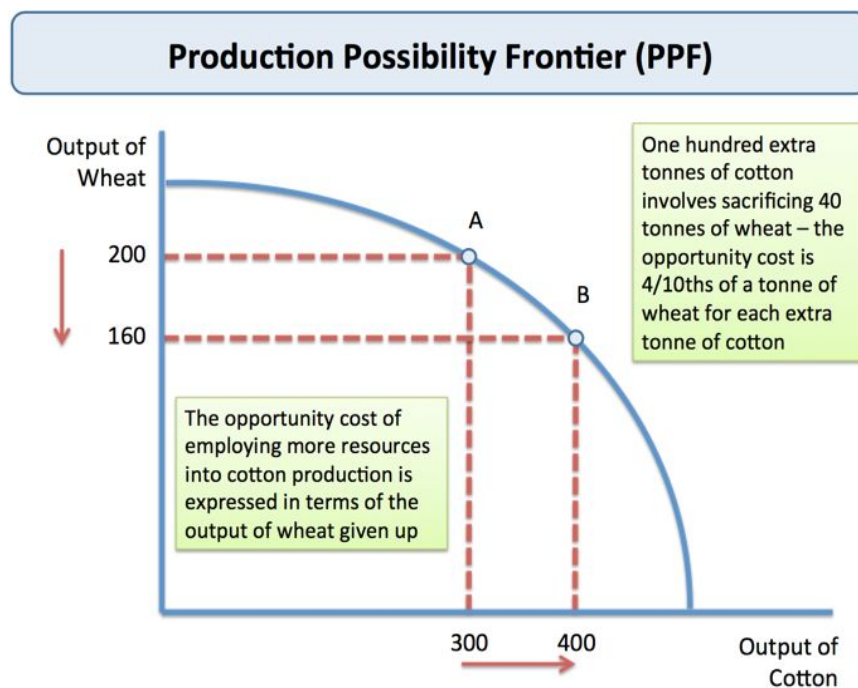


Figure 1: Production Possibility Frontier (PPF) . (Tutotr2u.net ,Geoff Riley n.d)

In this picture is the example of the production possibility frontier, here are used two types goods cotton and wheat. If supposedly the producers use the resources to produce more cotton in a country, this will lead to a decrease of wheat production. Whilst, when there is more need to produce wheat that will lead to less cotton produced. (Geoff Riley n.d)

The ideal mix between producing wheat and cotton could be point B. That point is known as the optimal mix of output, where the market needs for both goods are achieved by producing the most wheat and importing the needed cotton. This optimal mix of outputs is just assumed, in reality, economists use data from the market to decide which product is wanted by consumers. When There is enough information about what the market needs, then more production of one good in this case cotton will bring more profits to businesses and retailers involved in this industry. (Schiller 2011)

When markets fail to deliver the desired goods gives the government a

reason to intervene. They argue that the market is not going to revise by itself, so there room for authorities to get involved. Because of failures in the economy, economists divided this into four main microeconomic market inefficiencies (market failures) :

- 1-Public Goods
- 2-Externalities
- 3-.Market Power
- 4-Inequity. (Schiller 2011)

This research will be focused only in two of the four failures. The two failures that will be described, will lead to understanding the ways how government gets involved in the economy. Public goods and externalities will take part in this report, but this does not mean that other failures are less important. To understand why the author is focused on these two failures, the reason is sugar tax and its relation to the health of UK citizens. Also, externalities will be explained further in more detailed context .

2.3 Public and Private Goods

This chapter will introduce public and private goods. It will include definitions as well as explanations of how these could be used. Public products and services are created by governments to serve its citizens. While private goods are created by individuals for private usage, that is how they named them. (Schiller 2011)

Public goods are products or services, that can be consumed by individuals without denying others access to it. Such products or services are produced in the public sector and other cannot be excluded from it. Examples of what could be considered as public goods are: national defense, public cars, public schools, public hospitals etc. (Investopedia n.d)

Let's make it more simple if person A buys a pizza he can exclude person B from using it. Person A has the entitlement to invite who he desires to share the pizza with, at the same time he has the right of excluding others. In this case, a non-excludable public good can be national defense, where nobody could exclude others from using it. If person A is safe in a country because of national defense so do, because it can not factor out the person B from using it. (Openstax n.d)

Whereas, if we consider national defence than everyone is included and if person A consumes national defence, this does not diminish the security of person B. This means when public good are non-rivalrous. (Openstax n.d)

Private goods are known to be all products and services when consumed by one individual could exclude others from using it. (Schiller 2011)

	Pure private goods	Excludable and non-rival
Excludable	Food Car House	Cable television Bridge Motorway
Non-excludable	Non-excludable and rival	Pure public goods
	Fish in the ocean Air	Lighthouse National defence
	Rival	Non-rival

Figure 2: Private and Public Goods explained (Economic Discussion 2017)

The table shows that these two categories of goods could be divided by the function that they have. This thesis will describe one from each group, for example, food is a pure private good and the owner of it could exclude others. Whereas a motorway can be considered a public good even though it could exclude others from using it. If there are too many cars on one highway, even that is a public good could exclude others from using it. But it is not a rival because it will not decrease others' usage later. When considered fish in the ocean, this is non-excludable by that it means nobody could exclude others from fishing. Because of fish being a scarce resource, if someone over-consumes it, the outcome could be that others will not have enough fish to eat. (Economics Discussion 2017)

The government decides if there is a need for more or less public goods based in markets demand and supply. But in general, markets habitually produce more private goods and less public goods. This theory is backed by economists who say that some public goods can turn consumers into free-riders. (Schiller,2010)

“ A free-rider is considered to be an individual who reaps direct benefits from someone else's purchase (consumption) of a public good” (p185-186), this is how Schiller defined it.

A free-rider is considered to be when the government decides to build a new park, some citizens who need it are ready to pay for, while others pretend that they do not want to pay for it, hoping that others will pay for it and they will use it for free. In this case of building a new park, if it was a private good the people who are not willing to participate in building it will not be allowed to use the park. But usually with public goods is harder to exclude others. Differences between public and private goods are the nature of the products and services not the producers of it.

(Schiller, 2010).

2.4 Externalities

Externalities are the circumstances when the production or use of the goods and services affects a third party, who may benefit or have extra costs from this economic activity. (OECD 1993)

Externalities are believed to derive from market failure, the causes of this are usually when goods and services price equilibrium is not reflecting the true value or costs of that product or service. These extra costs occur after the production or use of goods and services.

The best example for this is a factory that produces technology, they help people achieve more benefits or satisfaction, but at the same time, the factory pollutes the environment this is named as a negative externality. The positive externality would be education, where the education of one person could bring benefits for the society as well for the individual. (Investopedia n.d)

Why externalities are complicated and often hard to calculate?

The answer is because it is hard to quantify them. It is hard for economists to quantify the air pollution or the education of one person. The cost of air pollution is defined as a social cost. Social costs of an economic activity include also the external costs. The policymakers have different ways to get involved and tackle these issues that can come from negative externalities. Government intervenes in the market for the good of its citizens. The ways they do it are such as subsidies, permits, and licenses, through taxation and policies etc. (Helbling, IMF 2017)

In many ways that government uses to influence the markets, this research will focus on taxation, how the government uses taxes. Also in details, it will explain the types of taxes and how they are used to correct negative externalities that may occur in an economy.

