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The Czech Republic: European Integration and the Development of Trade Structure

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Declaration:

I hereby declare that I am the sole author of the thesis entitled "The Czech Republic: European Integration and the Development of Trade Structure". I duly marked out all quotations. The used literature and sources are stated in the attached list of references.

In Prague on the 5th of September, 2016

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Abstract

Trade structure changes over time as a result of fundamental changes within the country or the world around it. This thesis will investigate the case of Czech Republic in the period from the transition period till today with the foundation in classical and neoclassical trade theory. The trade structure will be analyzed in regard to trade partners, commodity structure, relative comparative advantages and degree of intra-industry trade within an industry or sector. It will provide basis for assessing the effects of increased European integration which the Czech Republic increasingly engaged itself in with the accession to the EU in 2004.

Key words: trade theory, comparative advantage, economic transition, European integration, intra-industry trade.

Abstraktní

Obchodní struktura se během času mění jako výsledek fundamentálních změn v zemi nebo okolním světě. Tato diplomová práce rozebírá případ České republiky od období transformace až dodnes, a to na základě klasických a neoklasických teorií. Obchodní struktura je analyzována ve vztahu k obchodním partnerům, komoditní struktuře, relativní komparativní výhodě a stupni vnitro-odvětvového obchodu v odvětví nebo sektoru. Poskytne základ pro hodnocení efektů zvýšené evropské integrace, ve které se Česká republika angažuje od vstupu do EU v roce 2004.

Klíčová slova: obchodní teorie, komparativní výhoda, ekonomická transformace, evropská integrace, vnitro-odvětvový obchod.

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Introduction

The accession to the EU in 2004 marked the final step of re-integration with Western Europe for the Czech Republic by being fully included in the political and economical union and the Common Market after fulfilling the Copenhagen Criteria for accession as well as enduring tough negotiations with the EU. The membership was the culmination of the transition period, where the Czech Economy went through severe times of reformation and recession to accommodate the demands of a capitalist market-based system and establishing the institutional foundations for competing in an increasingly globalized trade affected by the rules set through EU and WTO efforts. The Czech Republic is an interesting subject for research in the field of international trade. From a prosperous geographical location in the centre of the European Continent, the Czech Republic was isolated within the communist bloc for almost the half part of the 19th century, while the neighbouring states to the south and west developed at a different rate and direction – leaving the gap far greater than the physical and political borders. Trade is an indicator of openness, prosperity and integration among many other factors, and from analyzing the Czech trade structure it would be expected that the findings would be evident as have been the changes that the country have faced for the past 20-25 years.

1. The Aim of the Thesis

The overall goal of the theses is to investigate and analyze the Czech trade structure in the aftermath of the transition period through the accession to the EU till today. How has the development been and what is the significant difference -if any exist- from then to now? This will base on the following time spectre from the mid 1990's till the most recent trade statistics when available. It will contain the theoretical foundations appropriate for accessing the Czech Republic and international trade, the thesis will focus on the inclusion of classical- and neoclassical trade theory to explain the development or lack thereof. The industry and sectors of the economy will be analyzed through relevant models and indexes to highlight the areas of interest, and illustrate the development of the Czech trade. It is mainly focused on the export side of trade, but will include the imports in situation of relevance. Followed by the theoretical foundations and the historical context, the Czech Republic will assessed in terms of descriptive statistics and tendencies in relation to partners and standalone to illustrate the economy and the society. These will provide the basis for understanding and explaining the findings of the empirical research, which will be discussed in the latter part and put into the context of current views on international trade and transition economies.

The thesis is structured around a problem statement and four related research questions:

- *How has the Czech trade structure developed since the transition period till today and does it correspond to the theoretical expectations?*
- *What determines trade structure and international trade flows?*
- *What are the Czech relative comparative advantages in relation to the main trading partners and the World? And has this development been influenced by changes in the Czech relative factor endowments?*
- *Which role has the membership of the EU and the Common Market had for the development of the Czech trade structure?*
- *How has the development of intra-industrial trade been?*

1.1 Structure of the Thesis

The structure will be based on three main chapters: Trade Theory, The Czech Republic, and the empirical findings. Those are the subjects for the discussion section afterwards.

The first main chapter will present and analyze the theoretical foundations for the purpose of the thesis and how it can be applied in the context of the Czech Republic. The Classical trade theories and the advantages and limitations in regard to explaining modern trade patterns. How they are relevant today, and in which areas they lack explanatory foundation in regard to the Czech Republic. The Neoclassical trade theories will then further seek to provide a modern look at the international trade and the patterns, which will be evident from the later empirical data.

The following chapter will describe the Czech period of transition and the accession to the EU to provide and insight in the development that the country went through in the 1990's till early 00's. This will benefit the understanding of the results, and provide basis for the final discussion. Then various relevant data on the Czech Republic trade and the economy and society as a whole will be presented as it will add to the theoretical applications.

The final chapter will contain the empirical findings and actual results of the thesis, and will be held in regard to the theoretical expectations and provide basis for the following discussion. How was the development? Which factors affect the results? Why? Inclusion of relevant sources and views on the matter to conclude and hopefully provide valuable answers of the research questions in the end.

1.2 Limitations

The thesis will seek to analyze and investigate the development of trade structure for the Czech Republic in the aspect of European Integration given by the years up to and after the accession to the EU in 2004, and thus the relevant time period applied will be in this range, approximately the years 1995-2014 where available and relevant. In some areas, especially emphasizing on the transitionally phase of the 90's, data will be used as they are regarded relevant in answering the overall aim of the thesis.

In the description and analysis of the Czech economy and the trade structure, the thesis will seek to explore the various aspects of relevance for final discussions and, therefore, not include areas that might be significant for the country, but not in regard to explaining the empirical findings or the application of the theories. The relevant areas will be of GDP development, educational levels and labour costs, expenditure on education, and others as well as including data on the main Czech trade partners and important traded sectors. Effort will be put in analyzing the various aspects of the Czech economy and society from raw data, although not all aspects will covered with the same focus. Mainly those where the Czech economy is expected to possess a comparative advantages.

1.3 Methodology of the Empirical Study

The methodology and the basis for the thesis will firstly be of the Classical trade theories of Ricardo of comparative advantages and the factor proportions model, also commonly referred to as the Heckscher-Ohlin model in reference to its authors. The comparative advantages of the Czech Republic will be revealed through the Balassa-index that was introduced in Balassa (1965), which will be constructed in regard to the factor intensity approach developed by Marrewijk[1] that allocates specific goods under categories of the factor that is intensively used in the production of the very good. This will provide a way to access in which sectors the Czech export has a relative comparative advantage and provide theoretical views as how the Czech trade pattern will and should be.

The analysis of the Czech trade structure requires data and statistics at a detailed level, as countries' foreign trade is complex and consists of several product classifications or nomenclature, which separates specific goods and products and allows for an in dept analysis. The main source of data sheets are based on the Standard International Trade Classification (SITC, rev. 3).

This classification is used on both the 1-digit and 3-digits level as needed and considered relevant and to a degree sufficient for the dissertation analysis purposes. In the empirical study of the relative factor endowments used SITC simply as a tool for classification of categories by factor intensity see Marrewijk (2007, p. 89). Data is retrieved

[1] Apendix I

from UNCTADstat, where data on a SITC 3-digits level can be extracted. This database is considered valid when the above classification is based on UNCTADstats classifications regarding factor intensities. Data for individual product groups (e.g. for trade in uranium and weapons) are not available, and thus the key assumes few product categories as a zero. These shortcomings accounts for just a small part of the 254 categories in the SITC 3-digit and should not affect the optimal end result. Finally, the use of the same consistent statistical database will be the objective wherever possible to provide stability for the indexes and final conclusion of the thesis.

For the analysis of the relative factor endowments used aforementioned classification / distribution (Marrewijk 2007). The classification of product categories from SITC 3-digit being for the factor which is intensively used in the production of a product that provides an indicator of and in which factors a country is relatively well endowed with, evaluated for example foreign trade within these categories. Groups of products distributed on the 5 categories:

A) *Primary products:* food, beverages, tobacco, fruit, oil, natural gas, etc.

B) *Natural resource intensive products*: wood, aluminium, leather, etc.

C) *Unskilled-labour intensive products*: clothing and textiles, glass, ships, shoes, furniture, etc.

D) *Technology intensive products*: chemicals, medicine, machinery, telecommunication, etc.

E) *Human-capital intensive product*s: perfume and cosmetics, watches, cars, etc.

Additionally, there are 5 non-classifiable categories *not* included in this distribution key, and therefore *not* included in the analysis of factor endowments. These 5 belongs to the SITC group 9: items or transactions not classified elsewhere, as well as gold.

By using this distribution key, it is possible - at a relatively affordable way - to illustrate a country's factor endowments and clarify the areas where a country should specialise production in - and finally, is said to have its comparative advantages.

The Neoclassical trade theories to be included will be the thoughts and theory developed by Krugman et al. of Imperfect Markets and Economies of Scale, and the introduction of Intra industry trade (IIT) measured by the Grubel-Lloyd index from Grubel & Lloyd (1975), which will provide the basis for the empirical analysis of the Intra industry trade.

