**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Economics**


**Diploma Thesis**

# The Foreign Exchange Rate and its Impact on Foreign Trade: Case Study of the Czech Republic

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# CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

# DIPLOMA THESIS ASSIGNMENT

Bc. Tomáš Roller

Economics and Management

Thesis title

**The Foreign Exchange Rate and its Impact on Foreign Trade: Case Study of the Czech Republic.**

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**Objectives of thesis**

The aim of the thesis is to analyze the impact of the Foreign Exchange Rate on Foreign Trade of the Czech Republic by comparing statistical data of exchange rate of the Czech currency against Euro. Then the exchange rate will be compared with data of Czech foreign trade. Indicators of the foreign trade will be regarding exports and imports.

**Methodology**

This diploma thesis is divided into two main parts. In theoretical part will be described theoretical background of exchange rate and which factors can influence it and how. In practical part will be analyzed impact of the Foreign Exchange Rate on Foreign Trade of the Czech Republic.

The thesis uses comparative and descriptive methods to research impact of currency exchange rate to foreign trade of the Czech Republic.

**The proposed extent of the thesis**
60-70 pages

**Keywords**
Monetary policy, Exchange rate, Currency, Trade, Czech National Bank

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**Recommended information sources**

NEUMANN, P. – ŽAMBERSKÝ, P. – JIRÁNKOVÁ, M. *Mezinárodní ekonomie*. Praha: Grada, 2010. ISBN 978-80-247-3276-3.
REVENDA, Z. *Banky a měnová politika*. Praha: Nad zlato, 1991. ISBN 80-900383-3-6.
UKLEIN, J. – BLAŽEK, J. *Bankovnictví*. Brno: Doplněk, 1997. ISBN 80-85765-91-8.

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Electronic approval: 12. 5. 2017
**Ing. Martin Pelikán, Ph.D.**
Dean

Prague on 14. 03. 2018

**Declaration**

I declare that I have worked on my diploma thesis titled " The Foreign Exchange Rate and its Impact on Foreign Trade: Case Study of the Czech Republic " by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any third person.

Prague on 15. 3. 2018

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Tomáš Roller

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I would like to thank Assoc. Prof.  Ing. Mansoor Maitah, Ph.D. et Ph.D. for being my supervisor, for support and consultations concerning my diploma thesis and useful advices.

# Vliv směnných kurzů na zahraniční obchod: případová studie České Republiky

**Souhrn**

Diplomová práce s názvem Vliv směnných kurzů na zahraniční obchod: případová studie České Republiky je zaměřena na vývoj směnnných kurzů a jejich vliv na zahraniční obchod v časovém období 2007 až 2017 v České Republice. V diplomové práci jsou použity komparativní, deskriptivní i statistické metody.

První část diplomové práce popisuje ekonomickou teorii ovlivňující vývoj směnných kurzů a zahraniční obchod České Republiky. Druhá část je věnována charakteristice české ekonomiky z pohledu konkurenceschopnosti a struktury zahraničního obchodu. Dále je podrobně analyzován vývoj dat směnného kurzu a zahraničního obchodu, tyto získané informace jsou dále využity pro statistickou analýzu závyslosti zahraničního obchodu na směnném kurzu.

V této diplomové práci je zjištěno jaký vliv a vzájemný vztah má směnný kurz na zahraniční obchod a jak se tento vliv měnil v průběhu sledovaného období.

**Klíčová slova:** Zahraniční obchod, sěnný kurz, dovoz, vývoz, obchodní bilance, Česká Republika, intervence, Česká Národní Banka

# The Foreign Exchange Rate and its Impact on Foreign Trade: Case Study of the Czech Republic

**Summary**

Diploma thesis titled The Foreign Exchange Rate and its Impact on Foreign Trade: Case Study of the Czech Republic is focused on the development of exchange rates and their impact on foreign trade in the period 2007-2017 in the Czech Republic. In the diploma thesis there are used comparative, descriptive and statistical methods.

The first part of the diploma thesis describes the economic theory influencing the development of exchange rates and foreign trade of the Czech Republic. The second part is devoted to the characteristics of the Czech economy in terms of competitiveness and the structure of foreign trade. The development of exchange rate data and foreign trade is further analyzed, and this database is used for statistical analysis of the dependency of foreign trade and the exchange rate.

This diploma thesis identifies the influence and the correlation between the exchange rate and foreign trade and how this influence changed during the monitored period.

**Keywords**: Foreign trade, Exchange rate, Import, Export, Trade balance, Czech Republic, Intervention, Czech National Bank

# Contents

# 1. Introduction

Foreign trade is an integral part of the lives of all people in the world. It may seem that this economic phenomenon does not affect so much, but most of the products we use do not come from the Czech Republic, let's take a look at some merchandise products, and we usually find the state of origin in the description of these goods. It may be the state we are neighboring with, but it can also be a state on the other side of the globe.

In this diploma thesis is provided knowledge necessary to be acquainted with the theoretical background of foreign trade as well as the factors influencing this trade. When countries import or export products or services from abroad, foreign currency is used for this business, which is used in a particular foreign country and therefore foreign trade should be influenced by the value of the domestic currency as well as the foreign currency. This idea and economic theory has led to the creation of this diploma thesis, which deals with foreign trade as well as exchange rate.

After summarizing the most important theory which affect foreign trade and exchange rates such as different types of policies, the competence of the Czech National Bank or information how the foreign exchange market works, there is provided analysis of the Czech economy and the most important economic factors which have impact on the foreign trade and exchange rates in the Czech Republic. With all these knowledge and data collections there is implemented statistical analysis to determine the mutual dependence of exchange rates and foreign trade and these results are interpreted and explained.

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## 1.1. Objectives

The main aim of this diploma thesis is to analyze foreign exchange rate EUR/CZK and compare it with the data about import, export and trade balance of the Czech Republic. The research time period is from 2007 to 2017 and there are used quarterly data. The reason for the quarterly data is the opportunity of implementation the statistical analysis in the shorter time period and not only in the whole period from 2007 to 2017. The reason for selection exchange rate EUR/CZK is because the main foreign trade partners are in the European Union, this is also the subject of analysis.

The main objective is to determine if there is some relationship between the export, import and trade balance with the exchange rate of EUR/CZK. And if there is some relation, is it positive or negative (reverse) relation, which is analyzed by the correlation statistical method and represented by the values of correlation and also by graphical representation. The aim is not only to analyze the whole time period from 2007 to 2017 but also try to analyze shorter periods which are characterized by some economic situation such as economic crisis or intervention by the Czech National Bank.

## 1.2. Methodology

In this diploma thesis there are used comparative, descriptive and statistical methods. In the theoretical part there is used literature review of economic resources in both printed publications and internet sources are used. Every resource is listed in the end of this diploma thesis under the section references. The practical part is based on the data collected form the Ministry of Industry and Trade, Czech Statistical Office and Czech National Bank´s webpages. Collected data are processed into the tables and graphs for better imagination and comparison. The analytical part is created by the statistical correlation of different time periods and various variables.

# 2. Theoretical Part

The theoretical part is divided into two parts. The first part deals with foreign trade and answers the questions why foreign trade is important, why it is happening, and what tools governments use to regulate or control foreign trade. It is known, that foreign trade is essential for economic growth and it is important to introduce some of the basic theories. The second part deals with the exchange rate theory that is directly related to foreign trade, and it is also very important to understand this theory for better implementation and understanding of the analytical part, where these two topics are intertwined and analyzed using statistical methods.

## 2.1. Foreign Trade

The main concepts of this thesis include foreign trade. This term is mainly used for trade (exchange of goods and services) across state borders between different entities and on the basis of different legal standards.

Foreign trade can be defined in two ways:

Cross-border conception of foreign trade - this concept mainly reflects the physical movement of goods across borders, regardless of whether there is trade between national or foreign entities. These data are internationally comparable and can serve as an indicator of the development of trade value.

The National Concept of Foreign Trade - This concept testifies to the export and import performance of the economy, i.e. the trade balance of the foreign trade of the given economy. It monitors the actual trade in goods between national and foreign entities, i.e. the change of ownership between residents and non-residents.[1]

Foreign trade meets the classic business concept. Considering the microeconomic level, the main players are consumers and companies that import and export abroad. Consumers strive to maximize their benefits, companies maximize their profits. The main regulator in this case is the state overseeing the implementation of foreign trade activities. How much foreign

[1] Krugman, P., Obstfeld, M. & Melitz, M. (2014). International Finance: Theory and Policy, Global Edition. P. 54

trade plays a role in the foreign trade depends on the degree of openness of the economy as well as on foreign trade policy.

From the point of view of the company, there are other reasons for doing foreign trade. For example, penetration into new markets (diversification), import of cheap input raw materials, materials or semi-finished products from abroad. From the point of view of history, it is also necessary to mention the motivation of the states and the possibility of obtaining a convertible strong currency, for which it would be possible to buy scarce goods on world markets.[2]

Foreign trade affects the external balance of a country that is captured in a balanced balance of payments. The balance of payments is made up of individual accounts, i.e. a current account, a capital, a financial and a change in foreign exchange reserves where the deficit of one is offset by a surplus of another. Consequently, various trade policies affect the balance of payments, the stability of economic development, interest rates, domestic demand, money supply and, above all, exchange rate changes. Foreign trade also affects the country's internal balance. Increasing the country's export performance may be accompanied by an increase in employment of the population and an improvement in the overall development of the country's economy. In this case, the degree of dependence on foreign trade plays a role. The degree of dependence depends on the openness of the economy, the economic maturity and the size of the country. The openness of the economy is determined by the share of exports of goods and services to GDP. Economic maturity can be measured, for example, by the level of GDP per capita, index of human development or the level of education of the population.

Even if we do not take into account the country's resources and the extent to which foreign trade with other countries, etc., can be found, some general functions that are fulfilled by foreign trade can be found:[3]

The growth function has two aspects. It creates an optimal specialization profile of the economy and stimulates GDP growth through foreign trade. The structure of domestic production is influenced by the export performance and competitiveness of the country's

[2] Helpman, E. (1987). Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy. P. 49

[3] Krugman, P., Obstfeld, M. & Melitz, M. (2014). International Finance: Theory and Policy, Global Edition. P. 71

products on foreign markets. It is quite logical in terms of free trade that, as increasing the export of goods and services increases the GDP of the country, on the contrary, higher imports of goods and services can hinder economic growth.

The transformation function is related to internal economic equilibrium, when foreign demand changes the structure of domestic production. Each country also has certain limits, given for example by natural conditions (insufficient raw material base, inappropriate climatic conditions, etc.) and economic conditions (technological backwardness, inappropriate structure or volume of labor, etc.), with the possibility of importing certain raw materials and products to overcome these limits.

Transmission functions consist in transferring information flows (new technologies and know-how), knowledge, and external environment criteria to the domestic economy.[4]

### 2.1.1. Prerequisites for the Competitiveness

The success of countries in foreign trade is given by general prerequisites for creating favorable conditions within the competitive relationship between countries in foreign trade shop. At these competitive barriers, respectively. Pressures react each company in the national economy differently and is a combination of several components and steps to turn these negative aspects into positive ones and turn them into a competitive advantage.

The main elements and assumptions of the country's competitiveness include the following:

- Human resources: especially their quality of education, motivation, discipline, etc.

- Natural resources: soil, minerals, climate

- Capital formation: machinery, infrastructure

- Technology: science, technology, management, business environment

In general, we can specify the importance of the optimal use of human and natural resources, the capital that is involved in the process and the technological and technological changes that are being made.[5]

[4] Poon, J. & Rigby, D. L. (2017). International Trade: The Basics. P. 27
[5] Samuelson, P. & Nordhaus, W. (2009) Economics. P. 444.

In the wider context, one of the prerequisites of a small economy, among which the Czech economy, is to include the activities of the state in the field of providing subsidies to exporting companies and other forms of state export support through state-run organizations (e.g. Czech Export Bank, Export Guarantee and Insurance Company).

### 2.1.2. The Role of the State in Foreign Trade

The state can look at the export activity of business entities, which then form the overall output of the economy from two perspectives. The first approach can be state support in the form of state subsidies for export, development and investment abroad, the second approach can be the acceptance of the free trade concept. Free-trade issues are viewed by economists from different perspectives. Whether the free trade has its meaning or whether there is a need for state intervention, long discussions are being held, and even individual states are not clearly convinced of the effectiveness of free trade as the only approach.

The rule of every state entering the market is to promote its interests in international trade. The state has the option to choose two types of access when selecting the appropriate policy and that is a liberal or protectionist approach. States mostly choose a form of compromise. Each country approaches foreign trade differently, but usually chooses the optimum so that foreign trade (especially imports) does not undermine the internal functioning and competitiveness of domestic companies.[6]

Liberalism means, above all, the removal of barriers to trade. It is about opening up the internal market to foreign competitive forces and removing various pro-export support to the state. The main goal of liberalism is above all to achieve free trade without the intervention of states. The result of liberalism is greater openness of the economy, it facilitates foreign competition to the local market, but similarly facilitates export operations for domestic producers. At the same time, it allows liberalism to more easily achieve comparative advantages and achieve lower consumer prices. As has already been mentioned, liberalism also has some negatives. These often include increasing unemployment in the domestic economy and reducing wages. There is also the possibility of dominating the domestic market by a foreign importer. These are also the main arguments used by advocates of protectionism in political ranks.

[6] Poon, J. & Rigby, D. L. (2017). International Trade: The Basics. P. 95

Protectionism, on the contrary, from liberalism seeks various interventions to protect the domestic economy from external influences. This is a certain effort to mitigate or eliminate negative influences coming from abroad. Protective measures often have the opposite effect depending on the time horizon. For example, protectionist interventions may keep employment and wages at the required higher level, but protected industries often become uncompetitive on foreign markets. If this happens, it may eventually increase unemployment and reduce wages as a result of lower producer profits over a longer period of time. Long-term protectionism can have many negative consequences from the loss of contact with other countries to the limitation of the influx of know-how and technology from abroad. It cannot be clearly stated whether protectionism has a positive or negative impact on the domestic economy. With regard to a short period, there are arguments for introducing protectionist measures. Protectionism also has several different forms, ranging from less radical to extreme cases, the so-called autarky. Historically, especially during the 20th century, the period with more protectionist trade policies and a period of considerable liberalization can be distinguished. In recent decades, however, liberalization has taken place in the form of both bilateral and multilateral agreements.[7]

### 2.1.3. Fiscal Policy

Fiscal policy is a set of steps and instruments made by the government in an attempt to influence the development of the economy through public budgets. Operates with setting government revenue and expenditure levels to reduce economic fluctuations (economic stabilization) while sustaining economic growth, high employment without high inflation Over recent decades, fiscal policy goals have been influencing developments and debt levels (reducing them)[8]

When formulating fiscal policy, it is necessary to take into account the consistency framework created by Anand van Wijnberger, which implies the consistency of fiscal targets with other macroeconomic objectives (GDP growth, low inflation, balancing national accounts), which is difficult because the objectives can be mutually inconsistent. Authors admit the scope for targeted deficit or targeted inflation.

[7] Helpman, E. (1987). Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy. P. 114
[8] Samuelson, P. & Nordhaus, W. (2009) Economics. P. 442

Since the achievement of individual objectives can be mutually contradictory, it is necessary to prioritize them, which is primarily a political issue. One of the main problems of the politicization of public finances is the continuity of the decisions taken (hence the achievement of the set goals) resulting from the periodic change of the decisive entity. This also leads to the anonymization of the decisions made. Another negative consequence is the interdependence with the political cycle.

Fiscal policy measures are implemented in two ways, either on a one-off basis through so-called discretionary measures, such as changes in government spending or changes in the tax system or long-term via so-called built-in stabilizers that act on the level of aggregate expenditures. They work automatically when changing GDP. Their purpose is to ensure that disposable income falls below GDP, such as progressive taxes, unemployment insurance policies, and more.[9]

Types of fiscal policy can be divided into expansive and restrictive. Expansionary fiscal policy aims at increasing GDP and reducing unemployment, using as a tool the growth of state budget expenditure (direct instrument) and tax cuts (indirect instrument). As a result, the financial imbalance is a deficit). Restrictive fiscal policy aims to reduce inflation (even at the cost of lowering GDP growth), which is achieved through a reduction in state budget spending or an increase in revenue (especially tax). The result is also financial imbalance (surplus).[10]

### 2.1.4. Monetary Policy

Monetary or monetary policy is one of the main components of the economic policy of the state. Together with the fiscal policy implemented through budgeting, the main instruments of stabilization (macroeconomic) policies. Monetary policy deals with the control of the amount of money in the economy and the regulation of interest rates. For the actual execution of monetary policy, the existence of a central bank is necessary; in the Czech Republic, this is the Czech National Bank (CNB), which has the prerogative of issuing money. Monetary policy is basically divided into 2 types. The first type is expansive, it is an increase in money

[9] Zekos, G. I. (2015). Monetary Policy and Risk Management in Financial Globalization. P. 149
[10] Samuelson, P. & Nordhaus, W. (2009) Economics. P. 443

supply. The second type is a restrictive policy when the supply of money by the central bank is reduced.[11]

#### 2.1.4.1. Indirect Instruments of Monetary Policy

Indirect monetary policy instruments are, in principle, all central bank actions that are directed to the entire banking system, thus giving equal treatment to all entities. Free market operations mean a situation where a central bank buys short-term securities from commercial banks or sells securities to commercial banks. In most cases, these are state-owned securities of high quality. The central bank's purchase of securities is a monetary expansion, or a rise in money supply, which in turn will cause a fall in interest rates due to lower demand for money. In the case of the sale of securities by the Central Bank, this is the exact opposite mechanism.

Interventions in the foreign exchange market mean that the exchange rate of the currency is influenced by the central bank by means of exchange of reserves for the domestic currency and vice versa, thus being able to change the monetary base and affect the value of the course. In the case of domestic currency purchases, this currency is strengthened (market price is rising due to higher demand) while selling it increases its supply and the price is decreasing.[12]

Mandatory minimum reserves consist of setting the amount of mandatory minimum reserves, where commercial banks in the Czech Republic or foreign bank branches the Czech Republic, to maintain a certain percentage (set by the central bank) in reserves. This means that they can no longer manage and freely dispose of them. In the Czech Republic, these reserves are limited by a maximum of 30% of the deposits of the liable person by Act No. 6/1993 of the Collection and are remunerated by a two-week repo rate since 200121. The amount of reserves has a direct effect on the multiplier effect.[13]

[11] Revenda, Z., Mandel, M., Kodera, J., Musílek, P., Dvořák, P., (2011). Peněžní ekonomie a bankovnictví.5th edition. P. 211.
[12] Zekos, G. I. (2015). Monetary Policy and Risk Management in Financial Globalization. P. 95
[13] Revenda, Z., Mandel, M., Kodera, J., Musílek, P., Dvořák, P., (2011). Peněžní ekonomie a bankovnictví.5th edition. P. 320.

#### 2.1.4.2. Direct Monetary Policy Instruments

These are mechanisms where the rules for the operation of individual banking entities are directly determined and thus affect the decision-making mechanisms of commercial banks.

Under the liquidity rules, the Central Bank sets rules to ensure that commercial banks have a desirable ratio of assets and liabilities to an adequate amount of liquidity. Simplified, it is a requirement that short-term loans be covered by short-term sources and long-term loans with long-term resources.

The most effective monetary policy instrument is credit ratios where the central bank determines the amount of finance in the form of a loan that the commercial bank can use from the central bank, as well as the amount of money the commercial bank itself can provide the so-called absolute credit contingent.[14]

Mandatory deposits provided by the Central Bank are determined by individual entities to carry out non-cash transactions and other banking operations exclusively through the central bank. These are typically offices and other state authorities, with regular checks being made through these accounts.

Separate chapters are recommendations and challenges. As a rule, central banks enjoy a special position in the Western world economy and, above all, a high degree of credibility, which is another way of influencing the banking sector and other entities through advice and recommendations that are generally followed.[15]

#### 2.1.4.3. Monetary policy of the Central Bank

By conducting monetary policy, the central bank can supervise and regulate bank activities. The Czech Republic is a small open economy. In open economies, central banks are managing reserve flows, fixing exchange rates and controlling international financial developments.

Supporters of the banking regulations say, bank protection is needed. First of all, clients who put money into their account because the market has some imperfections. But there are also opponents of this regulation and supervision. The reduction of mediation can be

[14] Zekos, G. I. (2015). Monetary Policy and Risk Management in Financial Globalization. P. 264
[15] Samuelson, P. & Nordhaus, W. (2009) Economics. P. 475

characterized as the most important reason for damage in earlier times of relatively strong links between the monetary base and monetary aggregates.[16]

### 2.1.5. Czech National Bank

The central bank is a government organization that is primarily responsible for the country's monetary affairs. The Czech National Bank was established together with the emergence of the Czech Republic on January 1, 1993. By the end of 1992, the Czechoslovak State Bank was responsible for monetary policy. The main goal of the Czech National Bank is to maintain price stability. Its headquarters are located in Prague and also has offices in other cities in the Czech Republic. Achieving the basic objective of price stability is through changes in key interest rates. Interest rates are formed by the Bank Board of the Czech National Bank. The Bank Board is deciding on the latest macroeconomic data and assessing risks.

The Czech National Bank creates the conditions for maintaining economic growth. For example, it also seeks to maintain the Czech crown and the stability of the macroeconomic environment. The Bank's Board is the governing and the highest authority of the CNB. By using the instruments, the Bank Board implements monetary policy. In addition to deciding on important financial market issues, it has the authority to approve the central bank's budget, determine the amount of salary and other benefits of Bank Board members and, last but not least, outline the types, amounts and uses of the CNB's funds. The composition of the Bank Board is from members who are appointed by the President of the Republic for two six-year periods. The main member is the governor, who is currently Jiří Rusnok and was appointed by the President of the Republic on 1 July 2016. There are two vice-governors and four other members of the Bank Board in the Bank Board.[17]

#### 2.1.5.1. Central Bank Objectives

The account management function for the government and the state treasury bank credit was used mainly at the establishment of the central bank. As time passes, the targets grow. Today's general goal is to maintain economic stability. The specific objectives are

[16] Revenda, Z., Mandel, M., Kodera, J., Musílek, P., Dvořák, P., (2011). Peněžní ekonomie a bankovnictví.5th edition. P. 225

[17] Czech National Bank [online]. *Bankovní rada ČNB.* Quoted: 2018-01-04. Available from: http://www.cnb.cz/cs/o_cnb/bankovni_rada/

characterized above all by low and stable inflation. The targeting of inflation is medium-term and the results of the inflation target or the way the target was achieved are public. In the Czech Republic, at the end of 2017, the average annual inflation was 2.5%. It is also necessary to target the exchange rate for stability. The central bank can not make a separate monetary policy on the basis of that fixed exchange rate. In the Czech Republic, a floating rate is managed and, in the event of exchange rate fluctuations, the Czech National Bank may intervene with certain measures. Another goal is to maintain low unemployment, rapid economic growth and coordination with fiscal policy.

