

**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Economics**



**Master's Thesis**

**The Analysis of Czech Beer Export to Germany**

**Aneta Čeplová**

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# CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

## DIPLOMA THESIS ASSIGNMENT

Bc. Aneta Čeplová

Economics and Management

Thesis title

**The Analysis of Czech Beer Export to Germany**

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### **Objectives of thesis**

The aim of the diploma thesis is to analyze the beer exports development from the Czech Republic to Germany. Secondly, assessing the contribution of beer exports to the Czech Economy. Finally, to find out the main factors which determine the export of beer. The analysis on trade in beer between the Czech Republic and Germany will be conducted through econometric model with observed period for 2003-2022.

### **Methodology**

This diploma thesis consists of two parts, theoretical and practical. The first part will describe the basic concepts related to the topic with emphasis on two key parts: the Foreign Trade and the beer commodity. The second part will use collection of secondary data while using selected statistical and econometric methods for the analysis. The findings will then be compared and evaluated while using statistical tools, including:

Correlation, similarities, probabilities to pinpoint possible anomalies, drastic changes in the data of the time series and utilization of trends, coefficient of determination, and OLS. An econometric model will be constructed for selected observed period 2003-2022.

**The proposed extent of the thesis**

50- 60 pages

**Keywords**

Foreign trade, Czech Republic, Export, Beer export, Germany

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**Recommended information sources**

- ČIDEROVÁ, T. 2022. Analysis of demand for on-trade and off-trade alcoholic beverages in the Czech Republic. Charles University.
- GROSOVÁ, S., MAŠÁR, M., KUTNOHORSKÁ, O. & KUBEŠ, V. 2017. The demand for beer in Czech Republic: understanding long run on- and off-trade price elasticities. Czech Journal of Food Sciences, 35, 165-170.
- SVATOŠ, M. a kol. Zahraniční obchod teorie a praxe. 1. vyd. Praha: Grada Publishing, 2009. 368 s. ISBN 978-80-247-2708-0.

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## **Declaration**

I declare that I have worked on my master's thesis titled "The Analysis of Czech Beer Export to Germany" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 29.03.2023.

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**Aneta Čeplová**

### **Acknowledgement**

I would like to thank prof. Ing. Mansoor Maitah, Ph.D. et Ph.D. for helpful advice for the thesis.

# **The Analysis of Czech Beer Export to Germany**

## **Abstract**

This thesis is intended to analyse the foreign trade of the Czech Republic, but the primary objective is its beer exports to Germany and identification of factors which are determining the beer export. The paper is split into two parts. First half is covering the literature research and explanation of relevant terms to foreign trade from historical aspect and in relation to policies and history of beer brewing industry in the selected countries. The second part is practical where statistical tools will be employed alongside econometric procedures. The data's origin is from Czech Statistical Office for Czech Republic, Statbank for Denmark, DE-statis for Germany and additional data comes mainly from macrotrends and statista. Software Gretl will be used to process the data outputs. The aim is to determine which is the most significant selected factor which determines the export of the Czech beer to Germany. As the total volume of beer exported annually from the Czech Republic continues to grow, Germany is a very important trade partner for the Czech Republic as majority of Czech Beer goes to Slovakia and Germany.

**Keywords:** export, foreign trade, trade balance, international relationships, Czech Republic, Germany, beer, international trade, European Union, trade policies.

# **Analýza vývozu českého piva do Německa**

## **Abstrakt**

Cílem této práce je analyzovat zahraniční obchod České republiky, ale primárním cílem je vývoz piva do Německa a identifikace faktorů, které vývoz piva určují. Práce je rozdělena do dvou částí. První polovina zahrnuje rešerši literatury a vysvětlení relevantních pojmů k zahraničnímu obchodu a to i z historického hlediska a ve vztahu k politice a historii pivovarnictví ve vybraných zemích. Druhá část je praktická, kde budou vedle ekonometrických postupů použity také statistické nástroje. Původ dat je z Českého statistického úřadu pro Českou republiku, Statbank pro Dánsko, DE-statis pro Německo a další data pocházejí zejména z macrotrends a statista. Ke zpracování datových výstupů bude použit software Gretl. Cílem je zjistit, který z vybraných faktorů je nejvýznamnějším faktorem, který určuje vývoz českého piva do Německa. Jak celkový objem ročně vyvezeného piva z České republiky stále roste, Německo je pro Českou republiku velmi důležitým obchodním partnerem, neboť většina českého piva směřuje na Slovensko a do Německa.

**Klíčová slova:** export, zahraniční obchod, obchodní bilance, mezinárodní vztahy, Česká republika, Německo, pivo, mezinárodní obchod, Evropská unie, obchodní politika.

## Table of content

<b>1 Introduction .....</b>	<b>10</b>
<b>2 Objectives and Methodology .....</b>	<b>11</b>
2.1 Objectives.....	11
2.2 Methodology .....	11
<b>3 Literature Review.....</b>	<b>17</b>
3.1 World history of the Foreign Trade.....	17
3.1.1 Classical Theories of Foreign Trade .....	18
3.2 Approaches towards the Foreign Trade.....	19
3.3 Factors influencing external economic relations.....	20
3.4 Reasons for Foreign Trade .....	20
3.5 Advantages and disadvantages of Foreign Trade.....	21
3.5.1 Advantages of Foreign Trade.....	21
3.5.2 Disadvantages of Foreign Trade .....	23
3.6 Impact of Foreign Trade on national economies.....	24
3.6.1 Introduction to Czech trade.....	25
3.6.2 Main trading partners of Germany and Czech Republic.....	25
3.7 History of Czech and German beer brewing industry .....	27
3.7.1 History of Czech beer industry .....	27
3.7.2 History of German beer industry .....	29
3.7.3 The importance of Czech beer exports to Germany .....	30
<b>4 Practical Part.....</b>	<b>31</b>
4.1 Topography, natural resources and population of the Czech Republic.....	31
4.2 Economy of the Czech Republic .....	33
4.2.1 Overview.....	33
4.2.2 Czech Exports .....	39
4.2.3 Czech Trade balance .....	43
4.2.4 Next export comparison between Czech Republic and Germany.....	46
4.2.5 Beer Consumption per capita.....	47
4.3 Time series analysis.....	48
4.3.1 GDP analysis.....	48
4.3.2 Exchange rate of Czech Republic time series analysis .....	50
4.4 Data preparation .....	51
4.5 Economic and econometric model .....	51
4.5.1 Correlation matrix .....	53
4.5.2 Ordinary Least Square Method .....	56
4.5.3 Econometric verification.....	56



4.5.4	Statistical verification .....	60
4.5.5	Heteroskedasticity testing .....	61
<b>5</b>	<b>Results and Discussion.....</b>	<b>62</b>
5.1	Findings from Econometrics model .....	62
5.2	Recommendations .....	63
<b>6</b>	<b>Conclusion.....</b>	<b>64</b>
<b>7</b>	<b>References .....</b>	<b>65</b>
<b>8</b>	<b>List of pictures, tables, graphs and abbreviations .....</b>	<b>67</b>
8.1	List of pictures.....	67
8.2	List of tables .....	67
8.3	List of graphs.....	67
8.4	List of abbreviations.....	68
<b>Appendix.....</b>	<b>.....</b>	<b>68</b>

# 1 Introduction

This paper analyses the one-sided trade of beer exports from Czech Republic to Germany while taking into account selected economic factors which determine the beer export. It looks at exports as total not at respective beer brands. The observed period is for 20 years allowing a detailed analysis on the development of Czech beer exports to Germany. Starting from the year 2003 to 2022. Where the key year is 2004, which is where Czech Republic became part of the European Union and therefore the Common Market which is often referred to as the Single Market. Therefore, in the trade between neighbouring countries and trade partners of Czech Republic and Germany, there are no obstacles for trade neither any tariffs nor trade barriers. It is beneficial to select a period this large of 20 years as it allows to maintain relevancy of the data outputs when adjustments of the data are made in the case of discovered high correlations among the selected factors influencing the beer exports.

Alcoholic beverages are one of the most significant commodities traded on the international market and the Czech Republic is known for its good taste and quality of brewed beer. Beer is the most popular alcoholic beverage for Czech people and that explains its wide range of beer brands and breweries among the country. The Czech Republic is also a worldwide number one leader in beer consumption per capita and has been for many years straight while being one of the key exporters of this commodity to the world. In terms of beer exports, it is most common when in relation to other European Union member states which allows good conditions for trade. For Czech Republic, Slovakia is the number one trade partner as the countries were formerly united and Germany takes second place. Member states of the European Union enjoy benefits of no trade barriers and tariffs allowing free flow of goods and services.

It is important to determine the main determinants of Czech beer exports to Germany and the most significant one to understand the market and the demand for this commodity from side of Germany. The value added of this work is for better understanding of the factors affecting the export of beer.

## 2 Objectives and Methodology

### 2.1 Objectives

As the thesis suggests the core analysis will be on selected commodity Czech beer exports from Czech Republic to Germany during the period of 2003-2022. The importance of those exports will be indicated through foreign trade of Czech Republic and Germany. The first objective is to conduct the analysis of the beer exports development from the Czech Republic to Germany. Secondly to assess the contribution of beer exports to Germany on the Czech Economy and finally to determine the most significant selected factor which determines the export of beer of the Czech Republic to Germany.

The research questions of this paper will be as following:

- What is the development of export of beer from Czech Republic to Germany during the period 2003-2022?
- Is there a correlation between total sales of beer in Germany and exports of Czech beer to Germany during the period 2003-2022?
- What is the impact of foreign exchange rate on the export of Czech beer to Germany?

**With the set hypothesis:**

The Average export price of Czech beer to Germany is the main determinant of Czech beer export to Germany.

### 2.2 Methodology

This paper is applying quantitative methodology, in addition to calculations and procedures which are included in the practical part of the thesis. In order to be able to measure foreign trade where the analysis of Czech beer exports is conducted, several factors determining Czech exports of the beer were selected to begin with:

- Czech foreign exchange rate (CZK/EUR)
- GDP of Germany (total)
- Average export price of beer to Germany from Denmark (in EUR)
- Average export price of beer to Germany from Czech Republic (in EUR)

- Total consumption of beer in Germany (in hectolitres)

The methodology will be done in chronological order to answer all the research questions, goals and objectives.

The analysis of the time series will be conducted through the use of tools: fixed base index, chain base index and average growth rate index. The Fixed base index will be used to assess the change of the data of the observed time frame 2003 to 2022. Comparing the most recent value with the first value in 2003. The formula for the fixed base index is as follows:

$$\text{Fixed Base Index} = \frac{\text{Present Value}}{\text{Original First Value}} = \frac{Y_{t20}}{Y_{t1}}$$

The chain base index uses two selected time periods in the data set for comparison to show a more pinpoint change in value from one year to the next. For the purpose of this work, the chain base index will be used on the most recent value and comparing it by the value t-1 for both the GDP and foreign exchange rate index of the two countries with the exception of Germany for the exchange rate criteria due to the focus of this work. The formula used for the chain base index is listed below:

$$\text{Chain Base Index} = \frac{\text{Present Value}}{\text{Previous Value}} = \frac{Y_{t20}}{Y_{t19}}$$

The average growth rate index utilizes the entire observation period and estimated the growth rate of the selected value each year or also known later as the “t” period. The value of overall change is then divided by the number of observations also known as “n” with 1 less observation. The formula used for the average growth rate index is listed below:

$$\text{Average Growth Rate Index} = \sqrt[n-1]{\frac{Y_n}{Y_1}}$$

To conduct the analysis of the development of export of Czech beer to Germany there will be correlation of the export of the Czech beer to Germany (EUR) with the total sales of all beer sold (EUR) on the German market and with the development of the exchange rate of CZK/EUR during the years 2003-2022 using correlation analysis to test similarity as well as utilizing the econometrics model through ordinary least squares method known as the OLSM where Export of Czech beer to Germany (in EUR) is the dependent variable.

To assess the contribution of beer exports to Germany on the Czech Economy the comparison between the timeline (2003-2022) of the export of Czech beer to Germany (EUR) with the trade balance (export – import) in beer between the Czech Republic and Germany (EUR) using yearly indexes represented in %. This will allow to calculate a positive correlation (thus ranging 0-1) and link export of Czech beer to Germany to the GDP of the Czech Republic through the calculation below.

- Calculation of the contribution percentage of the balance of trade in beer between the Czech Republic and Germany for the GDP of Czech Republic will be done by using the equation for all years (2003-2022):

$$\frac{\text{Trade balance in beer (in EUR)}}{\text{Total Nominal GDP of CZ (in EUR)}} * 100(\%)$$

Resulting in the percentage of the above-mentioned balance in nominal GDP

The equation above will be done 20 times to obtain 20 different values to calculate yearly indexes represented in the percentage. This will help indicate whether there is decrease or increase of the Czech beer exports to Germany.

Correlation is a process where two variables are being tested by how similar datasets of selected variables are. It ranges from -1 to 1 and can result in a positive or negative number. If the result is 0 or close to it, it means that there is weak or no relationship and the closer the value is to 1 or -1 the stronger the relationship among those variables in a positive or negative manner respectively.

The reason this step requires correlation to be undertaken is because the trade balance is missing information about the proportion of exports and imports. The total nominal GDP is a GDP of Czech Republic a number without inflation index, is expressed in the current prices and for this calculation is more suitable.

The sub-step is a calculation of the TB (Trade balance) above. Trade balance indicates how a country is oriented. It can result in either surplus or deficit.

The equation is:

$$\text{Trade balance} = (EX - IM)$$

Where EX is a total value of exports and IM is indicating total value of imports.

As already mentioned in the objectives section, third aim is used to determine the most significant selected factor (which were listed at the beginning of methodology) which determine the export of beer from the Czech Republic to Germany. This will be identified using the OLSM on the data matrix composed of the dependent and independent variables for the years 2003-2022.

The equation  $(XT * X)^{-1}$  will be calculated in with the absolute values of the coefficients and compared with the critical values to reach a significance value that either is Statistically significant or insignificant based on the set alpha threshold  $\alpha = 0.05$ .

The selected factors utilized in the econometric model were picked for specific reasons:

- Czech foreign exchange rate (CZK/EUR): directly influences the price of Czech beer on the German market.
- GDP of Germany shows what influence does GDP of Germany has on exports of beer from Czech Republic to Germany
- Denmark's average export price of beer (EUR): Allows for comparison of prices of Czech beer (used specifically for comparison as this country is the Czech's main competitor of beer exports)
- Average price of Czech beer exported to Germany (EUR): Sets the competitiveness of the Czech beer.

- Total consumption of beer in Germany (hectolitres): Determines the size of the market for beer in Germany.

And finally, the largest portion of the practical part will be done by using statistical tools, including Correlation, similarities, probabilities to pinpoint possible anomalies, drastic changes in the data of the time series and utilization of trends, coefficient of determination, OLS, dummy variables and artificial if necessary.

Correlation analysis of the total export of Czech beer to Germany (EUR) compared to total sales of all beer in Germany (EUR) for each year of 2003-2022. To identify positive similarities (correlation) of total sales of all beer in Germany (EUR) with increased exports of Czech beer to Germany (EUR) from the years 2003-2022.

Construction of an econometric model for beer exports from the Czech Republic to Germany during period 2003-2022.

There will be an economic model created with a general equation as following:

$$y_1 = f(x_2, x_3, x_4, x_5, x_6)$$

Which will be further converted into an econometric equation with its general equation:

$$\beta_{1t}y_{1t} = \gamma_{11}x_{1t} + \gamma_{12}x_{2t} + \gamma_{13}x_{3t} + \gamma_{14}x_{4t} + \gamma_{15}x_{5t} + \gamma_{16}x_{6t} + +\varepsilon_{1t}$$

The dependent endogenous variable ( $y_1$ ) represents the Export of Czech beer to Germany. While all the explanatory exogenous variables are those pre-selected five factors which determine the Czech export of the beer. In this model is also included the constant which is necessary to be included in the econometric model and is represented by  $x_{1t}$

The difference between economic and econometric model is that the econometric model includes a random variable denoted by  $\varepsilon_{1t}$ , which is a stochastic variable and

represents the effect of all others on the dependent variable that are not included in the model. The econometric model also shows the influence of time and is denoted by  $t$ .