2.5 Introduction to Taxation

As it was mentioned before, taxation is a result of government intervention in the markets, there are many causes why authorities prefer to tax suppliers or consumers of goods and services.

The fee requested by a country's government on personal income, business earnings, sale of goods and for other financial transactions or earnings is known as tax. The money obtained by authorities through these activities is budgeted and are used to fund public goods and other spendings of the government. (Financial Times n.d)

There are two main categories of taxes direct and indirect taxes and direct taxes. Direct taxes is known that the payment goes directly to authorities who imposed the tax. Types of taxes that are paid directly to the government are such as income tax, property tax, and stamp duty tax etc. The list of taxes that are paid directly to government can be different in different legislations.(Investors Guide n.d)

Indirect taxes are categorized as taxes that target manufacturing, sales or services. These type of taxes are firstly paid by a producer of goods or services, later to be applied in prices of the end users, by adding the percentage of the tax in price the actual payer is consumers.(Yahoo Finance 2014)

2.6 Characteristics of Taxes

Taxes have different characteristics from one another, they can be named in three categories: regressive, proportional or progressive. The differences are visible, by how the authorities collect them.

Regressive type of taxes is where the citizens or organizations with lower income pay a higher portion from their earnings, whereas the ones with higher income pay less of a portion from their earnings.(Jodi Beggs 2018)

A proportional tax is known as a flat tax, where citizens or organizations pay the same portion of their income, even though their returns may vary from lowest to highest. (Jodi Beggs 2018)

A progressive tax is the type of levy, where citizens or organizations pay the fraction based on their income level. In other words, individuals with lower income pay less and the ones with higher income pay more. (Jodi Beggs 2018)

2.7 Pigouvian Levy on Negative Externalities

The main purpose of taxes is to collect revenue for the state authorities so they can produce public goods and services. These are referred to as revenue taxes, with a tendency to raise capital for the government. Arthur Pigou introduced a tax different from the one to raise revenue, this levy has a mission to correct negative externalities. In an economy where production and consumption of goods or services have negative effects on society. (Economist (2017)

The Pigouvian tax is a corrective tax that aims to change the negative externalities in the markets. Pigouvian tax is aimed to fix the harm done to the environment by businesses activities, the motivation is to reduce the pollution.(OECD 1997)

For example, sugar production and consumption have side effects on both sides production and consumption. The production of sugar harms the environment more than most produced vegetables. Not only farming the sugar uses a tremendous amount of natural resources. Also, the process of production is known for pollution and use of different scarce resources that are needed for the society. Sugar is not sustainable for the environment and also affects negatively the health of consumers. This is an example of when a goods consumption has a negative externality. (Food Research UK 2015)

Additional to the environment the sugar consumption has also health consequences, one major problem is obesity and the second one is diabetes. This is the intention of the UK government to fix the failure by imposing a levy on sugary drinks, a similar tax to Pigouvian tax aiming to change the market behavior is introduced in Uk 2018. (Thornton 2018)

The next graph will show how this tax affects the supply curve when considered sugar tax and its social marginal cost (SMC) and private marginal costs (PMC):

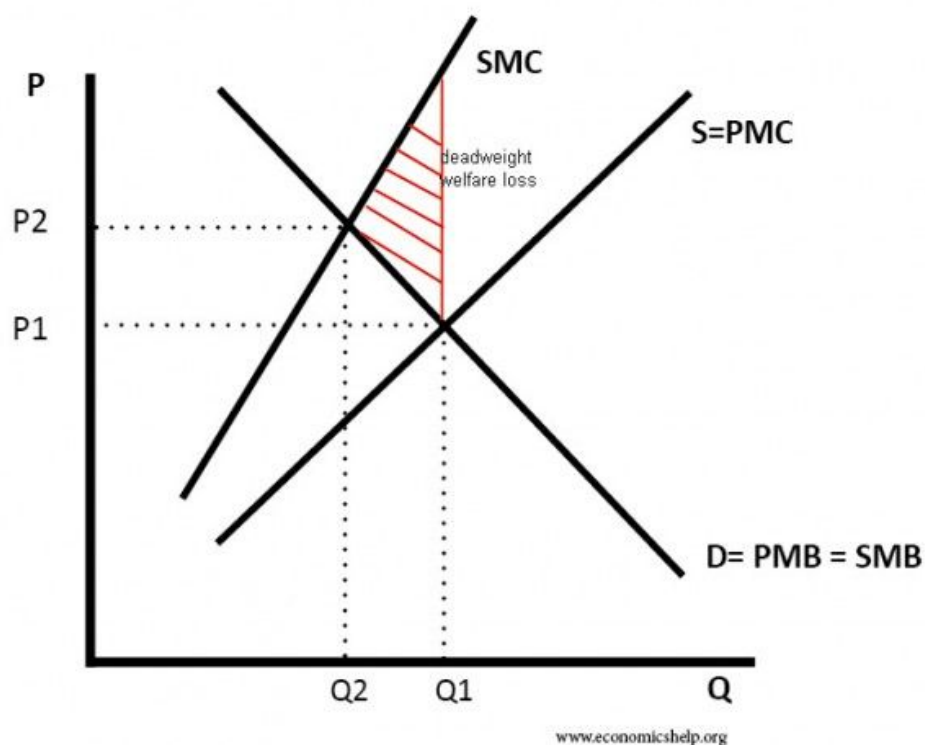


Figure 3: Tax on negative externality (Tejvan Pettinger 2017)

In this case, the graph is showing government trying to intervene in the behavior of consumers, by imposing a tax on sellers of sugary drinks. At Q_1 we have quantity produced to reach the free market demand with a price of P_1 . When the government tries to monetize the social costs, the

new price will be higher which in this case is P_2 . The social marginal costs (SMC) are the real costs of goods consumed, whereas private marginal costs (PMC) is the private costs without additional costs to society. These additional costs usually occur from consumption of a good, if sugar consumption has additional negative health or environmental consequences that are considered as a social cost. The government with a per unit tax wants to intervene in the quantity of consumed sugar, shifting the supply to the point of Q_2 (quantity) is believed to be the socially optimal quantity, where social costs are covered by the levy imposed to sugar. (Tejvan Pettinger 2017)

Because there will be a motive behind this tax to collect some revenue, despite that the main reason behind is to make the sugar consumption less attractive to consumers. (Tejvan Pettinger 2017)

The government in the UK is charging per grams of sugar used in drinks and foods to tax the negative externality. This is the same as charging per unit produced, this is the reason why the sugar tax is similar to Pigouvian levy. (Thornton 2018)

When a tax is introduced to influence consumers decisions, many economists argue that it should include the income spent on that good. If individuals have to choose between paying more or using less a good they tend to save their income for their needs. Many argue that this may legitimize the bad behavior of businesses, especially when it is hard to value the social costs of a negative externality. The Pigouvian levy is supposed to make the world a better place and raise awareness about negative externalities, but many argue that this does not work because of policymakers and politics. The tax may work when it is used correctly in goods that are easier to calculate social costs. Moreover, this tax is very practical and useful even in present times. (Economist (2017)

If the tax will decrease the quantity of supplied sugar than the government intervention will be considered as successful. In the next chapter is described the sugar tax in UK and what government aims with this levy policy.