1.3.1 Balassa Index (RCA)

$$RCAij = \frac{\sum Xik / \sum Xi}{\sum Xjk / \sum Xj}$$

The export value for a given product according to a country's total exports, thus the importance of this product for its total exports, compared with the equivalent of a partner, such as the EU or the world. This provides an index number, where 1 represents an identical impact on both the analysis-country and partner, which means that it is neither the revealed comparative advantage or disadvantage for a given product or industry. If B> 1, as can be said to be a comparative advantage when the country relatively more specialized.

This index is the basis for assessing the Czech comparative advantages and thus explaining the trade structure of the country and provide the evidence for the development or change hereof. The Index will be calculated and presented from 1995 and till present date from 2014 (where available). Furthermore, the RCA index will be calculated and presented divided into categories according to factor intensity as well as on SITC 1-digit level.

1.3.2 Grubel-Lloyd Index

$$GLi = 1 - \frac{|Xi - Mi|}{Xi + Mi}$$

The index keeps export values of a commodity group against the corresponding import values. Is the case either 100% pure intra-industrial or pure inter-industrial trade, the index values will be either will be 100 or 0. The index value indicates the degree of intra-industry

trade a category. GL index can be used aggregated to include a country's total trade or group of entities, i.e. an industry for an example or a specific SITC grouping.

In the process of distinguishing IIT in horizontal (HIIT) and vertical (VIIT) parts – as IIT = HIIT + VIIT, Abd-el-Rahman (1991) uses an approach based on the calculations of unit values for the export and imports of a given good or industry. The ratio of the unit values UVX and UVM in relation to the dispersion factor, α, to provide a tool to determine whether a good falls in the category of VIIT or HIIT. Greenaway et al. (1995) uses a dispersion factor at 0.15 due to the original definition of the range, which were defined as HIIT.

$$1-\alpha \leq \frac{UVX_{ijt}}{UVM_{ijt}} \leq 1+\alpha$$

And it is VIIT when

$$\frac{UVX_{ijt}}{UVM_{ijt}} \langle 1-\alpha \qquad or \qquad \frac{UVX_{ijt}}{UVM_{ijt}} \rangle 1+\alpha$$

In the empirical chapter, the GL Index will be calculated and presented at a SITC 1-digit level for each of the 9 groupings calculated (and weighted) from the 3-digit level to limit the data aggregation problem. The index will also be presented according to the distribution key to align with the analysis of factor endowments and comparative advantages. The specific categories are weighted on the 3-digit level according to their relative importance for the group, and then summed to one-digit level. Thus, an overestimation is only limited as it cannot be completely eliminated or exhausted on the 3-digit level as well.

1.3.2.1 Data Aggregation Problem

This involves the issue of detail and the logical problems that arise with results calculated at a less detailed level. Those tend to be skewed and overestimate the level of IIT as measured by the GLI index. It is evident from (Marrewijk) and (Janda et al, 2004) that 3-digit and 4-digit

level-based calculations will be more precise and useful than those from 1-digit and 2-digit. IIT is specifically based on trade with a specific good or trade in an industry and the distinguishing between them.

The rationale is that under the various factions acting products which in reality are not the same - and in the case of trade, thus not be considered as intra-industry. To avoid this problem, the rule is: the more detailed, the greater the probability of not counting "wrong" products. Marrewijk (2007) illustrates an example where microphones and razors are included in the same grouping and deal with them then, mistakenly, is included as intra-industry trade. For this thesis used SITC 3-digit to achieve a certain detail, though even 3-digit is not completely exhaustive in terms of product groups, ergo can event get where trading of two non-identical products count as intra-industry. It is estimated however that the level of detail required for this thesis met.

2. Trade Theory

The chapter will introduce and analyze the theoretical foundations of the thesis and how it can be applied in the context of the Czech Republic. The Classical trade theories will first be included with the advantages and limitations in predicting the modern trade flows of today, but also assess which areas that is still relevant now.

Then the Neoclassical trade theories will then further seek to provide a modern approach to the international trade and the patterns and will include the components of Intra-Industry trade, which will be evident from the later empirical data.

2.1 Classical Trade Theory

2.1.1 The Theory of Comparative Advantages

As a development of the notion of absolute advantages by Adam Smith, David Ricardo introduced in the 19th century his thoughts on the behaviour of international trade and the term of comparative advantage of nations. The Ricardian model depicts a simple world, where there will be benefits from trade, when a country specializes in the production of the goods it can produce more efficiently – even when another country can produce at an even higher efficiency and in the case of an absolute disadvantage. In its simplicity, the production of a good relies on just one factor of production, say amount of labour or units of labour, which determines the productivity within a given sector of a country. (Daniels and Radebaugh, 2001)

In a situation of no international trade, each country is put in a situation to consume whatever it produces and every given production comes with a trade-off and is limited by the production possibility frontier that states how much of each good that can be produced – and consumed – by its resources it possesses. In a world of no trade, a country will therefore set up the production of the 2 goods in a combination – where it produces less of one good in order to maintain the production of another food – to supply its domestic consumption with not just a single demanded good. (Krugman et al, 2012)

On the contrary under the existence of international trade, suppose that the Czech Republic can produce 10 million cars or 100 tons of Bohemian crystal for the same amount of

labour. The producers face a trade-off when producing either good in terms of production in other. The opportunity cost of producing 10 million cars is therefore 100 tons of crystal for the Czech Republic. On the other hand, the larger neighbour Germany can produce 30 million cars or chose to also produce 100 tons of crystal.

Table 2.1: Production Example

	Cars	Crystal
Czech Rep.	-10	100
Germany	30	-100
Total	20	0

Source: author

In the above example, The Czech Republic has a comparative advantage in producing crystal while Germany has a comparative advantage in producing cars. It is, therefore, a result of the German car producers being more efficient than the Czech, and both could benefit by allowing the production for each domestic market only to be made in the sector, where the country has its comparative advantage.

In conclusion, the Ricardian Model is very simplistic, but offer insight in as to why international trade occurs and the benefits hereof. Although - and as a consequence – the model relies on assumptions that are hardly valid in the real world. Firstly, the notion of two countries with two goods is good for the simple understanding, but has little grounds in the globalised world of today. The goal of the countries may be other than just achieving economic efficiency and the idea of full employment nor is likely to be valid as well. Lastly, the theory assumes that resources or labour can move freely from one sector to another without the cost of relocating, education, etc. It will be easier domestically than internationally, although it is evident from the EU market – that it is difficult for workers to leave their homes regardless of the job situation, and perfect mobility of labour do not exist. It costs money and takes time to adjust. (McDonald and Daerden, 2005)

In addition, the theory of comparative advantage applied to the Czech Republic states that the Czech production and exports should be focused in areas or on the production of

goods, where C.R. has a lower opportunity costs than those of other countries in general. In other words, where the Czech producers are more efficient than the countries they trade with.

2.1.2 The Theory of Factor Proportions

The theory developed by the Swedish economists Eli Heckscher and Bertel Ohlin in the 20th century further ads to the thoughts from Smith and Ricardo, but expands the number of inputs or factors of production to 2, namely labour and capital why the model now appears in a 2 x 2 x 2 function. Thus equals two trading countries, two good and two factors of production. It proscribes that technology dictates the use of production factors – or the factor proportions – that is necessary in the production of a good. Different goods require different proportions of factors of production in order words, and the technology determines which factor that is intensively used. And here appears a major assumption to this model that differs from ideas of the Ricardian Model, as same technology in all countries is assumed and as such there shall be no productivity differences between countries. In addition to this, there are several more assumptions that are critical to the understanding of the Factor Proportions Model, which will be mentioned below. (Czinkota et al, 2008)

The idea of the theory is that when no technology differences exists and the productivity is similar between two countries, then what determines the costs is the price of production factors. Here it is clear that labour is relative cheaper for a country that has abundant of (cheap) labour, and on the contrary – a country abundant with large amount of capital can be said to have cheaper price of capital. As production factors are immobile and cannot cross-borders, then finally, a country should specialise in the production of a good that intensively uses the production factor, which a country is abundantly endowed with – and in that production lie the comparative advantage. The country must then instead import the product that it does not abundantly possess. The rationale is that countries are differently equipped with production factors and when they cannot move or in the short term change, then production will be said to be optimal in those areas relative to the trading partner, which is important – as it is the relative factor endowment, why one country may well be endowed more favourable with both input of production factors. (Strøjer Madsen et al., 2001).

The assumptions of the Factor Proportions Theory are to some extent similar to those of the Ricardian with some differences as mentioned previously. This could potentially lead to the notion that the theory cannot be valid in some areas in explaining the trade patterns today.

The theory assumes 2 x 2 x 2 and is simplistic as models tend to be, and in a situation where both countries produce at maximum output – and trade is restricted to just the 2 of them, trade would natural balance. This will not be directly applicable to the Czech Republic, where trade cannot be said to balance even if sometimes almost, and trade will never just be limited to 2 countries. Furthermore, The Czech Republic and the goods the country produced consists of far more factors than just labour and capital, which we will later explore – also one might also distinguish labour in different kinds; high-skilled, low-skilled – and this have links to infrastructure, education and capital – and lastly also the technology level of the country, which leads to the next assumption.