Heteroskedasticity testing will be conducted to test if there is any relationship between the squared residuals and the independent variables of a significant level. This will be done by conducting the White's test to test heteroskedasticity. The calculated p-value will reject one out of two hypotheses that are set. In case the p-value is larger than the alpha that is set at 0.05 then the  $H_0$  cannot be rejected and thus the  $H_0$  stands. In the case that the p-value is lower than the alpha, it is possible to reject the null hypothesis with a level of certainty of 95%, therefore the  $H_1$  stands and there is a relationship between the variables.

*$H_0$  ... no relationship between variables*

*$H_1$  ... detected relationship between variables*

The form of testing Heteroskedasticity will utilise hypothesis testing such as above, with the exception that smaller p-values show that the model has heteroskedasticity while larger p-values than the alpha show that there is no heteroskedasticity detected and  $H_0$  stands.

*$p < 0.05$  ...  $H_0$  is rejected ... model with heteroskedasticity*

*$p > 0.05$  ...  $H_0$  is accepted ... no heteroskedasticity*



## **3 Literature Review**

### **3.1 World history of the Foreign Trade**

#### **History of Czech Foreign Trade**

In the 1750s, Germany had strong influence over Czechs as 35% of its population consisted of Germans and they decided its politics, economy, and management matters. Germany was also step ahead in its industrial advancements. During the 1840s Czech and Germany would rival one another to have economic dominance in education, entrepreneurship, journals, and culture. Therefore, the Czech Lands began to look like to Germany's more than any else in Central Europe. When it comes to cultural and economic development peak, the Czech Land was the most prosperous in the year 1912. However, this took a turn during World War 1 where Germany was defeated and in 1918 Czechoslovakia was established. As Czechoslovakia was formed and was undergoing a transition the demise of Austria-Hungary had a severe impact on the country by a large drop of GDP by around 20% when comparing the years 1920 to 1912. Czech economy was very unstable and had ongoing recession. With growing influence of Nazism, economies began to align with Germany and the Czech exports share in GDP had decreased from 33% to 20%, respectively in years 1928 to 1937 (Benáček, 2001).

The Post-World War 2 foreign trade was conducted through an exchange of goods among the actors used to be referred to as “the barter”. Czechoslovakia's trading partner Yugoslavia would trade through an arrangement known as “product sharing”. The idea is that two partner countries participate together in production of certain commodity. Czechoslovakia would export poultry at large while Yugoslavia would export over poultry for slaughter. The barter would eventually become inconvenient as the international trade would evolve and it would only slow down the process of trade as when one party would have shortage of certain good which was agreed upon to be traded with the other party. The cases where the seller would not need a particular commodity or good at the time so it would only turn into business obstacle. It was necessary to figure out what would be a good general equivalent among the buyer and the seller. A commodity such as gold and silver would be considered as precious metal and for those the demand would remain high. With that coins made of silver and gold

would begin to be used. But even then, there would be shortage of those. Eventually, banknotes were introduced to help with the issue (Svatoš, et al., 2009).

## **History of German Foreign Trade**

During the year 1850, the country used to be heavily oriented on agricultural sector following by shifting into industrial. As of 1914, in comparison with the United Kingdom, Germany had a significant advantage by obtaining second place in exports in the world. Since then, Germany is one of main countries when it comes to international trade. Germany was able to expand as trade costs had decreased so exports from Germany had risen and having its labour specialise consistently with comparative advantage. As of the second industrial revolution, when trading with countries that are neighbours and rich, they had trade surplus caused by increasing exports in manufacturing. The surplus was thanks to exports of chemicals, equipment for transportation and machinery which the country benefits from up till present (Hungerland & Wolf, 2022).

As of the 1991 France and Germany cooperated with attempt for European unity, political unity and economic cooperation which led up to Treaty of Maastricht signed by Franco-German countries and European Community member states in the city Maastricht, Netherlands. With removed trade barriers which happened with the creation of the European Union, additional benefits included free movement of labour, land and capital, and thousands of people immigrating to Germany to work. (Orlow, 2018).

### **3.1.1 Classical Theories of Foreign Trade**

From the scientific perspective the first research regarding the exchange comes from the 17<sup>th</sup> and the 18<sup>th</sup> century, during the era of Mercantilism. The key ideas were the national interest and its wealth. Which can be achieved through foreign trade. Priority was given to importing of precious metals and a “zero-sum game” was made essential. Zero-sum game assumes predetermined world’s wealth and countries fighting over it. It is a game where some nations are the winner while others are on the losing side. To achieve this victory, it is necessary to have trade balance active (Svatoš, et al., 2009).

Adam Smith, Mill and Ricardo were all supporters of mercantilism however they opposed the idea of zero-sum game. Smith was a Scottish economist and

Glasgow's university professor who was referred to as the "father of economy". In his work, *The Wealth of Nations*, he defined the main purpose of foreign trade and points out the existence of "positive sum game" which contradicts the previously mentioned zero-sum game as it states that the participants of the game gain wealth independently of their balance of trade and that foreign trade thrives mainly through division of labour and its benefits among the countries. In the *Wealth of Nations*, his theory is about how nations can maximise its prosperity by concentrating on commodities their country has prerequisites therefore producing goods and services more efficiently than the other country. This theory is labelled as the "Theory of Absolute Advantage". The next theory "Comparative advantage" is by David Ricardo. This theory is contradicting with Smith's theory. It is about producing goods and services at a lower opportunity cost when compared with a competitor. John Stuart Mill further developed this in his work entitled as *Theory of Reciprocal Demand* (Svatoš, et al., 2009).

### 3.2 Approaches towards the Foreign Trade

There are exactly two approaches when it comes to the perspective of national economic.

**Passive approach:** The foreign trade is supposed to assure the aspect of proportionality of an economy. The purpose of foreign trade is to meet the needs of demand in sectors where there are shortages of them. In order to achieve this the country has to import. Passive approach is connected with protectionism that utmost protects its domestic market (Svatoš, et al., 2009).

**Active approach:** As for active approach the emphasis is put on the efficiency aspect. The government focuses on export and remove potential obstacles occurring during trade to exporters. Furthermore, the government aims to have the most convenient trade with the other countries. This approach is linked with liberalism where the interventions into the economy are minimal (Svatoš, et al., 2009).

### 3.3 Factors influencing external economic relations.

**Objective factors:** An example of objective influences would be its geographic characteristics such as where the country is located, whether it has access to sea, its quality of water, whether it has mountains or plains, what its usual weather conditions are and so on. In addition, as objective factor is considered also the country's each region' economic development along with its level of education (Svatoš, et al., 2009).

**Subjective factors:** This is mainly represented by the government intervention. The state's institutions with its influence to modify, adjust, use, or eliminate objective factors is part of subjective factors (Svatoš, et al., 2009).

### 3.4 Reasons for Foreign Trade

The reason for a country to conduct trade is in pursuit of receiving some value that benefits the economy of the country in question. In moments where an economy is staggering due to various inefficiencies such as high unemployment rates or inefficient use of resources that the country has in possession, it is possible for a situation to occur where the economic progress of a country is being halted by the scarcity of a certain commodity that is not attainable within the situation or the geographical positioning of the country. This situation may be a deciding factor that determines the standard of living as well as the GDP of the country. On the other hand, in occurrences such as the one established it is a recommendable approach to locate a commodity or tradeable good that is in abundance inside the country and search beyond the border for a country with the opposite position in terms of abundance and scarcity. The source by Paul Wonnacott states that "International trade and the accompanying financial transactions are generally conducted for the purpose of providing a nation with commodities it lacks in exchange for those that it produces in abundance", and later continues to elaborate on the fact that various economies working together to fill insufficiencies of each other is a beneficial action for achieving stronger economies. In addition, international relations focus on maximizing the opportunity of trade to countries at the cheapest rates and is possible<sup>1</sup>.

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<sup>1</sup> ALLAIS, M., BALASSA, B., BERTRAND, T.J. *Britannica | The theory of international trade*. 2024. Available at: <https://www.britannica.com/money/international-trade/The-new-mercantilism>.

## **3.5 Advantages and disadvantages of Foreign Trade**

### **3.5.1 Advantages of Foreign Trade**

The benefits of foreign trade on the economy of the country can vary with different scales of benefits to different sectors of the country's economy. The article by Bruna Martinuzzi lists ten major benefits, that are listed below to foreign trade among the countries that partake in it.

- An increase in revenues
- New lower competition environments
- An increase in product lifespan
- Better manageability of cash-flow
- Lesser risk occurrences
- Saving money on various currency exchange rates
- Eligibility for export financing
- Usage of abundant resources
- Increased reputation internationally
- Allows to focus on a specific commodity/export goods

The increase in revenues refers to the increase in potential customers that the country will be able to get in touch with. Products/goods that the country can offer abroad have a much higher number of potential customers than the country can in most cases have internally. However, these opportunities depend on values and the culture of each country. The meaning behind the lower competitive environments is in the fact that foreign countries that have a scarcity of a certain resource and or specialize in a different sector will be very likely to welcome the import of a foreign product into the country. In addition to that, since the market that just received the imported good does not have a crowded market to the respective item in question, the competition will be of relatively low strength and thus the chances of the good being highly demanded to be exported from the original country are much higher. It is necessary to approach with caution towards the economies of countries that are highly competitive for the exported good, as the competition on the market where the resource is utilized is very likely to be too strong for a positive outcome. Increasing the products lifespan is in the sense of that some products may become less demanded with time in a country due to strong competition within the market. The idea is that as stated, "Selling

a product to an overseas market can extend the life of an existing product as emerging markets seek American products”. In this case, countries such as the USA will have products that have dropped in demand domestically, while being in high demand abroad. The cause for an increase in the simplicity of managing cash-flow is in the fact that often a country can ask payment upfront upon the export without having to get compensated with dependence on how much of the product is utilized in the other country. Due to a country having diversification in its market abroad as well as domestically, it allows the country to have more stable conditions in moments when the economy falls domestically due to “political factors, environmental events, and other factors”. This means that the more integrated the country is with other countries’ economies, the possibility of the economy dropping in all sources is lessened.

Using currency exchange rates is an option that helps support the economy in cases when the currency in the local country is less powerful than the currency in a targeted country abroad, exporting to the more powerful currency will allow not only higher amounts of export but also more demand as the price will be cheaper in the country that is importing. Large bodies that offer assistance in occurrences of exports and imports such as “The Export-Import Bank of the United States” and or “The US Small Business Administration”, can then be used for further support.

A strong factor associated with a country using resources that it has an abundant capacity of is the fact that it will use a factor for improving the country’s GDP in a higher efficiency of the resources available. The act of exporting gives purpose to resources that would otherwise hold lower value within the country and allows the resources to generate value which can then be used for the country internally or inversely for the purpose of bringing needed resources into the country that were previously scarce. The reputation that a country gains with time exporting to other countries, adds to further possibilities of additional international trade as the country will seem credible and will be more known in adjacent countries all around.

The fact that the country being allowed to prosper from exporting its resources allows and encourages the country to diverge its focus more specifically on the resource/product that it exports. Focusing on upgrading and allocating new functions to the good, through

improved technologies and or research, allows the country to solidify its position as the exporter of that specific product<sup>2</sup>.

### **3.5.2 Disadvantages of Foreign Trade**

The article published by Barry Moltz discusses the disadvantages of foreign trade. These disadvantages, listed below, range from cultural differences to difficulties of the actualizing of the export itself into the foreign country.

- Various shipping customs and requirements
- Different languages
- Differences in culture
- Customers of various backgrounds and locations
- Refunds
- Stealing the idea of the property

Various export destinations may have different conditions for taking the goods inside the country, such as rules set through restrictions and taxes on the shipped commodities/goods. Managing the rules and regulations of all the export destinations may cause trouble for the country to meet all the set standards. The barriers presented through language differences more often causes miscommunications and poorly translated documents between the different countries that may drift from the initial message. In a similar aspect, cultural differences cause further miscommunications of values and preferences which may hold a strong presence within a country and may be known internally, but not known internationally. A step ahead of different languages and cultures is the fact that the customers may be potentially all over the world. The back-and-forth communications may be dragged out from a matter of a working day to a month due to different time zones, work ethics and or, as stated earlier, language barriers. Issues such as refunds are a reality that may cost the country in cases when the costs for shipment back is being compensated by the country itself, leading to a situation where the specific export caused additional cost of shipment for a returned product. The country may reduce the risks by not offering refunds, however such a decision will come at a cost of the demand from the side of the customers as the risk for them wanting goods from abroad will increase.

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<sup>2</sup> MARTINUZI, B. *What Are the Advantages of International Trade?* 2023. Available at: <https://www.americanexpress.com/en-us/business/trends-and-insights/articles/advantages-international-trade>.

Lastly, the fact that the product leaves the borders of the country of origin comes with the risk of an increase of goods and products of similar or even identical characteristics on the global market. In cases when such occurrence happens domestically, the country may resolve the situations through incorporating copyright laws, however as the product leaves the country the power to interact in the affairs abroad weaken. International institutions such as the “copyrighting in the U.S.” allow for some protection, once the “international intellectual property treaty” was signed. Even in such case the international entity looks at the benefits and disadvantages of the countries affected as a whole, rather than the original country itself, leading to a lower prosecution power in comparison to the authority the country would have internally<sup>3</sup>.

### **3.6 Impact of Foreign Trade on national economies**

Exports and imports are playing factors in aspects of a country that affect the Gross domestic product of a country. In occurrences of exports, the country experiences an inflow of foreign currency, which if treated properly in contrast to local currency outflow in terms of exports, requires the attention of the central bank to manage the reserves in order to reduce extreme shifts in the economy for better or worse. Imports are inversely about the outflow of currency, which benefits the country’s market by allowing a larger variety of choice for the consumer to choose from. In this meaning, it is reasonable to state that exports are more beneficial to countries with a currency of weaker strength, while imports offer more benefits to countries with stronger currencies. Products imported from abroad can often benefit the country of origin and the destined country as the product in many situations will be cheaper and allow for the country of origin to benefit due to the higher competitive aspect in terms of prices. The country that obtains the product on its market, gains benefits for its consumers in offering a cheaper choice of a product and increasing the competition to mind their set prices as to not lose its customer base. In countries where the market of a certain product has little competition, the issue of higher prices being set by the dominating figures causes for less power to be had in the hands of the consumer as the options for the product do not vary. However, instances where the import into a country is much larger in scale than the export out of the country often comes with a risk of that “it can distort a nation’s balance of trade

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<sup>3</sup> MOLTZ, B. *Disadvantages of International Trade*. 2022. Available at: <https://www.americanexpress.com/en-us/business/trends-and-insights/articles/6-disadvantages-of-international-trade-and-tips-that-may-help-solve-them/>.



and devalue its currency”, thus large imbalances between imports and exports may lead to negative changes in Gross domestic product, inflation, interest rates and or the exchange rates of the currency.

The expenditures method of measuring GDP uses variables of consumer spendings, investment, spending of the government and lastly the difference between the export and import which is known as net exports. Exceptionally high imports and exports are also useful in being used an indicator of assessing abroad economies compared to the internal economy of the country. Quoting the source by Leslie Kramer, “If exports are growing, but imports have declined significantly, it may indicate that foreign economies are in better shape than the domestic economy”. On the other hand, the opposite is also valid as an indicator in the fact that when the imports are increasing at a higher rate while export values are stagnant, it is an indicator that the economy in the country of origin is operating on a superior level than the external economies<sup>4</sup>.

### **3.6.1 Introduction to Czech trade**

The Czech Republic, functioning as a nation of moderate size, boasts an economy characterized by openness and a strong reliance on exports, with a significant reliance on foreign demand, particularly from the Eurozone. Approximately 70 percent of the Czech Republic's exported goods find their destination in other member states of the European Union (EU), with a substantial share, precisely 26 percent, being sent to Germany the largest trade partner within the EU for the Czech Republic. Notably, the United States assumes a crucial role in the Czech Republic's economic landscape, standing as its principal non-EU export destination and ranking as the third-largest non-EU trading partner overall<sup>5</sup>.