#### 2.1.5.2. Activities of the Central Bank

The central bank differs from other banks in particular from the issuance functions. Other activities of the central bank include, for example, the activity of a monetary policy subject, the status of regulation of the banking system, the bank of banks and the state bank. Last but not least, it manages foreign exchange reserves and conducts payment transactions.

**Emission Functions**

The central bank's issuance functions are historically the oldest and most important activities. It is based on an emission monopoly, which is considered a priority of the central bank. In the Czech Republic, the central bank obtained an emission monopoly in 1926. At that time it was called the Czechoslovak National Bank. As the right to issue banknotes is exclusive, the bank may be called the so-called sign-on bank. Today's development of non-cash transactions reduces the ability of the central bank to influence the total amount of money in circulation. Earlier, when the use of non-cash payments was not extended, the central bank was able to regulate the amount of currency issued more accurately.

**Top Subject of Monetary Policy**

As a senior entity, the central bank may conduct monetary policy without deciding on its main objectives. The central bank only performs certain operations that have not been largely involved in the decision-making process. On the other hand, the central bank can carry out monetary policy while deciding on priority intentions. The decision is limited by the law.

Central banks are now a separate entity in monetary policy decisions. It is the responsibility of the central bank to take care of the quality of the national currency by intervening in the currency area. Excluding liability for the quality of the currency, the Bank has a

responsibility for the purchasing power of money and its long-term stability. The interventions influence the rate of inflation, exchange rate, or balance of payments balances.[18]

**Regulation and Supervision of the Banking System**

Another important function of the central bank is the regulation and supervision of the banking system. Regulation and supervision are closely linked to the other functions of the central bank, in particular the "bank of banks". The central bank controls commercial banks, how they conduct banking business and whether they comply with the law. The Central Bank of the Czech Republic oversees the entire financial system.[19]

**Bank of Banks**

All banks in the Czech Republic have an account in the central bank. The Czech National Bank approves the access of new commercial banks to the banking system and at the same time it has the right to stipulate the termination of their activities in case of non-fulfillment of the conditions. Furthermore, the central bank can provide loans to commercial banks, perform payment and clearing operations between them and, last but not least, provide banking services. Other activities are characterized by securities operations (treasury bills), which the central bank has the ability to buy and sell to other banks.[20]

**Bank of the State**

The central bank serves as government adviser in monetary policy context and runs the state budget account. The Bank carries out all operations, remittances and other activities directly related to the state budget account. The Czech Republic accounts regularly receive revenues, which are mainly taxes and duties. Undoubtedly, State Expenditure is also covered by this account. If the state does not have sufficient funds, the state bank may grant a loan.

The central bank sells securities issued by the state, so-called Treasury bills. A treasury bill is a security that is of a short-term nature. The state can borrow by issuing securities in case

[18] Zekos, G. I. (2015). Monetary Policy and Risk Management in Financial Globalization. P. 310
[19] Revenda, Z., Mandel, M., Kodera, J., Musílek, P., Dvořák, P., (2011). Peněžní ekonomie a bankovnictví.5th edition. P. 248
[20] Revenda, Z., Mandel, M., Kodera, J., Musílek, P., Dvořák, P., (2011). Peněžní ekonomie a bankovnictví.5th edition. P. 260

of inconsistency of revenues and expenditures in a longer period at the time of the state budget closure. More of these securities are sold in the public market.[21]

**Foreign Reserves**

Foreign currency is a non-cash form of money denominated in a foreign currency. Foreign exchange transactions are foreign currency transactions through a central bank and are used to pay foreign liabilities. By buying foreign currency, the central bank increases the money supply. Otherwise, the money supply will be reduced by selling foreign reserves. The central bank is able to reduce monetary policy interest rates to so-called technical zero. The foreign reserve structure consists of foreign reserves, a reserve position with the International Monetary Fund, Special Drawing Rights (SDR), gold, other reserve assets and other foreign exchange assets.[22]

**Payments**

In addition, the bank conducts payment transactions where it mediates payments between the payer and the payee. At present, they become more popular non-cash transactions, with which payment transactions are facilitated by means of payment instruments. The payment process can take place, for example, by means of securities (check, bill), payment cards or electronic wallet.

**Payment Card**

Through a payment card, the bank account holder can pay for the purchase of goods or services in almost all payment terminals. Although the beginnings of the payment cards were introduced at the end of the 19th century, in Czechoslovakia, their origin was dated in the second half of the 20th century. Czechoslovak citizens were able to use their first payment card in 1988, when the card was issued by Živnostenská banka and served only to tuzex accounts.[23]

[21] Revenda, Z., Mandel, M., Kodera, J., Musílek, P., Dvořák, P., (2011). Peněžní ekonomie a bankovnictví.5th edition. P. 258
[22] Zekos, G. I. (2015). Monetary Policy and Risk Management in Financial Globalization. P. 343
[23] Juřík, P. (2012). Platební karty. P. 126

**Types of Payment Cards**

*The debit card* is currently one of the most widely used credit cards in the Czech Republic. The amount paid is deducted from the balance of the account and at the same time the amount can not exceed the balance of funds.

*A credit card* has a different meaning. With a credit card, the client can pay an amount that exceeds his account balance. Overdraft is granted under normal credit terms.

The new trend comes in 2011, when MasterCard and Citibank in the Czech Republic show new technology for contactless and mobile payments.[24]

### 2.1.6. Currency transmission mechanism

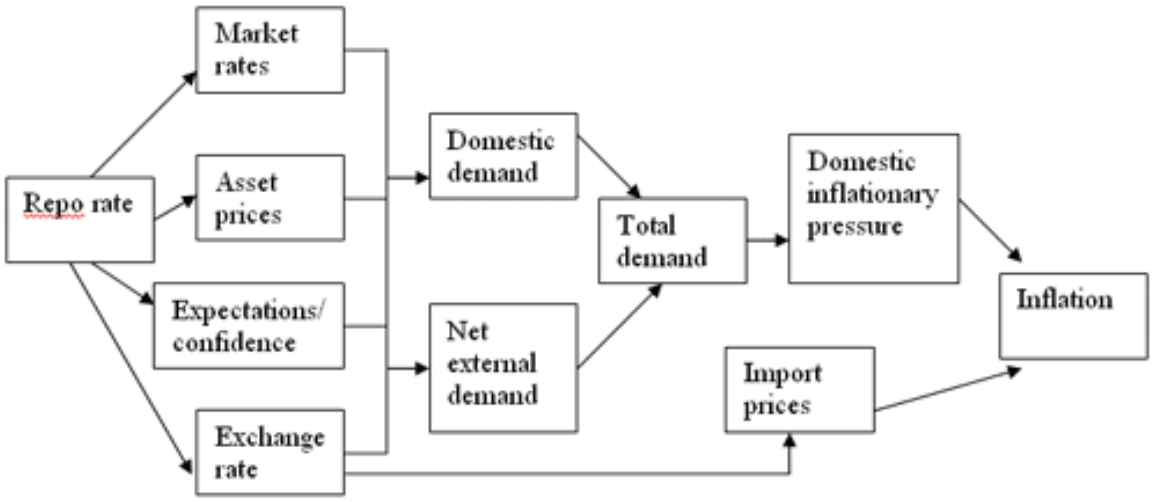
The monetary transmission mechanism, or the chain of economic links, allows for variants in the setting of monetary policy instruments, leading to the necessary changes in inflation. The string carries channels or multiple paths in parallel. Through the process, the central bank cooperates with banks and the economy, in order to set interest rates, financial conditions and inflation. The monetary transmission mechanism can affect output, employment, prices and inflation. In the event that the central bank requires price developments to be affected, the setting of monetary policy instruments should be changed at the start of the transmission process, thereby changing the behavior of intermediary markets. Through other intermediary markets, there is consequently a change in target markets.[25]

A typical example is the interest rate channel. "The increase or decrease of the monetary policy rate (in the Czech Republic, especially the repo rate) leads first to an increase or decrease of interest rates on the interbank market". The impact of this process is to increase (decrease) interest rates that banks declare for lending or accepting deposits. "As a result, revitalizing investment activity as part of aggregate demand and eventually weakening or reinforcing pressures on price level growth ". The operational currency criteria assist the

[24] Juřík, P. (2012). Platební karty. P. 137
[25] Czech National Bank [online]. Jak se změny úrokových sazeb promítají do ekonomiky Quoted: 2018-01-04. Available from: http://www.cnb.cz/cs/faq/jak_se_zmeny_urokovych_sazeb_promitajx.html

central bank in planning the development of currency variables in the monetary policy transmission mechanism in such a way as to meet the main monetary objective.[26]

**Picture No. 1: Transmission Mechanism Diagram**




*Source: financialmarketsjournal.com/*

### 2.1.7. Exchange rate and net exports

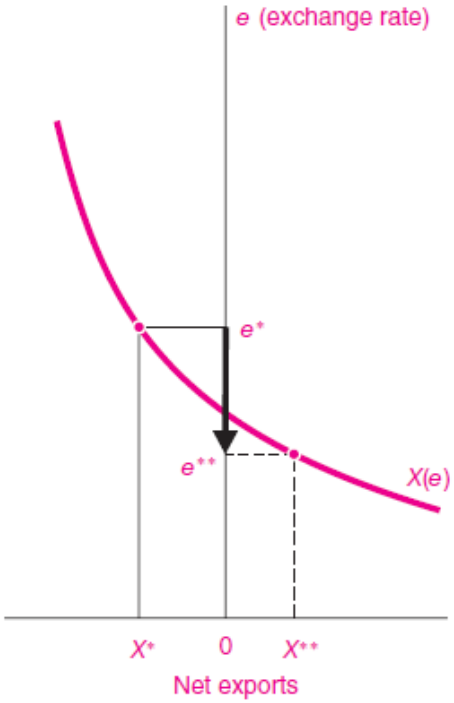
An important insight in this area is that macroeconomic policy with flexible exchange rates is quite different from the case of fixed exchange rates. The flexible exchange rate has a strengthening monetary policy. Consider the case when the currency transmission mechanism has changed significantly due to increased openness and change in the flexible exchange rate. In modern times, international trade and finance have become increasingly important roles in macroeconomic policies. Graph No. 1 shows the currency transmission mechanism under flexible exchange rates, which shows the relationship between net exports and the exchange rate. This is an inverse relationship, because devaluation stimulates exports and reflects on imports.

Suppose the CNB decided to cut interest rates to stimulate the economy. The fall in interest rates led to a weakening of the Czech currency as financial investors moved from the Czech

[26] Czech National Bank [online]. Jak se změny úrokových sazeb promítají do ekonomiky Quoted: 2018-01-04. Available from: http://www.cnb.cz/cs/faq/jak_se_zmeny_urokovych_sazeb_promitajx.html

market. Depreciation is illustrated in graph no 1 as a move from e * to e **. This reduction in depreciation influence net export from deficit X * to the net export surplus X **.[27]

**Graph No. 1: Net Export and the Exchange Rate**




*Source: Samuelson, P. Economics*

[27] Samuelson, P. & Nordhaus, W. (2009) Economics. P. 572

## 2.2. The Currencies

The second part of the theory will be focused on the currencies and exchange rates. There is importance to explain some theoretical aspects of how the exchange rate works for better understanding of the analytical part, where will be combined data analysis of the foreign trade of the Czech Republic with the foreign exchange rate of the currency pair EUR / CZK.

### 2.2.1. The money

The term "money" is very difficult to define. In the UK, there are 8 definitions for money, and the US has more than 40 definitions for money. Even the critics themselves claim that it is very difficult to define such a contradictory notion. That is why it depends on what view we look at. Another contradiction is between the theoretical definition and its practical function. From the theoretical point of view, we can consider as money any asset that serves for the payment of goods, services or the payment of debt. Such an asset, which is accepted by all members of the company. If this is not the case, such an asset can not be considered as money but only as an artificial or temporary substitute for money.

Unfortunately, this definition does not imply that only coins and banknotes can be considered as money. The forms of money that can perform the same function are different. In the past, the role of money was played by cloth, cattle, salt, coffee beans and much more. These forms of money were only temporary and with a number of limitations. For these and many other reasons historically the first money was considered a precious metal coins.

At present, the use of the so-called "credit card" and many other types of so-called "invisible" non-cash money is expanding.[28]

### 2.2.2. Function of the Money

Among the basic functions that every asset, such as money, must fulfill is the "medium of exchange" function. Nowadays a form of money has to be formulated. It is very difficult to imagine money in the form of cloth, grain or even cattle. In such a situation, there would be big problems with the shift itself, not to mention the custody and sustainability of value. For this reason, the first form of "money" precious metals were used. Precious metals perfectly meet all implicit requirements. They are firm, fairly divisible and rare. Money in the form of

[28] Eichengreen, B., Mehl, A. & Chitu, L. (2017) How Global Currencies Work: Past, Present, and Future. P. 84

precious metals greatly simplified the shift and significantly reduced so-called "transaction costs".

Money also acts as a unit of account. Furthermore, money also serves as a store of value. Compared to other assets such as stocks or other securities, money is a relatively risk-free asset. Even before, people preferred to own their wealth in the form of money. However, today people also use saving wealth in the form of other assets such as stocks, bonds, etc.[29]

### 2.2.3. The Money and Currency

The term money has already been explained in the previous paragraphs. When money is said, many people will also remember the word "Currency," each nation has its own currency. Each currency must meet certain criteria and features:

- Name,
- Basic cash types,
- Nominal structure,
- The exclusivity of the currency as the basic currency in the territory,
- Laws on emission, protection and acquisition
- Rules of use in domestic and foreign relations,
- And more.[30]

In today's emerging world where currency unification is taking place for some countries, thanks to the emergence of international organizations and communities, for example the European Union, etc. Some currencies are gaining an international character. One of the most important and most used in the world is, for example, the currency used mainly in Europe but not only in its territory, and that is the Euro (EUR). The US dollar (USD), which was the predecessor of the euro, gained an international character. International currencies, as the name suggests, serve international trade.

[29] Cohen, B. J. (2015) Currency Power: Understanding Monetary Rivalry. P. 61
[30] Eichengreen, B., Mehl, A. & Chitu, L. (2017) How Global Currencies Work: Past, Present, and Future. P. 96

## 2.3. The Exchange Rate

As for the internal trade, it is very well known to all citizens. In a certain currency that is approved by the constitution of the state, all transactions, both cash and non-cash, take place. Internal trade is therefore very easy and does not involve any major difficulties or obstacles.

International trade is a bit more complicated, just because every country is trading in another currency. E.g. If we want to buy a car from the UK to the Czech Republic, there is a problem with the existence of two currencies. On the Czech side, the existence of the Czech crown (CZK) and the existence of the British pound (GBP). Here an international business works with a currency exchange rate. The exchange rate expresses the price of one currency in other currency prices. In our case, first of all, we would be interested in the exchange rate between the Czech crown (CZK) and the British pound (GBP). If the exchange rate between the currencies in question is known, there is no longer a problem that would prevent us from doing our business and buy a car from the UK.

For the state economy is always a great benefit stable exchange rates. This concerns, in the first place, the most important business partners. In the case of volatile exchange rates, there is a risk for both exporters and importers in terms of costs. In international trade, all entities have to count with a possible reserve of costs that may increase or decrease as a result of the exchange rate change. The economy of the small state is largely dependent on international trade as opposed to the economies of larger states.[31]

In the field of financial markets, two currency exchange rate conventions are commonly used. A more direct dimension is expressed, which expresses how many units of the domestic currency are equal to one foreign currency unit (in some cases, 100 or 1000 units are used), for example 24.6 CZK / 1 USD. The Indirect Listing is the reversed direct quote and indicates how many foreign currency units are equal to the domestic currency unit, 0.04065 USD / 1 CZK. For each currency pair on the market, there are two prices (a two-way quote), which is a buying, demand rate (bid) for which the market maker is willing to buy a base currency unit and a selling, (ask, offer) for which the market maker is willing to sell a unit of base currency.

[31] Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING p. 47

When developing the exchange rate and the currency, the terms of depreciation and appreciation are used to evaluate individual changes. All this information is recorded on the exchange rates.[32]

### 2.3.1. Nominal and Real Exchange Rate

The exchange rate is expressed in two forms, as nominal and real, with different economic interpretations.

#### 2.3.1.1. Nominal Exchange Rate

Nominal exchange rate is the price of a foreign currency unit expressed in domestic currency units. In the event of a decrease in the exchange rate, it is an appreciation or a nominal strengthening of the domestic currency. Otherwise, as the value of the exchange rate increases, we talk about depreciation or nominal weakening of the domestic currency. The nominal exchange rate is formed on the foreign exchange market and is valid for all transactions at a certain point in time.[33]

#### 2.3.1.2. Real Exchange Rate

The real exchange rate is most often expressed as a nominal real exchange rate multiplied by the rate of change in the foreign price level and the domestic price level.

$$ER^R = ER^N * \frac{p_f^e}{p_d^e}$$

Where: $ER^R$ represents the real exchange rate, $ER^N$ nominal exchange rate and $p_f^e$, $p_d^e$ represents signs for foreign and domestic price levels.

The real exchange rate is the basic indicator of the country's export competitiveness. With the fall in the real exchange rate, the domestic currency is appreciating realistically and the foreign currency is actually depreciating and the export competitiveness of the domestic economy is declining. This system works in an analogous way and in the opposite case the real exchange rate increases.[34]

[32] Samuelson, P. & Nordhaus, W. (2009) Economics. P. 545
[33]Czech National Bank [online]. Co to je nominální a reálný měnový kurz? Quoted: 2018-01-04. Available from: www:www.cnb.cz/cs/faq/co_to_je_nominalni_a_realny_menovy_kurz.html
[34] Hartmann, P. (1998) Currency Competition and Foreign Exchange Markets. P. 38

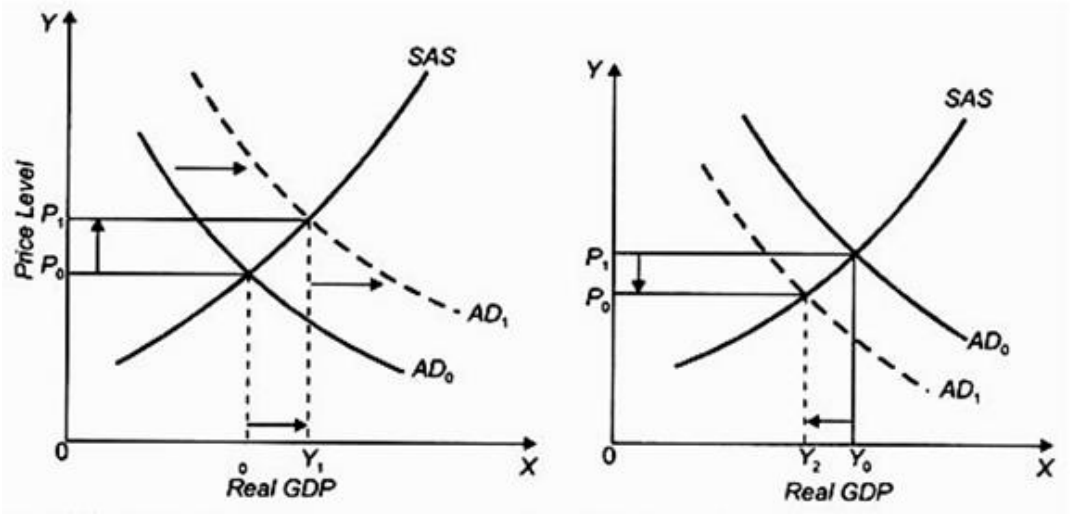
### 2.3.2. Exchange Rate Changes

Currency devaluation or revalidation occurs in the fixed exchange system. Currency devaluation means depreciation of the currency and the rate is increasing. Conversely, the increase in the official exchange rate is called revaluation.

In the case of flexible exchange rates, we are talking about depreciation or appreciation that occurs spontaneously. Depreciation of the currency is a depreciation or a weakening of the exchange rate. When the currency depreciates, the rate increases. An example is when 1 EUR = 26 CZK increases to 1 EUR = 29 CZK. Appreciation is the decrease of the exchange rate against foreign currencies, which reduces the exchange rate. For example, the Czech crown's exchange rate against the euro 1 EUR = 28 CZK may increase to 1 EUR = 25 CZK)[35]

According to the macroeconomic theories, there could be explanations, how the economy is affected by changing its price level as it is introduced in the graphs below. From the left graph, there is depreciation of the currency, which has consequences to rise of net exports and this leads to increase in the price level and also in the GDP. On the right graph there is opposite scenario, when there is appreciation of national currency and it causes to fall net exports which leads to decline in GDP and price level.

**Graph No. 2: Price Level and Real GDP**




*Source: economicsonline.co.uk*

[35] Manning, M. C. (2013). A Student Guide to Practical Modern Macroeconomy. P. 44

### 2.3.3. The Law of One Price

The Single Price Act says that two identical products are in two competing markets sold at identical prices, converted into a single currency.

If the price of the goods were significantly lower than the price of the same goods from abroad, there would be a great demand on the domestic market and domestic producers would try to sell their goods abroad. If we want to use, for example, cheaper goods abroad, it is also necessary to add the costs incurred when the goods are purchased. Therefore, the price difference would have to be sufficient to cover the costs associated with the acquisition. This process is referred to as commodity arbitrage and takes place as long as the balance on both markets does not match. At the same time, it is necessary to say that it is only a theoretical concept that applies to certain services and products.