3 Sugar Levy in UK and Impact Analysis

3.1 Sugar Tax Introduction

In this chapter, the reader will be able to understand how sugar tax works and the social cost of sugar consumption. The writer research on how this economic policy works in reality and what are the real needs that this levy should cover. It is worth mentioning that this thesis is analyzing if this tax has positive results for society, furthermore, how it is going to affect the participants in the economy.

The government as mentioned before has an important role in the economy, these actions that the authorities take in an economy are named as government intervention in the economy. Moreover, this role includes creating a fair economy and transparency. The authorities are there to regulate the markets and create a trustworthy market competition where nobody abuses with prices or power. Moreover, the state and its laws have also a role to protect the consumer or the environment any negative outcome. These could be some of the reasons why the government intervenes in a market. The intervention is needed to provide also more trust and fairness between suppliers (businesses) and consumers. (The Economic Times 2017)

World Health Organization considers national health policies, strategies, and plans as an important aspect of the economy because it is a process that needs support from the government to achieve better welfare in general. This process consists of objectives such as needs for healthier citizens, respond to the health crisis and maintain the relationship between health and other sectors. Policies or action plans are introduced by agencies of state or individuals, to tackle health issues and they always have an objective to improve the effectiveness. (World Health Organization 2012)

The sugar tax in the UK is focused on reducing the consumption of drinks that contain high amounts of sugar. The reasoning to support this tax is mainly due to health risks that occur after use of sugar. These health risks have a high social cost to the society and government in UK after gathering informations from different organizations, came to a conclusion that they need to intervene to change the outcome. Obesity is thought to be the number one reason behind so many diseases, this tax is expected to encourage citizens to live healthier and consume less sugary drinks. The obesity of adults and children in UK was a problem for many years. Even organizations such as Public Health England (PHE) asked to food and drink producers that they reduce the amount of sugar used by 20% in the end of 2020. But in recent research made by them they realized that only 2% of the 20% objective is achieved. This made a huge impact on raise for the support of using taxation as a solution. (Thornton 2018)

Because of obesity and high consumption of sugar, another health threatening outcome is type two diabetes. This type of sickness is related to a non-healthy lifestyle and over-consumption of daily needs for sweets and sugar. Based on World Health Organization diabetes is the sixth highest cause of deaths and health complications in 2015. All these are a result of an unhealthy lifestyle where people every day have less time for activities and fast food also is easier to have access. (Gov. UK n.d)

Over 3.7 million people are diagnosed with obesity in UK and is believed there are around 4.6 million in total who live with this diseases. These statistics get more frightening knowing that 12.6 million citizens in UK are at high risk for diabetes. Estimated 59% of woman and 68% of men are

considered to be obese or with diabetes and one of major causes for these health complications is sugar.(Diabetes UK Org 2018)

The levy introduced in the UK will affect the producers of soft drinks industry based on the amount of sugar they use for their end product. The tax will be divided into two categories based on the amount of sugar. The first category is for drinks that contain more than 5g of sugar per 100ml. The second category which will pay a higher tax is for drinks with over 8g of sugar per 100ml. (The Sun 2018)

The levy on sugary drinks in the UK, will be applied directly to manufacturers and it is in their decision to make if they want to charge the end consumers. The first category of drinks from 5g to 8g per 100ml will have to pay 18p per liter(pennies). Whilst, the second category of more than 8g per 100ml will pay 24p per liter. Additionally, fresh fruit juices will not be part of this levy, if they do not contain additional sugar. Part of this group will be also drinks that have high amounts of milk.(BBC 2018)

But there is one question. Why is the government in the United Kingdom focused on the soft drinks industry?

Based on the reports from Uk government, the main reason is the childhood obesity and its relation with fizzy drinks. In this research done by government, it is mentioned around 30 % of children age 2 to 15 are identified as obese or overweight. So the authorities decided to make a research on the origin of the problem. The causes of obesity at this young age is discovered to originate from soft drinks. The teenage citizens of Uk are the largest proportion of consumers in the soft drinks industry.(Gov UK 2017)

The average consumer of sugary drinks as presented in this graph are the age group of under 25:

Percentage of calories which come from free sugars at each age

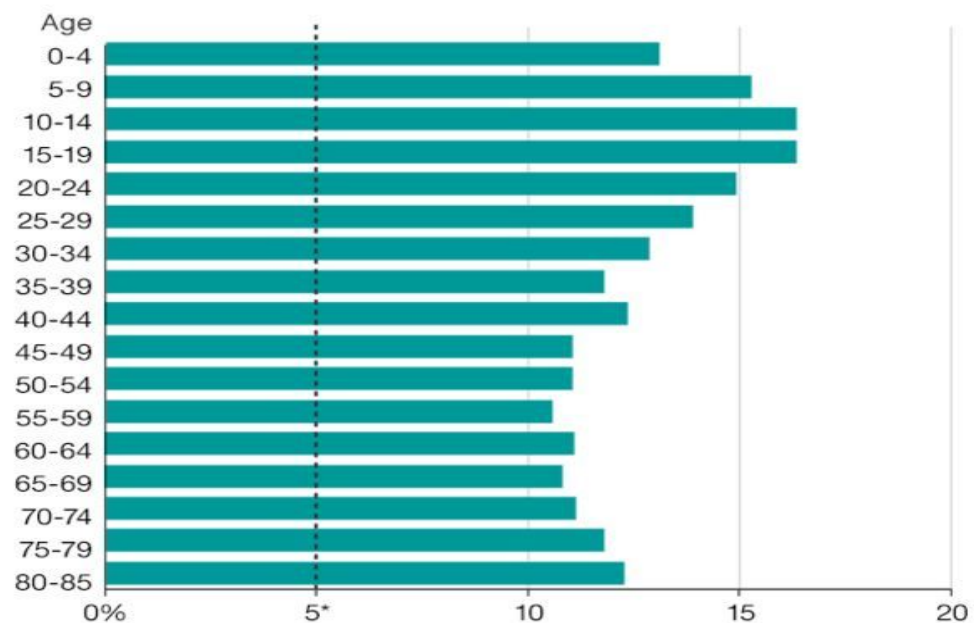


Figure 4: National diet and nutrition survey 2008-2014 (BBC 2018)

Based on these researches government came to an action plan on how to correct this problem. The idea is not only to impose a tax but how the income from this levy could be reused in society. The objective of this taxation policy will be to correct the negative externalities in this case obesity and other diseases related to it. This is considered as a threat to the health young population in the UK. After this research was finalized many health experts asked the government to interfere in this situation. And the authorities in the UK proposed an action plan against childhood obesity. This action plan is to reduce the sugar used in food and drinks. Furthermore, this action plan suggests that there should be more sports activities and healthier lifestyle for children. The schools should provide more healthy food and reduce the sugar consumption is suggested by experts who took part in drafting this action plan. (Gov UK 2017)

The tax was thought at first to collect around £520 million when it was planned in 2016. However, this number decreased to £240 million. This is not the numbers that the government predicted, because producers reduced the amount of sugar used in their drinks. The government in UK will use the income from the levy to fund more sports activities in schools and provide the help needed against obesity in childhood. The Department for Education in the United Kingdom reports that the investments in sports activities for primary schools will increase to £320 million. This tax is returned to society as an investment in public goods, as a way to fix the negative externality. In this case, is considered to be obesity and other health implications that may be related to it. The government is aware that there is action needed to fix this is an issue.