### **3.6.2 Main trading partners of Germany and Czech Republic**

The economic dynamics of the Czech Republic reflect a dominant export sector, securing the nation's position as the 27<sup>th</sup> largest product export economy and the 36<sup>th</sup> largest

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<sup>4</sup> KRAMER, L. *Investopedia | How Importing and Exporting Impacts the Economy*. 2023. Available at: <https://www.investopedia.com/articles/investing/100813/interesting-facts-about-imports-and-exports.asp#:~:text=A%20country's%20importing%20and%20exporting,on%20a%20country's%20exchange%20rate.>

<sup>5</sup> *International Trade Administration | Czech Republic - Country Commercial Guide*. 2023. Available at: <https://www.trade.gov/country-commercial-guides/czech-republic-market-overview>.

service export economy within the NATO alliance. With the combined value of exported products and services reaching a substantial amount of 223.1 billion USD. Simultaneously, the nation is engaged in imports that are equal to 199.7 billion USD and resulting in a positive trade balance of 23.5 billion USD.

Czech Republic’s export commodities come from many different sectors. Mainly the export of commodities such as iron and steel, amounting to 420 million USD, oil and mineral fuels totalling 266 million USD, wood contributing 202 million USD, aluminium accounting for 183 million USD, and wool registering at 52 million USD. After commodities, the Czech Republic showcases notable strength in exporting automobiles, with cars reaching a significant value of 22.7 billion USD. Additionally, the export of vehicle parts, computers, broadcasting equipment, and office machine parts emerges as other strong contributing factors to the positive trade balance as was mentioned earlier.

In terms of imports, the Czech Republic focuses on various commodities, with oil and mineral fuels leading the way at 731 million USD, followed by imports of iron and steel valued at 662 million USD, aluminium totalling 244 million USD, copper amounting to 141 million USD, and wood accounting for 94 million USD. Significant non-commodity imports include vehicle parts, broadcasting equipment, office machine parts, cars, and computers. Notably, vehicle parts stand out with an import value of 10.2 billion USD, emphasizing the nation's dependence on this sector to meet the domestic demand of the country<sup>6</sup>.

**Table 1: Top 5 export partners for Germany in 2021**

Country	Export Value (in million USD)	Partner Share (%)
United States	\$114,604	8.84
China	\$123,585	7.56
France	\$121,000	7.40
Netherlands	\$108,856	6.66
Poland	\$92,311	5.64

Source: Own processing, 2023

As shown in the table above, Germany exports the most into the US and China the second most. As Germany is one of the strongest countries in the EU economically it stands

<sup>6</sup> CSOKASI, M. *Czech Republic’s Economy: GDP + Top 5 Exports & Imports*. 2021. Available at: <https://commodity.com/data/czechia/>.

to reason that trade with large economic forces will be conducted. In terms of exporting into EU countries, France is on the top.

**Table 2: Top 5 import partners for Germany in 2021**

Country	Import Value (in million USD)	Partner Share (%)
China	\$170,640	11.98
Netherlands	\$106,763	7.49
United States	\$86,799	6.09
Poland	\$81,518	5.72
Italy	\$77,221	5.42

Source: Own processing, 2023

In terms of the imports, it is clear that China is on top and surprisingly Netherlands which was fourth in exports is second in imports being above the US. Furthermore, while France was the top EU country for export, it is not mentioned in the top 5 for imports.

In terms of the thesis, the Czech Republic is not mentioned in either export or import from the side of Germany, leading to a realization that if Germany is the main trading partner for Czech Republic, Czech Republic is not one of the top trading partners for Germany<sup>7</sup>.

### **3.7 History of Czech and German beer brewing industry**

#### **3.7.1 History of Czech beer industry**

The first evidence of beer brewing comes from year 993 at Břevnov Monastery. However, the first verified evidence comes around 1088, where Vladislav II spoke about usage of hops for brewing. Brewing used to be forbidden but Pope Innocent IV ended the 250 years long ban on brewing. Since the beginning of the brewing era, quality of Czech hops was high and therefore worth a high price even abroad. In the year 1101, the Bohemian hops' price was the highest on the entire market. Bohemian hops have a long history, even longer compared to Britain which started focusing on brewing in 1524. Evolution of beer had been changing throughout the years starting with term "white beer" which was a wheat

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<sup>7</sup> *Germany Trade*. 2021. Available at: <https://wits.worldbank.org/CountrySnapshot/en/DEU/textview#:~:text=Overall%20Exports%20and%20Imports%20for,are%20imported%20from%2022%20countries.>

beer with lots of foam. It is believed that this type of beer was brought to Bavaria which is the largest state of Germany directly next to West side borders of Czech lands. And in Germany it was called 'Weizen' or 'Hefeweizen' (Rail, 2023).

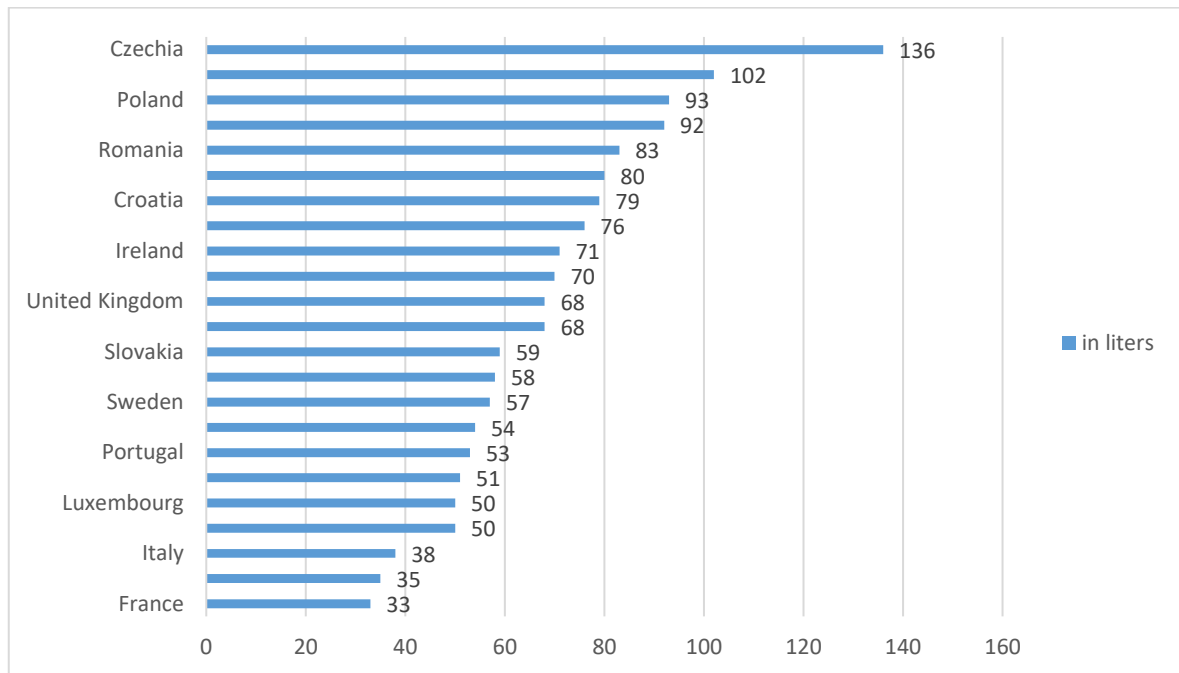
During the 19<sup>th</sup> century the export and import of beers had become way easier thanks to transportation advancements. During these years, the most popular beer was bottom-fermented beer. It was imported to both southeast of Germany and Czech regions around year 1830. Another popular beer was 'Bavarian beer' which was very dark with rich crisp taste, leading to inspiring other breweries to make their own version. Pilsen's brewery changed its brewing style to match the English one of malt kiln using the method of indirect heat. Instead of wheat, the Pilsen brewery used dried malt and the flavour was rich very similar to the Bavarian beer. The only difference being the colour. Pilsen's beer had a colour like gold. This type of beer gained so much attention and was a huge success that it completely changed the style many Czech breweries to do bottom fermentation just like Pilsen. This success was recognized even abroad in the United States of America, in the year 1876 there was an article writing about brewing 'complete revolution' in Czech lands. Breweries that didn't shift to bottom fermentation had to close its business. And the number of breweries went up from 135 to 831 (Rail, 2023).

The communist era that started in the year 1948 had many restrictions for Czech beer breweries. And for a period of 40 years only two types of beer were allowed: dark lager and pale lager. When capitalism started, Czech breweries had a hard time as many of the breweries were sold off, were privatized, or had its assets taken away. And in the 21<sup>st</sup> century only around 60 breweries were still operating, and new small ones began to form. Breweries started using top fermentation style which was inspired by America and United Kingdom. Since then, there were more than 400 Czech breweries maintaining its good quality of beer (Rail, 2023).

The most popular Czech beer brands are Pilsner Urquell, Budwiser, Gambrinus, Strahov Monastery Brewery, Starobrnno, Radegast, Breznak and Staropramen. Staropramen in the Czech Republic is the second biggest beer brewery. Pilsner Urquell is the biggest beer exporter and has the largest beer brewery in Czech Republic (Burak, 2023).

Czechoslovakia had split at the end of year 1992 and with the start of the next year, the Czech Republic was established the first day of the year 1993. When it comes to beer consumption per capita, the Czech Republic has been the leading country every year since 1993 (Pirodsky, 2019). The evidence of that can be seen in the Figure 1 below.

**Figure 1: Volume of Beer consumption per capita in Europe in 2022 by country**



Source: Own processing according to statista, 2023

### 3.7.2 History of German beer industry

Not just Europe's but also German's brewers are noted since the thirteen centuries where beer was produced mainly by the monk's due to their strong relations with the churches. The beer was at first very strong and had high level of alcohol to remain fresh. Germans were using recipes which included more herbs known under alias 'Gruit'. The most known beer brewed in Germany was 'Reinheitsgebot' from Bavaria in the year 1516. There were just three ingredients: hops, water and barley. Several years later, various other ingredients were added: sugar, yeast and a larger number of malted grains (Nowek, 2024).

When it comes to the consumption habits it had varied throughout the centuries. From the year 1957 it had doubled from 6.1 litres to 12.7 litres in the year 1976, then in the upcoming 30 years decreasing by 25%. This was caused by the quantity demand changes and some breweries in Germany had to close down. However, even with decrease in demand the country remains as one of the top 4 countries in terms of beer consumption per capita (Volland, 2012).

The most popular brands of German beer as of 2015 were Krombacher, Veltins, Bitburger, Oettinger all of them are Pils, which is an adapted pilsener style beer that is the most popular among German citizens (Nowek, 2024).

### 3.7.3 The importance of Czech beer exports to Germany

The embassy of the Czech Republic in Germany does not explicitly mention beer among the most promising commodities for all bilateral trade, but in the source, it is mentioned that agricultural and food product in general is of mutual interest. This statement nonetheless shows that the main trading partner of Czech Republic could be no one other than Germany.

It is important to notice that according to the data of the Czech statistical office in 2022 export of Czech beer to Germany made 17.3% of total export of Czech beer worldwide. (CZSO). Promoting a discussion area between the data from the source of the business info and the Czech Statistical office, as Czech Republic exports beer into numerous countries and over 17% going into Germany is not negligible.

On one side this proves that the German market for Czech breweries is irreplaceable as it is one of their largest customers in terms of the product of beer that is exported abroad, additionally the value added of this work allows for deeper understanding of the trends in beer trade between the Czech Republic and Germany<sup>8</sup>.

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<sup>8</sup> *Businessinfo* | Německo. 2023. Available at: <https://www.businessinfo.cz/navody/nemecko-souhrnna-teritorialni-informace/2/#0-uvod>.

## **4 Practical Part**

### **4.1 Topography, natural resources and population of the Czech Republic**

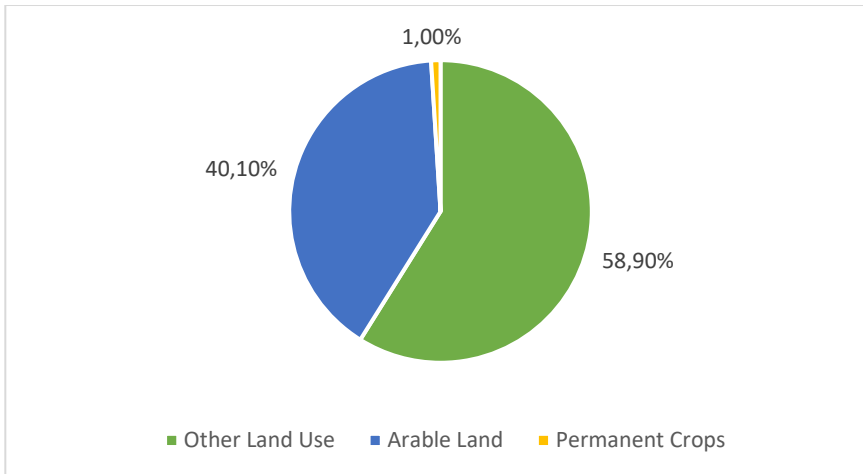
Czech Republic has the advantage of being positioned in centre of Europe, thus a large proportion of European trade flows through the country. Be it only as passing by or directly from Czech Republic or to the country. Its neighbouring countries are Germany, Poland, Slovakia and Austria, where Czech Republic is in the centre of them. From a historical perspective there are three provinces: Bohemia, Moravia and Silesia. Since the year 2016, the Czech Republic also has been referred to as “Czechia”. Czech lands are covered by Bohemian Massif at large. The highest mountain areas can be found in the North and Northeast of the country. Krkonoše mountains with a highest peak of 1,602 meters Sněžka, is the highest point of the country. Additional highlands are located in the southwest, the Šumava Mountains and the southeast Bohemian-Moravian Highlands and by the borders with Slovakia the Little Carpathian.

In terms of soil and water, as the country is located in central Europe it has no connection to any sea, so it benefits from its freshwaters. Central European watershed is within the Czech lands. As for the rivers, near borders with Poland Elbe river rises flowing in direction through the southwest of Bohemia. Elbe in Czech Republic is called Vltava, flows through the capital city Prague and before it goes to Germany it has other rivers like Vltava, Ohře and Jizera flowing into it. Vltava along with other bigger rivers also contributes to hydroelectric power. The Czech Republic is filled with so called “black earth” chernozems such as black chernozems and brown soils of good quality in the lowlands. Furthermore, in the wet region Podzols are present and the mountain areas have stony soils. In the east of Czechia are heavy clay soils and the alluvial soils.

The climate is humid and can vary from hot, rainy or to cold. The temperature in summer during the month of July can surpass 32 °C (in Prague) and in winter can reach very low temperatures -17 °C (in Cheb, west of Czech Republic). Most of its area consists mainly of oak, spruce and beech forests and former forest areas had been

insisted on farming purposes. Vegetation of northern areas with higher altitude consist of taiga and tundra<sup>9</sup>.

**Figure 2: Use of Natural Resources inside Czech Republic**



Source: Own processing, 2023

In Figure 2, it can be seen that the orientation for permanent crops is minimal. The other land use and arable lands are the most used. Other Land User covers 58.9% and 40.1% goes to Arable lands.

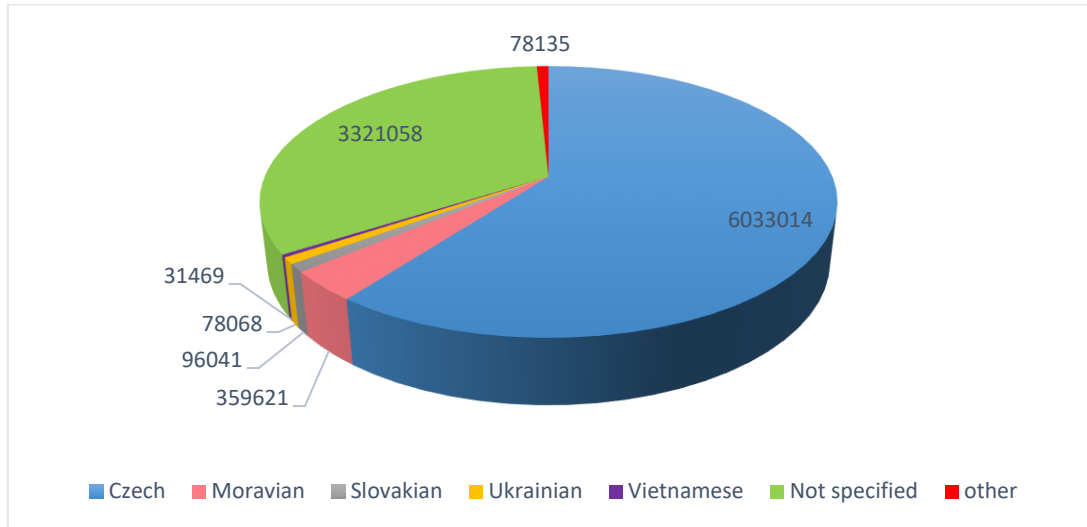
In terms of population, citizens of the Czech Republic consist of various ethnic groups mainly Czech, Moravian and Slovak. The country has many immigrants, often from countries of Europe.