The theory of one price law also has to meet certain assumptions - free trade between countries, zero transport costs, zero acquisition costs and zero time costs.[36]

### 2.3.4. Purchasing Power Parity – PPP

Purchasing power parity exists in absolute and relative versions. It is an economic theory that links the exchange rate and prices of services and goods in two countries. The first deals with the definition of the exchange rate and brings a static view. The relative version examines the causes of the course and expresses a dynamic view.[37]

#### 2.3.4.1. Absolute Purchasing Power Parity

Absolute PPP do not match just one product or service but focus on the overall price level of both countries. The exchange rate thus compares the price levels of services or goods in both countries that make up the consumer basket. According to the theory of absolute purchasing power parity, the price level converted to the exchange rate should be the same in both countries. The exchange rate in the direct quotation corresponds to the ratio of the domestic $P_D$ (the price of the product at home) and the foreign price level of $P_F$ (the price of the product abroad). The equilibrium exchange rate of $ER_{PPP}$ is thus emerging.

$$ER_{PPP} = \frac{P_D}{P_F}$$

[36] Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING p. 94
[37] Samuelson, P. & Nordhaus, W. (2009) Economics. P. 524

The absolute version of the purchasing power parity is based on some assumptions, namely that the goods are identical, that all goods are tradable and there are no costs when the goods are purchased.[38]

#### 2.3.4.2. The Relative Purchasing Power Parity

Relative PPP focuses on comparing exchange rates that are only affected by relative inflation. It deals with the causes of currency exchange and tells us how much the exchange rate will change over a certain period. Purchasing Power Parity Theory provides a change in the exchange rate as the difference in inflation between two countries. If the value of the real exchange rate increased during the period under review, then the domestic currency weakened.

$$ER_{PPP,t+1} = ER_t \frac{1 + p_{D,t}^{t+1}}{1 + p_{F,t}^{t+1}}$$

$ER_t$ – market exchange rate in the initial period that meets the equilibrium exchange rate condition

$ER_{PPP,t+1}$ - the equilibrium rate in the t + 1 period, calculated according to the relative version of purchasing power parity theory

$p_{D,t}^{t+1}$ - the rate of inflation in the domestic country over the period t to t + 1

$p_{F,t}^{t+1}$ - rate of inflation abroad for the period t to t + 1

Purchasing Power Parity is useful in estimating long-term exchange rate trends. However, it is not appropriate to estimate exchange rates for broadly traded currencies in the short and medium term. Purchasing power parity is subject where the deviations may occur. These can be measured using indicators that indicate how much the nominal exchange rate deviates from the purchasing power parity rate.

The most used of these indicators is the ERDI indicator. The Exchange Rate Deviation Index (ERDI) indicates how many times the real exchange rate of a given currency is lower than the PPP-based rate (indicates a nominal exchange rate deviation from the PPP rate). If the

[38] Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING p. 96

country is less developed, its ERDI values are higher and vice versa for more developed countries. Thus, if we express the relationship for ERDI calculation, it will look like this:

$$ERDI = \frac{E_{D/F}}{E_{D/F(PPP)}}$$

Where: $E_{D/F}$ - Nominal exchange rate (exchange rate based on law of one price)

$E_{D/F(PPP)}$ - The absolute version of purchasing power parity (Exchange rate based on purchasing power parity)

Besides the ERDI, we have also a comparative price level (CPL). This is an indicator, telling how many percentages the price level in the economy under examination is compared with the price level in the economy after converting to the common currency. This is the ratio of the exchange rate according to the purchasing power parities and the country's nominal exchange rate.

$$CPL = \frac{P_D}{E_{D/F(PPP)}}$$

This is the reversal of the ERDI or the real exchange rate and hence the interpretation is the opposite.[39]

#### 2.3.4.3. Interest Rate Parity

The interest rate parity explains the formation of the exchange rate on the basis of the interest rates of the countries concerned. "The rise in interest rates in the domestic economy will, in other circumstances, lead to an inflow of portfolio capital from abroad to the growing demand for the domestic currency and its short-term appreciation.

If this theory is explained in a simplified example, it would sound like this: It is possible to deposit money at the Czech bank at an interest rate of 5% or at a German bank at an interest rate of 10%. From a first point of view, it is beneficial to transfer money to a German bank, but it depends on how the CZK / EUR exchange rate will be, not just the current one but also the future one. If the outcome of the situation is that there is a better return in the German bank, the assets will be transferred there. This will be the case for most market participants and it will affect the exchange rate. As the market begins to demand the euro, the Czech

[39] Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING p. 97

crown's exchange rate against the euro will increase. As a result, after the realization of the investment, the same yield is obtained as in the Czech bank. Thus, a rate will be set in which the proceeds from the assets in the Czech bank will equal the proceeds from the assets in the German bank.

Of course, this theory is based on certain assumptions that domestic and foreign assets do not differ in their liquidity and are equally risky, investors only invest in other countries from the point of view of profitability and domestic and foreign assets differ only by their revenues.[40]

[40] Poon, J. & Rigby, D. L. (2017). International Trade p. 144

## 2.4. Foreign exchange market

The foreign exchange market is the main part of the currency market. It is the place where foreign exchange demand is encountered and the exchange rate is created. The foreign exchange market deals in non-cash form of foreign currencies. Basic non-cash forms include bank account entries, electronic listings on terminal screens, bills of exchange or checks.

The second component of the foreign exchange market is the currency market, which is a market that deals with the cash form of a foreign currency. However, the currency market is only a marginal part of the currency market and therefore the money market is generally called the foreign exchange market.

The forex market can be described as online interconnected terminals of dealing departments of banks, investment companies and other major institutions where these institutions exchange funds. This system is referred to as FOREX (Foreign exchange).[41]

The territorial distribution of individual foreign exchange markets allows continuous trading 24 hours a day. Among the most important traditional foreign exchange markets of the so-called on-shore center are Tokyo - Frankfurt - Zurich - London - New York - San Francisco. These are currently complemented by so-called off-shore centers, including New Hebrides, Hong Kong, Singapore and Bahrain. The post-war development of these centers is linked to tax benefits (so-called tax havens) and a favorable territorial position as they are among the traditional markets.[42]

### 2.4.1. The Classification of the Foreign Exchange Market

In addition to the type of money traded, the foreign exchange market can be divided into several other criteria. From the point of view of the nature of trading, the stock market and non-bourse market can be distinguished. According to the entities that enter the foreign exchange market, the foreign exchange market is divided into the interbank and client markets. And according to the technique of operations: the spot, futures and swap markets are distinguished.

[41] Lien, K. (2016) Day Trading and Swing Trading the Currency Market. P. 19
[42] Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING p. 27

Currently, the forex market is predominantly the character of the over-the-counter market, which is termed the OTC market in Czech banking terminology. Exchange trading only has a complementary role. It is used only for futures and options.

From the point of view of foreign exchange entities (participants), the interbank and client foreign exchange market is distinguished. The OTC Exchange Market expresses the relationship between the bank and the bank. In its implementation, dealers are involved in the so-called Market Bank Marketers, CB Dealers and Wholesale Brokers. The client's foreign exchange market is a typical relationship of a commercial bank and a client where a possible intermediary can be authorized and regulated by retail broker. The position of clients can be represented by manufacturing companies, insurance companies, funds, private investors or smaller commercial banks.[43]

According to the technique of operations, foreign exchange trading is divided into:

1. **Spot deals** consist of buying or selling a foreign currency at a rate that is current at the time. The condition is that delivery and payment will normally take place within two days of the conclusion of the agreement.

2. **Term deals** represent the purchase or sale of a currency for a fixed exchange rate at the time the contract is concluded. Delivery and payment must be made within this agreed time. The exchange rate differs from the spot rate in principle by the difference in the interest rate on the domestic and foreign markets. Basic futures include:

2a. **Forwards** are the oldest form of term deals. The agreement is concluded in the present, but its fulfillment occurs only at a pre-arranged term. Forwards are usually closed on the over-the-counter market. It is a kind of "tailor-made client" because the client chooses the amount traded and the term of performance.

2b. Unlike forwards, **futures** have a standardized form, both in terms of the traded quantity (lots) and the dates of their fulfillment. Therefore, they can be realized exclusively on the stock exchange. Each transaction enters a clearing exchange, which selects from merchants a multiple percentage of the total amount of the contract. The advantage of such trades is the possibility of immediately offsetting the profit or loss with the clearing center when closing

[43] Hartmann, P. (1998) Currency Competition and Foreign Exchange Markets. P. 41

the counterfeit. A major disadvantage, however, is the impossibility of adjusting the size and maturity of the claim.

2c. **Option** is a contract between the petitioner and the eligible party. The Claimant undertakes not to withdraw his offer for a predetermined period and the entitled party has the right to withdraw from the contract upon payment of the cash bonus. This depends on the length of the option period, the difference between spot and option rate and risk. The advantage is again the possibility of immediately compensating the profit or loss with the clearing center when closing the counter.

3. **Swap trades** are a combination of spot and forward trades. They are two-way shops, so they count on selling and re-purchasing (or vice versa), and they only affect the exchange rate temporarily.[44]

### 2.4.2. Exchange Rate Modes

Some countries leave their currencies free, do not interfere with the market, and let the value of the exchange rate control the supply and demand of private entities in the currency market. This mode is referred to as a floating rate. However, the exchange rate can fundamentally affect the entire economy, so some countries try to influence or eliminate it altogether. The fixed rate or the fixed exchange rate is the fixed nominal exchange rate of the domestic currency against the foreign currency.[45]

**Differentiation of several exchange rate regimes:**

- The gold standard;

- Fixed exchange rate;

- Corrected and sliding suspension;

- A clean, independent and managed floating exchange rate;

- The Monetary Committee.

**The gold standard**, used in pure form from 1717 to 1936. Under the gold standard, each country defined the value of its currency in proportion to a certain volume of gold, thereby

[44] Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING p. 87
[45] Lien, K. (2016) Day Trading and Swing Trading the Currency Market p. 35

creating fixed exchange rates between currencies. The essence of the gold standard is that when the means of exchange is nothing but gold, foreign trade does not differ from domestic trade; everything can be covered with gold. The only difference is the possibility of a different weight unit for their gold coins. The Queen of Victoria, for example, elected a quarter of an ounce for a pound while US President McKinley gave the dollar value of one twentieth per ounce of gold. The British pound had five times more weight, so the exchange rate was $ 5 / pound. That was the essence of the gold standard. In practice, the land used its own coins, but anyone could freely melt the coins and sell them for the price of gold. The exchange rates were fixed, given the price of gold; in particular, they were determined by the proportion of gold in coins. We call them nominal values or parities.

**Bretton wood system**

After the Second World War, the countries exchanged the gold standard for a more flexible system. A Bretton Woods system was established, which was a system of fixed exchange rates linked to the USD. The breakthrough was the fact that these were fixed but customizable courses. If the value of the fine currency began to deviate significantly from its target or "fundamental" values, their parity could be adjusted.[46]

**The currency board** represents the CB, which ensures the firm anchoring of the domestic currency to a certain foreign currency without a fluctuation band. The currency base is made up of foreign exchange reserves and each unit of domestic currency is 100% covered by them. The advantage is that the system prevents excessive money emissions into the economy. In the event of a fall in reserves, the money offer will be automatically reduced again. This mechanism may be particularly useful in combating high inflation or revitalizing the economy. The downside could be a sudden shock, such as a drop in exports that will reduce the money supply and weaken the economy. The Monetary Committee is the toughest system where the CB cannot pursue any autonomous monetary policy. It is currently being used by Bulgaria, Estonia and Lithuania.

**A fixed exchange rate** is a system where the CB sets the central level and the fluctuation band (± 1%) in which the exchange rate may fluctuate. If the exchange rate approaches the fluctuation band, CB intervenes by buying foreign currency. These foreign exchange

[46] Lien, K. (2016) Day Trading and Swing Trading the Currency Market. P. 36

interventions affect the foreign exchange reserves of the CB and the domestic money supply. For example, China, Denmark and Belarus use a fixed exchange rate.[47]

**The adjustable peg** is the regular official change in the exchange rate of the currency linked to the foreign currency or the basket of foreign currencies. The system was used by the United Kingdom or Mexico, for example.

**Crawling peg** is a system located at the intersection between fixed and floating rate mode. CB maintains a nominal exchange rate at a fixed level against a currency or a basket of currencies, but at regular and pre-announced intervals this central level changes. Changes are due to the development of inflation or other significant economic indicators. The advantage of the system is to fix the expectations of economic operators and to maintain useful flexibility. For this reason, crawling peg is referred to as a fixed exchange rate system. This system mainly applies to transforming economies with a relatively high inflation rate. The scheme was used, for example, in Poland or Hungary.

In **free floating mode**, the exchange rate of a given currency is purely determined by the supply and demand interaction on the foreign exchange market. CB does not interfere with the market at all and does no intervention.

**An independent floating exchange rate** is a currency exchange rate that is occasionally influenced by CB foreign exchange interventions to reduce exchange rate volatility. The determination of the domestic currency exchange rate is largely left behind by market forces. The CB intervenes only in exceptional cases. Among the countries benefiting from this regime are, for example, the USA, Canada, Switzerland and the Eurozone. The CNB uses an independent floating rate in line with inflation targeting.

**The managed floating rate** is a regime where the exchange rate is influenced by CB foreign exchange interventions in order to reach a certain exchange rate. The CB intervenes so that the domestic currency is not too weak or strong. This regime is used by less developed countries such as India, Pakistan or Ukraine. The different regimes operate differently on balance of payments developments, the state of foreign exchange reserves and the relationship of domestic foreign prices.[48]

[47] Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING p. 91
[48] Lien, K. (2016) Day Trading and Swing Trading the Currency Market. P. 41

# 3. Practical Part

This part of diploma thesis will be the most important part focused on data collecting, analyzing and interpreting. This part can be done after understanding the theory of foreign trade and also monetary policies. Theoretical basis was provided in these areas in the first part of the diploma thesis. For introduction in the theoretical part there is interpreted and explained economic situation of the Czech Republic and then the data analysis and interpretation is processed.

## 3.1. Characteristics of Economics of the Czech Republic

The Czech Republic is an inland state, situated in the middle of the temperate belt of the northern hemisphere in the central part of Europe and occupies the territory of the historical lands of Bohemia, Moravia and parts of Silesia. The state borders are Poland (761.8 km), Germany (810.3 km), Austria (466.3 km) and Slovakia (251.8 km).

From the physical and geographical point of view, the Czech Republic lies on the intersection of two mountain systems of the Bohemian Massif and the Western Carpathians. The territory of the Czech Republic is undergoing the main European divide separating the waters of the North, Baltic and Black Seas.[49]

**Picture No. 2: Geographic Location of the Czech Republic**

*Source: https://wikitravel.org/en/File:Czech_Republic_in_its_region.svg*

[49] Czech Republic [online]. About CZ. Quoted: 2018-01-06. Available from: http://www.czech.cz/en/About-CZ

### 3.1.1. Industry

Industrial production has deep historical roots in the territory of today's Czech Republic. Already in the times of Austria-Hungary, the Czech lands formed the industrial base of this constitution, and before its disintegration, approximately 70% of the industrial production of the Austro-Hungarian monarchy was concentrated in the Czech lands. After the emergence of a separate Czechoslovakia, the industry developed so much that Czechoslovakia could be ranked among the industrially most developed countries in the world.

In the Czech Republic, industry is still a major sector of its economy. It represents 35% of the Czech economy (services account for about 62.3% and agriculture is 2.8%) and employs over 40% of all economically active inhabitants of the country. The main pillars of the Czech industry include the engineering, metallurgical, chemical and food industries. Other important components are the energy, construction and consumer industries.[50]

#### 3.1.1.1. The Main Pillars of Czech Industry:

**Engineering industry**

The engineering industry is one of the most traditional industries in the Czech Republic. It's most important part in the Czech Republic is the automotive industry, which also plays a major role in exporting the country. Machines in 2010 accounted for 54.2%, according to the Statistical Office. The automotive industry employs more than 120,000 people. The most important and largest manufacturer of passenger cars in the Czech Republic is Škoda Auto.

**Metallurgical Industry**

The metallurgical industry is often linked to the engineering industry. At present, this sector is most concentrated in the areas of extraction of raw materials (black coal, limestone), especially in the vicinity of Ostrava. Iron ore, as a necessary raw material for steel production, must be imported.

[50] Hospodářská charakteristika [online]. Characteristics of the Czech Republic industry Quoted: 2018-01-06. Available from: http://zemepis-maturitni-otazky.blogspot.cz/2011/06/hospodarska-charakteristika-cr-prumysl.html

## Chemical Industry

The chemical industry is a measure of the economic maturity of the state because it needs skilled labor, sufficient raw materials, water and electricity. Production, however, is a burden on the environment (pollution of water, soil, air). The Czech chemical industry is most concentrated in northern Bohemia (from Ústí nad Labem to Hradec Králové). In Moravia, it is a Moravian chemical area (mainly on the middle and lower reaches of the Morava River). The proximity of oil pipelines (Litvínov, Kralupy nad Vltavou) is important for oil processing.

## Food Industry

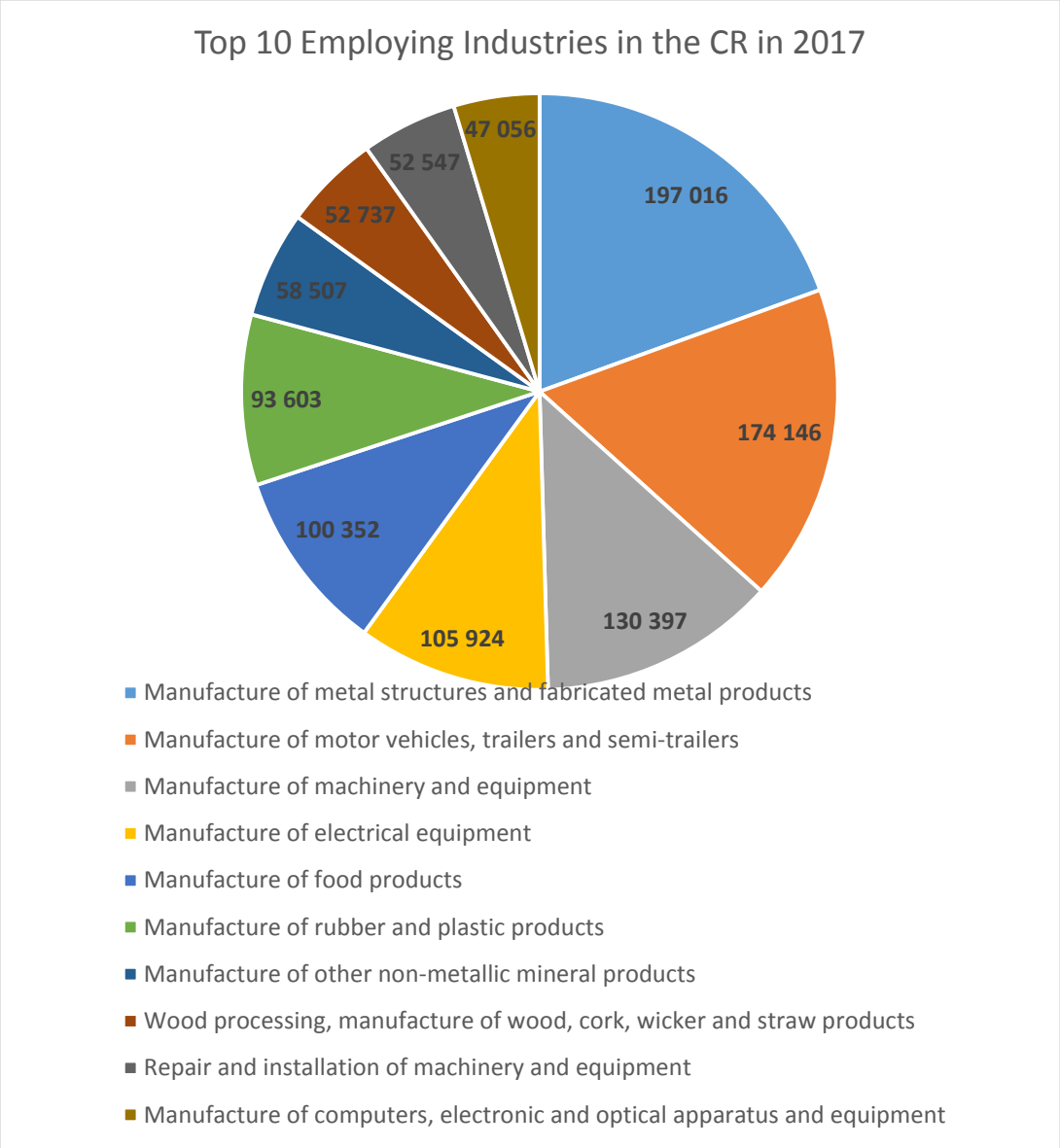
The food industry is scattered throughout the country. The basic raw materials of the food industry come from agricultural products, forestry and water products and from imported raw materials. An important branch of the Czech food industry is beer production. Every year, more than 2 million hectoliters are exported from the Czech Republic. Among the largest beer producers in the Czech Republic are Prazdroj Plzeň, Staropramen Praha and Budvar České Budějovice.[51]

[51] Hrad.cz [online]. Czech Republic industry. Quoted: 2018-01-06. Available from: https://www.hrad.cz/cs/ceska-republika/o-ceske-republice

### 3.1.1.2. The Industries with Largest Numbers of Employees

According to the Czech Statistical Office, the graph above is showing importance of Czech industry from the point of view of employment. There is introduces that the industry with the highest number of employees is the Manufacture of metal structures and fabricated metal products which employed in the year 2017 in average 197 016 people followed by Manufacture of motor vehicles, trailers and semi-trailers with 174 146 employees.