Identical technology levels and same production procedure is not the case of the world today, where many new ideas and technologies are developed everyday to increase output and make the general life easier in many regards. Thus the idea that the cost of production of a good only arises from the relative endowment of production factors is unlikely. In relation to this the assumption of each country endowed uniquely with resources. Some are particularly rich in capital, others in labour. The empirical evidence shows that countries have similar endowments of resources, although, it is unlikely for two countries to be identical. The premise, however, holds when it is said that the Factor Proportions Theory proves most useful in analyzing two countries with significant differences between them. For example, for analytical purposes between developed and developing countries. (Krugman et al., 2012, p.131).

The assumption of perfect competition. The factor of production were exchanged only to price of their true value, where no country had any power on the other ones market due to perfect competitive market forces. This is not realistic. Even within the Single Market with countless regulations and competition law will not be possible to comply. And then the prerequisite for the same consumer preferences: The fact that consumers have the same preferences across countries and continents is also problematic. Alone on the European continent and the market there are countless the examples of the different cultures have different preferences and make different demands on products and their capabilities. It is assumed that the differences are at least as important worldwide.

With these issues in mind, is it then applicable to use the Factor Proportions Theory? The assumption of the same state of technology in the industry is problematic, especially for large differences in factor equipment. Conversely, the model is good at explaining the effects beings between countries - and empirical data show that the theory is quite accurate for predicting patterns of trade between developed countries and evolving (transition economies). In that case, the model should be applicable for analysis at a time, when the Czech economy was lagging behind that of the Western Europe – a difference that is, however, not so evident in 2016. Applied to the Czech Republic, in the midst of the days of transition and the opening up of the economy to the west – it is naturally to assume that the Czech Republic were a different country as it is today, and thus with this model in mind, look at the state of labour force – is it large; is it relatively cheap? Or have the Czech rather relied on high-skilled labour in support of its capital-intensive industries? How many and what resources do the country possess? As the theory proves most useful when the differences are greatest, then the Factor Proportions Theory should be able to tell us about the development of the Czech specialization from the point of transition and onwards, where this paper has its foundation. The theory relies on the relative aspect and as such the Czech Republic will be expected to have specialized its trade in relation to those of its neighbouring countries, especially Germany – and the country is likely – if the theory holds – to specialize in the production of a good that intensively uses the production factor, which the Czech Republic is relatively abundantly endowed with compared to Germany.

2.1.3 Leontief's Paradox

In the 1950's one economist decided to test to what extent the Factor Proportions Theory was able to explain and predict the factual trade flows by focusing on the U.S. export and import of goods. The assumption was that the U.S. would be producing goods that intensively needed capital in the production – and thus exporting those goods, while importing goods of other factors; the belief was that the U.S. in turn would import large amounts of labour intensive goods. "*Since the United States possesses a relatively large amount of capital [...] direct domestic production of such "labor intensive" products would be uneconomical; we can much more advantageously obtain them from abroad in exchange for our capital intensive products"*. Leontief (1966, p. 69-70). The above represents the general perception as how the U.S. trade flows should be and it was, therefore, a surprise when Leontief presented the

results of the study, which would lead to what is called; the Leontief's Paradox. (Czinkota, 2008)

The findings through Leontief's input-output analysis showed a different story though. The U.S. exports consisted of relatively more labour intensive products than those that were imported. If the theory was still right, it meant that the U.S. had been perceived wrong and that the U.S. in fact should be regarded as a relative labour abundant country. Many discussions followed and other years were examined and included in the results as well. In the end it changed the thinking towards labour and the need to distinguish it into skill-levels, which differs from the assumption of the theory that production factors are homogenous. The teachings from the Leontief's Paradox have further developed the view on production factors in regard to the Factor Proportions Theory, and in the analysis of the Czech exports – products will be allocated into other factor intensities than just labour, land and capital. (Czinkota, 2008; Krugman et al, 2012)

2.2 Neoclassical Trade Theory

2.2.1 The Theory of Imperfect Markets and Economies of Scale

The following centuries after the result of the test that Leontief had conducted, the classical trade theories were victim of criticism as they failed to explain the then current trends in international trade. The large growth of trade worldwide and the contemporary decline in U.S. competitiveness in the 1980's and 90's with resulting large trade deficits were left unanswered for and discussions and search for a new approach was evident. Krugman provided trade theory with another chapter, the theory of imperfect markets and economies of scale. In a similar manner as the classical contribution, Krugman looks at the cost of production, but rejects the notion of constant (or diminishing) returns to scale and turns to increasing returns to scale, and how it impacts the markets and the international trade. Economies of scale in turn will lead a country to specialization and allocation of resources and labour in one or few industries, thus abandoning production of others products that in turn will be produced abroad. Consumers in each country will demand different kinds of goods – and international trade allows for this to happen, while maintaining economies of scale through specialization. The concept of economies of scale is distinguished into an internal and external kind both circling around the cost per unit in the production.
(Czinkota, 2008)

External economies of scale are when cost per unit derives from the size of an industry, which could consist of multiple smaller firms. The bigger or dense an industry is, the more efficient and cheap it can produce a good. Those are usually most efficient found in a concentrated geographical area, i.e. evidence of such clusters can be found in for an example the Silicon Valley. It seems that they appear independent from the presence of natural resources, but rather due to a combination of chance, historical aspects and a relative comparative advantage relevant for the industry. As a consequence, it is not given that the industries will be at the most optimal location. There might be examples where they could be concentrated more efficiently and potentially benefit the world to a greater extent. Krugman et al (2012) further highlights how large industries can lower the cost of production. Through the size and potentially close geography, an industry can benefit from attracting quality suppliers that could aid to the research and development stages of the production of a good – and therefore save costs, either through outsourcing, time or manpower. Another potentially gain is the attraction of high-skilled labour force – or at least customized to the industry needs, to the benefit of both parties; in case of lay-offs, the worker would potentially be able to find similar jobs in the near proximity. And the companies would have a lot of workers to choose from. Last, the potential knowledge spillover effect by concentrating the best within a company close together can also be seen as an advantage that countries that do not possess such an industry wouldn't be able to benefit from.

With internal economies of scale the cost per unit is now derived from the size of a firm and directly focuses on market structure, as large firms tend to create imperfect markets as they either set or affects the price on a market as a result of the relative size and power – both domestic and internationally. The large firm draws resources from other sectors in the country; again, in order to expand and/or achieve economies of scale and the variety of produced goods in the country will be limited. By narrowing and specializing the production in one or few products allows for a large production necessary for economies of scale. Under monopolistic competition, the firms benefits from differentiating its products in relation to its rivals, and achieves in some sense its own monopoly over its own product. International trade allows for penetration of other markets and increasing the market size. Krugman has contributed with a explanation that exceeds the pure specialization according to comparative advantage of the classical trade theories, and adds the effects that firms achieves further gains by economies of scale. Furthermore does it provide an explanation of intra-industry trade, which reflects the product differentiation and economies of scale that allows for trade between

similar countries with no apparent comparative advantage difference between them. (Krugman et al, 2012)

2.2.2 Intra-Industry Trade (IIT)

IIT occurs in situations where countries are exporting and importing products with basically the same function due to product differentiation, which allows for satisfaction of the consumer preferences that exists. It will be visible in terms of simultaneous export and import of "similar" product within the same industry, and will be evident by belonging to the same nomenclature coding – thus, appear to be mutual trade of the same good in the eyes of classical view upon comparative advantages and international trade. However, neoclassical trade theory introduced the concept in connection with empirical studies of the then EU and the Single Market. It was discovered that a major proportion of the total trade was made up of more products in the same industry or sector. It was at the time new knowledge as classical trade theories could not explain these phenomena. Ricardo and Heckscher-Ohlin consider similar goods produced by different manufacturers with a seemingly similar purpose as identical - but IIT rejects the perception that no preference exist among consumers. And today, it is logical that two similar products with the same seemingly identical function under a different label can attract different consumers and demand a different price. This opened up a new market structure (monopolistic competition), where firms could exploit this differentiation to achieve economies of scale (Marrewijk, 2007).

According to Krugman et al. (2012), the closer the level of economic integration - the higher the share of IIT. This has significant relevance for the Czech Republic, a country since the 1990s has gradually become more and more closely integrated economically as well as politically with Western Europe – not the least through joining the European Union in 2004. Firstly, by accessing the Single Market and then potentially by implementing the Euro as the next step, which naturally has a long time to event in the current political atmosphere. This would further expect the level of IIT to increase. This is supported by Strøjer Madsen et al. (2001) that add that the development by economic integration makes countries more alike and empirical data shows that the degree of IIT is highest between countries that are relatively similar.

Davis (1995) establishes a link between the classical trade theories and IIT. By

combining Ricardo's one-factor model with the two-factor model of Factor Proportions model, he illustrates the Heckscher-Ohlin-Ricardo model under the assumption that technological differences do exist between countries. It is then a 2 x 1 model with two products and just one factor of production. According to this model, the production of a product is based on the same factor intensity and it is assumed that the two products belong under the same industry, why specialization in this case will be the result of differences in technology. Thus, such a specialization will create a platform for trade between goods that intensively uses the same factor of production.