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<sup>9</sup> ZEMAN, Z.A.B., HAUNER, M., BLAZEK M. *Czech Republic – Geography and Travel*. Source: <https://www.britannica.com/place/Czech-Republic>.



**Figure 3: Main ethnic composition of the Czech Republic for year 2021**



Source: Own processing according to CZSO, 2023

Figure 3 above shows Census of Population, Houses and Flats collected by Czech Statistical Office for year 2021 which had the grand total population of Czech Republic equal to 10 524 167. From citizens who had specified their ethnicity, the largest portion consist of 6 033 014 Czechs, 359 621 Moravians, in third place Slovaks with 96 041 and then 78 068 Ukrainians. This graphical representation includes only persons who had specified just one nationality.

## **4.2 Economy of the Czech Republic**

### **4.2.1 Overview**

The main sectors in Czech Republic are industry with 28.1%, transport, wholesale, retail trade, food services and accommodation all together covering 17.5% and lastly social work activities, human health, public administration, education and defence 16.8%. In addition, investments helped the country to increase its productivity. United States holds foreign direct investments (FDI) stock and is one of three biggest investors outside of European countries that actively invest into Czech Republic. U.S. Department of Commerce's Bureaus of Economic Analysis stated that in the year 2022, United States' FDI total value was estimated to be of \$5 billion. Investments go into sectors such as like IT services and products, cars, pharmaceuticals, and business services.

Economy of the Czech Republic had slow yet steady growth with a sound Fiscal Policy. COVID-19 caused a crisis for the country where there was interrupted supply. During the ongoing situation of Russian's invasion to Ukraine the prices are going up and the money circulation in the country had decreased. The European Commission states that there is a prediction of Czech's real GDP to grow by 0.2 % and will be slowing down in year 2023<sup>10</sup>.

**International Trade:** The country is rather export oriented. Estimating 80% from total exports go to EU member countries mainly to Germany (33%), then Slovakia (8%) and Poland (6%). When looking at the import side, a large portion originates from the EU countries, namely 73%. The top 3 import destinations are Germany (28%), Poland (9%) and the Netherlands (7%)<sup>11</sup>.

**Infrastructure:** Unlike many countries of Europe, the Czech Republic does not have access to water to transport goods through ships so its main means of transport of goods consists of road network. Additionally, through railway and otherwise through air transport. The Czech roads and train rails are one of the densest networks inside Europe<sup>12</sup>.

**Beer consumption:** The Czech Republic is known for having “cheaper beer than water” with many Czech beer brands on the market. The beer consumption in the country is on steady increase excluding the slight decrease during the pandemic. Larger local beer brands dominate in certain regions usually matter of case where the beer originates from. Firstly, the largest, Pilsner Urquell in Czech known under “Plzeň” in all regions have relatively comparable market share and holds 22% share of the total volume in the country. Secondly, Birrell has nationwide share of 9% and in Pilsen region up to 15%. Another example of a brand which has stronger market share in certain regions is Bernard. Its average market share is way lower at about 4%. As the beer originates from Vysočina region there is fluctuation in this region of 8%. Czech citizens prioritise local beer over imported one<sup>13</sup>.

**Beer consumer base:** Investigations on beer consumption base are not as frequent. One of the most recent years provides the data stating that findings from year 2018 say that the share of people who drink beer was 86% of men that drink beer and in case of women it

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<sup>10</sup> *Czech Republic – Country Commercial Guide | Market Overview*. 2023. Available at: <https://www.trade.gov/country-commercial-guides/czech-republic-market-overview>.

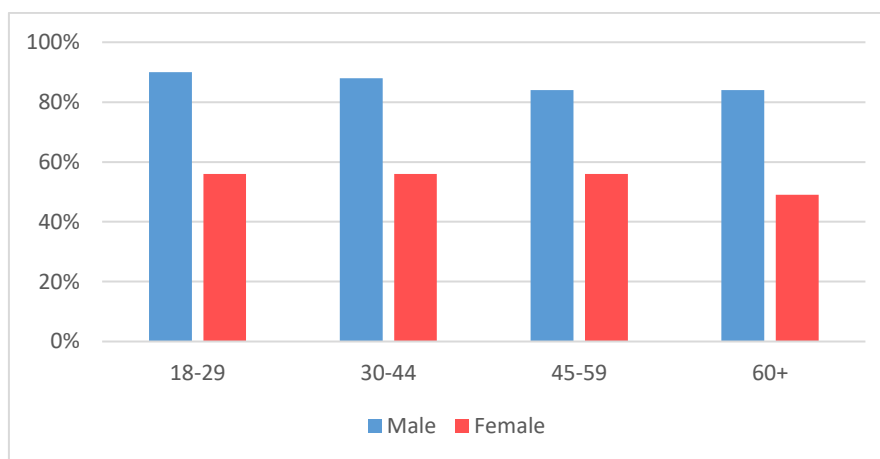
<sup>11</sup> *European Union | Czechia*. Available at: [https://european-union.europa.eu/principles-countries-history/country-profiles/czechia\\_en](https://european-union.europa.eu/principles-countries-history/country-profiles/czechia_en).

<sup>12</sup> JANEBA, T. *Transport and infrastructure*. Available at: <https://www.czechbusinessguide.com/content-of-book-top-sectors-for-investment-transport-and-infrastructure/>.

<sup>13</sup> MULLER, M. *Czech Beer Special: Volume & Value data shows rising consumption and price with strong regional leaders crushing the market*. 2023. Available at: <https://www.sharpgrid.com/ontrade-insights-eng/czech-beer-special>.

was almost half of all women who reside within the Czech Republic. In Figure 4 which can be found on the next page, it shows that men in the Czech Republic drink overall more beer when compared to women, however the consumption of beer starts to slowly decrease with aging. This is mostly noticeable where in first two age categories which are 18 years old to 44 years where the consumption is remaining relatively similar and slightly higher decrease is noticeable from men of age group 45 and older. For women the consumption remains relatively the same regardless of age and it begins to decrease for age category older than 60 years old. On average a Czech person will drink about 7.6 pints of beer<sup>14</sup>.

**Figure 4: Share of beer consumption by age categories in year 2018**



Source: Own processing, 2024

**Labour force:** the labour force varies from region to region. Especially when comparing north, east and the central regions. Unemployment is generally low. The Ministry of Labour and Social Affairs states that the unemployment share is about 3.7% as of March 2023, but it generally rises slightly during the winter season and decreases with arrival of spring. Large number of workers originate from neighbouring countries: Poland (52 072) and Slovakia (236 430). There can be found workers from also countries further away such as Romania, Bulgaria and Ukraine<sup>15</sup>.

**Economic policy reforms:** The Czech Republic is dealing with various economic issues. There are several reforms that are in talk as of now. The first example is that the process to be able to start running business is overly lengthy and is holding back possible entrepreneurs to operate. Given recommendation to this issue is to shorten the time the entire

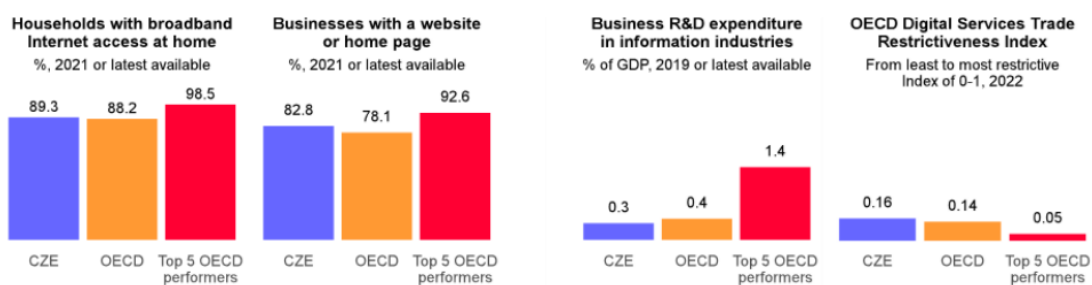
<sup>14</sup> Český svaz pivovarů a sladoven. 2018. Available at: <https://ceske-pivo.cz/tz/muzi-vypiji-takrka-osm-pullitru-piva-tydne-zeny-skoro-tri>.

<sup>15</sup> EURES | Labour market information: Czechia. 2023. Available at: [https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-czechia\\_en](https://eures.europa.eu/living-and-working/labour-market-information/labour-market-information-czechia_en).

process takes and simplify it. Citizens of the Czech Republic possess the basic digital skills; however, economy of the country does not properly apply the technology through its specialists and local businesses are behind on implementation of more complex and refined technologies, AI and big data. Making them fall behind. According to OECD's economic policy reforms, the solution to this is to invest more in this sector and to improve the area of IT sectors by employing specialised people, VET and to employ modern education.

A third example is that the working force of the country leaves to retire way too early from age of 60, therefore the solution to that is to raise the retirement age and the early retirement age. The final example is that usage of coal to produce electricity leaves high levels of greenhouse gas emissions. The solution to this would be to increase investments for renewable energy and energy that has low emissions to be more efficient<sup>16</sup>.

**Picture 1: Performance and digital transition of Czech Republic compared to OECD**



Source: OECD

Picture 1 shows Figures of performance in year 2021 with the most recent available data of Czech Republic compared to OECD where on the left side are households who have access to internet at home and businesses with its usage of basic digital implementation. Figures on the right side are showing the expenditures of businesses into information industries and how digital service is restricted. It can be seen in the household section there is room for improvement when compared to top 5 OECD performers but overall, the percentage of 89.3% is quite high. In the case of businesses that have homepage or website, for Czech Republic the percentage is higher by almost 5% when compared to OECD which is good sign. The issues are seen on the figures on the right where there is a large gap when comparing the business R&D expenditures of Czech Republic to top OECD performers. The

<sup>16</sup> OECD. *Economic Policy Reforms 2023*. 2023. Available at: [https://www.oecd-ilibrary.org/economics/economic-policy-reforms-2023\\_42e34215-en;jsessionid=rMEoDZr\\_rkNrg6K\\_iEjN8KQpMuJCvDi7P-zSZ2Ou.ip-10-240-5-90](https://www.oecd-ilibrary.org/economics/economic-policy-reforms-2023_42e34215-en;jsessionid=rMEoDZr_rkNrg6K_iEjN8KQpMuJCvDi7P-zSZ2Ou.ip-10-240-5-90).

last figure on the right shows that Czech digital service trade restrictions are the highest with an index of 0.16 as of 2022.

**Monetary policies:** One of the main actors for Czech Economy is Czech National Bank, shortly CNB which is an independent institution. Its task is to assure that there is financial stability and to maintain a stable price. In addition, CNB promotes general economic policies issued by the Government which result in economic growth. In order for price to be stable, interest rates need to be controlled accordingly to keep the inflation level low. As the Czech Republic became a member of the EU, it is currently under accession to euro area. It will in the future adopt the Euro currency<sup>17</sup>.

**Fiscal policies:** Currently the country is slowing down due high inflation which has an impact on public finance. There were extraordinary pension indexations last year and the one since June of 2023. State budget and state funds draft is influenced by various factors such as question regarding development of energy prices. The result of the public finances of the country is determined by performance of state budget. Estimation for end of the year 2023 is -3.6% with expectancies of improvement in the following year -2,2% (improvement of 1.4%). The draft for 2024 for state funds resulting of 270 billion CZK. Where 252 billion would go to state budget and remaining 18 billion into State Transport Infrastructure Fund. The result of state fund resulting in a deficit also means that the debt is expected to increase by 2% from 2023 and 2024<sup>18</sup>.

**Beer policies:** Consumption of alcohol per capita in the Czech Republic continues to increase where beer is the most popular commodity from alcohol. The policies regarding alcohol aren't updated as frequently as the last time they were updated were of 2008. There is an Umbrella document which is a long-term program that aims to prove health of Czech population, reduce harm caused by usage of drugs, alcohol, tobacco. Decrease consequences by overusing alcohol tobacco and psychoactive drugs. Additionally, in the Czech Republic there is a highway code that a person driving is forbidden from drinking alcohol during driving and drinking it before driving. When asked by police officer to undergo alcohol breath test and the BAC limit is 0.00 per mile regardless of vehicle. Within Act No. 379/2005 Coll., alcoholic drink is defined as any beverage with amount more than 0.5% of ethyl

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<sup>17</sup> CNB Czech National Bank | Monetary policy of the Czech National Bank. Available at: [https://www.cnb.cz/en/about\\_cnb/mp-factsheet-en/](https://www.cnb.cz/en/about_cnb/mp-factsheet-en/).

<sup>18</sup> Fiskální výhled ČR – listopad 2023. 2023. Available at: <https://www.mfcr.cz/cs/rozpocetova-politika/makroekonomika/fiskalni-vyhled/2023/fiskalni-vyhled-cr-listopad-2023-53585>.

alcohol. Furthermore, it is prohibited to sell the alcohol to people who are under 18 years old<sup>19</sup>.

**Table 3: Czech Republic and Germany's nominal GDP and growth rate in %**

year	GDP GER in mil EUR	GER growth rate (%)	GDP CZ in mil EUR	CZ growth rate (%)
2003	2211570	-0.7%	88,665	3.6%
2004	2262520	1.2%	96,515	4.8%
2005	2288310	0.7%	110,314	6.6%
2006	2385080	3.8%	124,577	6.8%
2007	2499550	3%	139,022	5.6%
2008	2546490	1%	162,090	2.7%
2009	2445730	-5.7%	149,530	-4.7%
2010	2564400	4.2%	157,883	2.4%
2011	2693560	3.9%	165,229	1.8%
2012	2745310	0.4%	162,626	-0.8%
2013	2811350	0.4%	159,498	0.0%
2014	2927430	2.2%	157,838	2.3%
2015	3026180	1.5%	169,533	5.4%
2016	3134740	2.2%	177,445	2.5%
2017	3267160	2.7%	194,103	5.2%
2018	3365450	1%	211,003	3.2%
2019	3474110	1.1%	225,596	3.0%
2020	3403730	-3.8%	215,895	-5.5%
2021	3617450	3.2%	238,203	3.5%
2022	3876800	1.8%	276,241	2.4%
<b>Mean</b>	<b>2877346</b>	<b>1.205%</b>	<b>169090.4575</b>	<b>2.54%</b>

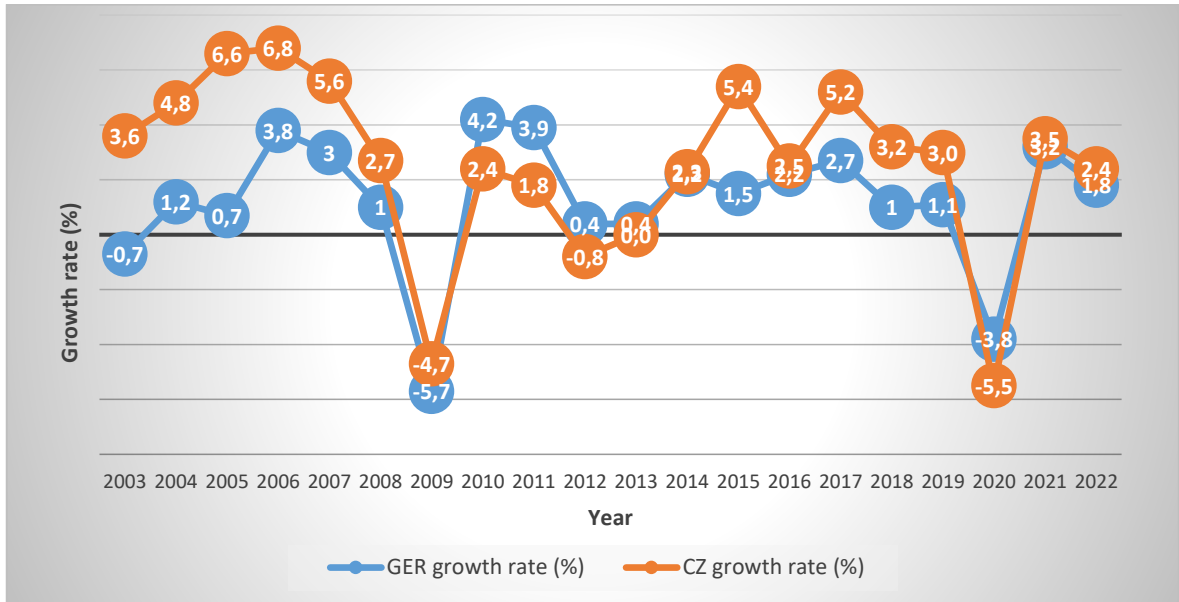
Source: Own processing according to CZSO, 2024

Table 3 shows yearly values of total GDP of Czech Republic and Germany in nominal prices from 2003 to 2022. In purpose of comparison to Germany, Czech GDP is provided in EUR currency. The average growth rate of GDP for Czech Republic is 2.54%. The average growth rate % for Germany is 1.205% which is lower than the Czech Republic in this case. Based on an observing period the increase of GDP in the case of Czech Republic went from 88 665 mil. EUR in the year 2003, up to 276 241 mil. EUR in 2022. For Germany the GDP in the first observed year was equal to 2 211 570 and in 2022 it reached up to 3 876

<sup>19</sup> Ministry of Health of the Czech Republic | Alcohol policies in the Czech Republic. 2008. Available at: [https://ec.europa.eu/health/ph\\_determinants/life\\_style/alcohol/Forum/docs/ev\\_20081013\\_co04\\_en.pdf](https://ec.europa.eu/health/ph_determinants/life_style/alcohol/Forum/docs/ev_20081013_co04_en.pdf).