**Graph No. 3: Top 10 Employing Industries in the Czech Republic in 2017 (the values are number of people employed in this industry)**




Source: Data from Czech Statistical Office , own processing , *https://vdb.czso.cz/vdbvo2/faces/cs/index.jsf?page=vystup-objekt&pvo=PRU05&f=TABULKA&z=T&skupId=146&katalog=30835&pvo=PRU05&str=v146&c=v3~3__RP2017#w=*

Third place is Manufacture of machinery and equipment followed by Manufacture of electrical equipment; Manufacture of food products; Manufacture of rubber and plastic products; Manufacture of other non-metallic mineral products; Wood processing, manufacture of wood, cork, wicker and straw products; Repair and installation of machinery and equipment and tenth place belongs to Manufacture of computers, electronic and optical apparatus and equipment with 47 056 employees.[52]

### 3.1.2. Agriculture

Agricultural production, together with the downstream food production, belongs to the traditional sector of the national economy. Both agriculture and the food industry have undergone, after 1989, a vital economic and economic transformation that has been reflected in the quality and quantity of individual commodities. Many of them have fallen below the level of domestic consumption, where the agricultural sector is taking the necessary steps to increase output, in a number of commodities the export potential has been opened or maintained or expanded, as documented by export data mainly commodities milk, live animals, cereals, sugar and malt. [53]

Agricultural land in the year 2015 accounted for about 53% of the total area of the Czech Republic. It is mostly owned by natural and legal persons. The agricultural production is carried out by approximately 47 thousand agricultural operators and processors of agricultural raw materials. This group accounts for about 3.5 million hectares, of which 2.5 million hectares of arable land. Arable land accounts for about 71%.

From the employment point of view, about 98,000 workers are employed in agricultural production, forestry and fishing, of which only 84,000 are in agriculture. These workers are thus involved in GDP creation: agricultural production in 2015 contributed to total GDP formation of 1.68%, food production from 2.19% of GDP.

In addition to its basic production function, food production, today agriculture also provides the public with other recently neglected social and ecological functions. Due attention is paid

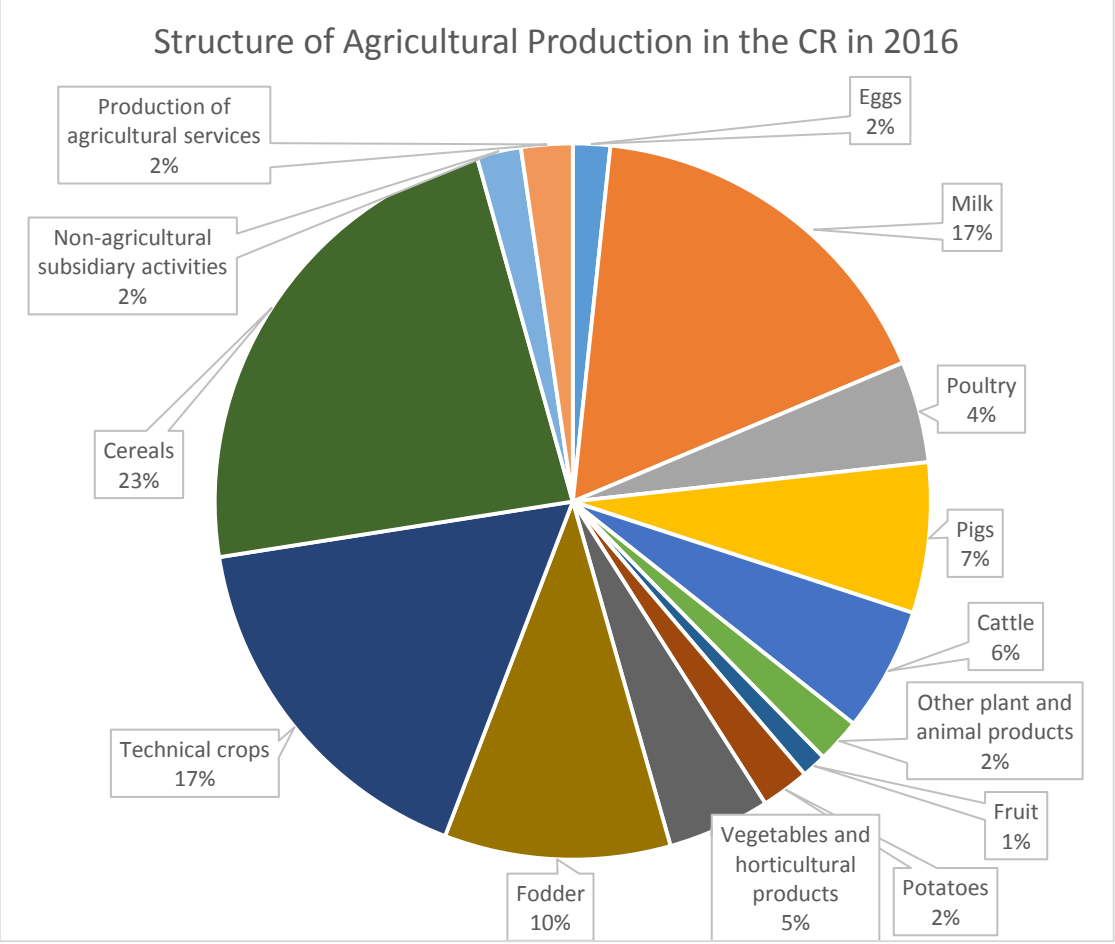
[52] Czech Statistical Office [online]. Industry employment. Quoted: 2018-01-06. Available from: https://vdb.czso.cz/vdbvo2/faces/cs/index.jsf?page=vystup-objekt&pvo=PRU05&f=TABULKA&z=T&skupId=146&katalog=30835&pvo=PRU05&str=v146&c=v3~3__RP2017#w=

[53] Statistikaamy.cz [online]. Agriculture. Quoted: 2018-01-06. Available from: http://www.statistikaamy.cz/2014/07/v-cem-je-ceske-zemedelstvi-jine/

to these functions with increasing intensity and emphasis. Agricultural activity is an integral and still basic component of rural space. Farmers are also led by a wide range of subsidy instruments, both national and European, to these public and environmental friendly activities. [54]

In the year 2016 the most important sphere in the agriculture was growing of cereals with overall share in the Czech agriculture with 23% followed by growing technical crops and production of the milk both by 17%. Other production is represented in the graph below with percentages of share in the Czech agriculture.[55]

**Graph No. 4: Structure of Agricultural Production in the Czech Republic (In percentages)**




Source: Data from Czech Statistical Office , own processing, *https://www.czso.cz/csu/czso/souhrnny-zemedelsky-ucet-predbezne-vysledky-2016*

[54] Investičníweb.cz [online]. Czech agriculture. Quoted: 2018-01-06. Available from: http://www.investicniweb.cz/news-ceske-zemedelstvi-2017-dotace-nakupni-horecka-pudy-i-nove-technologie/

### 3.1.3. Main Macroeconomic Indicators in the Time Period 2007 - 2017

#### 3.1.3.1. Gross Domestic Product

According to statistics, Czech households are richer than in the previous decade, they invest more in real estate but are also more indebted. The proportion of housing spending has increased, while spending on food, footwear and clothing decreased in comparison with years ago.

During 2016, growth in the Czech economy was slowing. This is related to the high comparative base of the previous year and to the fact that the funds from the European funds for the previous programming period have been used up. However, household incomes continued to grow and positive consumer attunes persisted. This also affected the significant growth in retail sales, which was the sixth highest among EU countries.

National economies have traditionally grown thanks to the manufacturing industry. However, business, transport, accommodation and hospitality or real estate activities were in 2016 also successful. The agriculture, forestry and fisheries sectors also saw positive results, as contributed by the good crops of all the basic crops.[56]

[56] Czech Statistical Office [online]. GDP. Quoted: 2018-01-06. Available from: https://www.czso.cz/csu/czso/katalog-produktu

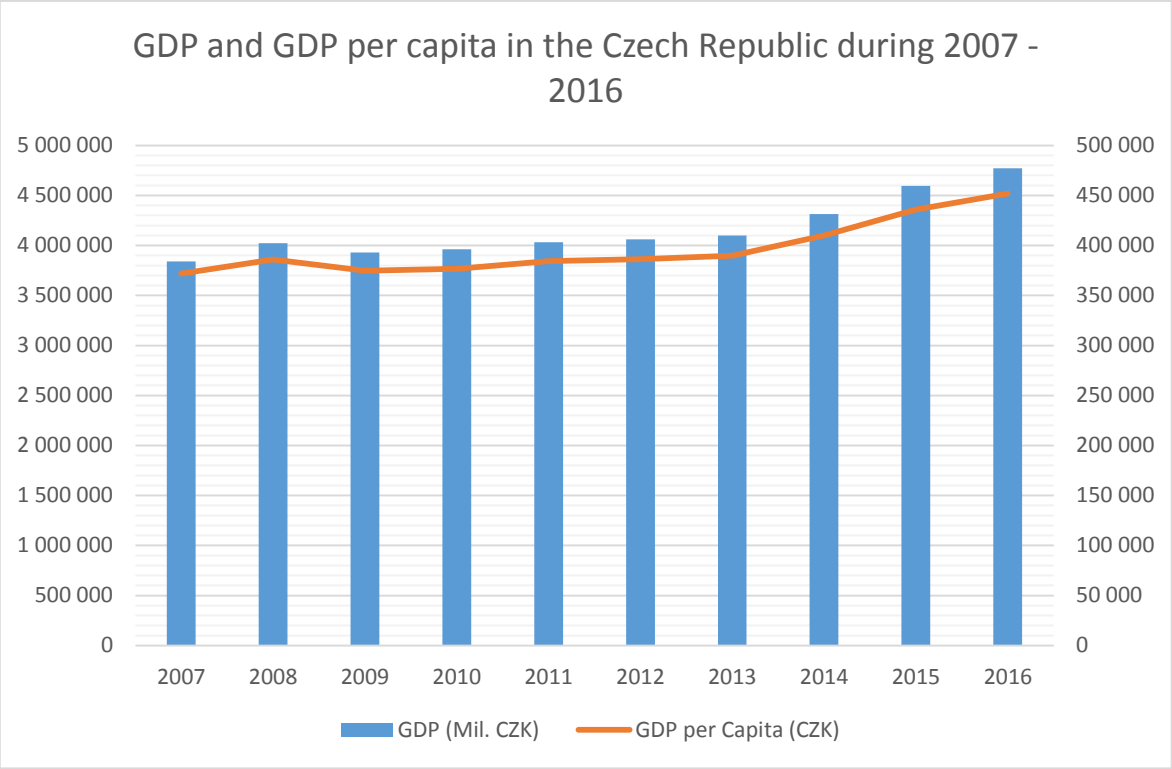
According to table below, there is development of Czech gross domestic product and also Czech domestic product per capita, these values are also graphically illustrated in the graph where blue panels are the GDP and red line is GDP per capita.

**Table No. 1: GDP and GDP per capita in the Czech Republic 2007 – 2016**

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| GDP (Mil. CZK) | 3 840 117 | 4 024 117 | 3 930 409 | 3 962 464 | 4 033 755 | 4 059 912 | 4 098 128 | 4 313 789 | 4 595 783 | 4 773 240 |
| GDP per Capita (CZK) | 372 007 | 385 833 | 374 628 | 376 759 | 384 289 | 386 317 | 389 900 | 409 870 | 435 911 | 451 785 |

*Source: Data from Czech Statistical Office, own processing*

**Graph No. 5: GDP and GDP per capita in the Czech Republic 2007 – 2016 (Left axis represents GDP in mil. of CZK and right axis represents GDP per capita in CZK)**




*Source: Data from Czech Statistical Office, own processing*

### 3.1.3.2. Unemployment

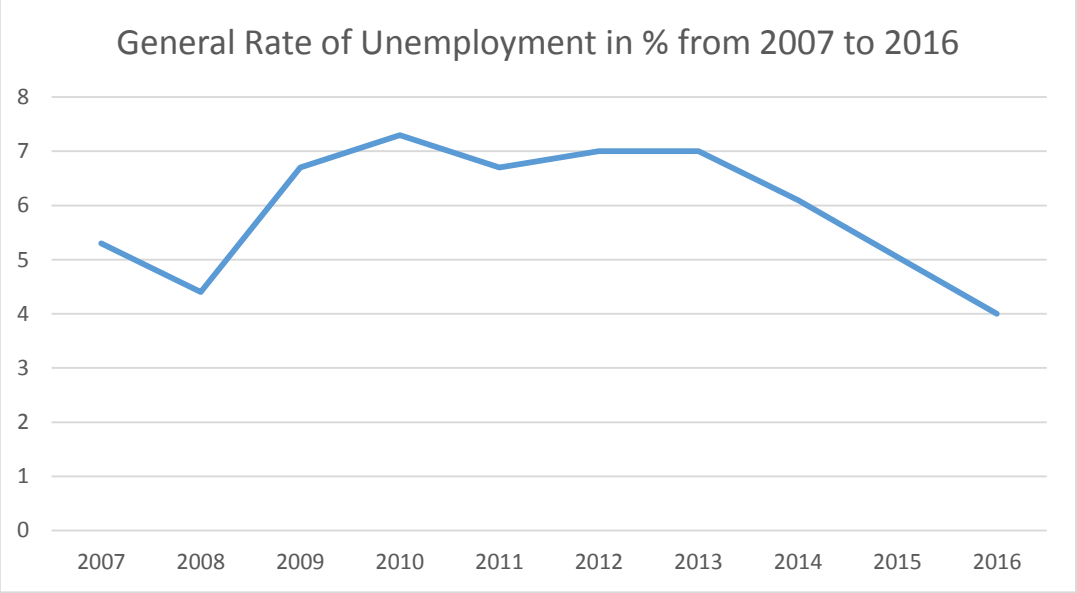
In 2016, labor market developments were exceptionally favorable. The total number of workers was the highest since the Czech Republic and the unemployment rate was the lowest in the whole European Union. In this situation, the more urgent the question is how to resolve the conflict between the pressure for further employment growth and the current socio-economic and demographic conditions.[57] For imagination of development of unemployment during from the year 2007 to 2016 is processed table and graph below.

**Table No. 2: General Rate of Unemployment 2007 – 2016**

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| General Rate of Unemployment in % | 5,3 | 4,4 | 6,7 | 7,3 | 6,7 | 7,0 | 7,0 | 6,1 | 5,0 | 4,0 |

*Source: Data from Czech Statistical Office, own processing*

**Graph No. 6: General Rate of Unemployment 2007 – 2016**




*Source: Data from Czech Statistical Office, own processing*

[57] Czech Statistical Office [online]. Unemployment. Quoted: 2018-01-06. Available from: https://www.czso.cz/csu/czso/zamestnanost_nezamestnanost_prace

### 3.1.3.3. Inflation

The rate of inflation is the percentage increase in consumer price indices. Generally, inflation means a general rise in price levels over time. The statistical expression of inflation is based on the measurement of net price changes using consumer price indices. Consumer prices in the Czech Republic rose 0.1 percent in December 2017. This increase was mainly influenced by the rise in prices in 'food and non-alcoholic beverages'. Year-on-year consumer price inflation decelerated to 2.4% in December (from 2.6% in November). The average inflation rate for the whole of 2017 was 2.5%, the highest figure in the last 5 years.

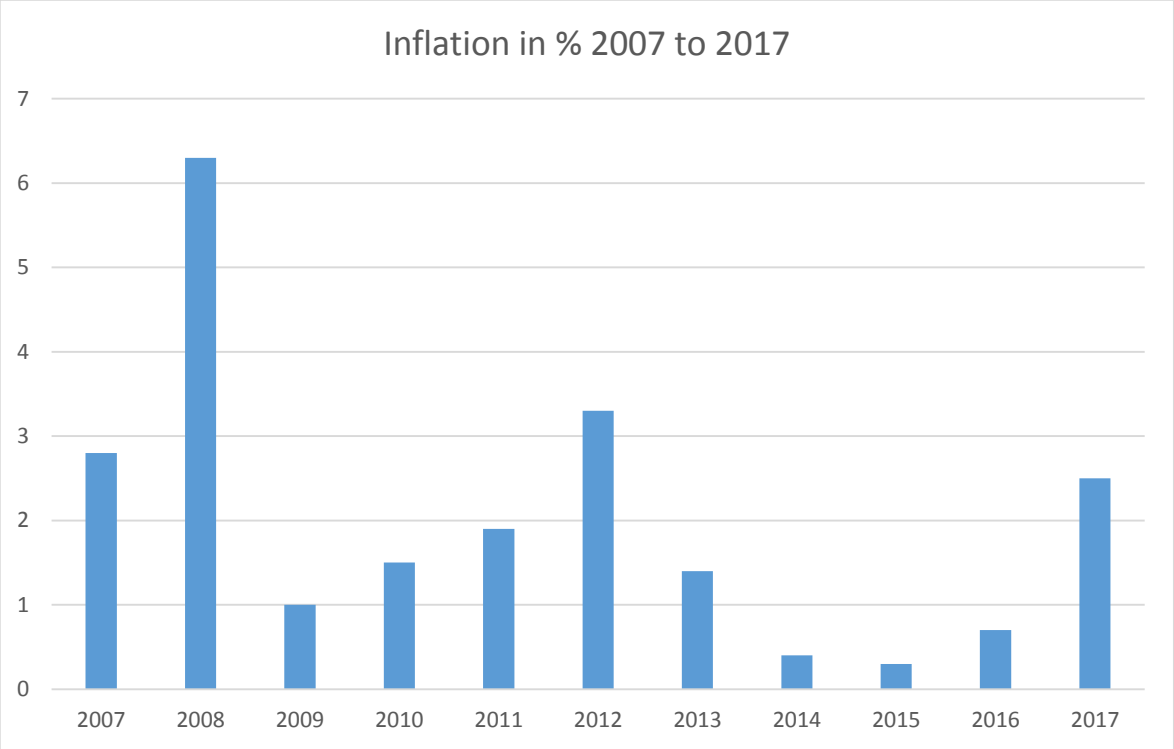
The following graph and table shows yearly averages of inflation in the Czech Republic from the year 2007 to 2017.[58]

**Table No. 3: Inflation in the Czech Republic 2007 - 2017**

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflation in % | 2,8 | 6,3 | 1,0 | 1,5 | 1,9 | 3,3 | 1,4 | 0,4 | 0,3 | 0,7 | 2,5 |

*Source: Data from webpage kurzy.cz, own processing*

**Graph No. 7: Inflation in the Czech Republic in % from 2007 - 2017**




*Source: Data from webpage kurzy.cz, own processing*

[58] Kurzy.cz [online]. Inflace. Quoted: 2018-01-06. Available from: https://www.kurzy.cz/makroekonomika/inflace/

## 3.2. Development of the EUR/CZK Exchange Rate

Graph No. 8 (which is real trading graph of values of the EUR/CZK on foreign exchange market on Patria.cz) reflects the development of the Czech crown against the euro in the period from 2007 to the end of 2017. Since 2007, the Czech crown has significantly strengthened against the euro, leading to a maximum of 22,99 EUR/CZK on 13 July 2008. This was caused by the world economic crisis that hit the euro far before the crown. However, even after this crisis date, it fell to the Czech Republic and the crown failed to compare. In the course of a few months, it weakened by more than 5 crowns and in 2009 it reached 28 crowns per euro. From this "shock", however, the Czech crown quickly recovered and the exchange rate from the end of 2009 to the end of the year in 2013 was between 24 and 25 crowns per euro. At the end of the year, the CNB intervened and the crown reached the level of 27 crowns for the euro.

**Graph No. 8: Development of the Exchange Rate EUR/CZK 2007 - 2017**


*Source: Patria.cz, own editing*

In November 2013, the CNB Bank Board decided to start using the exchange rate as an additional instrument for mitigating the currency conditions and intervening in the foreign exchange market to weaken the koruna's exchange rate to keep the koruna's exchange rate against the euro close to the 27 EUR/CZK level. The decision is known as the CNB's Exchange Rate Commitment (otherwise "CNB intervention" or "weakening of the koruna"). The weakening of the koruna's exchange rate by interventions and the purchase of the euro is not an objective but a means to achieve inflation of 2%.

The CNB's exchange rate commitment on the Euro / Koruna exchange rate has been confirmed several times since 2013 and the CNB advised the Czech National Bank II quarterly in 2017, probably the beginning of the second quarter.

The exchange rate commitment of the CNB was terminated at the meeting of the Bank Board on 6.4.2017. [59] The entire period of intervention by the Czech National Bank is shown on graph 8 and is bounded by red lines. The goal of the Czech National Bank was fulfilled and managed to keep the exchange rate above 27 EUR/CZK.

After the end of the Czech National Bank's interventions, the Czech crown started to strengthen against the euro, which was also expected. As can be seen in Chart 4, the crown's exchange rate against the euro climbed to 25.30 EUR/CZK, so the crown strengthened its value and in the other words appreciated.

[59] Kurzy.cz [online]. Inflace. Quoted: 2018-01-06. Available from: https://www.kurzy.cz/intervence-cnb/

According to the table number 4 there are values of Czech crown against Euro from the 2007 to 2017. The yearly values are divided into quarters and also there is yearly average. This table and time series is important for the research of this thesis, because this values are compared with values of foreign trade in statistical testing.