2.2.2.1 Types of Intra-Industry Trade (IIT)

Intra-industry trade can be separated in 2 parts; a horizontal kind (HIIT) and as vertical (VIIT). In analysis of IIT it is important to distinguish between the two kinds as the conclusion on the matter will differ as a consequence.

The horizontal IIT is characterized by simultaneous imports and exports within the same industry -on the same stage in the production. This type is based on product differentiation, economies of scale and specialization from what surrounded the situation under monopolistic competition. An example of HIIT is the trade flow of cars between two car-producing countries, such as Germany and the Czech Republic. Cars are being built in Germany and being sold to the Czech market, and vice versa – this represents the differences in consumer preferences as mentioned previously. A marketer would provide thousand of areas where the two products - the cars - would differ from one another, but the core function would be the same and the product nomenclature would as well. This kind of IIT will most frequently occur between countries of the similar factor endowments and in general terms between countries that are relatively similar. (Marrewijk, 2007).

Vertical IIT is characterized to occur at different stages in the production and can be described as a breakdown of the production phase from where a product is being produced and shipped through different countries of different factor endowments. In the end, the product will both be the subject of being imported and exported by one country depending of the stage in the production. For an example, a computer or phone inner parts might be developed and constructed in small parts in a country richly endowed with capital and technology, then constructed and exported to a country rich in cheap labour, which finally

bring the parts together into the end product that is a computer or a phone to finally being sent back to be sold on the domestic market of the initial developer. In such a production process VIIT occurs several times across technological level and factor endowments. In other words, vertical IIT resembles more the views of classical trade theory as it is basically trade of goods of different industries or qualities and is, thus, relatively equal to the Factor Proportions model and the notion about an international division of labour (Marrewijk, 2008)

3. The Czech Republic

The following chapter will describe the Czech period of transition and the accession to the EU to provide and insight in the development that the country went through in the 1990's till early 00's. This will benefit the understanding of the results, and provide basis for the final discussion. Then various relevant data on the Czech Republic trade and the economy and society as a whole will be presented as it will add to the theoretical applications.

The chapter will include a short presentation of how the expectations in advance of presenting the empirical findings will be with the data as point of reference. Then for the Czech comparative advantages, and, from different perspectives, provide an expectation of what the empirical findings should look like from a theoretical perspective.

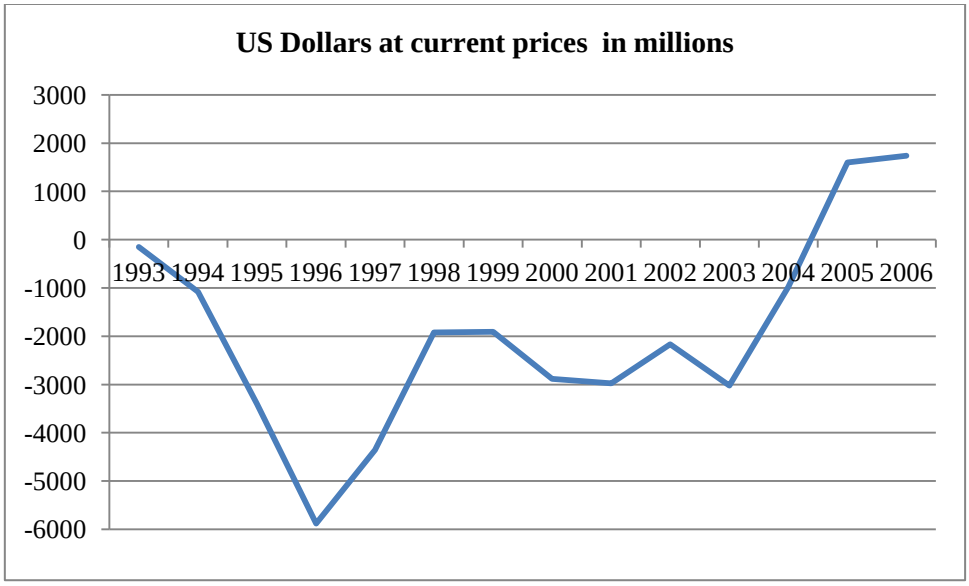
3.1 The Transition Phase and the Accession to the EU

On the day 1st of May 2004 the historical expansion of the European Union became a reality and the Czech Republic along with 9 other new member states was officially included in the European community that by the time then counted 25 countries. It was the culmination of the transition from a communist regime and planned economy through the 1990's and its numerous of political and economical reforms and catching-up, followed by tough accession negotiations with the respective EU leaders and the EU Commission in the years preceding that day in 2004. Officially the accession talks begun in February 2000 with all 10 potential new member states, but in reality, the Czech Republic had been part of a "first wave" of negotiations along some selected few since 1997 after the recommendation of the EU Commission of altering the process in 2 parts – before abandoning this idea later. (Nugent, 2006)

Before the collapse of the Soviet Union the relationship between Western- and Eastern Europe had largely been categorised as Communism against Capitalism with mutual isolation as a result hereof. The collapse created a "new" Europe with new possibilities in the west as well as in the east. The markets of the former CEECs and of the Czech Republic were open for access of the products and investments and the government monopoly of international trade had been abolished or were phased out gradually. In 1989 the Czech Republic were signified according to Hanousek et al. (2004) as having one of the smallest private sectors of the CEECs with just about 1,2% of the work employed privately. Although, The Czech stood

in a relatively good position as there was no large external debt, low inflation rates – positive trade balance at first as well as a balanced government budget – what was needed was heavily investments into infrastructure and technology. Further emphasis is put on the attitude and readiness to change and reform of the Czech politicians, which was positive. Janda & Münich (2004) divide the Czech transition into 3 phases, where the first phase as 1990-93 tells the story of an immediate decline in the GDP due to the loss of export markets. It been difficult to sell any product on the western markets due to the lack in quality compared to its western counterparts. The Czech companies were affected by the relative low competitiveness on foreign markets, low productivity and lower quality in the eyes of the consumers. And by opening the markets, the Czech companies also had to face outside competition on the domestic market with pressure on the price and the general profitability. The trade became a rather one-way trade in the favour of many western companies that in turn had expanded it potential consumer base. The situation of foreign exports took over the Czech market increasingly as well in the others of the CEECs and the fact that the Czech companies now did not have the COMECON export markets led to a deficit of trade in these years. (McDonald & Daerden, 2005), (Janda & Münich, 2004), (Hanousek et al, 2004).

Figure 3.1: Czech Trade Balance 1993-2006



Source: author from data from the Czech National Bank

Figure 3.1 sums up the impact of the transition phase on the Czech trade balance. In the immediate aftermath of the independence, the Czech Rep. – as highlighted by Hanousek et

al (2004) – had a positive trade balance from the then existing trade within the Central- and Eastern bloc. This however dropped significantly from 1993 after the "shock" of splitting the then Czechoslovakia as a contributing factor of instability in decline in GDP growth. The wages however had been allowed to rise around 2 times higher than the growth in productivity, resulting in increased demand for imported goods, which shows directly on the trade balance. Although not all imports went to satisfy the consumer demands, large parts of import went into improving the infrastructure as well as improving the quality of Czech energy sector, specifically the coal stations. The most declining years 1994-97 was a recession also caused by external factors, opening of the economy and integration with neighbouring countries to the west also made the Czech Republic more vulnerable to performance of those economies – defined as business cycle synchronization – especially on the situation of the German economy, but also competition from other CEECs. The recession is the second phase of transition by Janda & Münich (2004) leading into the third period of consolidation in terms of the trade balance after 1997, however unemployment rates went from 4% in 1996 to 8.5% in 1999.The decrease in the trade deficit were a result of a European economic expansion of economies, which stimulated further exports as well as the depreciation of the Czech Koruna during 1997. The trade balance declined again around 2000, where deeper economic recessions in neighbouring countries such Poland, Slovakia and for important trade partners in Russia and Germany resulted in lower demand in willingness to invest. As the table 3.2 illustrates, The Czech Republic was seen as a relatively positive example between the CEECs in those years with a comparable shorter recession than other CEECs.

Table 3.2: Time of Transition and Recession

CEECs	Consecutive years of GDP decline	Real GDP, 2000 (1990 = 100)
Czech Republic	3	99
Estonia	5	85
Hungary	4	109
Latvia	6	61
Lithuania	5	67
Poland	2	112
Slovakia	4	82
Slovenia	3	105

Source: The World Bank

The change from a planned economy to a market orientated economy demands severe structural changes to a country and an economy and the overall period was affected economic recession with high inflation rates, high levels of unemployment within the CEEC's and the Czech Republic. A. Kuznetzov in (McDonald & Daerden, 2005) emphasizes on the lack of sufficient and functioning institutions such as a capital market, investment banks, accountants and lack of several other practical necessities that had to be re-developed in order to integrate within the capitalistic world. The process can be divided into different stages as how to liberalize and closer integrate with the developed countries. Firstly, the situation of crisis had to be stabilized. The basic economic tools as prices and wage had to be adjusted a capitalistic market. And after, the focus was shifted in order to reform the institutional platforms and allow for private ownership, abolish state monopolies and stimulate competition. Privatization was seen as the driver of the economy and an incentive for start-ups and entrepreneurship. It should prove difficult, however as it wasn't uncommon that the state had ownerships over several thousands of companies within the country. Furthermore this process demands a legal foundation that too had to be established for an example for the case of bankruptcy. Finally the last stage was to re-structure the industries and prepare for a new consumer demand. A reallocation of capital and labour from heavy industry to the production of consumer goods and higher tech-products; from secondary to tertiary industries. In the end, the CEECs and Czech Republic would have a trade structure and economy closer to the developed ones as integration and trade increases. (McDonald & Daerden, 2005).