800. Germany as a larger country has much higher values of GDP compared to Czech Republic and therefore the average growth rate is smaller as it grows slower.

**Figure 5: GDP Growth rates of Czech Republic and Germany 2003 – 2022 (in %)**



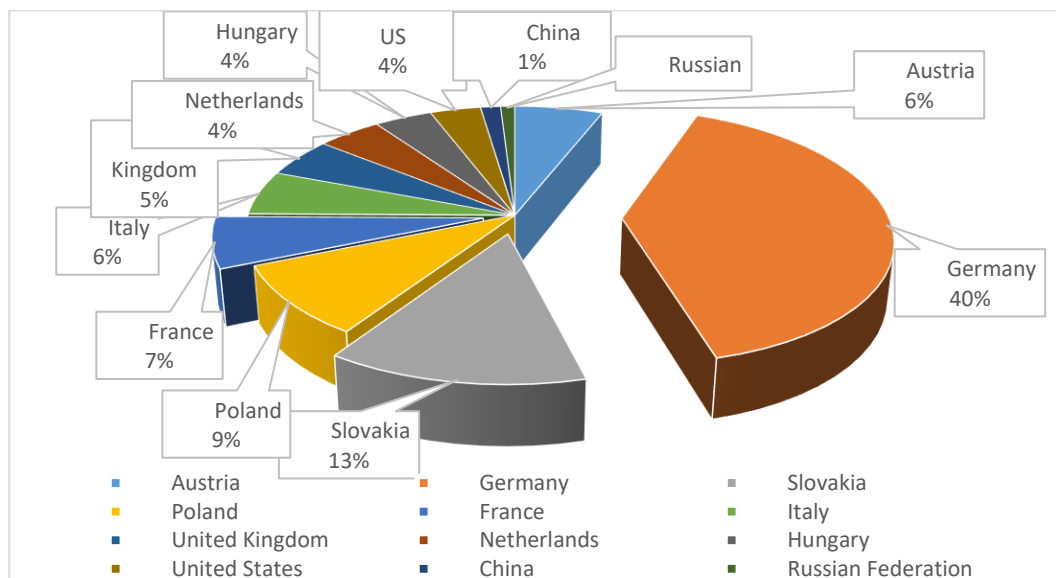
Source: Own processing, according to CZSO

As it can be seen in the above Figure 5, There are two big negative fluctuations in GDP growth rate. One is visible in the year 2009 which was when both countries were undergoing a global recession. The second spike may be observed in the year 2020 which is when the COVID-19 pandemic happened.

#### 4.2.2 Czech Exports

For the Czech Republic the exports are most significant when doing business with the neighbour countries.

**Figure 6: Czech Republic export destinations for 2022**



Source: Own processing, according to CZSO

Figure 4 shows a pie chart for better illustration of destinations of Czech export. Majority of Czech exports went to Germany which was about 40% of total exports in the year 2022. The second largest export destination was Slovakia with 13% and then third was Poland with 9%. The majority of Czech exports are to countries who are members of the European Union and the Common market where no trade barriers are present. However, in 2022 the Czech Republic exports also to non-EU countries such as United Kingdom, the United States and China. The volume of exports from the Czech Republic can be found in the Table 4 below.

**Table 4: Export and its destinations from the Czech Republic year 2022**

	export in billion CZK	proportion of export
Germany	1,329,286	40%
Slovakia	447,664	13%
Poland	308,570	9%
France	216,536	7%
Austria	200,146	6%
Italy	186,598	6%
United Kingdom	165,905	5%
Netherlands	148,336	4%
Hungary	132,063	4%
United States	115,230	4%
China	45,557	1%
Russian Federation	32,250	1%
total	3,328,141	100%

Source: Own processing according to CZSO, 2024



It is for certain that for Czech Republic Germany is its most important partner to trade with. Table 4 shows data from the year 2022 that around 40% of Czech's exports went to the Germany and the exports generated 1 329 289 billion CZK to the Czech economy. In second place is Slovakia and when comparing exports to Slovakia the export revenues were three times less than those to Germany.

**Table 5: Czech beer exports and export growth rates in 2003-2022**

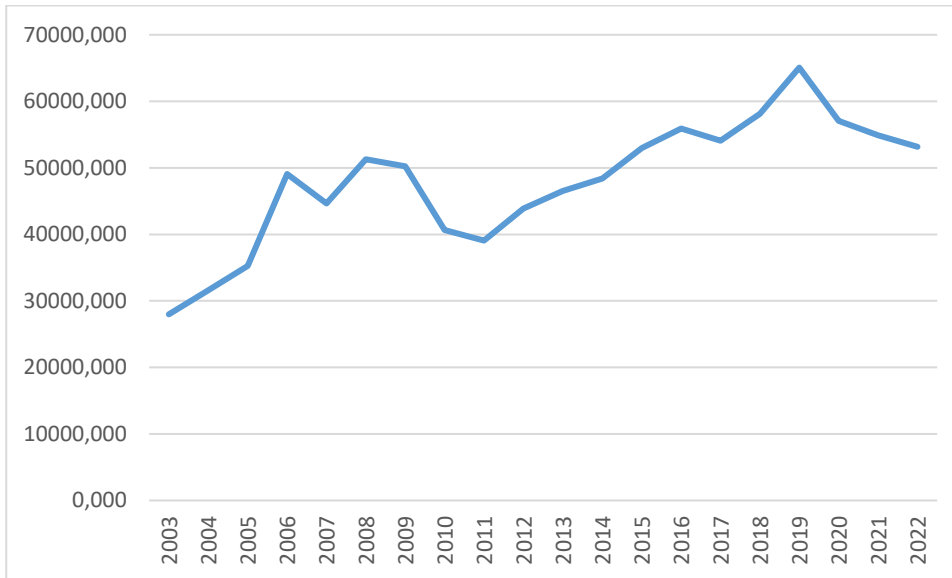
<b>YEAR</b>	<b>Czech beer exports (EUR thous.)</b>	<b>Export growth rate</b>
2003	27978.000	0.900
2004	31619.000	0.682
2005	35279.000	0.507
2006	49058.000	0.084
2007	44630.000	0.191
2008	51274.000	0.037
2009	50230.000	0.059
2010	40673.000	0.307
2011	39078.000	0.361
2012	43862.000	0.212
2013	46508.000	0.143
2014	48418.000	0.098
2015	52953.000	0.004
2016	55923.000	-0.049
2017	54100.000	-0.017
2018	58102.000	-0.085
2019	65072.000	-0.183
2020	57071.000	-0.068
2021	54888.000	-0.031
2022	53172.000	0.000

Source: Own processing, 2024

In the selected period of twenty years from 2003-2022 the export growth rate was positive except for 5 cases. This is visible in Table 5, where negative growth rates were found in year 2016, 2017, 2019 and 2021. This shows that in the observed time frame, the exports of beer experienced a relatively steady growth in export value from 2003 to 2015 with more of the negative values in the later year, in this case 2016 to 2022. These values apart from a change for demand of Czech beer being exported to Germany on the German market may also be affected by the strength of the Czech Crown. During the first half the

Czech Crown was experiencing the tendency of appreciating which would result in Czech Republic gaining more from possibly a similar amount of beer being exported with the growth rates post 2016 being more compatible with the depreciation trend of the Czech Crown.

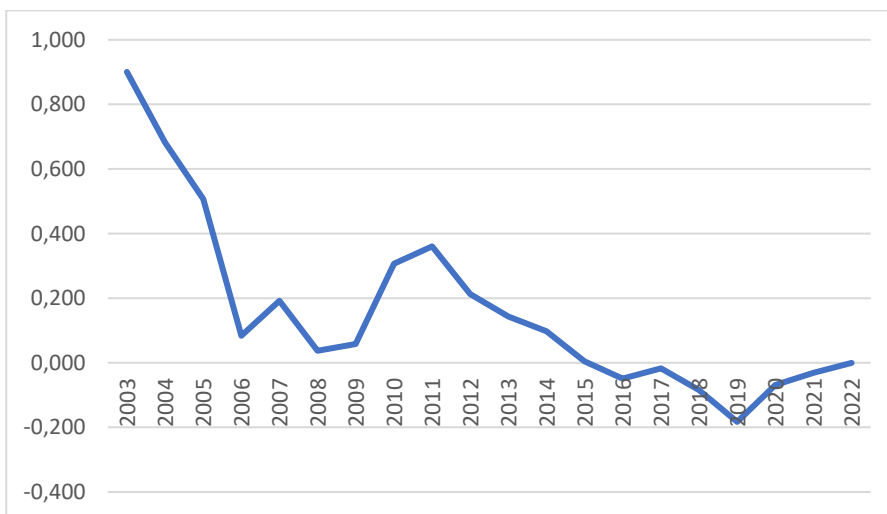
**Figure 7: Czech Beer exports development in period 2003-2022**



Source: Own processing according to CZSO, 2024

Figure 7 shows that there were many changes in trend. From the first observatory year 2003 there has been increase up till year 2006 with frequent fluctuations and from 2011 it began to rise steadily up till year 2019 and had been decreasing since.

**Figure 8: Yearly Czech beer export growth rate to Germany 2003-2022**



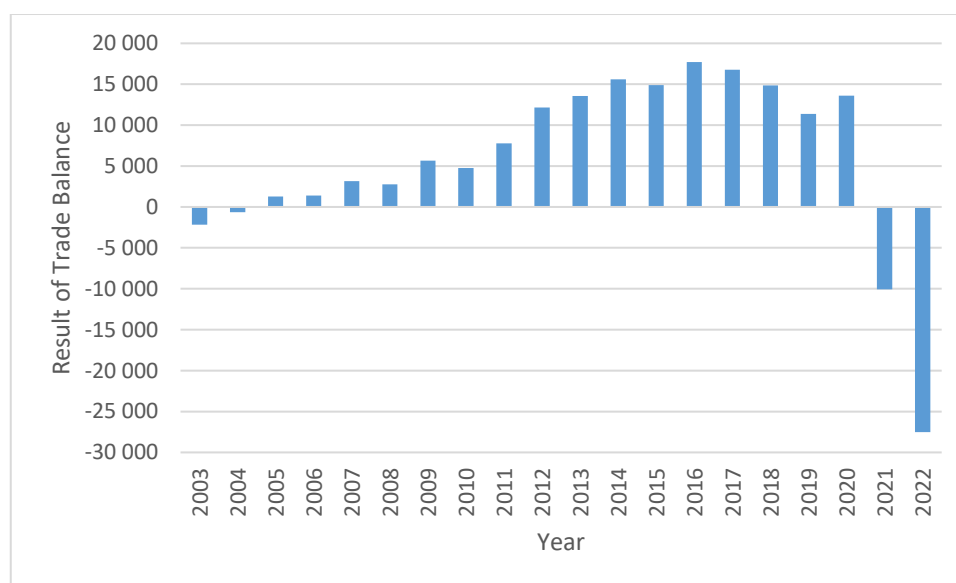
Source: Own processing according to CZSO

It is possible to see the change in the growth rates in Figure 8 more clearly, with the growth rates slowing down since the year 2003 with the largest steady decrease until 2006. The relative maximum occurs in the year 2011 and the relative minimum in the observed time period takes place 8 years later in 2019. The relative minimum being in 2019 is somewhat of an anomaly as the expected relative minimum if any would be in 2020 during the first wave of the pandemic, however this took place in the year prior.

### 4.2.3 Czech Trade balance

A common indicator of how well a country is doing would be trade balance. Trade balance is a result of Exports minus imports. When the result of trade balance is positive then it means the trade surplus is present. In case of a minus value of trade balance then the result is trade deficit.

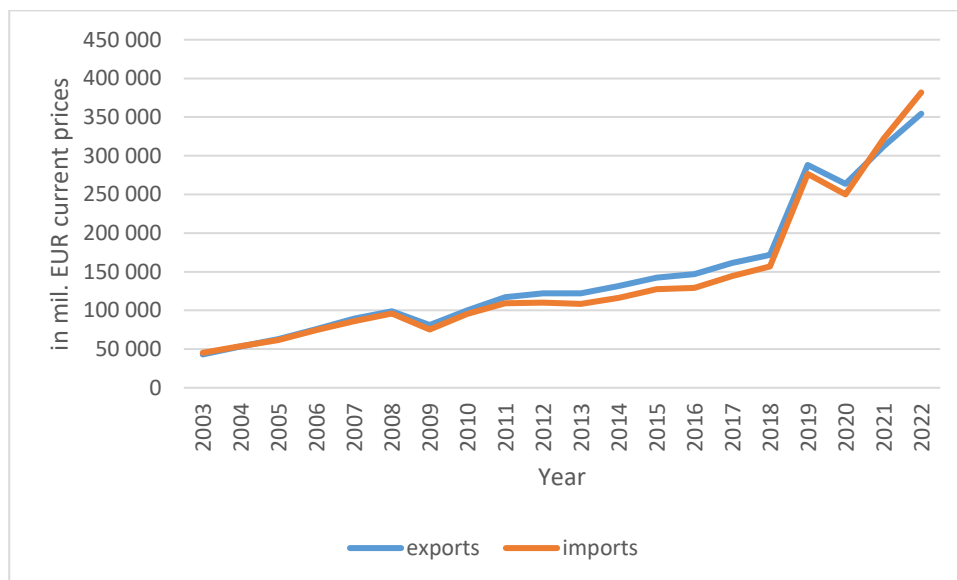
**Figure 9: Trade balance for Czech Republic 2003-2022**



Source: Own processing according to CZSO, 2024

Above Figure 9 shows trade balance in the Czech Republic. There is trade deficit for last two years 2021 and 2022 and first two observatory years 2003, 2004. The biggest disparity was in the most recent year 2022, equal to -27 536. This means that the country is importing more than it is exporting. The highest value of TB surplus is visible in year 2016 with 17 732 mil. EUR in current prices.

**Figure 10: Trade balance, import and export of Czech Republic 2003-2022**



Source: Own processing according to CZSO, 2024

In the Figure 10 the values of import and export in the Czech Republic are very similar having steady slow growth until year 2018. Since the year 2011, there is increase in exports and this shifts from the year 2020 and imports began to dominate for the last two observatory years 2021-2022. All the data of export and import and their trade balance in the respective period 2003-2022 are displayed under in the Table 6.