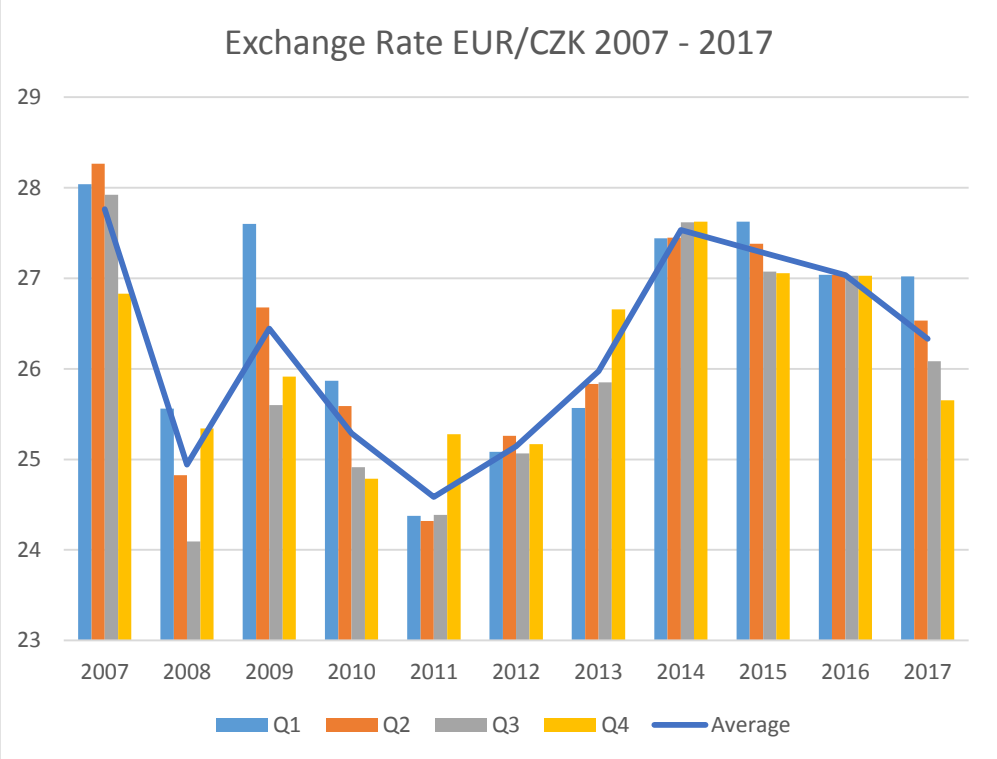
**Table No. 4: Exchange Rate EUR/CZK 2007 - 2017**

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | 28.037 | 25.562 | 27.599 | 25.868 | 24.375 | 25.083 | 25.568 | 27.441 | 27.624 | 27.039 | 27.02 |
| Q2 | 28.266 | 24.826 | 26.677 | 25.589 | 24.321 | 25.261 | 25.831 | 27.447 | 27.38 | 27.039 | 26.532 |
| Q3 | 27.923 | 24.092 | 25.598 | 24.913 | 24.388 | 25.065 | 25.852 | 27.618 | 27.072 | 27.028 | 26.084 |
| Q4 | 26.829 | 25.342 | 25.915 | 24.786 | 25.279 | 25.167 | 26.657 | 27.624 | 27.057 | 27.028 | 25.651 |
| Average | 27.762 | 24.942 | 26.445 | 25.29 | 24.586 | 25.143 | 25.974 | 27.533 | 27.283 | 27.033 | 26.33 |

*Source: Data from kurzy.cz, own processing*

For better imagination there is also constructed the graph no 8, which introduce this values. The quarter values are in Cluster Column chart type and the blue line represents the yearly averages of the exchange rate EUR/CZK.

**Graph No. 8: Exchange Rate EUR/CZK 2007 - 2017 (quarterlly and yearly averages)**



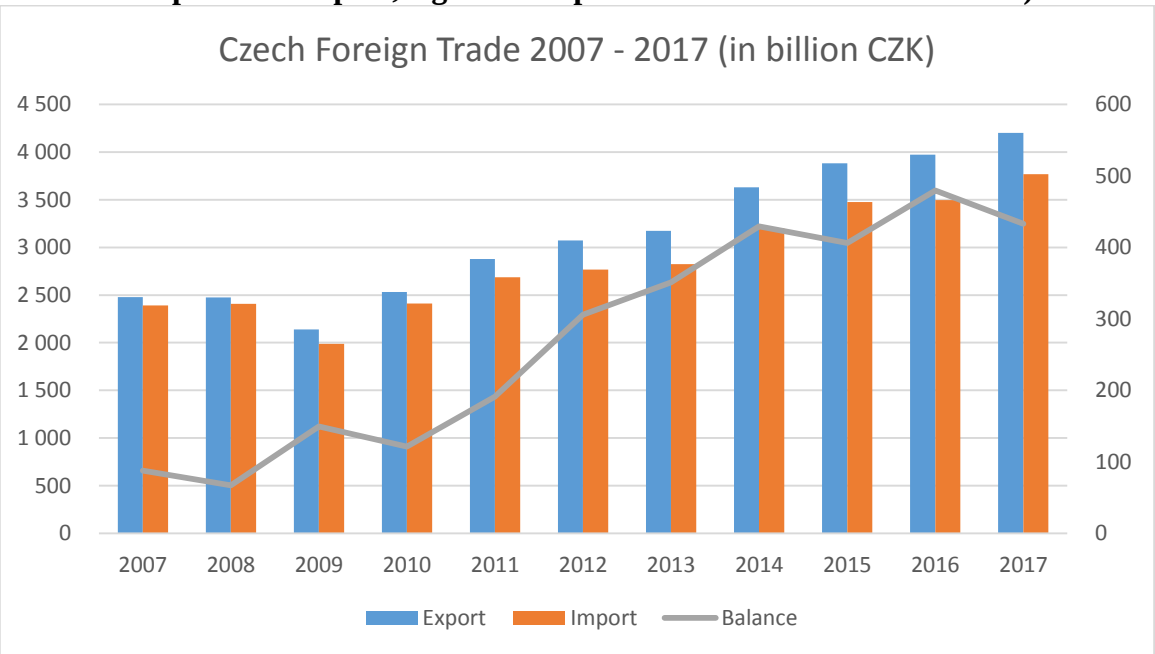

*Source: Data from kurzy.cz, own processing*

## 3.3. Foreign Trade of the Czech Republic

The Czech economy is in great shape. After slowing down growth in 2016 due to the drop in the extraordinary impact of EU funds absorption, it regained strength in 2017. Its performance in the first half of 2017 after seasonal adjustment increased by 3.8% year-on-year (even in the second quarter by 4.7%), in a favorable economic environment, reflecting the optimistic mood of both consumers and companies.

The role of the main growth factor has kept stable consumption that benefits from rising employment and wages, and hence the greater willingness of the population to spend. Consumption is rising in all the basic categories of household spending, but it is becoming more and more important to buy consumer goods and invest in leisure activities. The higher performance of the economy was also supported by the recovery in external demand, which was reflected in the record turnover of foreign trade. Imports have been driven up by higher oil prices, but exports of cars and machines have been able to offset this impact. While investment was a brunt of the economy in 2016, investment activity is boosted by rising spending on private investment this year. Their strong growth could be motivated by an effort to increase labor productivity in an increasingly acute shortage of labor.

**Graph No. 9: Czech Foreign Trade 2007 - 2017 in billion CZK (Left axis represents values for export and import, right axis represents values for trade balance)**




*Source: Data from mpo.cz, own processing*

Foreign trade in 2017 benefits from solid growth in Europe and favorable foreign demand, and once again, it has earned the dynamic growth of the domestic economy as a whole. Czech exports also stimulated the continued favorable situation on the European automotive markets and the supply of foreign orders stemming from the very good assessments of the current situation and the resulting strong optimism in anticipation of further acceleration of economic activity. The import intensity of Czech exports, however, pushes the import side, which still affects the growth of wages and domestic demand, also partly related to the interest in imported goods. The external trade results from Q2 also include the termination of the exchange rate commitment and the subsequent, yet moderate, appreciation of the crown.[60]

Next tables and graphs are focused on the analysis of quarterly data of the Czech import and export in total and there is also paragraph about comparison of the Czech export and import in total and with countries of European Union.

**Table No. 5: Czech Export Qarterly in Millions of CZK 2007 – 2017**

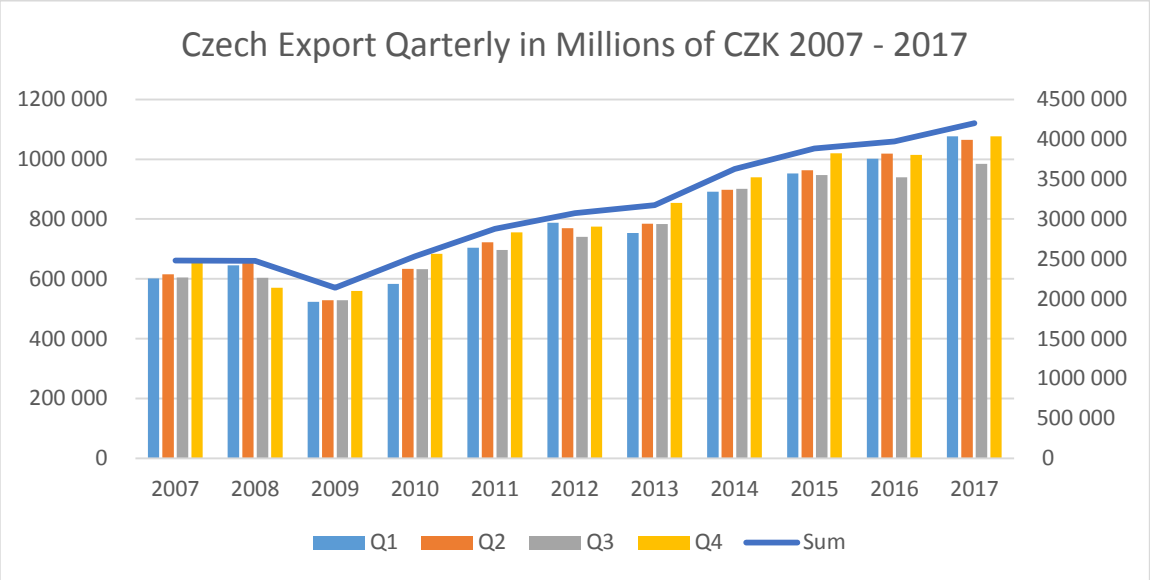
| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | 601 244 | 645 417 | 522 854 | 583168 | 703550 | 787325 | 752950 | 890979 | 952784 | 1001595 | 1076621 |
| Q2 | 615 192 | 654192 | 528 008 | 633563 | 722784 | 769523 | 784343 | 897411 | 963647 | 1018506 | 1064813 |
| Q3 | 604 820 | 603389 | 528 398 | 632163 | 696451 | 740884 | 783013 | 900576 | 947431 | 939887 | 984116 |
| Q4 | 657 979 | 570738 | 559 365 | 683901 | 755905 | 774865 | 854398 | 939860 | 1019386 | 1014053 | 1076941 |
| Sum | 2 479 235 | 2 473 736 | 2 138 625 | 2 532 795 | 2 878 690 | 3 072 597 | 3 174 704 | 3 628 826 | 3 883 248 | 3 974 041 | 4 202 491 |

*Source: Data from mpo.cz, own processing*

For better imagination there is graph no 10 below. The columns represent quarterly data in the years from 2007 to 2017 and the blue line represents the sum of quarters and the values of the blue line are on the right axis.

[60] Ministry of Industry and Trade [online]. Quoted: 2018-01-06. Available from: https://www.mpo.cz/cz/zahranicni-obchod/statistiky-zahranicniho-obchodu/hlavni-tendence-vyvoje-ekonomiky--prumyslu-a-zahranicniho-obchodu--232353/

**Graph No. 10: Czech Export Qarterly in Millions of CZK 2007 – 2017 (Left axis quartals, right axis total export)**




*Source: Data from mpo.cz, own processing*

Following table and graph are focused only on import of the Czech Republic in total with quarterly data.

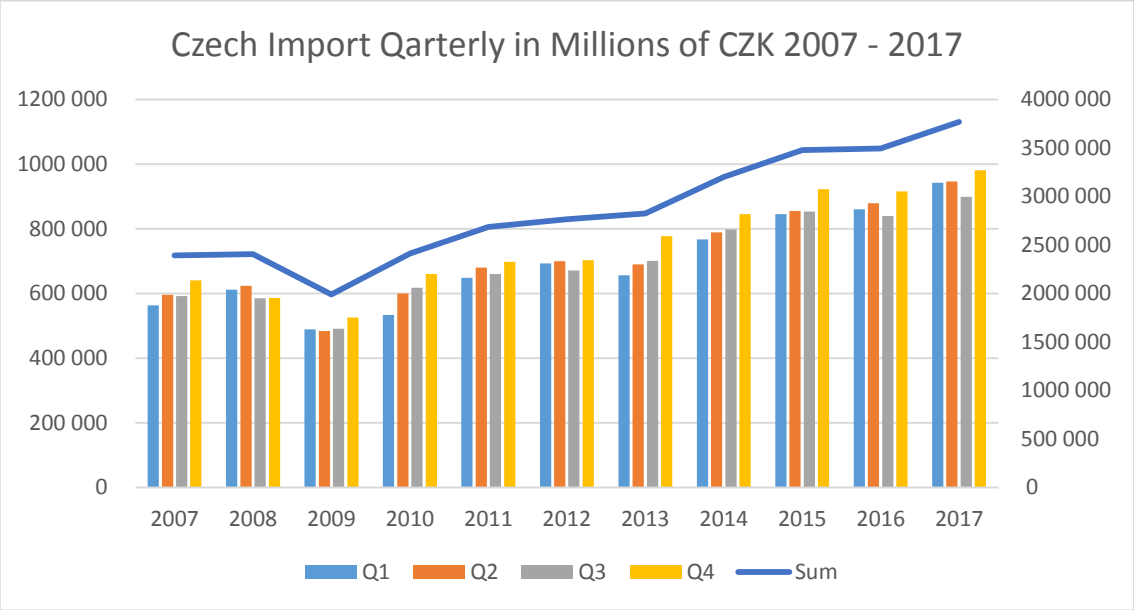
**Table No. 6: Czech Import Qarterly in Millions of CZK 2007 – 2017**

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | 563 294 | 611580 | 488861 | 533620 | 648436 | 692791 | 656115 | 767159 | 845339 | 860689 | 942807 |
| Q2 | 595 795 | 623983 | 483760 | 599961 | 680139 | 699832 | 689613 | 789476 | 855792 | 879314 | 946775 |
| Q3 | 592 122 | 584806 | 490690 | 617702 | 660760 | 671296 | 700572 | 797952 | 853677 | 839083 | 899380 |
| Q4 | 640 108 | 586121 | 525725 | 660274 | 698227 | 702970 | 777185 | 845044 | 922192 | 915587 | 980615 |
| Sum | 2 391 319 | 2 406 490 | 1 989 036 | 2 411 557 | 2 687 562 | 2 766 889 | 2 823 485 | 3 199 631 | 3 477 000 | 3 494 673 | 3 769 577 |

*Source: Data from mpo.cz, own processing*

Interesting trend is, that in almost all years there is lowest value in the third quartile of the almost all years, and this phenomenon is also appeared in the data with exports from table no 5. It could be caused by the summer time and fact, that many people in the companies are on holydays and overall productivity is decreased, there is less contracts and so on.

**Graph No. 11: Czech Import Qarterly in Millions of CZK 2007 – 2017 (Left axis quartals, right axis total export)**




*Source: Data from mpo.cz, own processing*

In the graph no 11 above, there are data series from the Czech Import from the year 2007 to 2017 and quarters have left axis and they are represented by clustered columns. Sum of yearly import is represented by blue line with scale of values on the right axis.

### 3.3.1. Foreign Trade with the European Union

The next part of the development of the foreign trade in the Czech Republic is focused on comparison of the Czech export and import in total versus the export and import only within the European Union. According to the following table and graph, there is clear interpretation of the importance of European Union to the foreign trade of Czech Republic, this is also reason for deciding to use currency pair EUR/CZK in analysis for deciding of relationship between value of currency and foreign trade. According to the following table no 7, the average percentage of Czech export to the EU is 84%. It means that Czech Republic sold in average 84% its goods and services to the European Union, the highest ratio appeared in the 2007 and 2008 which was 86%. On the other hand the import of the Czech Republic is lower in percentage to the European Union than the export in average value in the selected period of 66%. The highest ratio appeared again in the year 2007 as 71%. The lower percentage is described in the chapter about important trade partners, but in short description it is caused by the trade with China, which provides mainly goods in very competitive price leveling. In

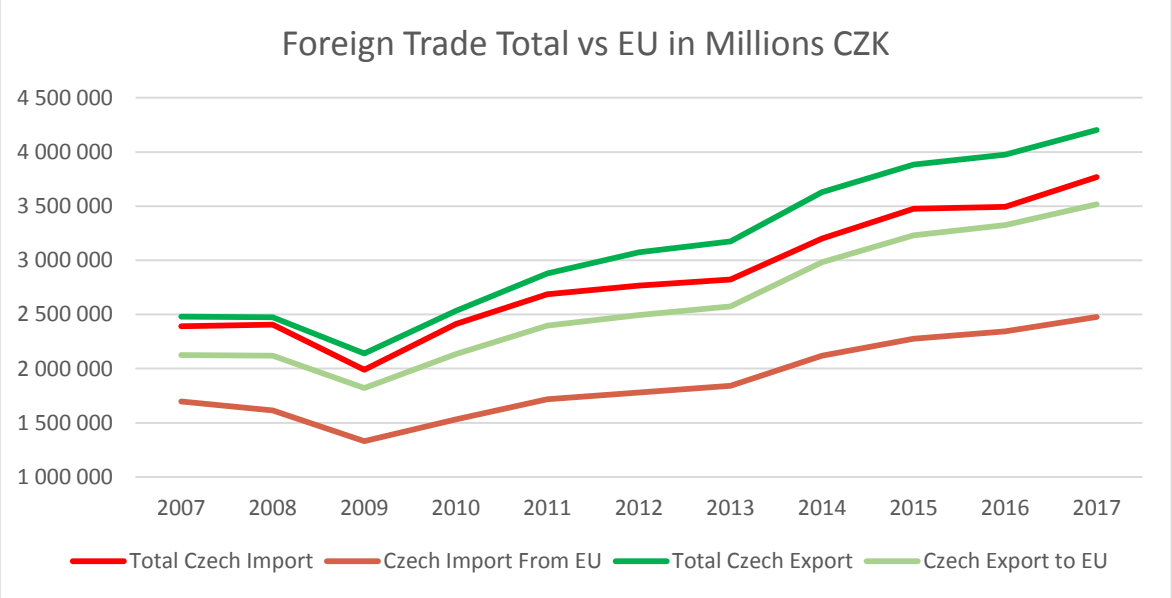
the graph no. 12 there is representation of total import against import only from the EU (light and dark green curves) and total export and export to the EU (red curves).

**Table No. 7: Foreign Trade Total vs EU in Millions CZK**

| Year | Total Czech Im. | Czech Im. From EU | % | Total Czech Ex. | Czech Ex. to EU | % |
|---|---|---|---|---|---|---|
| 2007 | 2 391 319 | 1 695 494 | 71 | 2 479 235 | 2 125 758 | 86 |
| 2008 | 2 406 490 | 1 613 625 | 67 | 2 473 736 | 2 119 018 | 86 |
| 2009 | 1 989 036 | 1 329 824 | 67 | 2 138 625 | 1 820 338 | 85 |
| 2010 | 2 411 557 | 1 530 078 | 63 | 2 532 795 | 2 134 869 | 84 |
| 2011 | 2 687 562 | 1 718 778 | 64 | 2 878 690 | 2 398 098 | 83 |
| 2012 | 2 766 889 | 1 779 611 | 64 | 3 072 597 | 2 495 734 | 81 |
| 2013 | 2 823 485 | 1 840 882 | 65 | 3 174 704 | 2 572 990 | 81 |
| 2014 | 3 199 631 | 2 119 681 | 66 | 3 628 826 | 2 981 972 | 82 |
| 2015 | 3 477 000 | 2 276 607 | 65 | 3 883 248 | 3 231 200 | 83 |
| 2016 | 3 494 673 | 2 345 023 | 67 | 3 974 041 | 3 323 713 | 84 |
| 2017 | 3 769 577 | 2 477 959 | 66 | 4 202 491 | 3 517 463 | 84 |

*Source: Data from czso.cz, own processing*

**Graph No. 12: Foreign Trade Total vs EU in Millions CZK**




*Source: Data from czso.cz, own processing*

### 3.3.2. Structure of the Foreign Trade

The impact of strong economic activity driven by both domestic and foreign demand was reflected in the growth of both exports and imports of industrial consumer goods, while the trend of interest for new cars on both sides of the border has traditionally persisted. From the point of view of the commodity structure, therefore, the main export and import item remained the machinery and means of transport, which also contributed to the greatest extent to the good result of Czech foreign trade. Exports showed the same growth rate as imports and trade in machinery and transport equipment.