The Czech politicians had its own view on how the privatization would be conducted and the approach differed from some of the other CEECs. The size of the company took different methods. Small- and medium sized companies were ought to be sold on auctions for domestic buyers only, in tender rounds or through direct sales. The larger Czech companies were made into joint stock companies and either transferred to the municipalities, or sold on public auctions through the "vouchers"-scheme, which was the approach chosen that differed and created some issues with fraud in some cases. The idea behind the voucher privatization was to make a rapid privatization, allowing the Czech citizens the possibility to exchange money for a book of vouchers that could be used on actions to obtain shares of a state-owned company going through privatization. To further stimulate this process, it was allowed to create "Investment Privatization Funds" that the individuals could entrust with their vouchers to invest on their behalf. The advantage of this was that the funds were able to obtain large

enough stock majorities to make the managers listen to the actual owners rather than if the owners had been thousands of single individuals. In reality though, it made the managers of the investment funds increasingly influential and the Czech Republic suffered from many cases of tunneling and asset stripping, which did not help the privatization process positively.

The choice of privatization approach was heavily politically as selling to the highest bidder (foreign) would have benefitted the state and government with a large inflow of capital, but at the same time it would have been unpopular in the eyes of the electors, who may take pride in keeping the national companies. The result was with the words of Hanousek et al (2004) an "economic nationalism" that meant domestic ownership over many companies, but failed in terms of leadership and management in relation to those of foreign control and many companies were inter-connected through close ownership relations.

A study made on the efficiency of privatized companies showed a relation between good performance and foreign private ownership, while domestic private ownerships did not significantly perform better than had the state-owned done. Further it showed a positive effect of state-owned shareholder position in companies. *"Foreign firms apparently engage in strategic restructuring to increase profits and sales, whereas domestic owners on average seem to reduce sales and labor costs"* and *"[…] the state induces profit-oriented restructuring but also pursues the social objective of employment generation"* (Hanousek et al, 2004, p. 22). Thus what proved successful is not whether private- or state-ownership, but rather the modus operandi of the ownership and structure.

The process of stabilization during the transition phase differed across the CEEC's, the Czech Republic experienced relatively fast steady growth rates after the dip and it might have been a contributing factor for being part of the "first wave" that took part in the EU negotiations of future membership. At the time, there was not any clear guideline as to how a country could fast and successfully going form a planned to a market economy – as such the 1990's was an experiment to study for the whole world. Each country had democratically elected its own government with its own theory of how to implement a market economy and liberalize the economy. As an illustration of the transition period as a whole, many CEECs experienced a decline in the GDP after independence and only regained levels from 1989 about 10 years later – the Czech Republic, however, over performed slight the rest in this regard. (Nugent, 2006)

As the CEECs gradually reached a certain level of stability and the implementation of the market economy progressed, the thoughts of EU membership began to spread – both in the EU which at the time were in the process of including Sweden and Finland from January 1995, and in the Czech Republic as well as the other CEECs. In a situation under the communist period, countries such as the Czech Republic had been without any prospect of membership, but suddenly had as a natural next step in joining the EU. The European community on the other side should begin discussions and preparation for a future EU that was not limited to Western European integration. While the NATO could provide the sought "hard" protection, the EU was the entity to provide with "soft" protection or support in the case – and fear for – a communist revival. At first – in the early 1990's – the believe within the European Communities was that a EU membership would be realistic in the near future, and as before mentioned, the EU itself were occupied by one enlargement as well as implementing the Maastricht Treaty. It was however important politically to "not close the door", and informal promises were uttered to the CEECs, which lead to the EU announcing in the closing paper of the Copenhagen European Council in 1993 that "*[...] the associated countries in Central and Eastern Europe that so desire shall become members of the European Union. Accession will take place as soon as an associated country is able to assume the obligations of membership by satisfying the economic and political conditions required"* (European Council, 1993, p. 12). Specifically, this statement was made after the creation of the *Copenhagen Criteria* that contained conditions or the criteria made to ensure a reasonably alignment between the political systems and economic level between existing and new member states in case of accession. Concretely the criteria for membership requires that the candidate country *"[…] has achieved stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities, the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union."* (European Council, 1993, p. 12). In the end, it will make sure that the new member state will be able to implement the *acquis communautaire*, the referral of the total of the laws and policies of the EU. (Nugent, 2006)

In some areas of the then EU15 there existed a fear and skepticism in including the CEECs as they possessed a competition for job creation, and some worried that the inclusion in the Inner Market would result in an influx of cheap goods and services due to the lower wage levels. Especially the lower developed regions of the Southern- and Mediterranean EU

countries were exposed to this challenge as they benefitted from this role at the time. Specifically, the concern was also related to the idea of a transfer of funds leaving the west and going to mainly the CEECs as a result of the expansion. Compared to the GDP of the EU15, the CEECS were at a level of 50% of that – only Slovenia was at a higher level than the lowest ranking country in the EU at the time, namely Greece. It was evident that large funds from the EU Structural and Investment Funds (including the Cohesion Fund and fund for regional development) would go to those countries relative to the west in alignment with the purpose of the funds; to raise the level of and converge all regions of the EU, but in the preparation for such an enlargement, the EU specially reformed within the areas of the Common Agricultural Policy and within the Structural policies.

The Czech Republic formally applied for EU membership in 1996, thus accession negotiations began with the profound status of 'candidate country'. In 2000 the roadmap for the historical enlargement were presented so that the new member states would take part in the elections for the European Parliament in June 2004. On a country-base, the Czech Republic had to finalize the negotiations with the Presidency country at the time, as all countries negotiating in confidence and all wanted the better deal, negotiations were tough, and it was make a choice between being excluded or reach a compromise as the EU and the Presidency had the better part to offer than the individual country. An agreement was reached for all the CEECs and the Eastern Enlargement became a reality on the Copenhagen Council in December 2002 and the Czech Republic joined the EU in May 2004. (Nugent, 2006)

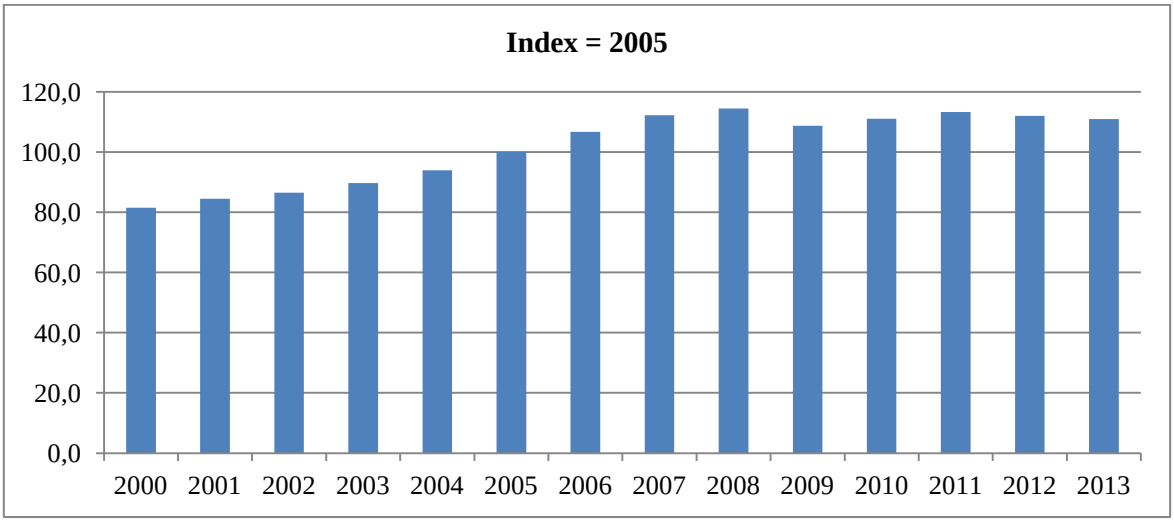
3.1.1 The Czech Republic in Figures

This section will cover various statistics that will be useful in relation to the trade theories in the assessment of the Czech Republic. The graphs and data will illustrate some key figures for the Czech Republic in relation to others and highlights some strength and weaknesses.