The National Health Service (NHS) announced that costs related to obesity in the UK are estimated to be around £6 billion. (Tom Walker 2018)

The Sugar tax is considered to be as a lifestyle levy, it is the way of life of many UK citizens. Obesity is considered to be a lifestyle because it includes from the way individuals eat and do shopping, to other activities they do daily. All the unhealthy products and drinks that contain large quantities of added sugar are cheaper. As Dr. Rachel Nugent mentions that levy in unhealthy food should be used carefully, it is important to tax something that threatens the health of citizens. At the same time it is important to think about the one who lives in poverty. This kind of taxes does not affect the citizens with higher earnings, but it will influence the decisions of the ones with lower earnings. (The Independent 2018)

The aim of this levy is not the consumer, the government has one main objective and that is to reduce consumption of sugar added to drinks in general. The media named it as "sugar tax" actually this is a tax on soft drinks industry mainly imposed on producers. The government decided on the soft drinks for the main cause to reduce the amount of sugar used. In one cola can of 330ml contains nine teaspoons sugar, this is enough for children to surpass the amount of sugar needed daily. A kid until 5 years old should not consume more than 19 g of sugar in a day when compared with a can of fizzy drink may have up to 35 g of added sugar. Which is already three times higher the amount recommended by health experts. This is why the fizzy drinks that have high portions of added sugar are used as justification for the obesity in childhood. For the UK authorities, obesity is a major problem and is considered to cost a lot to society. By introducing this levy policy government set an objective to reduce the sugar consumption by 20%. (Treasury UK 2016)

The obesity became like an epidemic problem and considering that major consumers of these drinks filled with sugar are the children. By increasing investments in sports activities, this will be a way to correct the lifestyle of young citizens. This levy aims to also raise awareness to other food and drinks producers, expecting them to play a role in this transition to manufacture products with less sugar. This is how state authorities believe this action plan against obesity and sugar will function. (Treasury UK 2016)

3.2 Sugar Tax Impact on Industry

As this levy is aimed at soft drinks producers, they did not want that the end consumer pays more. Most of the companies decided to react to these changes, by changing the recipe so they will not have to increase the prices a lot. All this is done because of the levy imposed on sugary

drinks in the UK. This reaction has resulted with reduction of sugar used by manufacturers, it is expected around 50 % of producers to participate in this reduction. This is equal to 45 million kg of sugar will, that will be reduced every year from the markets. (Treasury 2018)

Some of the brands that decided to reduce the sugar in order to not make end consumer pay. As the tax will be like a tax per unit manufactured, this payment could easily be transferred to consumers. But the industry decided to diminish the sugar content in their products. The producers say that by decreasing the amount of sugar from 8g to 5g per 100ml, this will increase the price less than if they keep the old recipe. (Metro 2018)

This is how some of the largest brands decided to reacted to levy:

All the different Fanta tastes will have less 33% sugar, this will decrease the amount of sugar from 6.9g per 100 ml to 4.6g. (The Sun 2018)

Sprite decided to reduce sugar from 6.6 to 3.3g, by this they avoid increasing the price. (The Sun 2018)

Old Jamaica ginger beer has decreased the sugar in their recipe from 15.2g per 100ml to 4.9g. (The Sun 2018)

Irn Bru traditional consumers are not satisfied with the change, the company decided to reduce sugar content from 10.3g to 4.7g per 100ml. This is a famous Scottish brand and consumers are asking for their classic taste.(The Guardian 2018)

The two brands that decided to keep their classic recipes are Coca-Cola and Pepsi, they did not change the amount of sugar. Even that some media journals mentioned that they will adapt to these changes. Because both of the brands have lighter and zero sugar products, they do not see as necessary to lower the amount of sugar in the original product. (The Sun 2018) But they promised to change the bottles from 1.75 liters to a smaller size, as the end result they will cost only 20 p more in markets. So consumers will pay more money, for a reduced amount of coke in bottle size. (Independent 2018)

However, this means that not all companies can afford to change their taste that easy. The consumers are used to live with this lifestyle and they are aware of sugar. Most of them complaining in social media about these changes, they say that some drinks have a bad taste without sugar. Producers of soft drinks should act careful to changes in markets, but also think about reducing the sugar use is a plan imposed by authorities. (The Guardian 2018)

Because of these changes in the sugar amount, most sugary drinks will not be taxed. The industry reacted simultaneously with these changes with reducing sugar content. This is why Government will collect nearly

less than the half of £520 million, as it was first promised. So as the outcome of this they will have a smaller budget to fight the obesity, also to improve the sports activities for children in the UK.(Telegraph 2018)

The industry experts say that is hard to replace these original products with new ones with less sugar. Even that they are aware of the national policy of reducing sugar consumption, the consumers are demanding the same product. The industry does not accept this pressure for change, they are trying to find solutions and cooperating in this policy. Cutting the 20% of sugar consumed in the whole UK is hard to be achieved, without changing the lifestyle of people. Experts believe that people need to live more healthy and they will raise awareness about it through campaigns and education at school. The 20% cut is aimed to be achieved by 2020. This is putting pressure in the industry a lot and they can not convince the consumer to use more sugar-free products.(The Guardian 2018)

3.3 Soft Drinks Market in UK

The soft drink levy introduced on April 6th, 2018, will not only affect consumers, also it may affect the whole sugar industry. Since for producing fizzy drinks is used high amounts of sugar, the decrease in added sugar means less demand for sugar in the market. The question is why sugar tax in the UK started with drinks, the response is because the soft drinks producers are easier to be identified as the major users of sugar. And as it is explained that the majority of consumers are teenagers. The first result of this levy is believed to be a decrease in consumption among young people.(The Guardian 2018)

The industry of beverages leads in market value in a report by state authorities. The UK food and drinks manufacturing industry generates a profit around £28.9 billion. (Gov UK Food stats 2017) The industries are listed by profit in gross value added (in billions) :

Beverages £6.7 bn.

Other food products: £6.0 bn.

Meat and meat products: £4.4 bn.

Bakery: £4.0 bn.

Dairy products: £2.1 bn.

Fruits and vegetables: £1.8 bn.

Prepared animal feed: £1.8 bn.

Grain and starch products: £.13 bn.

Fish and other seafood products: £0.7 bn.