**Table No. 8: Structure of the foreign trade in 2017**

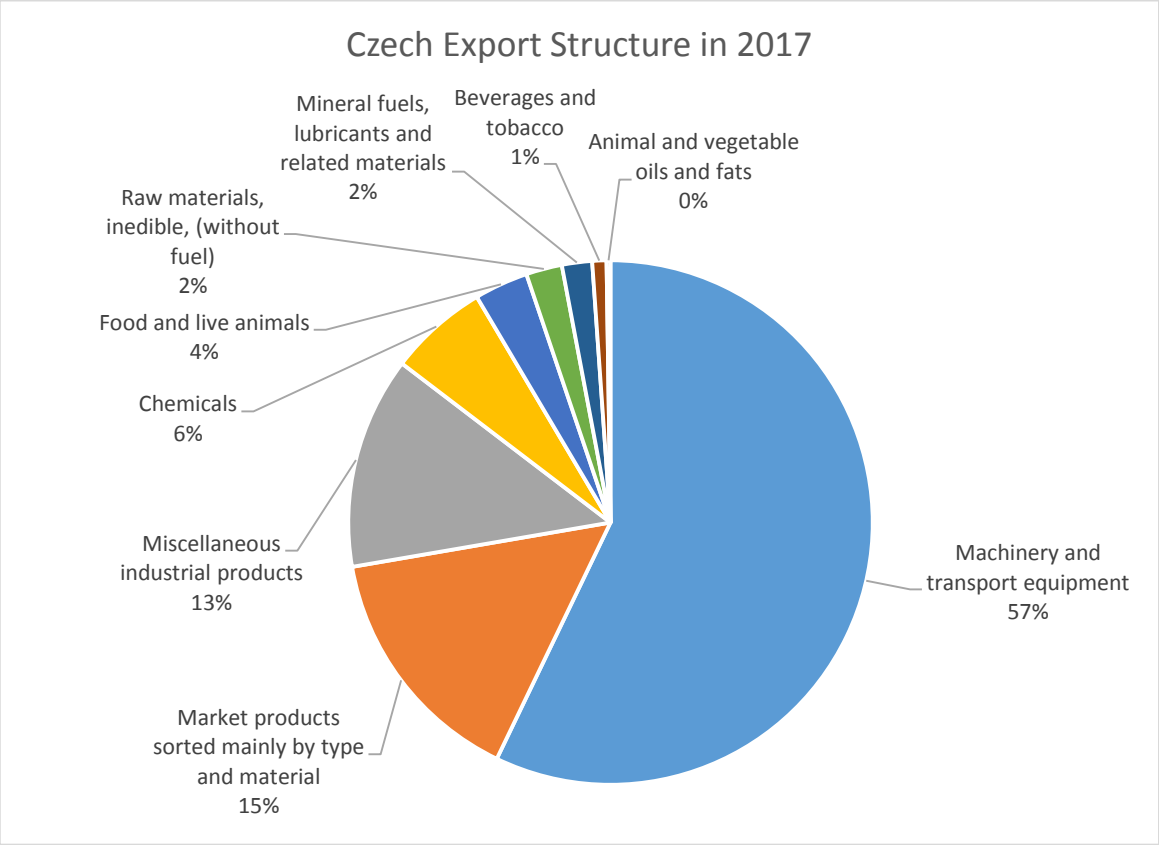
| | Export | | Import | |
|---|---|---|---|---|
| | 1-12/2017 | | 1-12/2017 | |
| | mil. CZK | % | mil. CZK | % |
| **Total foreign trade** | **4 202 492** | **100** | **3 769 576** | **100** |
| Food and live animals | 139 108 | 3.31 | 175 597 | 4.65 |
| Beverages and tobacco | 36 750 | 0.87 | 27 775 | 0.73 |
| Raw materials, inedible, (without fuel) | 93 027 | 2.21 | 80 222 | 2.12 |
| Mineral fuels, lubricants and related materials | 77 992 | 1.85 | 207 522 | 5.50 |
| Animal and vegetable oils and fats | 10 010 | 0.23 | 8 033 | 0.21 |
| Chemicals | 256 415 | 6.10 | 414 653 | 10.99 |
| Market products sorted mainly by type and material | 635 315 | 15.11 | 636 051 | 16.87 |
| Machinery and transport equipment | 2 395 164 | 56.99 | 1 748 792 | 46.39 |
| Miscellaneous industrial products | 548 057 | 13.04 | 460 454 | 12.21 |

*Source: Data from czso.cz, own processing*

Also, current economic situation among shopping managers confirm optimism and suggest continued recovery. The values of all indicators are higher than a year earlier than at the beginning of this year. Foreign demand has so far evolved positively, and the favorable situation in European automotive markets is continuing, which is also exacerbated by Czech exports. A further increase in the volume of Czech foreign trade would not prevent anything in the near future. However, growing export dynamics and, together with a downturn in

overall investment and a high domestic consumer demand, will also lead to faster imports growth.[61]

**Graph No. 13: Czech Export Structure in 2017**

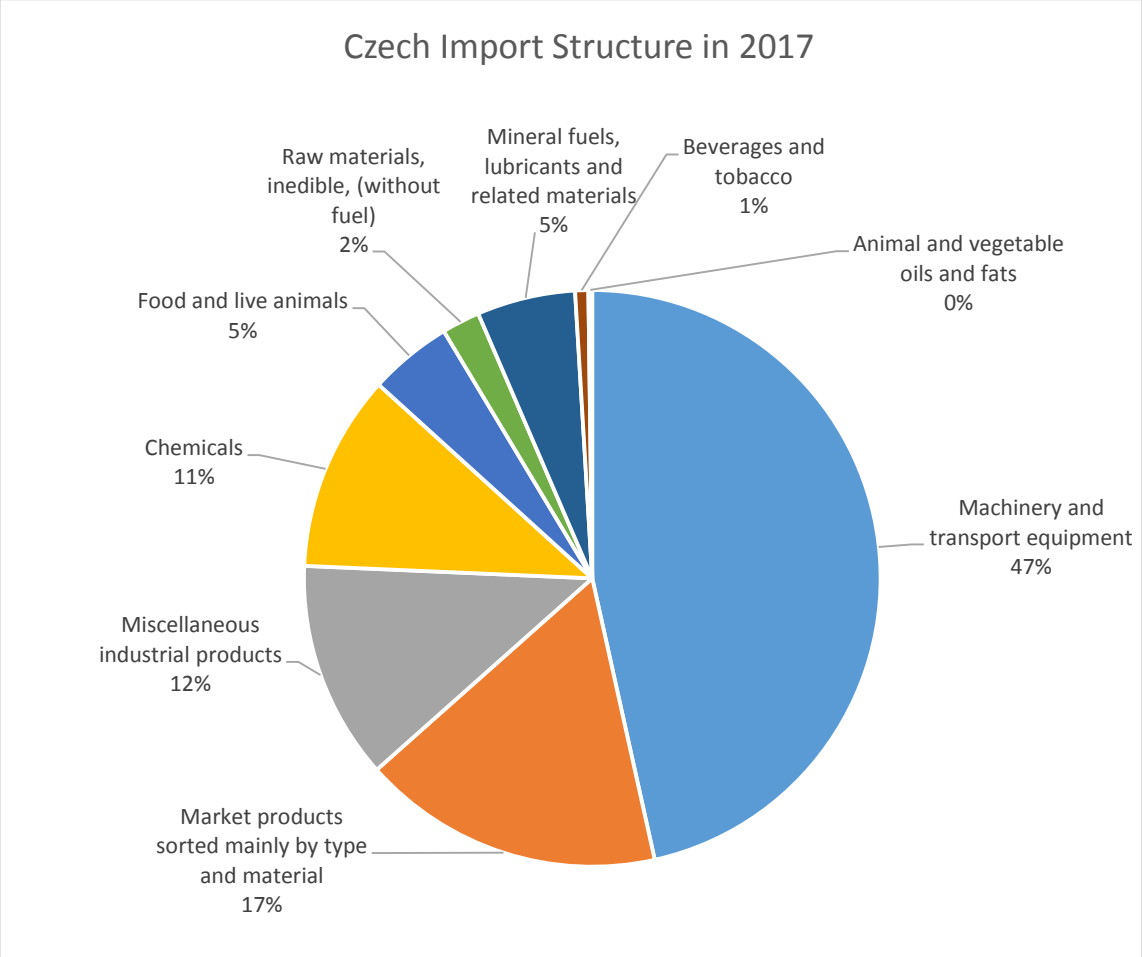



*Source: Data from czso.cz, own processing*

[61] Ministry of Industry and Trade [online]. Foreign trade. Quoted: 2018-01-06. Available from: https://www.mpo.cz/cz/zahranicni-obchod/statistiky-zahranicniho-obchodu/hlavni-tendence-vyvoje-ekonomiky--prumyslu-a-zahranicniho-obchodu--232353/

As mentioned above, Czech exports are mainly driven by trade in machinery and transport equipment. In addition, market products play an important role with 15% of Czech exports. This is followed by a 13% share of exports of other industrial products. Export of chemicals with 6% share follows. For Czech imports, the structure is very similar to that of exports, 47% is the trade in machinery and transport equipment, followed by market products and industrial products. This share is graphically represented in graphs 13 and 14.

**Graph No. 14: Czech Import Structure in 2017**




*Source: Data from czso.cz, own processing*

### 3.3.3. Important Partners in Foreign Trade

The Czech Republic's links with the economies of the European Union countries also bring strong trade links, so the largest volume of Czech exports and imports has traditionally been realized within these countries. The turnover of mutual trade is 76% of total trade in goods. In the first half of the year, 84% of total domestic exports were made to the EU and 68% of imports were made, but the share of this group declined slightly in total exports and wagons. The balance of trade with EU countries28 ended with a surplus of CZK 363.1 billion, up by CZK 28.5 billion year-on-year. Similarly, trade with the euro area was similar.

**Table No. 9: Important Partners in Foreign Trade 2017**

| | BALANCE | |
|---|---|---|
| | 1-12/16 | 1-12/17 |
| | mil. CZK | mil. CZK |
| **Germany** | 362 635 | 409 676 |
| **Slovakia** | 153 716 | 142 992 |
| **United Kingdom** | 114 928 | 111 165 |
| **France** | 94 971 | 96 485 |
| **Austria** | 67 075 | 75 922 |
| **Spain** | 47 151 | 48 096 |
| **Belgium** | 33 577 | 36 527 |
| **Sweden** | 32 417 | 36 402 |
| **Hungary** | 32 623 | 31 137 |
| **Switzerland** | 23 335 | 22 682 |
| **Denmark** | 19 959 | 19 932 |
| **Netherlands** | 14 319 | 18 732 |

| | BALANCE | |
|---|---|---|
| | 1-12/16 | 1-12/17 |
| | mil. CZK | mil. CZK |
| **Turkey** | 18 182 | 16 820 |
| **Italy** | 19 063 | 13 440 |
| **Romania** | 5 852 | 7 205 |
| **Ukraine** | 1 830 | 5 277 |
| **United States** | 5 848 | -5 346 |
| **Thailand** | -26 729 | -25 122 |
| **Ireland** | -14 509 | -25 230 |
| **Russian federation** | -8 677 | -32 402 |
| **Poland** | -59 747 | -37 328 |
| **Japan** | -37 917 | -48 879 |
| **Korea** | -74 957 | -88 523 |
| **China** | -385 041 | -416 598 |

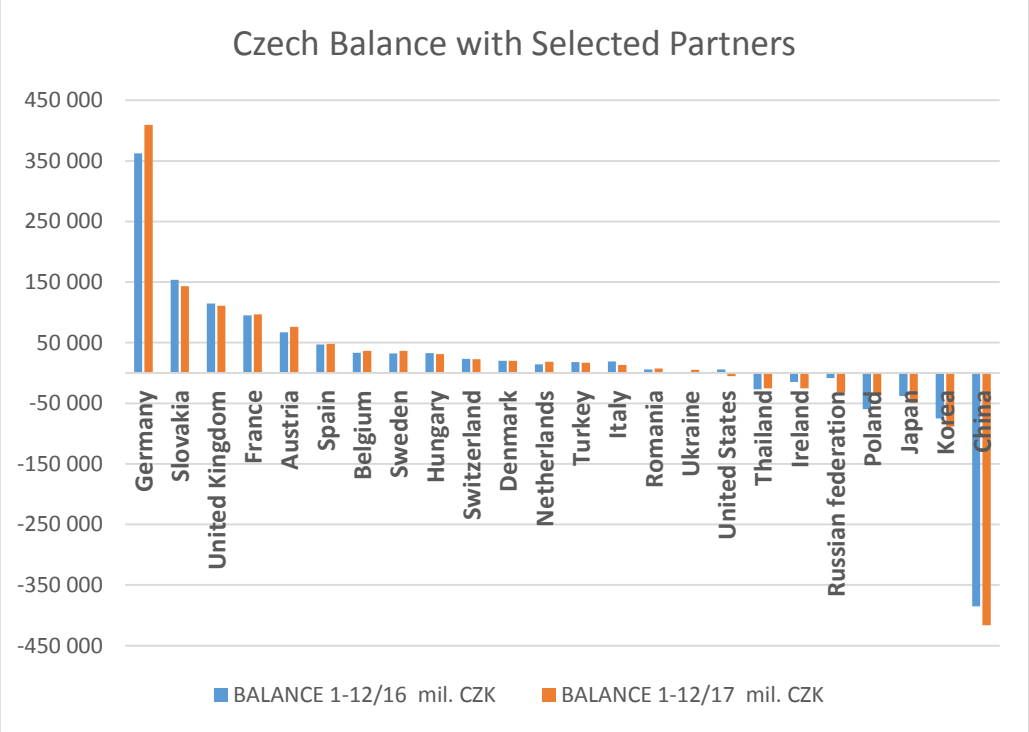
*Source: Data from czso.cz, own processing*

From this table there is clear interpretation of importance of some selected partners, according to balance of trade, the first states and last states are more important for the economy of the Czech Republic, than these in the middle. When there is positive balance, it means that the export exceeds imports, in other words Czech Republic is selling more goods and services to the abroad than buying. The most important representatives with the highest trade balance are Germany, Slovakia and United Kingdom. With these states the balance of the Czech Republic is more than 100 billion CZK and with Germany it is even more than 400 billion CZK and it is more than it was it the year 2016. There could be also observed from the table number 9 and graph number 15 that the balance of trade increased with

Germany but slightly decreased with Slovakia and United Kingdom and it means that products of the Czech Republic become more attractive to Germany.

In other case with negative balance, it means that Czech Republic is buying more goods and services from abroad than it selling there. The most important representative state is China and Czech Republic have deficit with China over 400 billion of CZK. It means that products from China are most important for the Czech Republic probably because of the better price which the China can offer.

**Graph No. 15: Czech Balance with Selected Partners in mil. of CZK**




*Source: Data from czso.cz, own processing*

### 3.3.4. Export and Import with Selected Partners

The diversification of exports and imports of goods in 2017 remained almost unchanged again. The most stable business partner of the Czech Republic is Germany, which is the most important business destination. The good performance of the German economy, which is holding on to stable track trajectories, has been reflected in mutual business relationships.[62]

**Table No. 10: Export and Import with Selected Partners during 2016 and 2017**

| | EXPORT | | IMPORT | |
|---|---|---|---|---|
| | 1-12/2016 | 1-12/2017 | 1-12/2016 | 1-12/2017 |
| | mil. CZK | mil. CZK | mil. CZK | mil. CZK |
| **Germany** | 1 286 718 | 1 380 277 | 924 083 | 970 601 |
| **Poland** | 229 138 | 253 977 | 288 885 | 291 306 |
| **Slovakia** | 331 354 | 324 926 | 177 638 | 181 934 |
| **China** | 46 874 | 56 243 | 431 915 | 472 841 |
| **Italy** | 169 628 | 171 482 | 150 565 | 158 042 |
| **France** | 205 572 | 215 058 | 110 601 | 118 573 |
| **United Kingdom** | 208 167 | 209 410 | 93 239 | 98 246 |
| **Austria** | 168 445 | 185 690 | 101 371 | 109 767 |
| **Netherlands** | 113 723 | 122 733 | 99 404 | 104 001 |
| **Hungary** | 114 009 | 121 514 | 81 386 | 90 377 |
| **Spain** | 111 714 | 119 896 | 64 563 | 71 800 |
| **United States** | 86 461 | 87 688 | 80 613 | 93 034 |
| **Russian federation** | 75 210 | 82 164 | 83 887 | 114 566 |
| **Belgium** | 92 871 | 96 143 | 59 295 | 59 616 |
| **Romania** | 51 141 | 58 429 | 45 289 | 51 223 |
| **Korea** | 10 778 | 10 642 | 85 736 | 99 165 |
| **Switzerland** | 57 270 | 59 261 | 33 935 | 36 580 |
| **Turkey** | 53 351 | 53 135 | 35 169 | 36 315 |
| **Sweden** | 59 515 | 66 427 | 27 097 | 30 025 |
| **Japan** | 22 761 | 18 121 | 60 678 | 66 999 |
| **Denmark** | 39 670 | 40 821 | 19 711 | 20 889 |
| **Ireland** | 16 352 | 15 018 | 30 862 | 40 248 |
| **Ukraine** | 21 757 | 27 991 | 19 927 | 22 714 |
| **Thailand** | 3 572 | 4 209 | 30 301 | 29 331 |
| **India** | 15 237 | 15 560 | 17 841 | 18 465 |
| **Others** | 1 496 592 | 1 590 625 | 1 317 746 | 1 477 456 |
| **Total** | **3 974 043** | **4 202 000** | **3 494 671** | **3 769 000** |

*Source: Data from czso.cz, own processing*

[62] Ministry of Industry and Trade [online]. Foreign trade. Quoted: 2018-01-06. Available from: https://www.mpo.cz/cz/zahranicni-obchod/statistiky-zahranicniho-obchodu/hlavni-tendence-vyvoje-ekonomiky--prumyslu-a-zahranicniho-obchodu--232353/

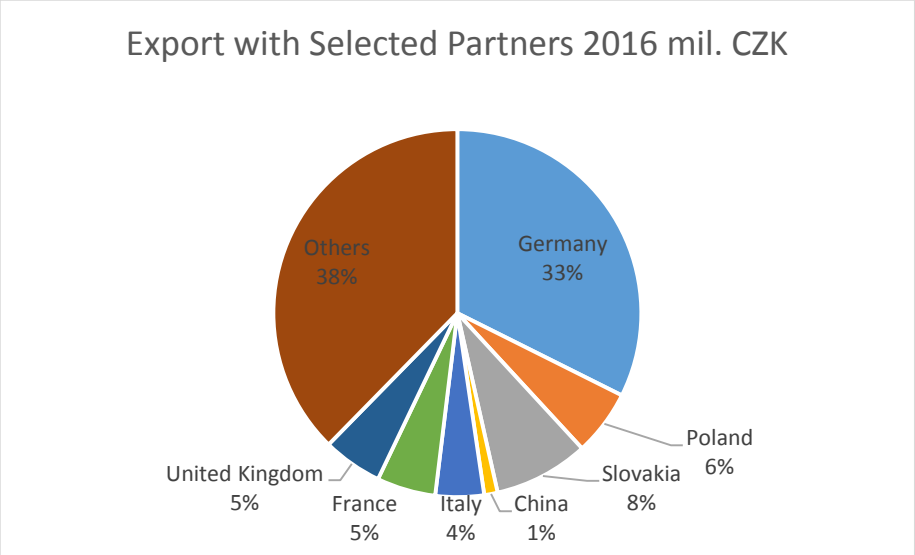
Exports to Germany grew by 7.7% year-on-year, imports by 5.9% and its share of total exports was kept at 32% and decreased to 27% on imports. The trade balance surplus of CZK 125.8 billion in favor of the Czech Republic was CZK 16.4 billion higher year-on-year. Slovakia stays second, but due to the year-on-year decline of exports by 6.7% and the increase in imports by 6.6%, the balance in the last year reached almost half of the trade surplus achieved by the Czech Republic with Germany. Interesting thing in export data is that Slovakia, Ireland and Japan have lower values of export of the Czech Republic, despite the fact that all other mentioned above increased their values in export.[63]

For better imagination there are created graphs no 16, 17, 18 and 19 which are comparing Czech foreign trade, namely Czech export and import with selected and most important partners in the years 2016 and 2017 for comparison of changes in these years.

[63] Ministry of Industry and Trade [online]. Foreign trade. Quoted: 2018-01-06. Available from: https://www.mpo.cz/cz/zahranicni-obchod/statistiky-zahranicniho-obchodu/

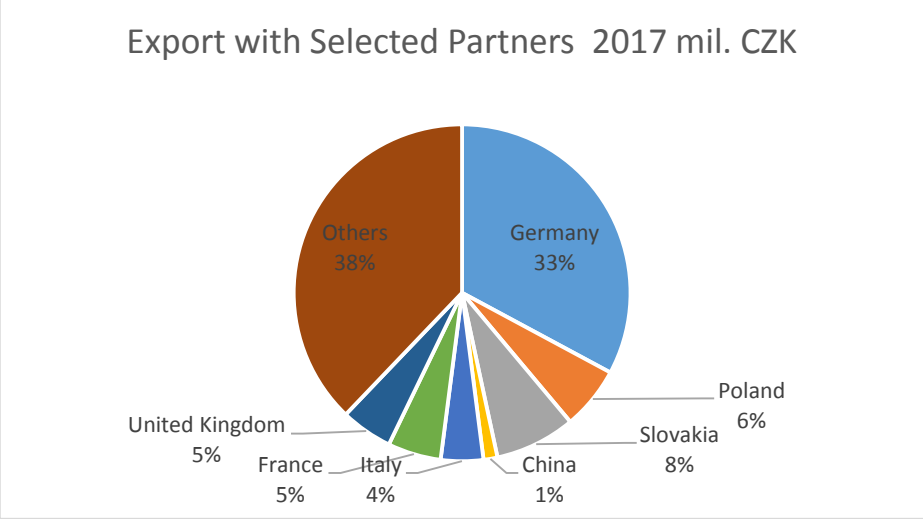
According to these graphs no 16 and 17 about Czech Export in the years 2016 and 2017, there is clear interpretation how the Germany is important for the Czech economy. One third of the Czech export is directing to the Germany and during the year 2017 it was more than 1 380 billions of CZK. In the second place of the Czech export is Slovakia with 8% in both years introduced by graphs below. Then there is Poland with 6% in both of described years. From this interpretation and table no 10 above, it is clear that for the foreign trade of the Czech Republic are also very important neighbors, which are Germany, Slovakia, Poland and Austria, which is right behind United Kingdom.

**Graph No. 16: Export with Selected Partners 2016 mil. CZK**




*Source: Data from czso.cz, own processing*

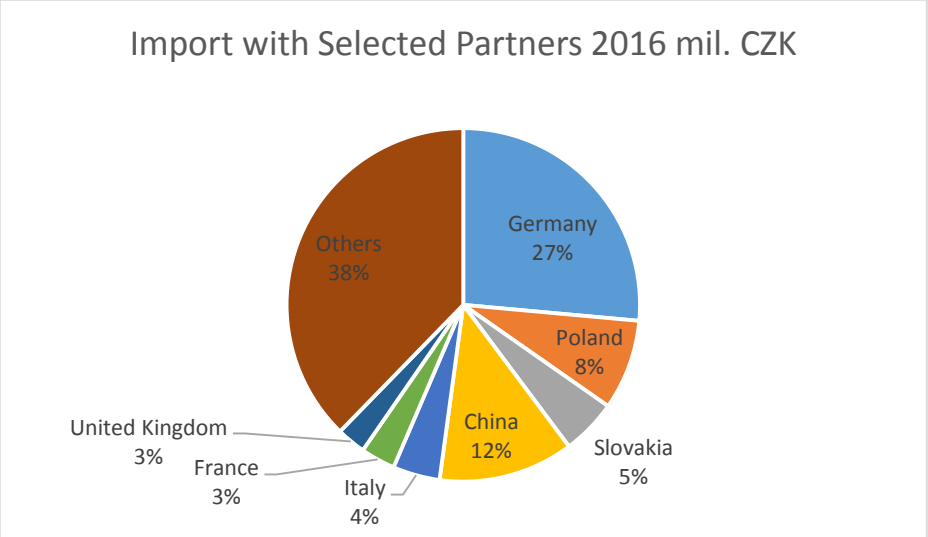
**Graph No. 17: Export with Selected Partners 2017 mil. CZK**




*Source: Data from czso.cz, own processing*

The order in the import of the Czech Republic in the years 2016 and 2017 is very similar, but there is one state which is for import of the Czech Republic important and it is not from European Union. This state is China with 12% of imports of Czech Republic and 472 billion CZK. According to the graph no 18 and 19 from the years 2016 and 2017, on the first place is Germany. Czech Republic imported from Germany 26% in 2017, which was in the percentage less than in the 2016, but in nominal value Czech Republic imported from Germany goods and services in value of 970 billion in 2017, which is more than 924 billion in the 2016. Third place belongs to Poland with 8% in both years.