Below is illustrated the development in the Czech GDP per capita since the year 2000, which saw a steadily increase since the start of the time period and further after the accession to the EU before stagnating during the financial crisis 2007-08 and onwards. It is evident for a growth in the economy since 2000 after the 90's of decline and return to 1990 level. Furthermore it suggests an increase in the general productivity in terms of output, and in figure 3.4 the productivity is shown graphically in comparison to the Visegrád (V4)

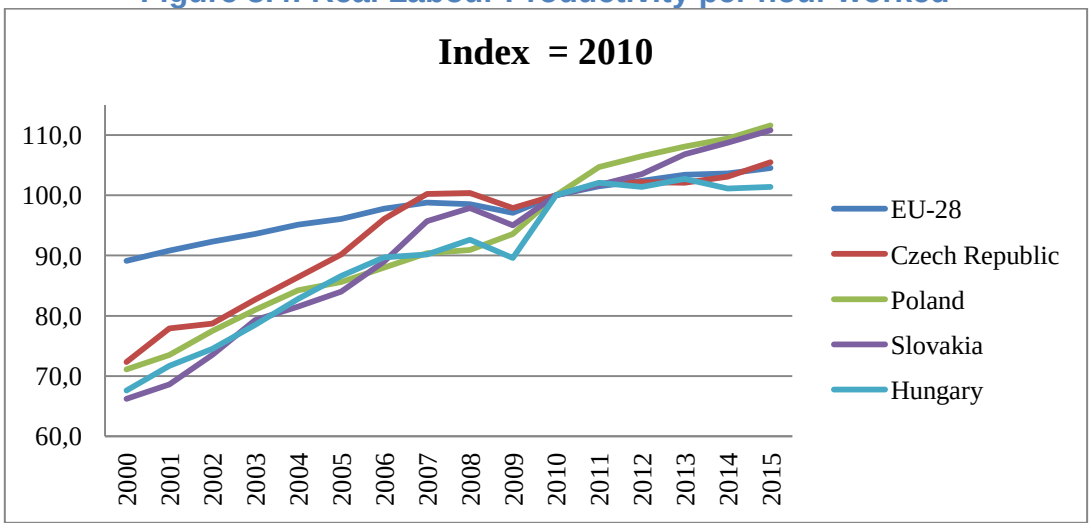
neighbours to put the development in a regional context. As Janda & Münich (2004) notes, the Czech faced increasingly competition from other CEECs and especially its close neighbouring countries, thus it is interesting to see if the Czech Republic has an evident advantage or lead in terms of productivity. The data shows that the Czech GDP per capita was steadily increasingly and the same pattern can be seen in the labour productivity graph. Since 2000 till 2007, the productivity rose significantly before stagnating as with the GDP. Recently, the graph shows a repeated increase as of 2013.

Figure 3.3: Czech Real GDP per capita



Source: Eurostat

Figure 3.4: Real Labour Productivity per hour worked



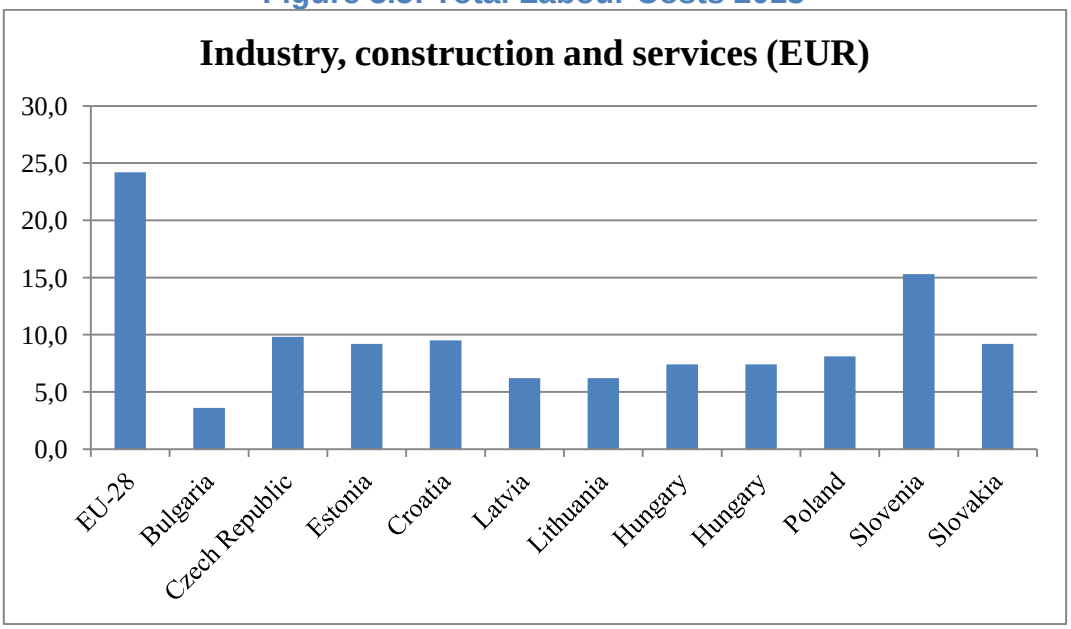
Source: Eurostat

In comparison with the Visegrád-countries and the EU-28, the Czech increase followed a trend within the group, generally outperforming the growth in relation to the EU28 level. The Czech Republic were the most productive country within the V4 in the 00's, but has been overtaken by Poland and Slovakia since 2010-11. This naturally results in a lower relative output in Czech Rep. In comparison to those two countries, and might – if the trend continues – have an effect on other areas of the Czech economy and general performance.

In the larger context on the European continent and the other EU countries and CEECs, figure 3.5 compares the cost of labour between the countries and in relation to EU28. Commonly for all countries is that they all provide cheaper labour than the current EU average as of 2013. The Czech Republic is the second highest ranking at 9.8 EUR only surpassed by the Slovenian labour costs at 15.3 EUR. The Czech labour costs are slightly higher than in the neighbouring countries with Slovakia, Poland and Hungary a few EURs behind. The differences are minimal within the group, but significant in comparison to the Western European countries. The numbers therefore suggest that the Czech Republic can be an attractive location for certain industries that can utilize the lower labour costs – by moving its business eastward. Whether to choose the Czech Republic will depend on other factors as well as the neighbouring countries shares the specific advantage.

For a further comparison, Finland has a total labour cost of 32 EUR. Finland is interesting as the Czech Ministry of Ministry and Trade (2012) in the 'The International Competitiveness Strategy for the Czech Republic 2012-2020' has Finland as a reference of example in numerous areas to improve Czech competitiveness. Especially within the educational sector, Finland (and the Nordic countries as a whole) is a main example, which related to Figure 3.6.

Figure 3.5: Total Labour Costs 2013

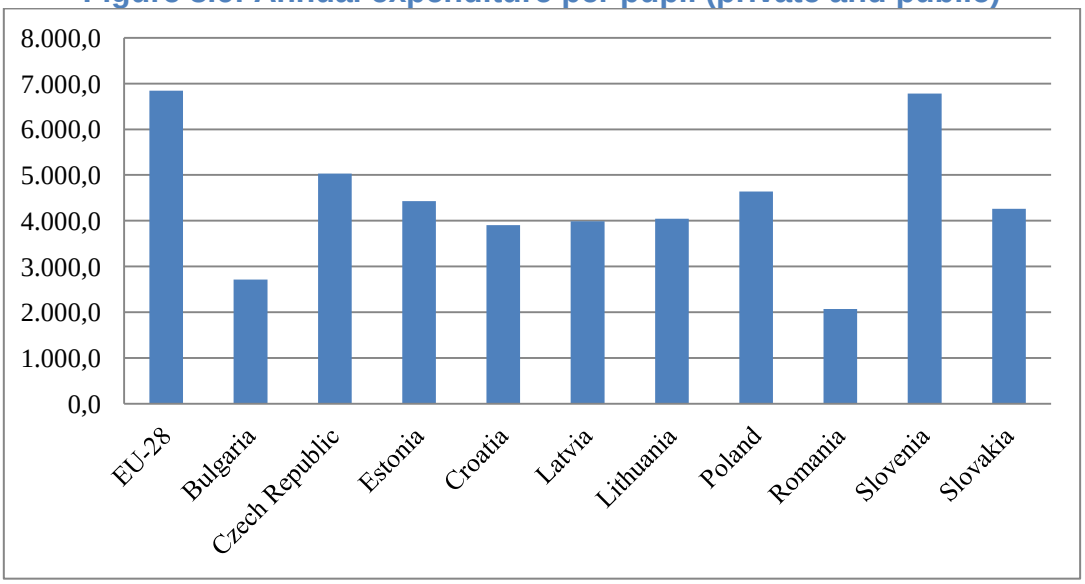


Source: Eurostat

One of the key recommendations by the competitiveness report for the Czech Republic is in improving the quality of educational and specifically reforming the tertiary in many fields to raise competitiveness. "*Reading, mathematical, and financial literacy must be enhanced and the quality of the practical knowledge of foreign languages and of soft skills must be increased"* Czech Ministry of Industry and Trade (2012, p. 28). The report acknowledges education as a key factor in the quality of life, and high-quality education as a decisive factor for the increase in living standards that has happened since the transition period. The goal is to create a flexible educational system that adjusts to changes in the comparative advantages and in the demand in those sectors in order sustain a positive development and compete worldwide. Another example of what the Czech Ministry of Industry and Trade recommends in the area of education: *"Robust and systematic monitoring of the results of educational activities and the quality of schools, teachers, and other entities in the educational system"*. And increased emphasis on developing or shaping students in terms of innovation and creativity – something that the Czech businesses are in lack of, as of: *"Companies will end up as subcontractors due to the lack of innovation"* (The International Competitiveness Strategy for the Czech Republic 2012-2020, 2012). This relates to the overall objective of the report; that the Czech Republic moves from being a country of cheap labor to a country with institutions of high quality and with an infrastructure to sustain and utilize the labor force to the maximum in an economy, driven by creative enterprise and innovation.