**Table 6: Czech Trade balance in 2003-2022 in million EUR in current prices<sup>20</sup>**

year	exports	imports	Trade balance
2003	43,053	45,236	-2,183
2004	53,252	53,901	-649
2005	62,784	61,499	1,285
2006	75,699	74,305	1,394
2007	89,396	86,238	3,158
2008	98,915	96,136	2,779
2009	80992	75322	5,670
2010	100319	95544	4,775
2011	117057	109288	7,769
2012	122244	110078	12,166
2013	122186	108622	13,564
2014	131806	116209	15,597
2015	142369	127486	14,883

<sup>20</sup> Note: from year 2019 the data was not available in EUR currency therefore it was converted from CZK to EUR and is therefore in decimals.

2016	147004	129272	17,732
2017	161284	144491	16,793
2018	171716	156852	14,864
2019	287957.5	276593.3	11,364
2020	263599.2	249982.01	13,617
2021	312063.4	322140.85	-10,078
2022	354348.5	381884.65	-27,536

Source: Own processing according to CZSO, 2024

Table 6 displayed above provides values of exports, imports and calculated trade balance of the Czech Republic. It shows that the negative trade balance was found in four years. In the years 2003, 2004 and last two observatory years 2021 and 2022 those are values which had its trade balance result in deficit. In all the other years the calculated results were positive indicating a surplus. That means the Czech Republic is an export-oriented country. The found deficits are indicating economic problems in the country.

**Table 7: Importance of the Trade in beer with Germany on the GDP of the Czech Republic**

Year	Trade balance	Czech GDP EUR mil.	Share of trade in beer with GER on GDP (%)
2003	-2,183	88,665	-0.00246
2004	-649	96,515	-0.00067
2005	1,285	110,314	0.001165
2006	1,394	124,577	0.001119
2007	3,158	139,022	0.002272
2008	2,779	162,090	0.001714
2009	5,670	149,530	0.003792
2010	4,775	157,883	0.003024
2011	7,769	165,229	0.004702
2012	12,166	162,626	0.007481
2013	13,564	159,498	0.008504
2014	15,597	157,838	0.009882
2015	14,883	169,533	0.008779
2016	17,732	177,445	0.009993
2017	16,793	194,103	0.008652
2018	14,864	211,003	0.007044
2019	11,364	225,596	0.005037
2020	13,617	215,895	0.006307
2021	-10,078	238,203	-0.00423
2022	-27,536	276,241	-0.00997

Source: Own processing, 2024

Table 7 indicates that during the observed period only in the years 2003-2004 and 2021-2022 the contribution of the trade in beer with Germany to the Czech GDP was negative. In all other years a positive contribution was observed, with a maximum share close to 0.01 percent of the GDP of the Czech Republic in 2016. Such share shows that this trade is not essential for the Czech economy as a whole however at the same time it is worthy to be analysed.

#### 4.2.4 Next export comparison between Czech Republic and Germany

The comparison of Czech total exports to the world and exports from Germany to the world can be shown in the table 8 below.

**Table 8: Net export comparison between Czech Republic and Germany**

Year	Czech Net export bil. USD	German Net export bil. USD
2003	-1.52	94.41
2004	0.75	146.36
2005	3.19	148.04
2006	4.26	162.19
2007	4.6	231.95
2008	5.12	227.48
2009	8.08	170.94
2010	6.39	178.9
2011	8.68	184.02
2012	9.95	215.16
2013	12.05	215.01
2014	13.26	257.4
2015	11.18	255.01
2016	14.98	255.96
2017	16.45	261.64
2018	14.79	242.35
2019	15.12	219.79
2020	16.61	218.91
2021	8.34	226.56
2022	-0.3	83.74

Source: own processing according to CZSO

The Table 8 shows net export comparison of Czech Republic with Germany net exports. It is immediately visible that Germany works on a much larger scale in terms of export to import ratios due to the range of the values for Germany ranging from a relative

minimum of 83.74 billion USD in 2022 to a relative maximum of 261.64 billion USD in 2017. However, during the observed time period the trade of balance has constantly remained in the positives for the export showing a healthy tendency for Germany to be exporting more constantly. This means that the country has a steady inflow of foreign currencies which help the economy of Germany. On the other hand, Czech Republic experiences negative values of the trade balance, having a larger import than export in the years 2003 and 2022 with the highest deficit being in 2003 with 1.52 billion USD of deficit. The net export of Czech Republic ranges much less than that of Germany, with the relative minimum as stated in 2003 and having a relative maximum 2020 with 16.61 billion USD surplus. This shows that during the events of the first wave of the pandemic that Czech Republic imported less in ratio to its export in comparison to its other years. The correlation conducted for the two variables resulted in  $r = 0.83$ , showing that the two countries have a positive and majorly strong correlation in terms of their trade balance tendencies through the observed last two decades.

#### 4.2.5 Beer Consumption per capita

Further analysis about beer can be done through looking at the consumption per capita. Czech Republic has been the world's leader in beer consumption per capita for 29 years. Table 9 displays the top 10 countries ranked from the highest consumption to the lowest.

**Table 9: Total beer consumption kg/capita in respective countries by ranking in 2021**

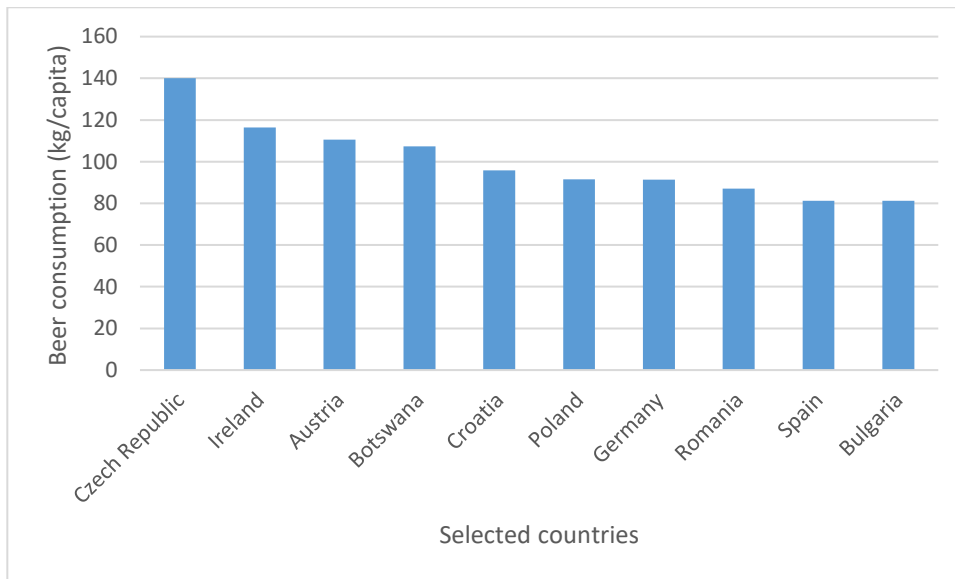
Ranking	Country	Per Capita Consumption (Kg/capita)
#1	Czech Republic	140.12
#2	Ireland	116.33
#3	Austria	110.52
#4	Botswana	107.30
#5	Croatia	95.77
#6	Poland	91.45
#7	Germany	91.30
#8	Romania	87.00
#9	Spain	81.21
#10	Bulgaria	81.15

Source: Own processing according to worldpopulationreview, 2021

The Czech Republic as the Table 9 shows, has the highest per capita consumption for year 2021 with amount equal to 140.12 kg/capita total in that year.

This means a Czech person will yearly consume around 140 kg which is equivalent to same number of litres of beer yearly. One bottle made of glass containing beer has 0.5 litres. By multiplying this by two that makes about 280 beers consumed per year per person. In second place comes Ireland with 116.33 kg/capita and third is Austria with 110.52 kg/capita.

**Figure 11: Total Beer consumption per capita in selected countries 2021**



Source: Own processing according to worldpopulationreview, 2021

As can be seen in Figure 11, the Czech Republic has the highest difference when a compared to country with 2<sup>nd</sup> highest beer consumption per capita. Other countries don't have as noticeable of a difference in the beer consumption per capita.

### 4.3 Time series analysis

The time series indicators will be used to analyse the GDP and the foreign exchange rate of Czech Republic and Kazakhstan. Due to the focus on the effect on Czech economy, the time series analysis tools for exchange rate will be done for specifically Czech Republic.

#### 4.3.1 GDP analysis

The fixed base index analysis for the data for GDP in the years 2003 to 2022 is in Table 10 below.



**Table 10: Fixed base index of GDP of Germany and Czech Republic**

Index	Germany	Czech Republic
GDP	1.627808	2.906584074

Source: Own processing, 2024

The fixed base index shows that since the year 2003, both countries have progressed in their GDP values, as expected, with a higher proportional increase being seen for Czech Republic. The index for the Czech Republic shows a over 290% value in GDP in 2022 compared to the value the country reported in the year 2003. The value for Germany is following behind with almost 163% value in 2022 compared to the value in the first observation period.

The average growth rate index will show the estimated index of how much the GDP is estimated to have grown every year through the entire 20-year observation period. The index is shown in the table below.

**Table 11: Average growth rate index of GDP for Germany and Czech Republic**

Index	Germany	Czech Republic
GDP	0.08139	0.145329204

Source: Own processing, 2024

In Table 11, The index for Czech Republic gives an estimate of an annual increase of almost 15%, whereas the index for the value of annual increase for Germany's GDP is a little over 8% every year. This shows that the GDP in the Czech Republic is consistently rising in proportion faster than the GDP in Germany. However, it is important to note that the GDP of Germany is on a higher basis and thus higher proportional changes would be less possible and realistic.

The chain base index will be applied to the most present value in the data set, meaning the year 2022 and its change since the year beforehand. The index is listed in the table below.

**Table 12: Chain base index of GDP for 2022, Germany and Czech Republic**

Index	Germany	Czech Republic
GDP	0.955929	1.032400014

Source: Own processing, 2024

In Table 12 the data shows that the GDP has slightly decreased in Germany in the year 2022 with a GDP lower by almost 5%, while in Czech Republic the value has increased by over 3%. It is important to note that while the index for Germany shows a decrease while the index for Czech Republic shows an increase, the value is fairly close to the former value in the observation period 2021. Again, setting the fact that Germany has a higher standard to fill.

#### 4.3.2 Exchange rate of Czech Republic time series analysis

The time series analysis using fixed base index, chain base index and the average growth rate index are listed in the table below using data for the foreign exchange rate of the Czech Crown.

**Table 13: Time series analysis tools for CZ Exchange rate**

Index	Czech Republic
Fixed base index	0.79
Chain base Index 2022	0.95
Average growth rate index	0.01

Source: own processing, 2024

The fixed base index shows that the value of the Czech Crown up to the EURO in the observed time period gained in strength as a currency with the CZK matching up to the EURO by a 21% stronger value which is visible in Table 13. This means that 21% of CZK is needed less to exchange it for 1 EURO, showing a tendency for either the CZK to be growing in strength, unless it is the EURO that is growing weaker inversely. The chain base index for the year 2022 shows that in the year 2022, the CZK gained in strength by 5% in ratio with the EURO. In order to calculate the average growth rate index for how much the value of the CZK gained in strength, as was determined by the fixed base index, through the selected observation period, the value used for calculation was 21% or the amount by how much the value dropped in the

20-year time period instead of using the status of the value compared to the original time period. This allows the average growth rate index to represent the value more accurately in terms of the strength of the CZK currency against the EURO. In the selected period, the average growth rate estimated for every year is an increase of a little over 1% in strength of the CZK currency against the EURO. It can be seen that the CZK is slowly becoming a stronger currency in the foreign exchange rate.

#### **4.4 Data preparation**

In order to prepare the econometrics model with selected factors influencing the dependent variable exports of Czech beer to Germany, several selected variables did not have an available data therefore they had to be calculated by hand. Meaning variables as following: Average price of Czech beer exported to Germany and Average price of Denmark beer exported to Germany.

To be able to calculate an average price of beer exported, the total Netto values of beer exported (EUR) to Germany in the given country had been divided by the total volume of beer exported (per litres /kg). In case of Czech's main competitor in terms of beer, Denmark values were available only in DKK, which is the country's local currency, so an additional step was needed where the exchange rate of DKK/EUR was recalculated to EUR.

#### **4.5 Economic and econometric model**

To create the econometric model, an economic model must be made first. The difference between the models is that the econometric model includes structural parameters and a random variable known as the error term  $\varepsilon_{1t}$ , while on the other economic model does not. Error term represents an effect on dependent variable from variables that are not included in the model.

For this paper one-equation model has been selected. Variables, which are included in an econometrics model are one dependent endogenous variable:

- Beer exports from the Czech Republic to Germany ( $y_1$ )

The right side of the equation has predetermined variables which are resembled by factors determining Czech export of the beer. They consist of both lagged and explanatory

variables. There are no lagged variables used in this model and on the position of explanatory were only exogenous variables selected.

For equation independent explanatory variables are:

- Czech foreign exchange rate ( $x_2$ )
- GDP of Germany ( $x_3$ )
- Average export price of beer to Germany from Denmark ( $x_4$ )
- Average export price of beer to Germany from Czech Republic ( $x_5$ )
- Total consumption of beer in Germany ( $x_6$ )

Note: The constant  $x_1$  was selected to be the unit vector.

**Assumptions:**

Increase (/decrease) in Czech foreign exchange rate will result in decrease (/increase) of beer exports from the Czech Republic to Germany.

Increase (/decrease) in GDP of Germany will result in increase in (/decrease) of beer exports from the Czech Republic to Germany.

Increase (/decrease) in Average export price of Danish beer to Germany will result in decrease (/increase) of beer exports from the Czech Republic to Germany.

Increase (/decrease) in Average export price of Czech beer to Germany will result in decrease (/increase) of beer exports from the Czech Republic to Germany.

Increase (/decrease) in Total consumption of beer in Germany will result in increased (/decrease) of beer exports from the Czech Republic to Germany.

**General Economic equation:**

$$y_1 = f(x_2, x_3, x_4, x_5, x_6)$$

**General Econometric equation:**

$$\beta_{1t}y_{1t} = \gamma_{11}x_{1t} + \gamma_{12}x_{2t} + \gamma_{13}x_{3t} + \gamma_{14}x_{4t} + \gamma_{15}x_{5t} + \gamma_{16}x_{6t} + \varepsilon_{1t}$$

### 4.5.1 Correlation matrix

The first step to have a working model is to proceed with testing the strength of independent variables and relationships they have on one other. Correlation is denoted by “r” and if r is equal to 0.75 or higher it is a case of multicollinearity which will be solved through first difference, or the variable will be made into a dummy variable.

**Picture 2: Output of correlation matrix for explanatory variables**

```

Correlation Coefficients, using the observations 2003 - 2022
Two-tailed critical values for n = 20: 5% 0.4438, 1% 0.5614

      exchrte      gdp_ger      totcons_ger      avgprice_dk
      1.0000      -0.6598      0.6833      0.8813 exchrte
              1.0000      -0.9704      -0.6045 gdp_ger
                      1.0000      0.6351 totcons_ger
                              1.0000 avgprice_dk

      avgprice_cz
      -0.4603 exchrte
      0.6852 gdp_ger
      -0.6263 totcons_ger
      -0.4838 avgprice_dk
      1.0000 avgprice_cz
  
```

Source: Software Gretl

Picture 2 above shows multiple cases of strong relationships. Value of r is in absolute values and the largest result was among variables of total consumption of beer in Germany and the GDP of Germany. The procedure was then repeated with the inclusion of a dependent variable to find out which of them is more important to remain in the model.

**Picture 3: Output of correlation matrix compared with the dependent**

```

Correlation Coefficients, using the observations 2003 - 2022
Two-tailed critical values for n = 20: 5% 0.4438, 1% 0.5614

      y      exchrte      gdp_ger      totcons_ger
      1.0000      -0.6702      0.7838      -0.7834 y
              1.0000      -0.6598      0.6833 exchrte
                      1.0000      -0.9704 gdp_ger
                              1.0000 totcons_ger

      avgprice_dk      avgprice_cz
      -0.7077      0.8300 y
      0.8813      -0.4603 exchrte
      -0.6045      0.6852 gdp_ger
      0.6351      -0.6263 totcons_ger
      1.0000      -0.4838 avgprice_dk
              1.0000 avgprice_cz
  
```

Source: Software Gretl

In the Picture 3, were all explanatory variables compared with the dependent variable to find out which one is more important to remain in the model. In the previous step, the two variables had high correlation and therefore one with a smaller value had to be eliminated from the model. The total consumption of beer in Germany was taken out as it had its absolute value equal to 0.7834 which is by 0.0004 smaller than the other variable GDP of Germany.