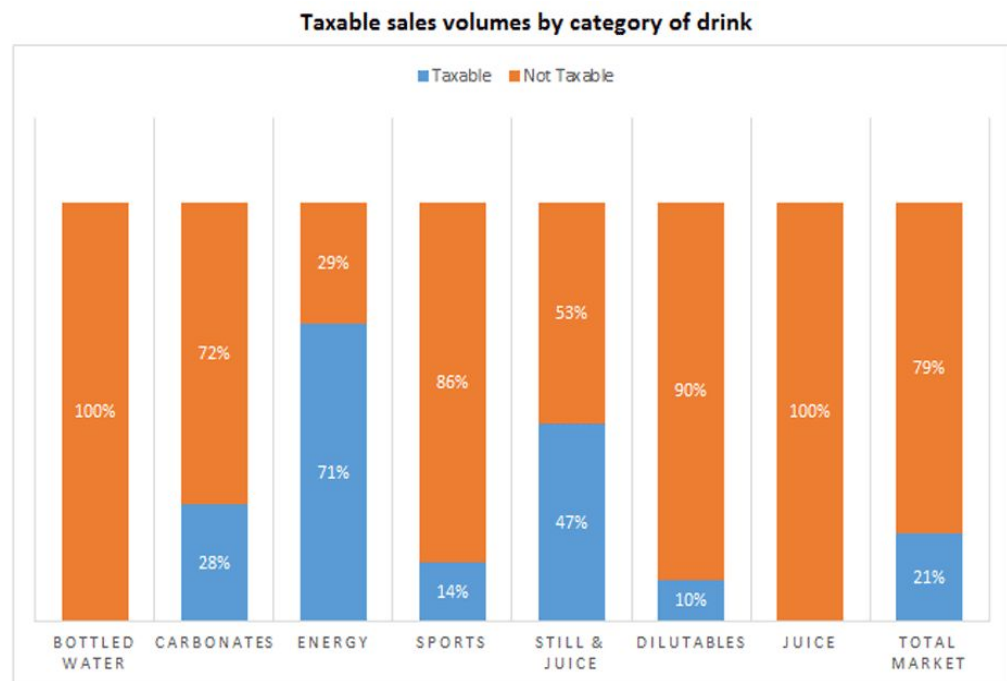
Oils and fats: £0.1 bn.

(Gov UK Food stats 2017)

The sugary drinks industry is the largest by market share in this national statistics, with a profit of around £6.7 billion it is the largest industry in

food manufacturing. This industry employs more than 115,000 UK citizens and around 6,600 businesses operating. (Gov UK Food stats 2017) If we consider also the supply chain and retailers the total contribution to the UK's GDP is £11 billion, as well is worth to mention that the British soft drink industry in total creates 340,000 jobs. (British Soft Drinks Industry n.d)

How this tax will affect the different producers will be explained in the next chart:



(Source: Oxford Economics, Kantar World Panel)

Figure 5: Oxford Economics 2016 (Warner 2018)

This research done by Oxford Economics shows how different type of drink producers will be taxed, the percentage of added tax is based on drinks sugar content. The type of producers that share higher amount of taxable sales are: energy drinks with 71% tax, 47% for still and juice and the third category will be carbonated drinks with 28%. However in total the tax will influence around 21% of total sales. (Joshua Warner 2018)

Exports are also imposed to sugar tax as well if you produce outside of the UK you have to pay the tax based on domestic market pricing. This measure will not allow competition from foreign market to damage the domestic producers(Gov UK 2018)

From the basic economic theory is known that higher prices decrease the demand because buyers react to changes in prices. If the prices are lower they buy more, if the price is higher there is less demand. When taxation

is imposed on a certain product this will lead consumers to look for substitute products, in cases when they can not afford to buy the product with the new price. (Behavioural Insights 2018)

Substitute products is defined in economics terms when product X and Y are similar. In this case the price of Y product increases, consumers will have more demand for product X with lower price . When a product's functionality is similar to another in the market, than consumer can have a second option with decreased price. These products with lower price and similar function, in other words is known as substitute goods or services.(Investopedia n.d)

In this case, consumers may buy more similar products that contain less sugar. From the economic point of view, consumers react usually to increases in prices with a change of behavior. Some of them do not buy the product at all, while other buy similar products at lower prices. The aim of this levy is to change how consumers behave, in this example is expected to reduce sugar consumption in general. If this sugar can not lower sugar usage, another theory is that it may create awareness at consumers that there are healthier options. For example, a buyer that goes to a store he can see that Cola zero is cheaper than classic Cola. So the buyer decides that for him is better to buy the product without sugar and it will cost him less. (Behavioural Insights 2018)

Since the majority of the soft drink users are teenagers, this tax will be paid mainly by them. The government predicts to see a reduction of sugar use, meanwhile, the producers are trying to minimize the amount of sugar in soft drinks. This might have positive results in decreasing sugar intake of children in the UK, the authorities expect this to work as part of the childhood obesity action plan. (Independent 2016)

As for the conclusion of the chapter, the reader can see how this tax will be imposed both on demand and supply side. It will affect producers and consumers, there are possibilities that buyers will still purchase these products even after taxation. But based on the theory this tax should affect the market as it was mentioned previously.

3.4 Government Presumptions of Sugar Levy

The political parties agreed on this case even that some are sceptic about the future if sugar tax is going to work. The tax will be aimed to fix the obesity in childhood, even if this tax does not collect the estimated amount government will support the action plan. The authorities say that schools play an important role in this process and that needs their support to change the obesity levels in the younger generations. Education and sports activities for living healthier will be provided to fight obesity, this was planned to be paid by income from the levy on sugary drinks. (Independent 2016)

To understand the reason why the government announced that they will cover the school activities, one explanation is that they did not expect that industry will react to the tax. Another one is the policy that they want to achieve which is to reduce sugar as the reason for childhood obesity. (Gov UK 2017)

This Levy was announced as a very important but later even authorities had to admit that income will be lower than it was presumed. Until 2020, the government expected to collect around £1 billion. But the producers reacted to market and decreased the amount of added sugar in drinks. (Financial Times 2017) It was estimated that the tax will raise around £500 million per year but lately the UK authorities announced that the income from levy will be around £357 million. In the latest report published by the government it was estimated that this tax will collect around £240 million. (Drinks Insight Network 2018)

In 2014 government in UK invested £150 million to improve the school sports activities. (Education Department UK 2014) This was established that to continue on yearly basis, but now with the new tax government plans to invest £415 million in schools sports and meals. It is important to mention that the government will add the amount even if the sugar tax will not reach the desired amount. (Telegraph 2017)

The government achieved the aims to reduce sugar consumption, only after the soft drinks producers reduced the amount of sugar added to drinks. The levy on sugar achieved the objective to reduce sugar content, on the other hand financially it did not meet the market needs that the UK authorities predicted. Those market needs are social costs created by negative externalities after sugar consumption. The next chapter will describe these costs to society in details.

3.3 Social Costs of Sugar Consumption

Sugar consumption affects our life on a daily basis, individuals as part of society might have some additional costs that may occur later in life, all of them caused by sugar consumed today. These costs can take a large amount of money from the national budget. National Health Service (NHS) reported in the years 2014 and 2015, the obesity and other related diseases such as type 2 diabetes cost to UK citizens around £6.1 billion. If the numbers of cases continue to increase in the year 2050 is projected to raise up to £9.7 billion. This is the costs to the citizens who are considered as obese or with other obesity-related illness. (Gov UK 2017)

The social cost to the whole society is estimated to be around £27 billion and forecasted cost in 2050 is £49.9 billions. Obesity is a hazard to health

and may create many other diseases that may be life-threatening. Obesity is not an outcome only from the immune system it has a lot to do with the lifestyle citizens live. How people behave and what kind of food they eat may result in obesity so it is like a process. If people are served with healthier options, obesity may decrease in the future.(Gov UK 2017)

UK is one of the countries that consumes around 2.72 million tonnes of sugar per year and 75 % of it goes to the foods and drinks industry. (NHS 2016)