The Czech Republic does spend a relatively high amount per pupil in comparison with the CEECs, but is still below the EU28 average level. The recommendation from the competitiveness report do not specifically mentions increased investments – the focus is more on a re-thinking of the whole system. Nonetheless, increased investments in the educational sector would possible stimulate comparative advantages in relation to others countries that do not. The Czech Republic as the second highest ranking is said to have a relative strong position amongst the CEECs with only Slovenia spending more.

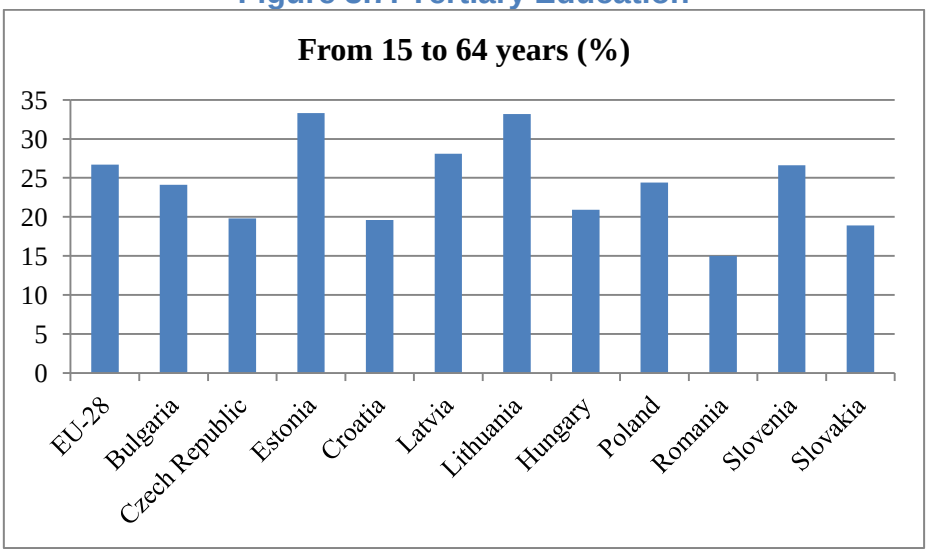
Figure 3.6: Annual expenditure per pupil (private and public)



Source: Eurostat

In the percentage of tertiary educational level, the Czech Republic has a share of 19.8% of persons aged 15 to 64 to have finished a tertiary educational. This only ranks as far as the middle spectre, where the Baltic countries excel as well as Slovenia. The Czech share is roughly 7% below the EU28 average and thus, the Czech Republic does not stand out within the field of tertiary education in numbers.

Figure 3.7: Tertiary Education



Source: Eurostat

In conclusion, what these graphs do not include is the quality angle and the issue of over educating within the European Union - highlighted by Jacobsen (2015)[2] in an article concerning overeducating and the effects in the EU and the role for EU policies. Overeducating in countries such as Spain, Greece and Ireland have let to high unemployment, and ultimately migration of those to countries with demand for their abilities. As the labour mobility is not perfect on the European continent this development took a relatively long time. This is one of the consequences by overeducating its population.

Thus, it is in general not necessarily a good sign to educate a large share to the level of tertiary education – if they are not in demand and will have to find 'lower' levels job after completion of their studies. Furthermore the abilities could be having been used beneficial in other sector instead. For the individual, however, it is – as backed by the competitiveness report (2012) – a factor for the quality of life and educated people tend to live better life (lifestyle, etc.). In the end, it is not possible to deduct higher allocated resources to the educational sector equals proportionally higher output. There might be issues with the fundamental system of educational or other factors, therefore it is only an indicator for, where the Czech Republic are in comparison with especially its neighbouring countries in attractiveness for investments and comparative advantage.

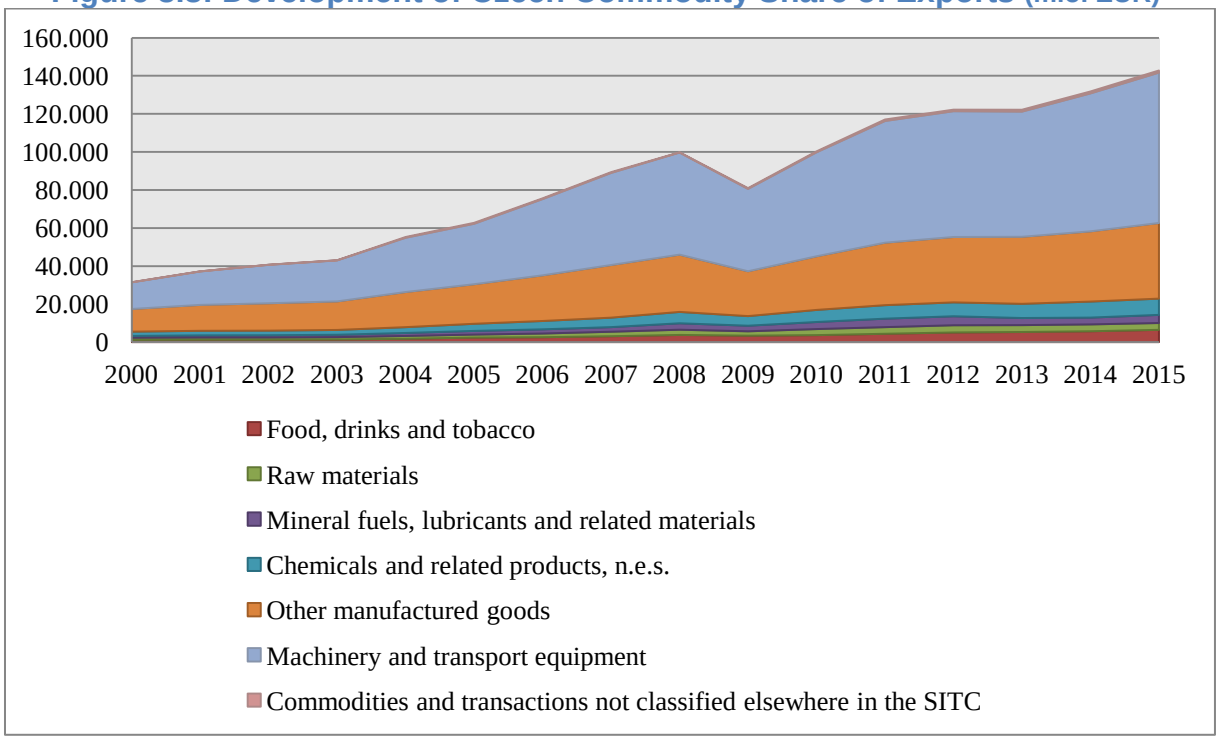
[2] http://www.euractiv.com/section/education/interview/economist-there-is-a-role-for-eu-policy-on-overeducation-among-young-people/

3.1.2 Czech Trade

In this section the trade structure of the Czech Republic will be presented, based on the components of the Czech exports, largest groups i.e. share of total exports, the destination of the exports and the largest export markets, and illustrating the importance of the EU market for the Czech Republic.

The commodity structure of the Czech Exports is dominated by two categories as illustrated by Figure 3.8. The two categories are 'machinery and transport equipment' and 'other manufactured goods', while the other groups only provide limited amount of export – and those groupings are also limited by fewer sub-categories. Apart from the increase in the Czech export value since 2000, the ratio between them has seen the former increase in importance, which will further be detailed in Table 3.9.

Figure 3.8: Development of Czech Commodity Share of Exports (mio. EUR)



Source: Eurostat

Table 3.9 expand the time period back till 1995 and depicts the significance of the 8 largest sub-categories of good by the SITC rev. 3. The development from above figure is highlighted by specifically the exports of 'motor vehicles' increases its share from 3.3% to 10.2% in 2014. The related industries within 'parts & accessories of vehicles' (short version) see a similar increase in the period. On the contrary, the most significant export group in

1995, 'iron & steel bars' has been out competed and lost its significance. The total share has increased as well of the 8 largest groups suggesting increased specialization which the share of 37.9% shows. The Czech Competitiveness reports notes this development as well: *"[...] the cumulative comparative advantages of exports confirms that there is a high degree of specialization in both exports and imports. The first 50 commodity groups (out of a total of seven thousand possible groups) account for more than a half of the comparative advantages."*Czech Ministry of Industry and Trade (2012, p. 38).