**Graph No. 18: Import with Selected Partners 2016 mil. CZK**




*Source: Data from czso.cz, own processing*

**Graph No. 19: Import with Selected Partners 2017 mil. CZK**


*Source: Data from czso.cz, own processing*

## 3.4. Statistical Analysis

This part of diploma thesis is focused on computation of dependence of export, import and trade balance with exchange rate of EUR/CZK. Data base is used monthly values and quarterly values of the mentioned variables. The focused period is from the year 2007 until the year 2017. For the experimental purpose this time series are analyzed in different combinations to try prove or disprove the main hypothesis, if there is some relation between foreign trade and exchange rate during some selected periods. There is also experimenting with total foreign trade and foreign trade only with European Union, in covered chapters in this thesis is explained and shown importance of different countries for the foreign trade of the Czech Republic.

For the following analysis it is important to mention hypothesis and expected results: when the exchange rate of EUR/CZK moves up (Czech crown depreciate for example from 24 to 26) the products and services in the Czech Republic should be cheaper for foreigners and the export should increase and import should decrease because for Czech people it is more expensive to import and buy goods and services in abroad. In other hand if the exchange rate of EUR/CZK moves down (Czech crown appreciate from 27 to 25) the products and services in the Czech Republic should be more expensive and so the export should decrease and import increase. In correlation the result should be positive between exchange rate and export, and negative between exchange rate and import.

The following range of values are searched in the correlations to interpret the results:

- **.00 - .19** **very weak**
- **.20 - .39** **weak**
- **.40 - .59** **moderate**
- **.60 – .79** **strong**
- **.80 – 1.0** **very strong**[64]

These values could be with positive and negative values, the - means positive relationship and – means reverse relationship and the range is between -1 to +1.

[64] statstutor.ac.uk [online]. Correlation analysis. Quoted: 2018-01-10. Available from: http://www.statstutor.ac.uk/resources/uploaded/pearsons.pdf

### 3.4.1. The Analysis of the Period 2007 – 2017

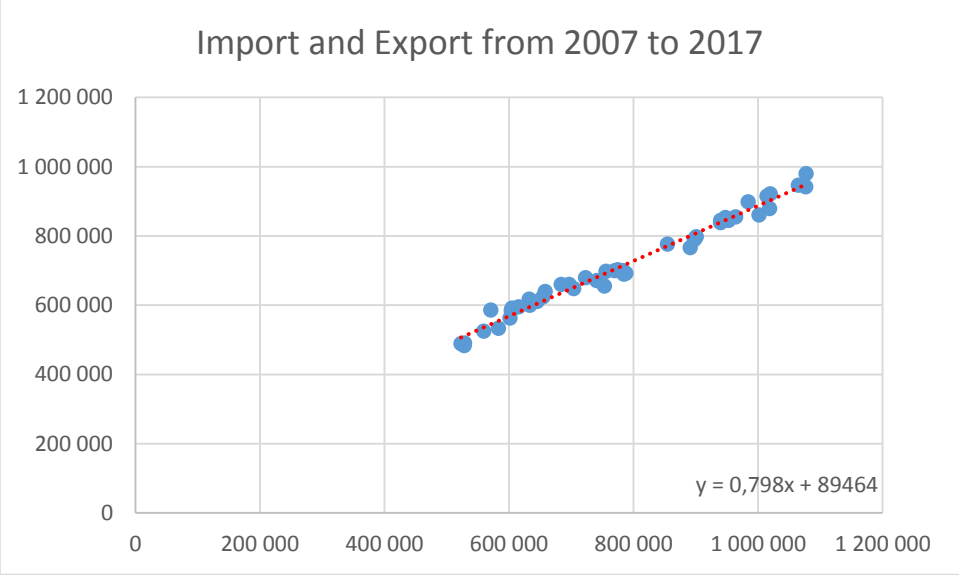
**Table No. 11: Correlation Result in the Period 2007 - 2017**

| | *Export* | *EU Export* | *Import* | *EU Import* | *Balance* | *EU balance* | *Exchange Rate* |
|---|---|---|---|---|---|---|---|
| Export | 1 | | | | | | |
| EU Export | 0,996955203 | 1 | | | | | |
| Import | 0,990737309 | 0,990817226 | 1 | | | | |
| EU Import | 0,981104607 | 0,986969343 | 0,988469342 | 1 | | | |
| Balance | 0,879421456 | 0,865888596 | 0,806632472 | 0,80512724 | 1 | | |
| EU balance | 0,961808668 | 0,959738605 | 0,932485926 | 0,902034267 | 0,91740052 | 1 | |
| Exchange Rate | 0,334172813 | 0,351286702 | 0,305827637 | 0,392941859 | 0,382393374 | 0,256433589 | 1 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools*

This is correlation of all variables in the time period from the 2007 to 2017. Very interesting discovery is that there is almost perfect positive correlation between the export and import both total or export and import with European union. The values are around 0.99 which means that the moves in the whole period are almost identical.

**Graph No. 20: Import and Export from 2007 to 2017**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools (foreign trade in millions of CZK)*

The relation between exchange rate and EU export is positive moderate, which is according to the macroeconomic theory, however according to this theory the relation should be more positive, but there are lot of factors which affecting the variables such as Big economic crisis, for this reason the other correlation analysis are in the different time periods for researching if there is higher relation.

### 3.4.2. The Analysis of the Period 2007 – 2008

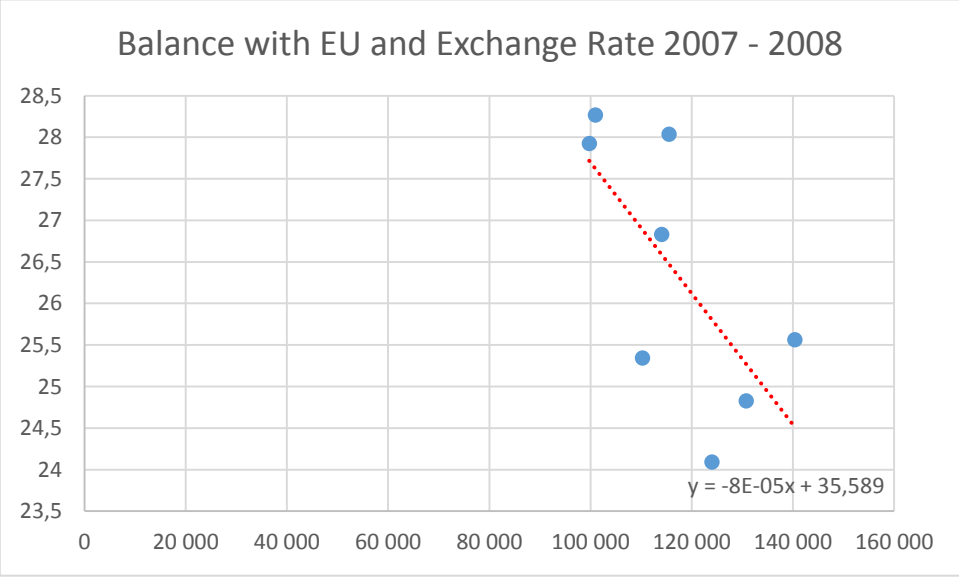
**Table No. 12: Correlation Result in the Period 2007 - 2008**

| | *Export* | *EU Export* | *Import* | *EU Import* | *Balance* | *EU balance* | *Exchange Rate* |
|---|---|---|---|---|---|---|---|
| Export | 1 | | | | | | |
| EU Export | 0,990042546 | 1 | | | | | |
| Import | 0,841528765 | 0,764644145 | 1 | | | | |
| EU Import | 0,874061598 | 0,861149654 | 0,729651745 | 1 | | | |
| Balance | 0,607339805 | 0,70203714 | 0,081926479 | 0,539519358 | 1 | | |
| EU balance | 0,507815195 | 0,548619544 | 0,302424379 | 0,047424993 | 0,492127987 | 1 | |
| Exchange Rate | -0,090815819 | -0,052879893 | -0,219253302 | 0,356200115 | 0,154882438 | -0,68974396 | 1 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools*

In this time period there is no relation between export or import and exchange rate, but there is strong negative relation with value -0.69 between exchange rate and balance of the Czech Republic with European Union. The positive balance means that export is higher than import and in this time period the Czech currency strongly appreciated before the crisis and also the export to the European Union slowed down. The result represent unstable economic situation, where the rest of the world started to feel economic crisis and it was the reason for declining in amounts of foreign trade, on the other hand the crisis came later to the Czech Republic.

**Graph No. 21: Balance with EU and Exchange Rate 2007 - 2008**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools (vertical axis EUR/CZK, horizontal axis: foreign trade in millions of CZK)*

### 3.4.3. The Analysis of the Period 2008 - 2009

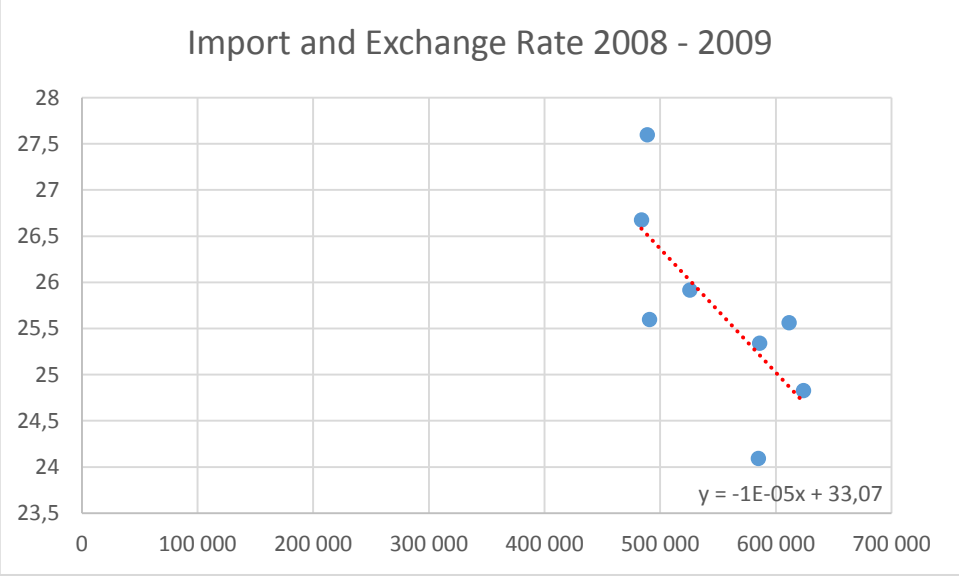
**Table No. 13: Correlation Result in the Period 2008 - 2009**

| | *Export* | *EU Export* | *Import* | *EU Import* | *Balance* | *Balance EU* | *EUR/CZK* |
|---|---|---|---|---|---|---|---|
| Export | 1 | | | | | | |
| EU Export | 0,997966105 | 1 | | | | | |
| Import | 0,949442418 | 0,937248596 | 1 | | | | |
| EU Import | 0,987524695 | 0,977919662 | 0,964509934 | 1 | | | |
| Balance | -0,160611701 | -0,128018894 | -0,462357101 | -0,243220366 | 1 | | |
| Balance EU | 0,516254163 | 0,563240765 | 0,33827399 | 0,378124566 | 0,394595983 | 1 | |
| EUR/CZK | -0,67236684 | -0,635715742 | -0,729588765 | -0,745327795 | 0,394767688 | 0,130840346 | 1 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools*

In this time period during the economic crisis in 2008 there is also covered the year 2009 where the crisis has impact too. The Czech currency depreciated as the effect of the economic crisis. In this time period the import fulfill the expectation and it has the strong negative relationship with exchange rate, unfortunately the same negative relationship is between export and exchange rate but at least the power of relationship is weaker, the explanation of this phenomenon could be that decrease of import is affected more than decrease of export. In this case the result is highly affected by the economic crisis and economic development.

**Graph No. 22: Import and Exchange Rate 2008 - 2009**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools (vertical axis EUR/CZK, horizontal axis: foreign trade in millions of CZK)*

### 3.4.4. The Analysis of the Period 2009 – 2011

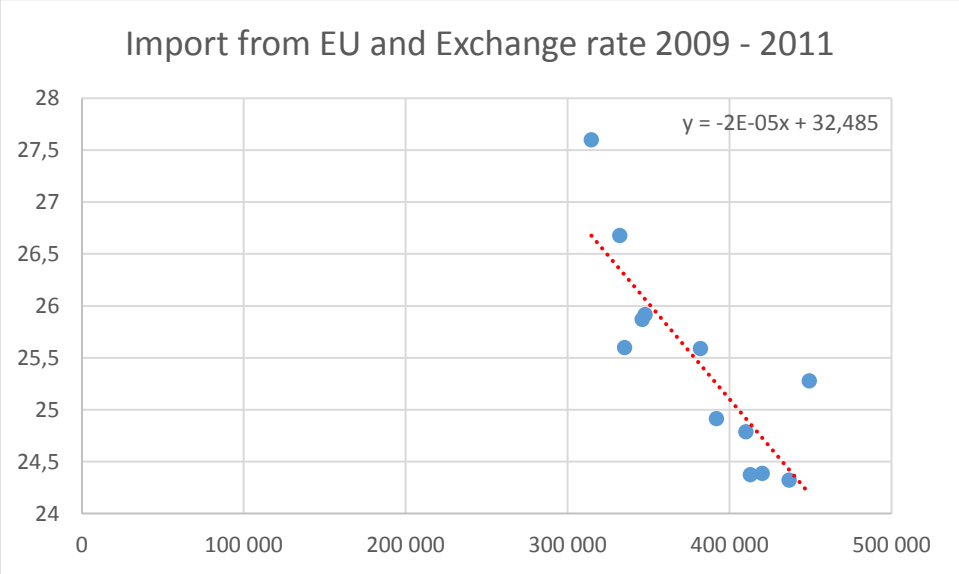
**Table No. 14: Correlation Result in the Period 2009 - 2011**

| | *Export* | *EU Export* | *Import* | *EU Import* | *Balance* | *Balance EU* | *EUR/CZK* |
|---|---|---|---|---|---|---|---|
| Export | 1 | | | | | | |
| EU Export | 0,997914892 | 1 | | | | | |
| Import | 0,988999653 | 0,98664789 | 1 | | | | |
| EU Import | 0,988882341 | 0,982123226 | 0,987786694 | 1 | | | |
| Balance | 0,24305078 | 0,24444533 | 0,09689483 | 0,176192277 | 1 | | |
| Balance EU | 0,903612989 | 0,923486953 | 0,872890191 | 0,834763842 | 0,355930294 | 1 | |
| EUR/CZK | -0,805818603 | -0,810711643 | -0,825554249 | -0,838968915 | -0,008308934 | -0,661553493 | 1 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools*

In this time period from 2009 – 2011 there is opposite situation, the Czech currency appreciate after economic crisis as the result of recovery and as the economic situation got better, the export and import increase it their values, so there is again negative relation between those variables and again the import has stronger negative relation -0.826 which corresponds more with macroeconomic theory. For the introduction of the correlation there is used chart with the highest correlation value which is relation between exchange rate and import from European Union.

**Graph No. 23: Import from EU and Exchange rate 2009 - 2011**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools (vertical axis EUR/CZK, horizontal axis: foreign trade in millions of CZK)*

### 3.4.5. The Analysis of the Period 2011 – 2013

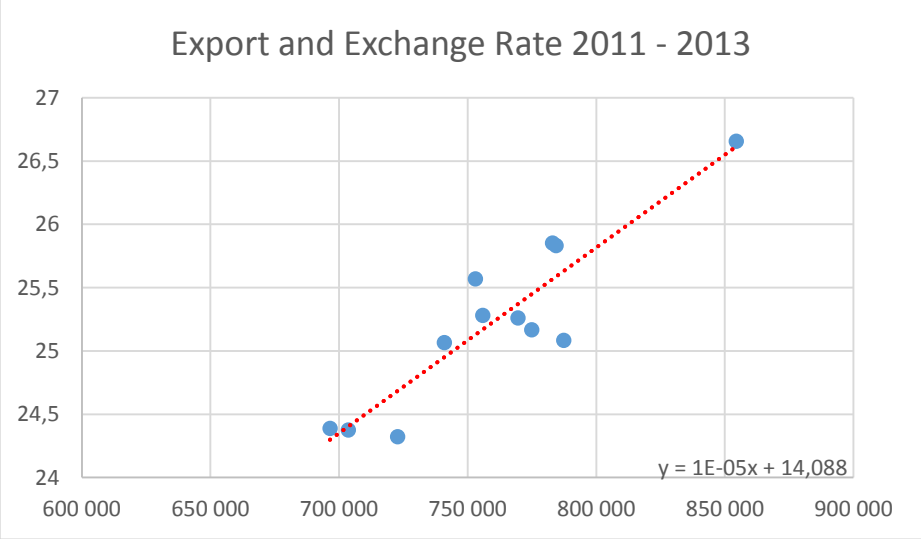
**Table No. 15: Correlation Result in the Period 2011 - 2013**

| | *Export* | *EU Export* | *Import* | *EU Import* | *Balance* | *Balance EU* | *EUR/CZK* |
|---|---|---|---|---|---|---|---|
| Export | 1 | | | | | | |
| EU Export | 0,970521899 | 1 | | | | | |
| Import | 0,889787719 | 0,90487852 | 1 | | | | |
| EU Import | 0,935800136 | 0,937504598 | 0,978275928 | 1 | | | |
| Balance | 0,652639092 | 0,564800197 | 0,234929359 | 0,368997153 | 1 | | |
| Balance EU | 0,622260194 | 0,696270112 | 0,361984189 | 0,402988503 | 0,724355173 | 1 | |
| EUR/CZK | 0,910373143 | 0,834929942 | 0,755894897 | 0,833573193 | 0,684034208 | 0,476520622 | 1 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools*

Time period from the 2011 to 2013 could be explained as the time of economic prosperity and also the time without any strong external factors or monetary policy interventions. Czech currency depreciated from the exchange rate 24.32 to 26.65 EUR/CZK. The Czech export and import grew constantly. This economic situation is projected in the correlation analysis, where export has strong positive relation with the exchange rate, in this case there is also positive relation with import, but the power of correlation so lower, this is same case as previous with negative correlation, but again in behalf of the macroeconomic theory when the positive correlation between export and exchange rate is stronger than relation between import and exchange rate. This also agrees with the fact, that the balance of trade has also positive relationship with exchange rate which means that balance increased, because the export was higher than import.

**Graph No. 24: Export and Exchange Rate 2011 - 2013**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools (vertical axis EUR/CZK, horizontal axis: foreign trade in millions of CZK)*

### 3.4.6. The Analysis of the Period 2014 – 2017

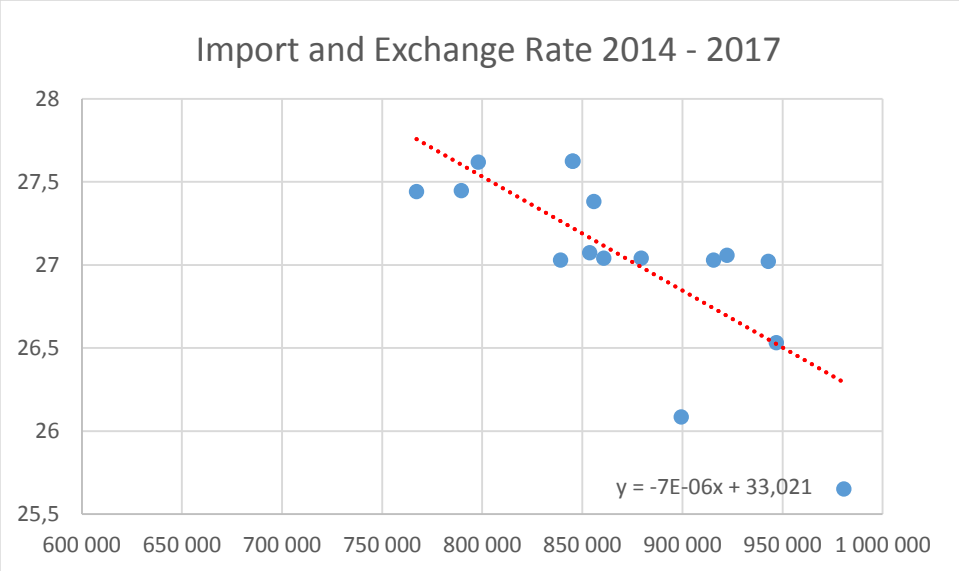
**Table No. 16: Correlation Result in the Period 2014 - 2017**

| | *Export* | *EU Export* | *Import* | *EU Import* | *Balance* | *Balance EU* | *EUR/CZK* |
|---|---|---|---|---|---|---|---|
| Export | 1 | | | | | | |
| EU Export | 0,995601302 | 1 | | | | | |
| Import | 0,960770394 | 0,946211378 | 1 | | | | |
| EU Import | 0,973784293 | 0,962780299 | 0,981760087 | 1 | | | |
| Balance | 0,227152124 | 0,262437748 | -0,051853969 | 0,059053267 | 1 | | |
| Balance EU | 0,857515816 | 0,887410028 | 0,718981782 | 0,729784556 | 0,563113058 | 1 | |
| EUR/CZK | -0,675180294 | -0,681718938 | -0,747544818 | -0,731034474 | 0,193725921 | -0,4775791 | 1 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools*

In this time period from 2014 to 2017 the Czech National Bank introduced interventions which should target the exchange rate of EUR/CZK on the value 27 EUR/CZK. This stabilization and holding of the exchange rate was successful and the fluctuation was minimal. The correlation analysis in this period is showing strong negative relation between the export and exchange rate and the same negative strong relation is also between import and exchange rate. In this time period is again seen the phenomenon that when is negative relation, the import is strongly affected than the export with value of correlation -0.748.