**Picture 4: Output of correlation matrix with one excluded variable**

```

Correlation Coefficients, using the observations 2003 - 2022
Two-tailed critical values for n = 20: 5% 0.4438, 1% 0.5614

      exchrte      gdp_ger      avgprice_dk      avgprice_cz
      1.0000      -0.6598      0.8813      -0.4603 exchrte
              1.0000      -0.6045      0.6852 gdp_ger
                      1.0000      -0.4838 avgprice_dk
                              1.0000 avgprice_cz
  
```

Source: Software Gretl

As it can be seen, Picture 4 shows the correlation matrix of 4 independent variables and their relationships. The next correlation appeared among the variables: Average price of beer from Denmark and the Czech Foreign Exchange Rate where  $r$  was equal to 0.8813. The same step as in previous case was repeated to compare the explanatory variables with the dependent to see which is more important. Unlike the first case, no more variables will be eliminated however the one of smaller value when compared to dependent will have to be solved through difference or be turned into a dummy variable to allow the model to work.

**Picture 5: Correlation matrix testing with dependent, the second step**

```

Correlation Coefficients, using the observations 2003 - 2022
Two-tailed critical values for n = 20: 5% 0.4438, 1% 0.5614

      y      exchrte      gdp_ger      avgprice_dk
      1.0000      -0.6702      0.7838      -0.7077 y
              1.0000      -0.6598      0.8813 exchrte
                      1.0000      -0.6045 gdp_ger
                              1.0000 avgprice_dk

      avgprice_cz
      0.8300 y
      -0.4603 exchrte
      0.6852 gdp_ger
      -0.4838 avgprice_dk
      1.0000 avgprice_cz
  
```

Source: Software Gretl

Picture 5 which can be seen on the pervious page displayed higher suggests that the explanatory variable which needs to be updated and improved further is Czech foreign exchange rate as its value is 0.6702 which is way smaller than absolute value of average price of beer exported from Denmark to Germany with value of 0.7077. For the variable Czech foreign exchange rate were done differences where the current year was compared with the previous one and the difference of it became the new value. To make the model as informative as possible and taken into account that the most recent year is very important for research the first (oldest) year had to be taken out of from the model for all observations meaning the year 2003. Since this step was taken this changes the original observation period from 20 years to only 19.

**Picture 6: The final correlation matrix output**

```

Correlation Coefficients, using the observations 2004 - 2022
Two-tailed critical values for n = 19: 5% 0.4555, 1% 0.5751

      gdp_ger      avgprice_dk      avgprice_cz      diff_exchr      gdp_ger
      1.0000      -0.5433      0.6450      0.1212
                        1.0000      -0.3732      0.0031
                                1.0000      0.1948
                                        1.0000

```

Source: Software Gretl

As it can be seen in Picture 6, when running the procedure in Gretl again with updated variables being changed from Czech foreign exchange rate to its difference values. This time there are no values in the correlation matrix showing any signs of multicollinearity among the variables. By verifying that no values in the model in the correlation matrix output from Gretl software is higher than value of 0.75 the next step is to proceed with Ordinary Least Squares Method which has shortcut known as the OLSM. This procedure will provide with the values which will complete the econometrics equation for the model and identification of the relationships of independent variables with the dependent variable Czech beer exports from Czech Republic to Germany.

## 4.5.2 Ordinary Least Square Method

Picture 7: Ordinary Least Square Method for dataset

```

Model 1: OLS, using observations 2004-2022 (T = 19)
Dependent variable: y

-----
                coefficient      std. error      t-ratio      p-value
-----
const           13677.3           10498.2           1.303        0.2137
gdp_ger         0.00492869           0.00303073        1.626        0.1262
avgprice_dk    -9035.66              5062.11          -1.785       0.0959 *
avgprice_cz    56044.4              16839.2           3.328       0.0050 ***
diff_exchr     -357.843              972.476          -0.3680     0.7184

Mean dependent var  49047.89  S.D. dependent var  8382.433
Sum squared resid  2.57e+08  S.E. of regression  4288.644
R-squared          0.796410  Adjusted R-squared  0.738242
F(4, 14)          13.69146  P-value(F)         0.000095
Log-likelihood    -182.9695  Akaike criterion   375.9390
Schwarz criterion 380.6612  Hannan-Quinn      376.7382
rho               0.447654  Durbin-Watson     1.102626

Excluding the constant, p-value was highest for variable 7 (diff_exchr)

```

Source: Software Gretl

The OLSM procedure as shown in Picture 7, gives R squared 79.6%. R squared is an initiator for how much was explained through the selected model which is quite a high value, and the model is of good quality that can be also seen with the value of Adjusted R squared equal to 73.8% which puts into consideration also the error in the model and shows the percentage of the explained dependent variable through the input variables. The goodness of fit is good since it is over 70%. Furthermore, the first column from the Gretl output the final equation of the model had been obtained. The econometric model's equation is as follow:

$$y_{1t} = 13677.3 + 0.00492869x_{2t} - 9035.66x_{3t} + 56044.4x_{4t} - 357.843x_{5t} + \varepsilon_{1t}$$

## 4.5.3 Econometric verification

Based on the model in the section above, the following relationships are created:

- When the Gross Domestic Product of Germany increases by 1 million EUR, the quantity of Czech beer exports to Germany will also increase by 0.00492869 thousand EURO, thus 4.928 EURO ceteris paribus. Although, a relatively smaller number, it stands to reason that in an instance where Germany generates a larger



GDP for itself, it will be in a better position to import from other countries or in the case of this thesis, to import Czech beer from Czech Republic.

- When the average export price of Danish beer to Germany decreases by 1 unit meaning that per litre/kg, the quantity of Czech beer exports increases and continues to rise by 9035.66 thousand EUR *ceteris paribus* until the moment when average prices of Czech and Danish beer reach similar levels. While this relationship seems inverse of what it should be, it is worth mentioning that the relationship in the model perceives the relationship as in that the average price of Danish beer to Germany increases so the average quantity of Czech beer decreases. While there are external factors that very well may be acting upon the relationship in this case, such as a factor of preference from the side of Germany and what is more demanded on its market which would not be quantified in this model, it is possible for an inverse relation between the dependent variable and the independent variable to be taking place. Moreover, the differences in price at the beginning of observation period were very high in the Favor of Czech beer.
- The model shows that although the average export price of Czech beer to Germany increases by 1 EURO, the amount of Czech beer exports increases by 56044.4 thousand EUR *ceteris paribus*. This fact as it may be viewed as different than would be expected, is possible to be taking place due to an increasing interest in Czech beer as a result among other, the competitive advantage of the Czech beer, although decreasing as a result of its lower average price compared to the main competitors. This means that while it is more expensive for German consumers to import beer from the Czech Republic, it is still a better deal than other imports from different competitors. Nevertheless, it seems that this price bumper has disappeared during the latest years, as seen in the case of the Danish average price of beer being exported compared to the Czech average price of beer in the data model.
- When the Czech foreign exchange rate increases by 1 unit in the rate of EURO to the Czech Koruna or in other words the Czech Koruna loses value by 1 unit to the EURO, the quantity of Czech beer exports decreases by 357.843 thousand EUR *ceteris paribus*. While this does not match the previously stated assumption, the following is a possible justification. During the observed period the opposite trend was witnessed. So, the strengthening of the crown to the Euro while at the same time increase that of Czech exports to Germany. This relation is possible to be read in the

way that other factors prevail appreciation of the Czech crown resulting in the increase of the share of Czech beer exports to the German market.

- Under the assumption that all factors were to be equal to 0, then the value for dependent Czech beer exports to Germany are equal to 13677.3 in EUR (thousands) ceteris paribus.

Comparing the created relationships with the first made assumptions is interesting that in the case of Average price of beer from Denmark raising the quantity of Czech beer exports is starting to decrease. A possible explanation of that could be that for Czech Republic, Germany is the main export destination, however it is not the other way around for Germany. Germany mostly enjoys and prioritises exporting the beer from Denmark. Therefore, the possible justification of this cause could be that Germany prefers to buy beer its citizens enjoy more regardless of the price change.

Observed development showed a decrease of the average exported beer to Germany from Denmark with a general increase of Czech beer exports to Germany. This would suggest, that because of the success of Czech beer in the German market there was a pressure on the price of beer from Denmark, until it reached price levels similar to of Czech beer. This can also be visible in the Figure 12 on the next page.

**Table 14: Average prices of beer exports from Czechia and Denmark to Germany in EUR, 2003-2022**

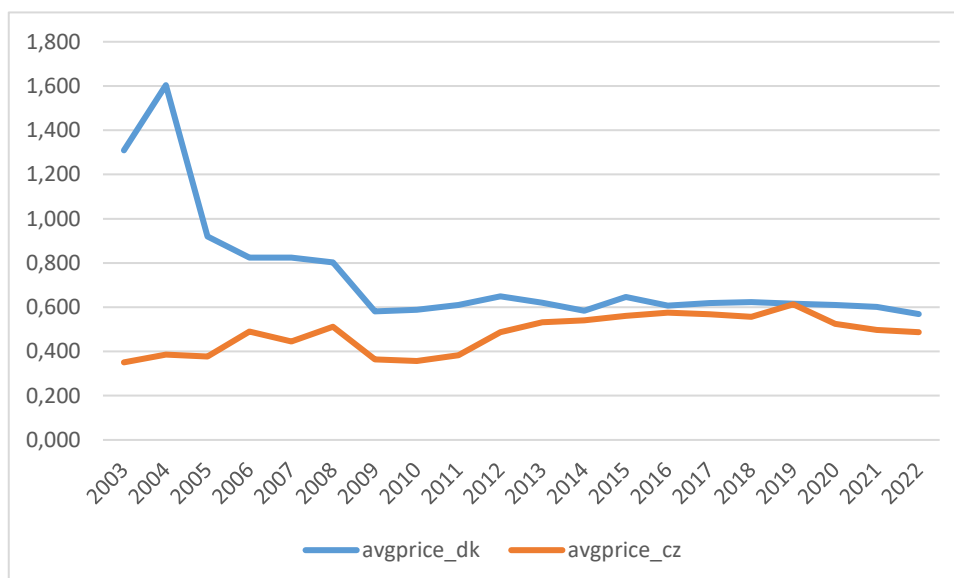
Year	Average Danish beer export price to Germany (EUR)	Average Czech beer export price to Germany (EUR)
2003	1.309	0.351
2004	1.604	0.386
2005	0.920	0.377
2006	0.824	0.490
2007	0.824	0.446
2008	0.803	0.512
2009	0.582	0.364
2010	0.588	0.357
2011	0.610	0.384
2012	0.650	0.487
2013	0.620	0.533
2014	0.584	0.540
2015	0.647	0.561

2016	0.607	0.575
2017	0.619	0.568
2018	0.623	0.556
2019	0.615	0.613
2020	0.611	0.524
2021	0.601	0.498
2022	0.569	0.487

Source: Own processing

The highest values of average export prices of Danish beer were in the second observatory year 2004 with value of 1.604 EUR per litre/kg while in case of Czech beer the average export price was highest in 2019 0.613 this can be visible in the above Table 14.

**Figure 12: Average beer exports prices Czechia and Denmark to Germany in EUR**



Source: Own processing

In accordance to Figure 12, Czech and Danish average export price of beer is starting to have similar prices since the year 2014 up till 2022. The time frame of 2003 to 2022 is in accordance with the two decades since the Czech Republic entered the EU (2003). The average export price of beer from Czech Republic to Germany is having slow but steady growth with small fluctuation after year 2008 where price slightly went down and began to slowly increase. However, the competitor of Czech Republic, Denmark, has its prices throughout the years mostly decreasing.

#### 4.5.4 Statistical verification

Using the Ordinary least squares method inter calculation method, the Statistical significance testing is shown in Picture 7. The calculated t-value is compared to the critical t-value for the model at the rate of alpha 0.05 with the degrees of freedom being 18 since the model used for the econometrics lost 1 observation period due to the utilization of first difference to resolve the multicollinearity.

In Terms of hypothesis testing the  $H_0$  states that the data model does not have any relationship between the variables with the  $H_1$  the alternative hypothesis states that there is a relationship. On the set alpha 0.05 (95%) it was found out that only one value meets this criterion. And that is the variable Average export price of beer from Czech Republic to Germany which is statistically significant. Through selected hypothesis: The Average export price of Czech beer to Germany is the main determinant of (dependent) Czech beer export to Germany. From the picture 7 above it is seen that the variables of average export price of Czech beer exported to Germany has a p-value of 0.005, meaning the p-value is lower than the set alpha 0.05 (additionally lower than even 0.01) this means that it is possible to reject the null hypothesis with over 99% certainty. This is in accordance with the aims of the thesis as it shows that the average beer price of Czech beer to Germany has a major contributing factor to the model, especially the dependent variable (export of Czech beer to Germany).

From the Gretl output in picture 7 it can be further seen that the Schwarz criterion value is very high going over three hundred, 380.6612 to be precise. The smaller the value for Schwarz criterion the better fit model from the perspective of statistics. However, as this is a single model selected for analysis as given in the assignment therefore it was not compared to other models which explains why the value is this high.

#### 4.5.5 Heteroskedasticity testing

To test the data model being analysed for Heteroskedasticity and if there is a significant systematic relationship between squared and independent variables. The results are listed in Picture 8 below using white's test.

**Picture 8: Heteroskedasticity testing using White's test**

```
White's test for heteroskedasticity
OLS, using observations 2004-2022 (T = 19)
Dependent variable: uhat^2
```

	coefficient	std. error	t-ratio	p-value
const	4.89070e+09	3.14354e+09	1.556	0.1947
gdp_ger	-2686.53	1616.52	-1.662	0.1719
avgprice_dk	-4.87896e+09	4.82743e+09	-1.011	0.3693
avgprice_cz	3.01329e+09	2.94270e+09	1.024	0.3637
diff_exchr	-4.58676e+06	1.88521e+08	-0.02433	0.9818
sq_gdp_ger	0.000225436	0.000145724	1.547	0.1968
X2_X3	1424.18	1264.45	1.126	0.3230
X2_X4	690.477	949.604	0.7271	0.5074
X2_X5	1.82700	28.5668	0.06396	0.9521
sq_avgprice_dk	9.34121e+08	1.15114e+09	0.8115	0.4626
X3_X4	-1.33338e+09	2.87425e+09	-0.4639	0.6668
X3_X5	-7.45669e+07	2.59299e+08	-0.2876	0.7880
sq_avgprice_cz	-3.89110e+09	4.46033e+09	-0.8724	0.4322
X4_X5	8.24717e+07	2.10167e+08	0.3924	0.7148
sq_diff_exchr	-2.51033e+06	8.61293e+06	-0.2915	0.7852

Unadjusted R-squared = 0.816008

Test statistic:  $TR^2 = 15.504143$ ,  
with p-value =  $P(\text{Chi-square}(14) > 15.504143) = 0.344583$

Source: Software Gretl

The test shows that the p-value has a value of 0.3445. From this result it can be stated that the calculated p-value is larger than the alpha that was put to 0.05, meaning that the null hypothesis stands and there is no heteroskedasticity in the data thus it has homoscedasticity. This means that there is no detected relationship between the squared residuals and the independent variables of a significant level. Furthermore, when it comes to the respective selected variables for the model, according to the gretl output in picture 8, all values are in degree of accordance with their p-values being larger than 0.05, thus showing further reliability.

## **5 Results and Discussion**

Beer has played a big role in Czech Republic. Its development underwent many changes in the brewing process. Comparing to the source of the Czech embassy in Germany that states a smaller export of Czech beer to Germany in the years 2022, with sourcing from the Czech statistical office stating a 17.3% of Czech beer export heading towards Germany is matched with the findings in the analysis of the growth rates of Czech beer exports to Germany on a yearly basis. While the values are much lower than in the previous decade, the export values in 2022 show an increase in the trend. With over 17% being a somewhat significant amount, it can be said that the Germany is a significant export destination in terms of Czech beer and as for Czech breweries, it is an important factor making up their demanded values.