There is no scientific proof that taxation helps to lower the consumption of sugar. The rise of sugar consumption is not something new, if we consider historical data also it shows that sugar consumption has been increasing for decades. The negative consequences of soft drinks consumption are obesity, type two diabetes, and other related illnesses. The health of citizens is important for the government because they need to be healthy to participate in the economy as workers or buyers. There are examples from developing countries life expectancy is lower, all this due to a poor diet they needed to visit doctors more. For instance, China citizens without health insurance are considered as bankrupt if they get sick. Even the people who have insurance, around 52% of them have financial difficulty when they need health services. That is the reason why government intervened in manufacturers with the levy, the immediate impact was reducing the added sugar in soft drinks.(Independent 2018)

With nearly 63% of mature persons being obese or overweight the government decided to change this unhealthy lifestyle of UK citizens. To change the behaviour or collect taxes due to high social costs. This costs to UK's economy around £6.1 billions NHS report says, also the authorities want to activate more citizens under 25 years old by investing in school more activities. Raise awareness of food and drinks industry to reduce sugar content, in the same time help citizens to have easier access to healthy food. Because of current lifestyle, people are around 20% less active than in 1960s and until 2030 number could raise to 30%.(Gov UK 2017)

Since the drinks industry reacted with lowering sugar content, the government in one hand achieved the objective that they had, in the other hand they did not collect enough money as they projected before. This tax some economists can say it is working since companies will reduce the amount but it will not cover the social costs. This will affect the number of investments that they wanted to do in schools. It looks like a good start for the government, but for having a better view of how this levy is functioning we need to wait few years to get better results. The UK authorities are trying to decrease these social costs by providing more sports activities and educating future citizens to live healthier. (Bloomberg 2018)

4 Context Analysis

4.1 Sugar Tax in Different Countries

From the recent scientific research on sugar and how it is affecting our life, sugar taxes gained popularity among legislators. Sugar taxes have so many arguments for and against it, it is a very debatable topic who is right and wrong. Nevertheless, one thing is known that sugar consumption creates obesity. Because of obesity becoming epidemic, governments of different countries decided to find a solution by introducing a levy in the food and drinks industry. World Health Organization (WHO) invited countries to intervene in this situation before is too late. Based on the report of WHO from research done by them believes that any tax over 20% may reduce the sugar consumption. This will help them reduce health care costs and promote a more healthy lifestyle.(The Guardian 2016)

Countries that have a sugar levy are France, Mexico, Chile, Finland, the UK, South Africa, Portugal, Saudi Arabia and so many others. This research will focus on these countries and give brief details of taxes and their functions.(Beverage Daily 2017)

France has introduced a tax in 2013 which was around €7.5 per 100 liters, later they decided that this is not efficient enough and it will change in the future. The next levy that will be introduced will tax drinks from 1g per 100ml and the tax will value around €20 per 100 liters.(Beverage Daily 2017)

Mexico introduced a tax that costs to consumers 1 peso per liter. This tax had a success in Mexico by reducing 5.5% of sugary drinks sales and is projected after 2017 it will result in a 9.7% decline in sales. It is still early to predict if the new tax will work.(Beverage Daily 2017)

One of the taxes that is considered successful is imposed in Chile. The levy was introduced to producers with more than 6.25g per 100ml, first, it was 13% latter that increased to 18%. Moreover, for drinks with less than 6.25g of sugar per 100ml, it was reduced from 13% to 10%. Even that the levy is charging less than in other countries in recent studies from New York University shows that it decreased 21% in total monthly sales of sugary drinks.(Science Daily 2018)

South Africa has decided to tax their soft drinks producers, the levy introduced there is different from other countries because is fixed. The first 4g per 100ml is not taxed, whilst drinks produced with more than 4g will pay 2.1 cents per gram of sugar used. Another significant difference is

that micro-producers, who use less than 500 kg of sugar content will be free from tax.(Times South Africa 2017)

Portugal is one of the countries that joined the fight against obesity, with imposing a tax that raised the retail prices around 25%. Soft drinks with less than 80g per litre will pay 15 cents per bottle and the ones that have more than 80g per litre will pay 30 cents per bottle. By introducing this tax the government plans to raise around €80 million in first year and they did raise €46 in first six months. (ESM magazine 2017)

Saudi Arabia is the country with strict policies on goods like tobacco and soft drinks. With the government trying to achieve more than \$2.1 billion in revenue from the tax annually.(Arab News Reuters 2017)

Saudi Arabia is known for high tax in energy drinks and tobacco, a levy that includes all 100% of producers. The levy on added sugar and carbonated drinks is 50% and might change in some regions but they have a fix 5% value added (Beverage Daily 2017) The government of other six countries who are part of the Gulf cooperation council decided to implement the same taxation system in their own countries in near future. (Arab News Reuters 2017)

Is understandable that the aim of all these taxes is to reduce sugar intake and raise revenue for investments, is an incentive to change the health of citizens and diminished e costs of national healthcare services. Maybe not all these models will work, but some of them are considered very effective in either reducing sugar content or lower the consumption.

4.2 Sugar Tax in the UK Compared to Finland

Finland was the first European Union country to introduce a levy in sugar, same case as in UK the incentive was to raise awareness about obesity. This tax is supposed to replace the sugar and ice cream tax that was before in Finland. The authorities were forced to do so due to warnings from European Commission, they said that Finland is favouring their domestic producers and taxing the foreign imports.(New Europe 2016)

Finland's sugar tax had to be removed due to pressure from EU Commission, actually it was one of the taxes that was aimed to reduce sugar intake. Local authorities believed that this tax will raise around €147 million from soft drinks in first year. The levy introduced was not only for soft drinks but also for sweets, ice cream chocolate and other products containing cocoa. (Yle 2015) The amount was €0.95 per kg of sugar content, which was considered to be one of the highest taxes imposed in sugar. (Taxation and Customs Union n.d)

The tax was excluding small and medium producers , this was the reason

why European Commission decided that this tax favouring the domestic producers. The authorities decided to remove the tax in 2017, but government projected another tax to be introduced soon. The levy on soft drinks and sweets might still remain the same as government is not forcing producers to change them. The government in Helsinki reported that soft drinks will be taxed with the same amount. There was no significant difference in consumption, so government will try to educate the citizens to reduce sugar consumption. (Yle 2015)

If we compare this with the UK we can see that this tax was higher than the one in the UK, moreover, it did not affect that much on soft drinks consumption neither the amount of added sugar in drinks. The only affected part of society is considered to be the lower income population, as national media Yle reports that only lower income families are reducing the number of products with sugar content. (Yle 2015)

Is not easy to compare two different countries with two different drinks and food culture, but we are comparing only how the taxes affected the society and by the collected revenue. The revenue from the levy of Finland is higher but it did not affect that much the consumption. While in the UK from the first moment of introduction affected the producers and they decided to reduce the sugar content in their drinks.

The government in Finland wants to continue to raise money from sugary drinks and they believe that is working well, but in the UK is a different story where the government gave a chance for companies to reduce the sugar so they do not pay additional costs. In Finland, small and medium producers are not included in this levy but other producers are. Whereas in the UK anyone who is not using sugar in their products could be exempt from the tax.

Is hard to argue which one is more efficient since the UK tax just got introduced and we can only assume how it will affect consumers. From the first outcomes, it seems like the tax in the UK is working, if the aim of government was only to reduce the sugar as calories. The tax in Finland failed to reduce the sugar content, this may lead to government introducing a new tax as it was reported in news.