**Graph No. 25: Import and Exchange Rate 2014 - 2017**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools (vertical axis EUR/CZK, horizontal axis: foreign trade in millions of CZK)*

### 3.4.7. The Analysis of the Period 2010 – 2017

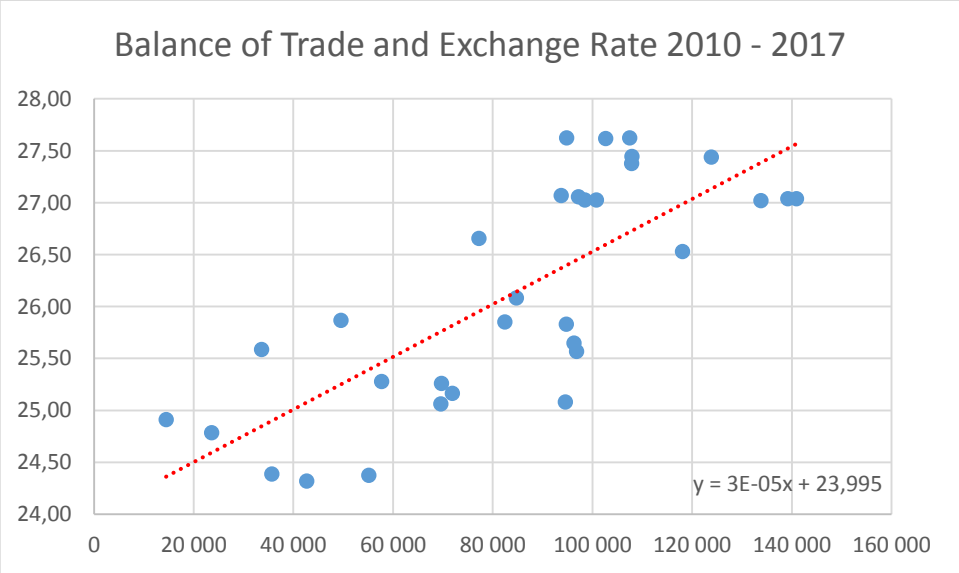
**Table No. 17: Correlation Result in the Period 2010 - 2017**

| | *Export* | *EU Export* | *Import* | *EU Import* | *Balance* | *Balance EU* | *EUR/CZK* |
|---|---|---|---|---|---|---|---|
| Export | 1 | | | | | | |
| EU Export | 0,996670236 | 1 | | | | | |
| Import | 0,988194363 | 0,988201628 | 1 | | | | |
| EU Import | 0,994057616 | 0,993744573 | 0,995671411 | 1 | | | |
| Balance | 0,8359224 | 0,821325909 | 0,74196737 | 0,783132358 | 1 | | |
| Balance EU | 0,961697414 | 0,972490485 | 0,932541552 | 0,940392841 | 0,867682291 | 1 | |
| EUR/CZK | 0,724729595 | 0,715033117 | 0,671035866 | 0,708154471 | 0,767520328 | 0,700381316 | 1 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools*

This is last period and interpretation using the correlation analysis for researching the dependence of selected variables. This period has been chosen because of the more stable situation after the economic crisis. In this correlation analysis appeared the same pattern like in the previous ones. There is strong positive correlation between the export and exchange rate +0.72 and this correlation is higher than the correlation between import and exchange rate which is 0.67. Even higher is the correlation between the balance and exchange rate with value 0.77 this also corresponds with the economic theory because the exports should be higher than imports and this difference should increase in the time.

**Graph No. 26: Balance of Trade and Exchange Rate 2010 - 2017**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; edited in MS excel with statistical tools (vertical axis EUR/CZK, horizontal axis: foreign trade in millions of CZK)*

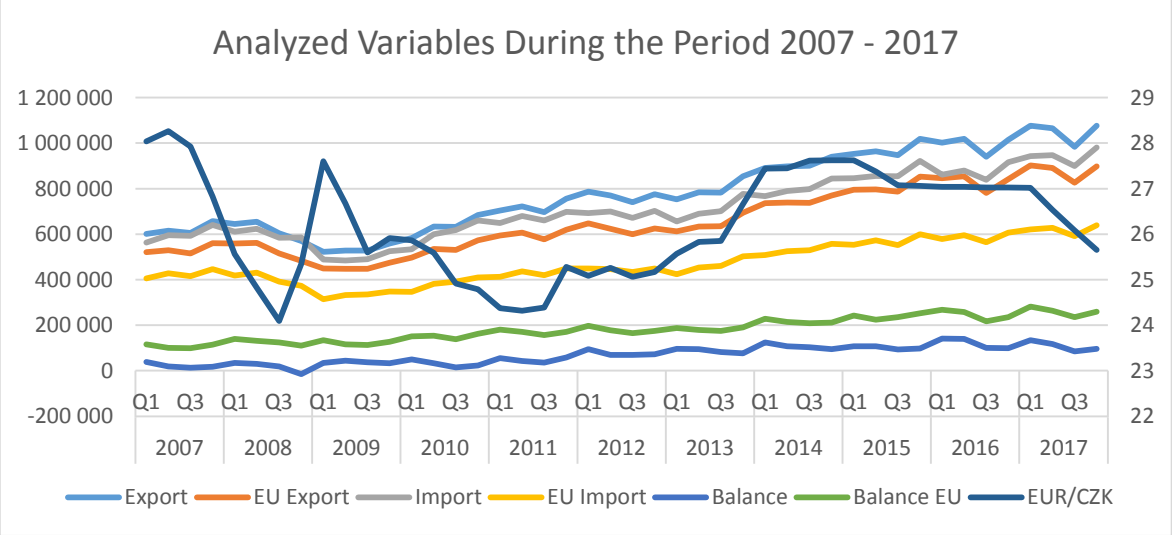
## 3.5. Discussion of the Statistical Results

According to the data from table no 18 it was created time series, the data about foreign trade were collected in the webpage of the Ministry of Industry and Trade in quarterly numbers and the quarterly averages of exchange rate EUR/CZK was collected on the webpage of the Czech National Bank. For better illustration of this period from 2007 to 2017 it was created also graph no 26 to illustrate development and to help visualize and imagine the economic development. After combining the data the correlation has been used to determine relations.

The first expectation, that the export and exchange rate have positive relation and import has negative relation with exchange rate was not fulfilled. For this reason there is implemented research of different periods of time to find some dependences. The result was that when there is relation, it is positive or negative with both values (export and import). But in case when it is negative relation, the import is more affected by exchange rate and in the other hand when there is positive relation, the export has stronger values. This can be observed in the time period 2011 – 2013 with positive correlation and time period 2014 – 2017 with negative correlation. This could be also implemented in the time period 2010 to 2017 in other words the period without the economic crisis.

For summarizing the results, in the statistical testing there is recurring phenomenon connected almost with all periods expect the period 2007 – 2017 which is affected by too many other factors.

**Graph No. 27: Analyzed Variables during the Period 2007 - 2017**




*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; own processing (Left axis for foreign trade in millions of CZK, right axis represents EUR/CZK)*

**Table No. 18: Analyzed Variables during the Period 2007 - 2017**

| Year | Qarter | Export | EU Export | Import | EU Import | Balance | Balance EU | EUR/CZK |
|---|---|---|---|---|---|---|---|---|
| 2007 | Q1 | 601 244 | 520 766 | 563 294 | 405 274 | 37 949 | 115 492 | 28,037 |
| | Q2 | 615 192 | 528 753 | 595 795 | 427 798 | 19 397 | 100 957 | 28,266 |
| | Q3 | 604 820 | 515 841 | 592 122 | 416 090 | 12 698 | 99 749 | 27,923 |
| | Q4 | 657 979 | 560 398 | 640 108 | 446 332 | 17 871 | 114 065 | 26,829 |
| 2008 | Q1 | 645 417 | 558 705 | 611 580 | 418 321 | 33 837 | 140 383 | 25,562 |
| | Q2 | 654 192 | 561 299 | 623 983 | 430 526 | 30 209 | 130 774 | 24,826 |
| | Q3 | 603 389 | 515 624 | 584 806 | 391 651 | 18 583 | 123 973 | 24,092 |
| | Q4 | 570 738 | 483 390 | 586 121 | 373 127 | -15 382 | 110 263 | 25,342 |
| 2009 | Q1 | 522 854 | 449 069 | 488 861 | 314 655 | 33 993 | 134 413 | 27,599 |
| | Q2 | 528 008 | 448 240 | 483 760 | 332 214 | 44 246 | 116 027 | 26,677 |
| | Q3 | 528 398 | 447 949 | 490 690 | 335 124 | 37 708 | 112 825 | 25,598 |
| | Q4 | 559 365 | 475 080 | 525 725 | 347 831 | 33 640 | 127 249 | 25,915 |
| 2010 | Q1 | 583 168 | 496 693 | 533 620 | 346 049 | 49 549 | 150 644 | 25,87 |
| | Q2 | 633 563 | 535 180 | 599 961 | 381 932 | 33 603 | 153 249 | 25,59 |
| | Q3 | 632 163 | 530 304 | 617 702 | 391 959 | 14 461 | 138 347 | 24,91 |
| | Q4 | 683 901 | 572 692 | 660 274 | 410 138 | 23 628 | 162 554 | 24,79 |
| 2011 | Q1 | 703 550 | 593 928 | 648 436 | 412 868 | 55 114 | 181 059 | 24,375 |
| | Q2 | 722 784 | 607 069 | 680 139 | 436 673 | 42 645 | 170 396 | 24,321 |
| | Q3 | 696 451 | 577 277 | 660 760 | 420 088 | 35 691 | 157 189 | 24,388 |
| | Q4 | 755 905 | 619 824 | 698 227 | 449 149 | 57 677 | 170 676 | 25,279 |
| 2012 | Q1 | 787 325 | 647 937 | 692 791 | 449 709 | 94 534 | 198 228 | 25,083 |
| | Q2 | 769 523 | 623 711 | 699 832 | 446 488 | 69 691 | 177 223 | 25,261 |
| | Q3 | 740 884 | 599 324 | 671 296 | 434 334 | 69 588 | 164 990 | 25,065 |
| | Q4 | 774 865 | 624 762 | 702 970 | 449 080 | 71 895 | 175 682 | 25,167 |
| 2013 | Q1 | 752 950 | 611 967 | 656 115 | 424 220 | 96 835 | 187 748 | 25,568 |
| | Q2 | 784 343 | 632 899 | 689 613 | 453 707 | 94 732 | 179 193 | 25,831 |
| | Q3 | 783 013 | 634 527 | 700 572 | 460 114 | 82 441 | 174 414 | 25,852 |
| | Q4 | 854 398 | 693 597 | 777 185 | 502 841 | 77 212 | 190 757 | 26,657 |
| 2014 | Q1 | 890 979 | 735 567 | 767 159 | 507 645 | 123 821 | 227 922 | 27,441 |
| | Q2 | 897 411 | 739 404 | 789 476 | 524 892 | 107 934 | 214 512 | 27,447 |
| | Q3 | 900 576 | 737 464 | 797 952 | 528 986 | 102 624 | 208 478 | 27,618 |
| | Q4 | 939 860 | 769 537 | 845 044 | 558 158 | 94 816 | 211 377 | 27,624 |
| 2015 | Q1 | 952 784 | 795 416 | 845 339 | 553 136 | 107 446 | 242 280 | 27,624 |
| | Q2 | 963 647 | 796 615 | 855 792 | 572 543 | 107 855 | 224 073 | 27,38 |
| | Q3 | 947 431 | 786 916 | 853 677 | 551 687 | 93 753 | 235 228 | 27,072 |
| | Q4 | 1 019 386 | 852 253 | 922 192 | 599 241 | 97 194 | 253 012 | 27,057 |
| 2016 | Q1 | 1 001 595 | 846 346 | 860 689 | 578 312 | 140 908 | 268 033 | 27,039 |
| | Q2 | 1 018 506 | 854 632 | 879 314 | 596 082 | 139 193 | 258 550 | 27,039 |
| | Q3 | 939 887 | 781 212 | 839 083 | 564 490 | 100 804 | 216 722 | 27,028 |
| | Q4 | 1 014 053 | 841 523 | 915 587 | 606 139 | 98 465 | 235 385 | 27,028 |
| 2017 | Q1 | 1 076 621 | 902 458 | 942 807 | 620 171 | 133 814 | 282 287 | 27,02 |
| | Q2 | 1 064 813 | 890 687 | 946 775 | 627 455 | 118 037 | 263 232 | 26,532 |
| | Q3 | 984 116 | 826 185 | 899 380 | 591 319 | 84 737 | 234 866 | 26,084 |
| | Q4 | 1 076 941 | 898 133 | 980 615 | 639 014 | 96 326 | 259 119 | 25,651 |

*Source: Data from czso.cz, cnb.cz, mpo.cz, kurzy.cz; own processing (foreign trade in millions of CZK)*

# 4. Conclusion

Foreign trade has high importance for the economies worldwide. Foreign trade also helps to improve living standards by delivering a greater variety of goods or services that people need or want and they have not had access to in the past. Thanks to globalization, foreign trade becomes more accessible and its development is constantly increasing, whether it is a growing population or economic development. Due to foreign trade, different countries can import, for example, goods that they do not have access to, can not grow or produce, such as mineral resources, some crops, or finished products. The price of goods abroad also affects the workforce, whether it is cheap or more expensive, this factor will always be reflected in the total price of the product and therefore a certain product may become more profitable when purchased abroad. This phenomenon is described in the chapter about important partner countries with which the Czech Republic trades, namely China, which offers to the whole world cheaper goods thanks to the cheaper labor force and that is why the Czech Republic imports so many products from this state.

The topic for this diploma thesis is The Foreign Exchange Rate and its Impact on Foreign Trade: Case Study of the Czech Republic and the main aim is the analysis of the development of exchange rate EUR/CZK during the period from 2007 to 2017 and with quarterly data to provide higher range of values for statistical testing. Second part of the data on which this diploma thesis is focused is the import, export and trade balance of the Czech Republic also in the time period from 2007 to 2017 and also the quarterly data was collected to fit the statistical testing.

Before the statistical testing and data analyzing have been processed. It was necessary to cover economic theory which is behind the whole economic behavior. This theory is covered in the theoretical part of this diploma thesis and it deals for example with different types of monetary policies such as fiscal policy, monetary policy and its instruments. There are also topics about competitiveness of states in foreign trade and which role belongs to the state in foreign trade issues. Special part is also devoted to the Czech National Bank and its activities and objectives. After the part about foreign trade, there is focused part on the exchange rate and theoretical questions which cover theory about Law of one price and Purchasing power parity. For combination of these two spheres there is topic about currency transmission mechanism which is focused on the impact of the exchange rate on the foreign trade.

In the practical part in this diploma thesis the first part is focused on analysis of the Czech economy and what are the main pillars of the Czech industry. Then there is focus on the main macroeconomic indicators during the time period from 2007 to 2017 which are gross domestic product, inflation, unemployment and development of the exchange rate EUR/CZK which is part of the statistical testing. Analysis of the foreign trade of the Czech Republic is created to answer questions who are the main partners with the Czech Republic in questions of the foreign trade and what products are subjects of foreign trade.

The statistical analysis is created to answer questions about dependency of the foreign trade on exchange rate of the Czech Republic, the tool used for testing is correlation which is statistical tool used for determination of relationship between two variables. In the statistical testing it was found, that there is relation between exchange rate and foreign trade and appearance of a certain pattern how the economic behavior could be interpreted. On the other hand there was also found that the dependence of foreign trade is not affected only by the exchange rate, but there is more factors which are affecting the foreign trade, such as economic situation or specifically the economic crisis after the year 2008. The more detailed interpretation of the statistical results can be found under the chapter named Discussion of the Statistical Results.

This diploma thesis is created to provide economic and statistical point of view on the combination of economic indicators such as foreign trade especially export, import and combination represented by trade balance and exchange rate of EUR/CZK. The reader should learn both the theoretical examples and the use of theory in practice by implementing analytical tools and interpretation of the results.

# 5. References

**Bibliography**

1. Cohen, B. J. (2015) Currency Power: Understanding Monetary Rivalry. Publisher: Princeton University Press. 304 p. ISBN 978-0691167855

2. Eichengreen, B., Mehl, A. & Chitu, L. (2017) How Global Currencies Work: Past, Present, and Future. Publisher: Princeton University Press. 272 p. ISBN 978-0691177007

3. Hartmann, P. (1998) Currency Competition and Foreign Exchange Markets: The Dollar, the Yen and the Euro. Publisher: Cambridge University Press. 212 p. ISBN 978-0521632737

4. Helpman, E. (1987). Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy. Publisher: MIT Press. 283 p. ISBN 978-0262580878

5. Juřík, P. (2012). Platební karty. Publisher: Libri. 205 p. ISBN 978-80-7277- 498-2

6. Krugman, P., Obstfeld, M. & Melitz, M. (2014). International Finance: Theory and Policy, Global Edition. Publisher: Pearson; 10th edition. 456 p. ISBN 978-1292065199

7. Lien, K. (2016) Day Trading and Swing Trading the Currency Market: Technical and Fundamental Strategies to Profit from Market Moves. Publisher: John Wiley & Sons; 3rd Edition edition. 288 p. ISBN 978-1119108412

8. Manning, M. C. (2013). A Student Guide to Practical Modern Macroeconomy. Publisher: Rosedog Pr. 66 p. ISBN 978-1434932457

9. Marta, T. J. & Brusuelas, J. (2010) FOREX ANALYSIS AND TRADING. Publisher: Kogan Page; 1st edition. 262 p. ISBN 978-1576603390

10. Poon, J. & Rigby, D. L. (2017). International Trade: The Basics. Publisher: Routledge; 1st edition. 210 p. ISBN 978-1138824393

11. Reuvid, J. & Sherlock, J. (2011). International Trade: An Essential Guide to the Principles and Practice of Export. Publisher: Kogan Page; 3rd edition. 408 p. ISBN 978-0749462376

12. Revenda, Z., Mandel, M., Kodera, J., Musílek, P., Dvořák, P., (2011). Peněžní ekonomie a bankovnictví.5th edition. Praha: Management Press, s. r. o., 424 p. ISBN: 978-80-7261-240-6

13. Samuelson, P. & Nordhaus, W. (2009) Economics. Publisher: McGraw-Hill Education; 19th edition. 744 p. ISBN 978-0073511290

14. Zekos, G. I. (2015). Monetary Policy and Risk Management in Financial Globalization (Monetary, Fiscal and Trade Policies) Publisher: Nova Science Publishers. 545 p. ISBN 978-1634828956

**Internet resources**

1. Czech National Bank [online]. Jak se změny úrokových sazeb promítají do ekonomiky Quoted: 2018-01-04. Available from: http://www.cnb.cz/cs/faq/jak_se_zmeny_urokovych_sazeb_promitajx.html

2. Czech National Bank [online]. *Bankovní rada ČNB.* Quoted: 2018-01-04. Available from: http://www.cnb.cz/cs/o_cnb/bankovni_rada/

3. Czech National Bank [online]. Co to je nominální a reálný měnový kurz? Quoted: 2018-01-04. Available from: www:www.cnb.cz/cs/faq/co_to_je_nominalni_a_realny_menovy_kurz.html

4. Czech Republic [online]. About CZ. Quoted: 2018-01-06. Available from: http://www.czech.cz/en/About-CZ

5. Czech Statistical Office [online]. GDP. Quoted: 2018-01-06. Available from: https://www.czso.cz/csu/czso/katalog-produktu

6. Czech Statistical Office [online]. Industry employment. Quoted: 2018-01-06. Available from: https://vdb.czso.cz/vdbvo2/faces/cs/index.jsf?page=vystup-objekt&pvo=PRU05&f=TABULKA&z=T&skupId=146&katalog=30835&pvo=PRU05&str=v146&c=v3~3__RP2017#w=

7. Czech Statistical Office [online]. Unemployment. Quoted: 2018-01-06. Available from: https://www.czso.cz/csu/czso/zamestnanost_nezamestnanost_prace

8. Hospodářská charakteristika [online]. Characteristics of the Czech Republic industry Quoted: 2018-01-06. Available from: http://zemepis-maturitni-otazky.blogspot.cz/2011/06/hospodarska-charakteristika-cr-prumysl.html

9. Hrad.cz [online]. Czech Republic industry. Quoted: 2018-01-06. Available from: https://www.hrad.cz/cs/ceska-republika/o-ceske-republice

10. Investičníweb.cz [online]. Czech agriculture. Quoted: 2018-01-06. Available from: http://www.investicniweb.cz/news-ceske-zemedelstvi-2017-dotace-nakupni-horecka-pudy-i-nove-technologie/

11. Kurzy.cz [online]. Inflace. Quoted: 2018-01-06. Available from: https://www.kurzy.cz/makroekonomika/inflace/

12. Kurzy.cz [online]. Inflace. Quoted: 2018-01-06. Available from: https://www.kurzy.cz/intervence-cnb/

13. Ministry of Industry and Trade [online]. Foreign trade. Quoted: 2018-01-06. Available from: https://www.mpo.cz/cz/zahranicni-obchod/statistiky-zahranicniho-obchodu/hlavni-tendence-vyvoje-ekonomiky--prumyslu-a-zahranicniho-obchodu--232353/

14. Ministry of Industry and Trade [online]. Foreign trade. Quoted: 2018-01-06. Available from: https://www.mpo.cz/cz/zahranicni-obchod/statistiky-zahranicniho-obchodu/

15. Statistikaamy.cz [online]. Agriculture. Quoted: 2018-01-06. Available from: http://www.statistikaamy.cz/2014/07/v-cem-je-ceske-zemedelstvi-jine/

16. Statstutor.ac.uk [online]. Correlation analysis. Quoted: 2018-01-10. Available from: http://www.statstutor.ac.uk/resources/uploaded/pearsons.pdf

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