This goes in step with the findings from the reports of the Czech Statistical office which states that 40% of export that are sent out from Czech Republic are headed towards Germany, this means that while for Germany the Czech Republic may not be the strongest trading partner but from the point of view of the Czech Republic, Germany is definitely a crucial trade partner in terms of export partners. Almost half of the exports of Czech Republic is a strong enough number, that if the export destination would be removed, the Czech Republic's inflow of foreign currencies would be significantly lowered to the point that Czech Republic would experience net export deficits more often than what was analysed during the actual comparison of the net exports of Czech Republic and Germany in the last two decades. This would end up pushing the central bank to end up depreciating the Czech Crown to incentivise an increase in export attractiveness to foreign countries with stronger currencies.

### **5.1 Findings from Econometrics model**

The interesting findings about Czech foreign exchange rate during the observed period 2003-2022, Czech beer exports to Germany have showed high level of resilience to the strengthening of the Czech crown compared to Euro. Among the factors influencing it can be abolishment barriers of trade after Czech Republic became a member of the European Union, lower level of prices of the Czech beer at the beginning of the observed period among other. The question is whether this resilience

will continue in the future. The data from last 4 years suggest that the price competitiveness was lost and thus the exchange rate would become more important.

The variable deemed as most statistically significant was the average price of Czech beer being exported to Germany. The finding did not go along the assumed criteria as through the econometric model the result estimated an increase in beer exports to Germany upon an increase in the average price of Czech beer being exported to Germany. The increasing interest in Czech beer due to the competitive advantage of the Czech beer compared to the other trade options on the international market, even though it is decreasing as a result of its lower average price compared to the main competitors. The results allow an illustration of the situation of the international market of beer for import to Germany in a way where it means that while it is more expensive for German consumers to import beer from the Czech Republic, it is still a better deal than other imports from different competitors. However, it seems that this price bumper has disappeared during the latest years, as seen in the case of the Danish average price of beer being exported compared to the Czech average price of beer.

## **5.2 Recommendations**

Due to the gloomy prospects of the Czech beer on the German market, a possible action to undertake from the side of the Czech breweries could be to utilize new marketing strategies and target new consumer groups like women, drinkers of non-alcoholic beer and consumers of alcoholic beverages in the alternative places like clubs rather than pubs. Another possibility outside of the scope of this thesis is to increase the focus on the non- alcoholic beer where the Czech breweries have much to offer. These actions could result in maintaining and possibly increasing the share of the Czech beer on the German market.

## 6 Conclusion

Concerning the future development, it is possible to mention that competitive advantage of the Czech beer that means price, was lost during recent years. This might be one of the reasons that exports of Czech beer to Germany have decreased since 2018 (table dependent y alone). In such case, in the perspective of the usefulness of this thesis, it can be recommended that Czech breweries and exporters should strive to focus on other means other than price to address German consumers including shifting to a premium sector, new groups of consumers (design of bottles) and marketing in general.

The set hypothesis, The Average export price of Czech beer to Germany is the main determinant of (dependent) Czech beer export to Germany was proven to be truth while being the only significant variable on the selected alpha 0.05.

In comparison the effects of the price development of the beer produced by the main competitor (Denmark), the price did not influence the sales of Czech beer in the years where the Danish beer was on average much more expensive than the Czech beer. As the price difference has become much narrower it is reasonable to expect that this independent variable in the model will start to influence the sales of Czech beer more significantly as this margin of difference lessens.

A similar influence can be predicted to the variable of the total consumption of beer on the German market. While in the past, the decrease of consumption might have slowed down the rise of the exports of the Czech beer to Germany, the shrinking market of beer should have a negative impact on Czech beer in the future with the highest probability taking into account that this trend has been observed during the latest years of the observation period.

The continuation of the appreciation of the Czech Crown would naturally increase pressure on the average price of Czech beer. This would result in a further decrease of the Czech beer's competitiveness on the German market.

In conclusion, the analysed data show that the impulses for the increase of Czech beer to Germany that were in place since the year 2003 have probably run their course. Unless there will be a new positive impulse, Czech breweries will with the highest probability face a decrease in their share on the German market.



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## 8 List of pictures, tables, graphs and abbreviations

### 8.1 List of pictures

Picture 1: Performance and digital transition of Czech Republic compared to OECD .....	36
Picture 2: Output of correlation matrix for explanatory variables .....	53
Picture 3: Output of correlation matrix compared with the dependent .....	53
Picture 4: Output of correlation matrix with one excluded variable .....	54
Picture 5: Correlation matrix testing with dependent, the second step .....	54
Picture 6: The final correlation matrix output .....	55
Picture 7: Ordinary Least Square Method for dataset .....	56
Picture 8: Heteroskedasticity testing using White's test .....	61

### 8.2 List of tables

Table 1: Top 5 export partners for Germany in 2021 .....	26
Table 2: Top 5 import partners for Germany in 2021 .....	27
Table 3: Czech Republic and Germany's nominal GDP and growth rate in % .....	38
Table 4: Export and its destinations from the Czech Republic year 2022 .....	40
Table 5: Czech beer exports and export growth rates in 2003-2022 .....	41
Table 6: Czech Trade balance in 2003-2022 in million EUR in current prices .....	44
Table 7: Importance of the Trade in beer with Germany on the GDP of the Czech Republic .....	45
Table 8: Net export comparison between Czech Republic and Germany .....	46
Table 9: Total beer consumption kg/capita in respective countries by ranking in 2021 .....	47
Table 10: Fixed base index of GDP of Germany and Czech Republic .....	49
Table 11: Average growth rate index of GDP for Germany and Czech Republic .....	49
Table 12: Chain base index of GDP for 2022, Germany and Czech Republic .....	50
Table 13: Time series analysis tools for CZ Exchange rate .....	50
Table 14: Average prices of beer exports from Czechia and Denmark to Germany in EUR, 2003-2022 .....	58

### 8.3 List of graphs

Figure 1: Volume of Beer consumption per capita in Europe in 2022 by country .....	29
Figure 2: Use of Natural Resources inside Czech Republic .....	32
Figure 3: Main ethnic composition of the Czech Republic for year 2021 .....	33
Figure 4: Share of beer consumption by age categories in year 2018 .....	35
Figure 5: GDP Growth rates of Czech Republic and Germany 2003 – 2022 (in %) .....	39
Figure 6: Czech Republic export destinations for 2022 .....	40
Figure 7: Czech Beer exports development in period 2003-2022 .....	42
Figure 8: Yearly Czech beer export growth rate to Germany 2003-2022 .....	42
Figure 9: Trade balance for Czech Republic 2003-2022 .....	43
Figure 10: Trade balance, import and export of Czech Republic 2003-2022 .....	44
Figure 11: Total Beer consumption per capita in selected countries 2021 .....	48
Figure 12: Average beer exports prices Czechia and Denmark to Germany in EUR .....	59

## 8.4 List of abbreviations

- **CZSO** .... Czech Statistical Office
- **CZK**.....Czech Koruna
- **DKK**.....Danish Krone
- **EU**.....European Union
- **EURES**...European Employment Services
- **EX**.....Export
- **GDP**..... Gross Domestic Product
- **IM**.....Import
- **OECD**... Organisation for Economic Co-operation and Development
- **OLSM** ... Ordinary Least Squares Method
- **SI**..... Statistically insignificant
- **SS**.....Statistically significant
- **TB**.....Trade Balance

## Appendix

### Appendix 1: Beer consumption per country per capita in litres in year 2021

Country	litres/per cap.
Czechia	136
Austria	102
Poland	93
Germany	92
Romania	83
Bulgaria	80
Croatia	79
Slovenia	76
Ireland	71
Netherlands	70
United Kingdom	68
Hungary	68
Slovakia	59
Spain	58
Sweden	57
Switzerland	54
Portugal	53
Cyprus	51
Luxembourg	50
Malta	50
Italy	38
Greece	35
France	33

Source: Own processing

## Appendix 2: Czech GDP and growth rates in CZK in 2003-2022 period

year	CZ in mil. CZK	GDP growth rate (%)
2003	2823452	3.6
2004	3079207	4.8
2005	3285601	6.6
2006	3530881	6.8
2007	3859533	5.6
2008	4042860	2.7
2009	3954320	-4.7
2010	3992870	2.4
2011	4062323	1.8
2012	4088912	-0.8
2013	4142811	0.0
2014	4345766	2.3
2015	4625378	5.4
2016	4796873	2.5
2017	5110743	5.2
2018	5410761	3.2
2019	5791498	3.0
2020	5709131	-5.5
2021	6108717	3.5
2022	6786742	2.4
Mean	4477418.95	2.54

Source: Own processing, according to CZSO

## Appendix 3: Average prices of beer export from Denmark to Germany 2003-2022 1/2

Year	Comp Price (%)	Comp price USD	Exch rate DKK/EUR	DKK vol. sold	DKK * 1000	Comp. price final	Comp. Price EUR	DKK curr. Volume.
2003	41.5	85.1	0.135	761777	761777000	630370370.4	630.3704	102839895
2004	34.9	92.9	0.134	930298	930298000	693283582.1	693.2836	124659932
2005	42.6	154	0.134	882185	882185000	1149253731	1149.254	118212790
2006	41.4	177	0.134	905378	905378000	1320895522	1320.896	121320652
2007	38.2	159	0.134	739308	739308000	1186567164	1186.567	99067272
2008	40.7	206	0.135	858723	858723000	1525925926	1525.926	115927605
2009	46.3	246	0.134	800600	800600000	1835820896	1835.821	107280400
2010	37.4	184	0.134	857843	857843000	1373134328	1373.134	114950962
2011	38	199	0.134	901269	901269000	1485074627	1485.075	120770046

2012	37.4	197	0.135	982225	982225000	1459259259	1459.259	132600375
2013	39.1	213	0.134	1013655	1013655000	1589552239	1589.552	135829770
2014	40	223	0.134	1036793	1036793000	1664179104	1664.179	138930262
2015	35.7	165	0.134	957217	957217000	1231343284	1231.343	128267078
2016	35.3	166	0.134	942527	942527000	1238805970	1238.806	126298618
2017	34.8	162	0.135	904273	904273000	1200000000	1200	122076855
2018	31.2	154	0.134	824461	824461000	1149253731	1149.254	110477774
2019	31.2	140	0.134	792577	792577000	1044776119	1044.776	106205318
2020	31.2	106	0.134	587614	587614000	791044776.1	791.0448	78740276
2021	31.2	110	0.134	585421	585421000	820895522.4	820.8955	78446414
2022	31.2	112	0.134	568547	568547000	123000000	123	76185298
Note:		Tot.mil					Tot.mil.	Average

Source: Own processing according to statbank DK, freecurrencyrates, trademap

#### Appending 4: Average prices of beer export from Denmark to Germany 2003-2022

2/2

Year	Danish Beer vol. export to GER	Correction (*1000)	DKK currency volume	Average price
2003	78576	78576000	102839895	1.308795243
2004	77718	77718000	124659932	1.604003345
2005	128541	128541000	118212790	0.919650462
2006	147176	147176000	121320652	0.824323613
2007	120269	120269000	99067272	0.823714108
2008	144338	144338000	115927605	0.8031676
2009	184395	184395000	107280400	0.581796686
2010	195554	195554000	114950962	0.587822095
2011	197822	197822000	120770046	0.610498559
2012	204130	204130000	132600375	0.649587885
2013	219029	219029000	135829770	0.620145141
2014	237941	237941000	138930262	0.583885341
2015	198279	198279000	128267078	0.646901982
2016	208045	208045000	126298618	0.607073556
2017	197311	197311000	122076855	0.618702733
2018	177402	177402000	110477774	0.622753825
2019	172620	172620000	106205318	0.615254999
2020	128953	128953000	78740276	0.610612208
2021	130467	130467000	78446414	0.601273993
2022	133940	133940000	76185298	0.568801687

Source: Own processing according to statbank DK, freecurrencyrates, trademap

#### Appending 5: Average beer price, export from Czech Republic to Germany 2003-2022

Year	Consum beer per capita (litres)	Population	Consump. of beer in L	Consump. of beer in HL	Netto kg= L	Stat. val. EUR tis
2003	117.8	81346810	9582654218	95826542.18	79771014	27978
2004	116	81266673	9426934068	94269340.68	81814813	31619
2005	115.3	81212168	9363762970	93637629.7	93577154	35279
2006	116	81177817	9416626772	94166267.72	100099779	49058
2007	111.8	81183830	9076352194	90763521.94	100099779	44630
2008	111.1	81217482	9023262250	90232622.5	100099779	51274
2009	109.6	81260615	8906163404	89061634.04	138021044	50230
2010	109.6	81325090	8913229864	89132298.64	113816973	40673
2011	109.3	81423378	8899575215	88995752.15	101885177	39078
2012	107.3	81545565	8749839125	87498391.25	90105715	43862
2013	106.6	81680591	8707151001	87071510.01	87336950	46508
2014	106.9	81858825	8750708393	87507083.93	89596007	48418
2015	102.9	82073226	8445334955	84453349.55	94366880	52953
2016	100.7	82331423	8290774296	82907742.96	97237980	55923
2017	98	82624374	8097188652	80971886.52	95325125	54100
2018	99	82896696	8206772904	82067729.04	104520843	58102
2019	96.8	83148141	8048740049	80487400.49	106138639	65072
2020	92.4	83328988	7699598491	76995984.91	108822096	57071
2021	89.4	83408554	7456724728	74567247.28	110255068	54888
2022	91.8	83369843	7653351587	76533515.87	109104757	53172

Source: Own processing according to CZSO

### Appending 6: Original econometric model dataset with selected dependent factors

Year	y (CZ beer EX to Germany)	Czech Foreign exch. r.	GDP of Germany	Average EX Price DK to GER	Average EX price CZ to GER	Beer total consumption in Germany
2003	27978	31.590	2823452	1.309	0.351	95826542.180
2004	31619	32.398	2262520	1.604	0.386	94269340.680
2005	35279	30.361	2288310	0.920	0.377	93637629.704
2006	49058	29.030	2385080	0.824	0.490	94166267.720
2007	44630	27.525	2499550	0.824	0.446	90763521.940
2008	51274	26.364	2546490	0.803	0.512	90232622.502
2009	50230	26.825	2445730	0.582	0.364	89061634.040
2010	40673	26.285	2564400	0.588	0.357	89132298.640
2011	39078	25.088	2693560	0.610	0.384	88995752.154
2012	43862	25.505	2745310	0.650	0.487	87498391.245
2013	46508	25.218	2811350	0.620	0.533	87071510.006
2014	48418	27.481	2927430	0.584	0.540	87507083.925
2015	52953.000	27.693	3026180.000	0.647	0.561	84453349.554

2016	55923.000	27.023	3134740.000	0.607	0.575	82907742.961
2017	54100.000	27.021	3267160.000	0.619	0.568	80971886.520
2018	58102.000	25.494	3365450.000	0.623	0.556	82067729.040
2019	65072.000	25.752	3474110.000	0.615	0.613	80487400.488
2020	57071.000	25.411	3403730.000	0.611	0.524	76995984.912
2021	54888.000	26.141	3617450.000	0.601	0.498	74567247.276
2022	53172.000	24.818	3876800.000	0.569	0.487	76533515.874

Source: Own processing

### Appendix 7: Czech population's consumption of beer distributed by gender

Age group	Male	Female
18-29	90%	56%
30-44	88%	56%
45-59	84%	56%
60+	84%	49%

Source: Own processing

### Appendix 8: International trade in goods (change of ownership) by territorial structure in 2022 where index is corresponding period of previous year = 100

Indicator	Export	index	Balance for 2022
Total	4,407,319	113.6	-204,815
EU	3,553,482	115.5	794,213
Eurozone19	2,891,073	115.9	806,942
non-EU	852,275	106.1	-970,558
unspecified	1,561	97.0	-28,469
China	45,557	95.6	-536,271
France	216,536	115.5	73,847
Italy	186,598	123.4	-10,674
Hungary	132,063	112.4	27,950
Germany	1,329,286	114.8	319,863
Netherlands	148,336	112.5	37,267
Poland	308,570	113.9	-100,226
Austria	200,146	115.4	63,019
Russian Federation	32,250	40.0	-233,630
Slovakia	447,664	119.4	223,816
United Kingdom	165,905	106.8	92,060
United States	115,230	123.7	-11,507

Source: CZSO