5 Conclusion and Discussion

This research paper's aim was to explain taxation in theory and how it is implemented in practice. How a tax is used to reduce a negative externality in a country's economy is explained in the theory. The theory is based on books, journals, and other national statistics and media outlets.

When there is a negative externality that will create social costs, one way of reducing the social costs or the negative outcome is government intervention.

State authorities have the eager to intervene when the markets cannot correct the failure by itself. Is this the best way of solving these obstacles in the economy is debatable, but when the case is sugar consumption and the externality that may occur, in this case, is obesity there is not much left to do. Considering that the obesity is becoming an issue that is growing so fast, the government decided to stop this health crisis and intervene.

Since the government intervened with a tax similar to the Pigovian levy to fix the negative externalities, this research analyzed and gathered data on what could change after the tax. The outcome of this levy was a reduction of sugar used by manufacturers in the UK so they will not be charged by tax authorities. The author considers this tax similar to Pigovian levy because it is imposed directly to manufacturers. Even that producers could make the buyers pay in this case when authorities introduced the tax it was meant to be aimed at producers.

The society will not pay a lot more as explained above but they will consume less sugar, in our case was not the best reaction because United Kingdom's government wanted to raise money for more sports activities in schools in order to reduce childhood obesity rate.

This gives an answer to the question meeting the market needs because the government did not collect enough money to cover the social costs of negative externalities.

This levy did not meet the needs of the market, as it was supposed to raise around £520 million now that amount is reduced to £240 million. But authorities planned to invest around £320 million in schools and since they publicly reported that the other £80 million will come from UK budget.

When it comes to the second question if this tax should be introduced to EU?

The author believes that EU needs a tax like this that would raise revenue for sports activities and raise awareness on health issues. But it should be introduced at Union level so there will not be disadvantages for other countries. Because of what happened in Finland, where the EU Commission complained about the tax not being fair to foreign companies. The recommendation would be that EU legislators should introduce a tax similar to this in the Union but it should be also equated to living standards of countries.

Lastly, the taxation on negative externalities works when the goods are tangible or used for the daily needs of consumers. Is easier to recognize the changes in the market compared to other levies in other industries. We have similar cases where the sugar levy is working, as for the beginning this tax is promising and had an immediate effect to sugary drinks industry. This is not a tax directly to consumers as they will pay more when it comes to health services, is a levy on a lifestyle that might reduce the healthcare costs of society.

It is recommended that this research to be continued in the future when there is more data available. The further research could be on how this tax affects consumers behavior and how the soft drinks industry is trying to avoid this levy by adapting their production line.

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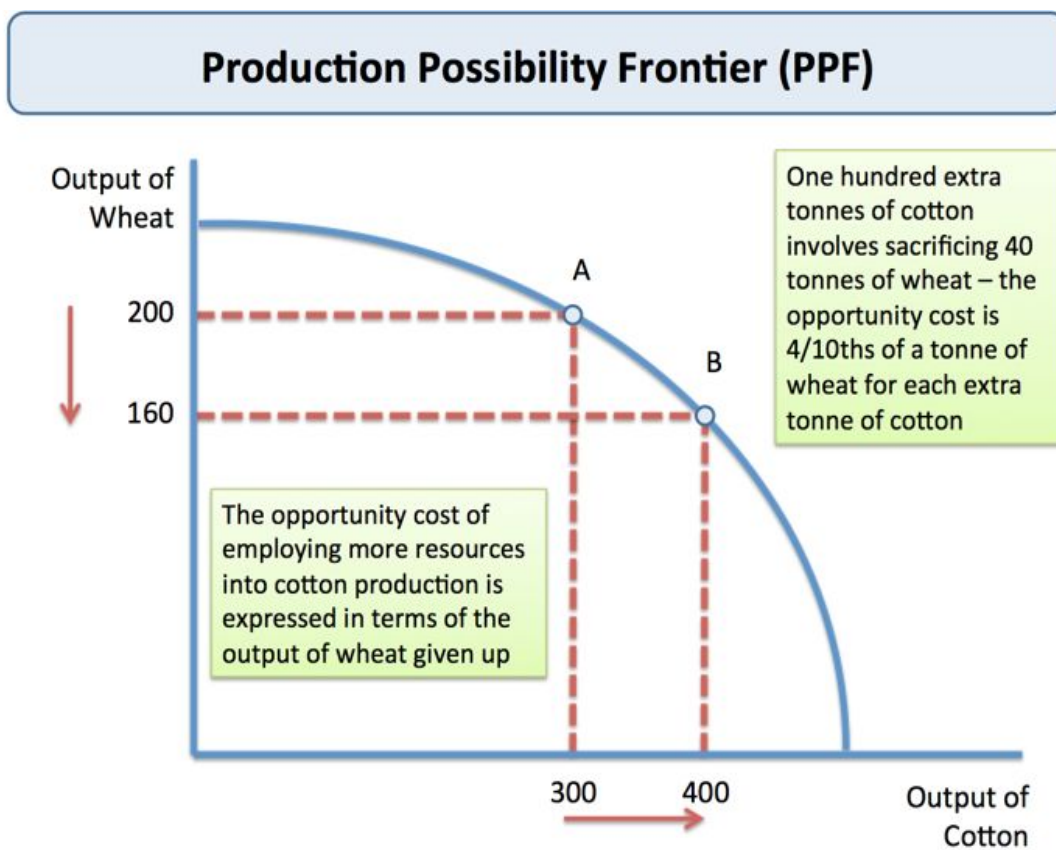
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APPENDIX HEADING

Appendix 1 source:

<https://www.tutor2u.net/economics/reference/production-possibility-frontier>



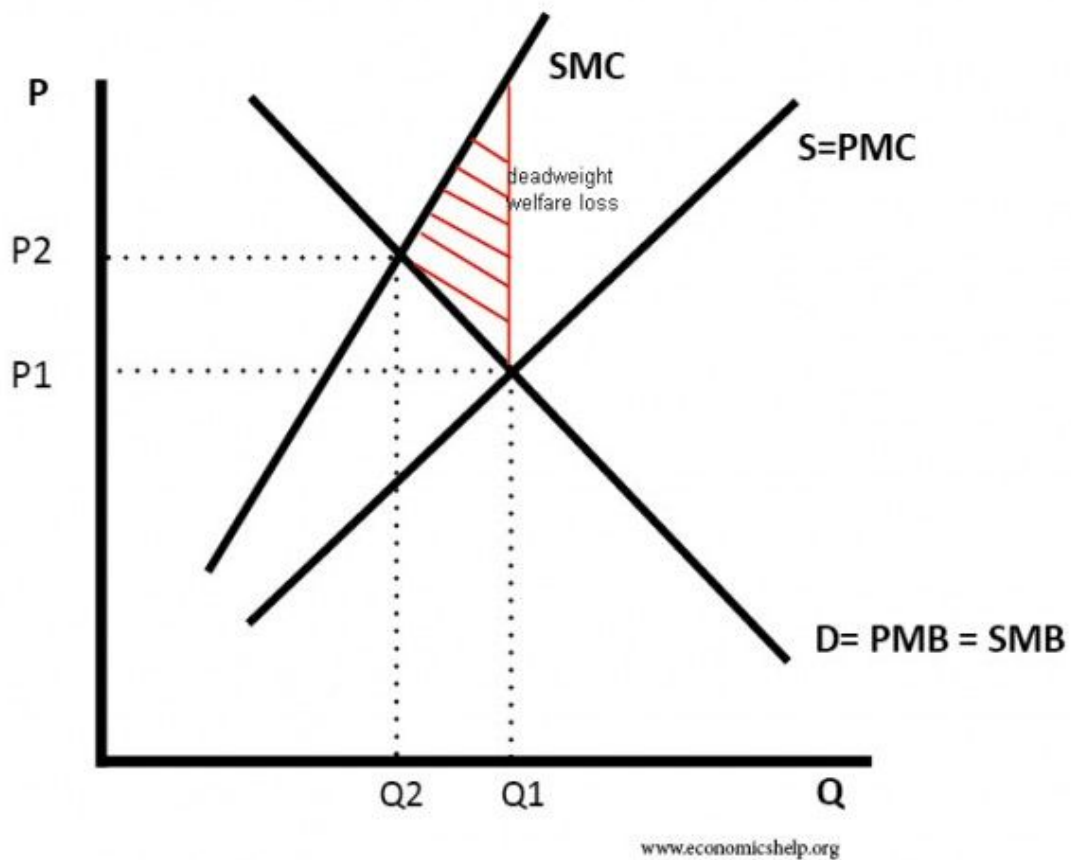
Appendix 2 source:

<http://www.economicdiscussion.net/goods/public-good-and-private-good-difference-economics/26182>

	Pure private goods	Excludable and non-rival
Excludable	Food Car House	Cable television Bridge Motorway
Non-excludable	Non-excludable and rival	Pure public goods
	Fish in the ocean Air	Lighthouse National defence
	Rival	Non-rival

Appendix 3 source:

<https://www.economicshelp.org/blog/14884/economics/sugar-tax-debate/>

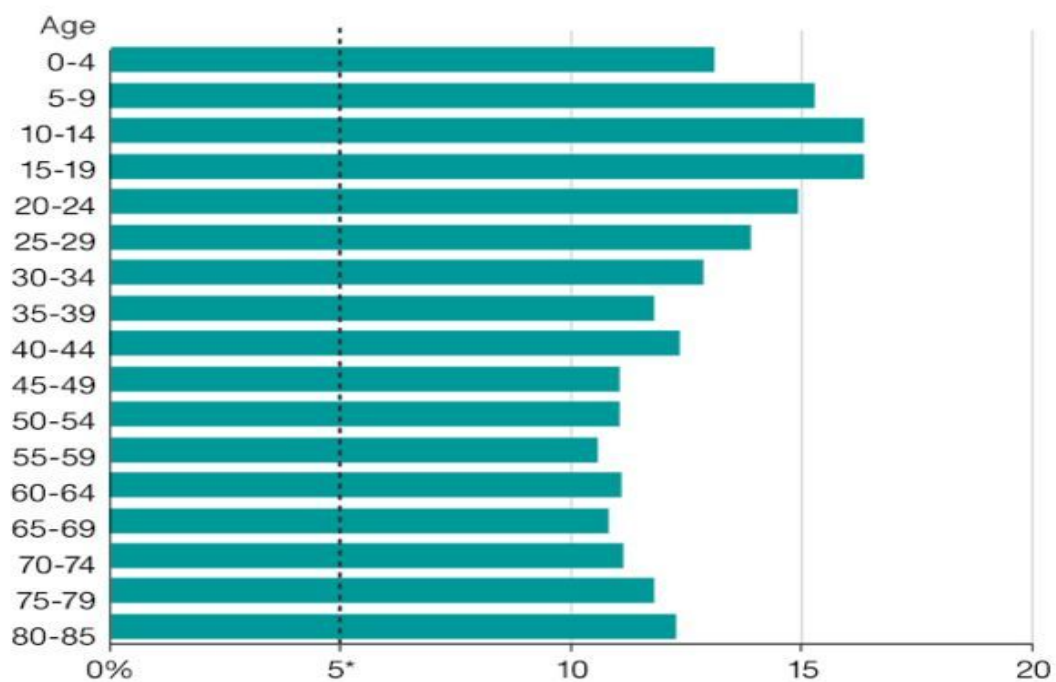


Appendix 4 source:

<https://www.bbc.com/news/health-43659124>

The average teenager consumes three times more sugar than recommended, as a share of total calories

Percentage of calories which come from free sugars at each age



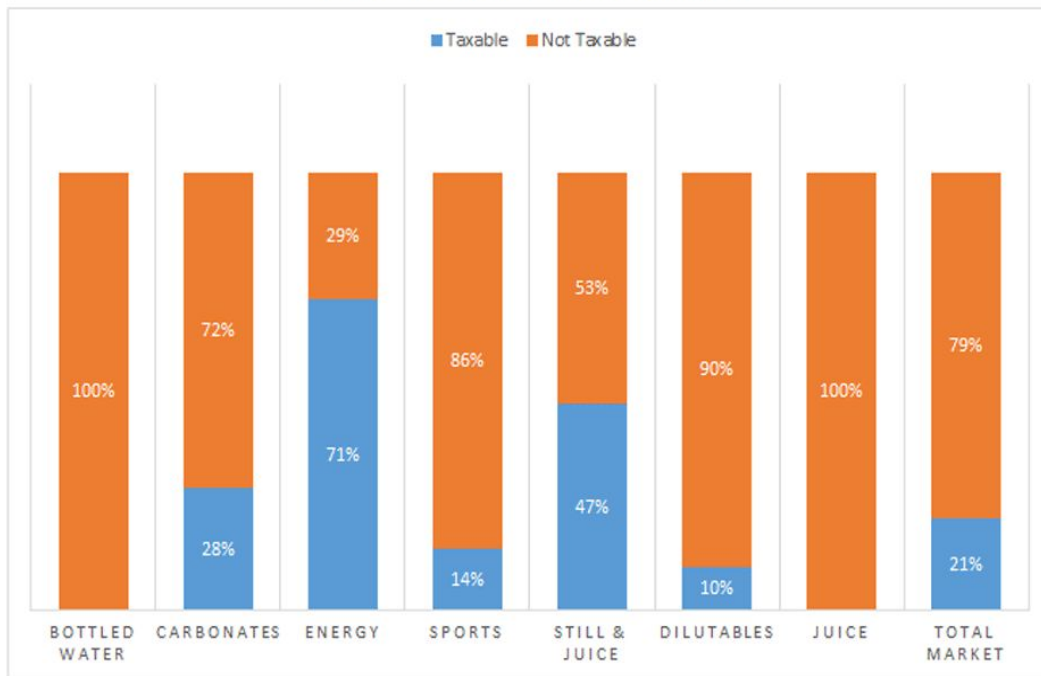
*Note: It is recommended that we consume no more than 5% of our calories from free sugars

Source: National Diet and Nutrition Survey, 2008-2014

BBC

Appendix 5 source:

<https://www.ig.com/uk/commodities-news/the-uk-soft-drinks-levy--whats-the-impact-of-the-2018-sugar-tax--42387-180226#lb-chart1>

Taxable sales volumes by category of drink

(Source: Oxford Economics, Kantar World Panel)