Table 3.9: Share of Total Trade – SITC 3 digit

1995		2014	
SITC	%	SITC	%
[676] Iron & steel bars	3,4%	[781] Motor vehicles	10,2%
[781] Motor vehicles	3,3%	[784] Parts & accessories of vehicles	7,7%
[699] Manufactures of base metal	2,9%	[752] Automatic data proces. machines	6,0%
[778] Electrical machinery & apparatus	2,4%	[772] Apparatus for electrical circuits	3,3%
[784] Parts & accessories of vehicles	2,2%	[764] Telecommunication equipment	3,2%
[772] Apparatus for electrical circuits	2,1%	[699] Manufactures of base metal	2,8%
[821] Furniture & parts	1,8%	[778] Electrical machinery & apparatus	2,7%
[665] Glassware	1,8%	[821] Furniture & parts	2,0%
Total share	19,9%		37,9%

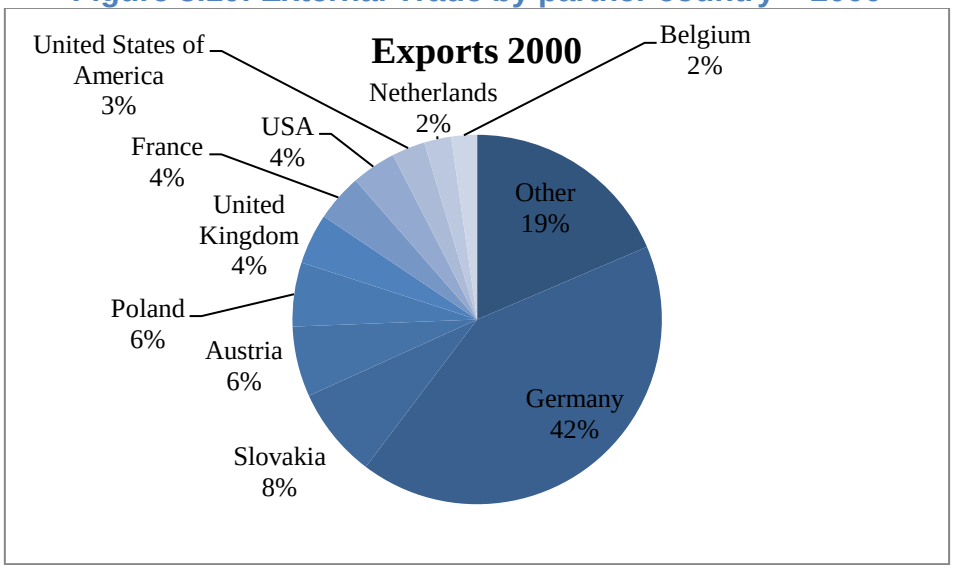
Source: author, UNCTADstat

The development has also seen new entries to list as 'automatic data processing machines' and 'telecommunication equipment' are areas that have seen a technological rise and increased importance. Furthermore it illustrates that the Czech Republic, although specialization has increased, is producing a variety of different goods to a high degree. Apart from the automotive sector and the related industries, the production of furniture and telecommunication relies on different factors of production.

Figure 3.10 and 3.11 shows where the Czech exports goes to and the largest export markets for the Czech exporters for the year 200 and as of 2015. The Czech Republic is heavily dependent on trade with its neighbouring countries, especially Germany with a share of 42% of the exports in 2000. The share has decreased in 2015 with other markets gaining

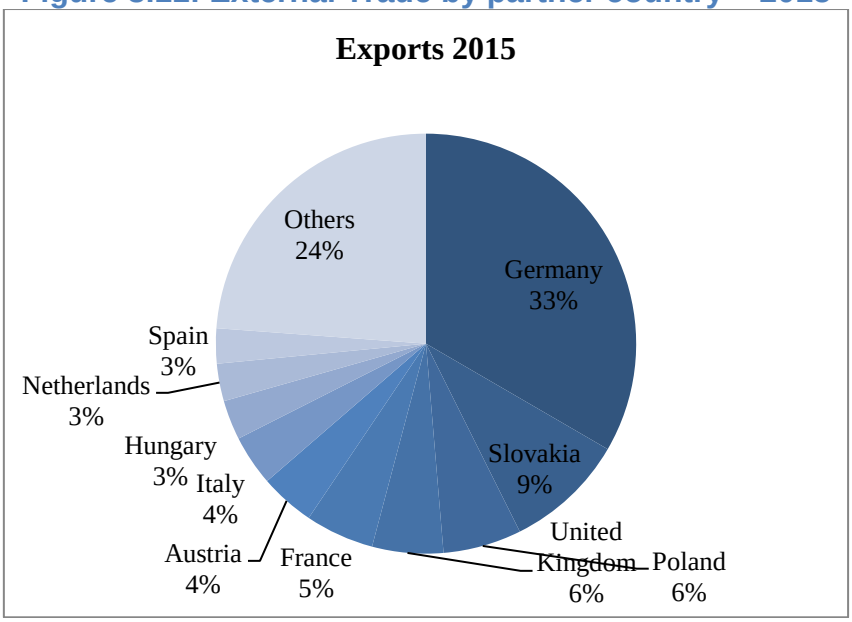
importance. Noteworthy is that the US nor China appears in the 2015, which underlines the importance of the closer markets for the Czech exports.

Figure 3.10: External Trade by partner country – 2000



Source: Czech Statistical Office

Figure 3.11: External Trade by partner country – 2015

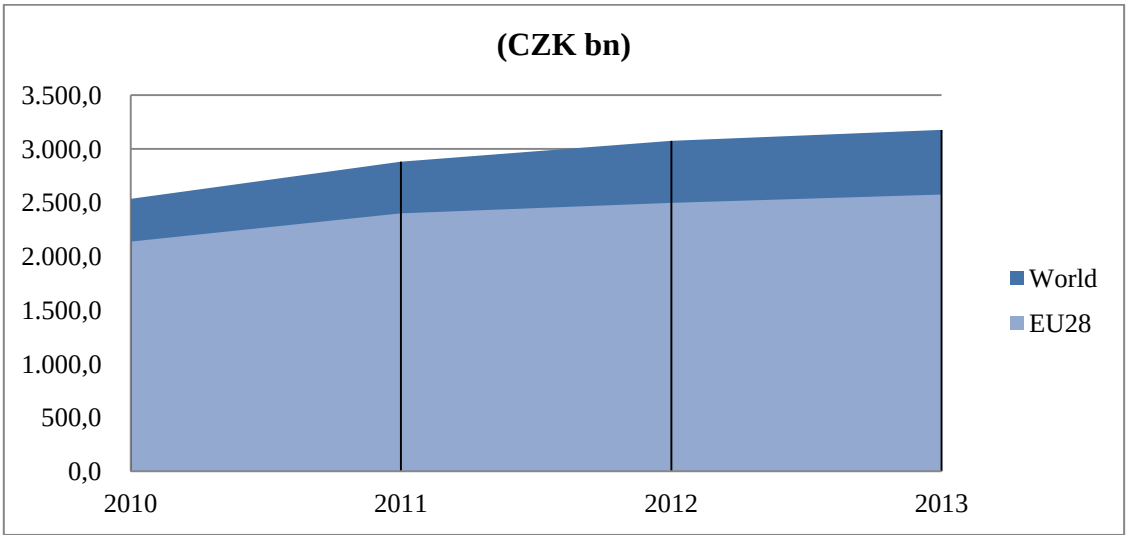


Source: Czech Statistical Office

Apart from Germany, the largest trade partners for the Czech Republic is Slovakia, Austria and Poland (all neighbour countries), and increasingly The UK, and France by around 5-6% in 2015. Common is that the countries are connected through the EU and the Single Market, and Figure 3.12 shows to what extent or importance that the EU has for the Czech exports of the total. The illustration shows the large share of EU and it is predominantly and

therefore makes the Czech Republic vulnerable to the performance of specially the German economy and the Euro zone in a wider term.

Figure 3.12: Share of EU28 of Total Exports



Source: Czech National Bank

4. Empirical findings

The chapter will contain the empirical findings and actual results of the thesis. Calculations on the basis of Balassa (1965) of revealed comparative advantage for the Czech Republic in the time period in terms of total trade, thus in relation to the World and the total exports. Then the Czech Republic will be assessed in relation to the average revealed comparative advantages on the EU level – for EU15, representing the countries that the Czech Republic were 'catching-up' with the transition period related to this. Also the Czech data will be compared to that of the EU27 to illustrate the level of development and similarity in trade structure with inclusion of the other CEECs including Romania and Bulgaria as well.

In the section 4.2 the degree of Intra-Industry Trade will be presented for the Czech Republic. It will be illustrated at different levels of aggregation with different results and for different subjects, the factor intensity allocation and on the SITC level.

The results will be included in the final discussion and as such this chapter will in large parts just present and highlight the tendencies of importance. Reasoning and explanation will be given more in debt after with the inclusion of theory, other data and sources on the matter.

4.1 Revealed Comparative Advantages (RCA)

The first table in empirical analysis is the Czech comparative advantage in terms of the products categories after factor intensity developed by Marrewijk (2007). The shades of blue signal the strength of the revealed comparative advantage with dark blue suggesting a more significant advantage in relation to the counterpart. A comparative is 'revealed' for all levels above 1, and similar levels below 1 is a comparative disadvantage. Hinloopen & Marrewijk (2001) grades the RCA values as above 1 equals a comparative advantage, whereas a index value of more than 2 is a medium to strong comparative advantage.

Table 4.1 is based on export values from the transition period by 1995 till recent data from 2014. It should be noted that some of the advantages are fairly insignificant; none reaches the level of above 2. The Czech Republic had a comparative disadvantage in the production of goods within category A in 1995 and still has today, it has been increasingly

neglected and in 2014 it is a significant disadvantage. Category A is denoted 'primary products' and consists largely of agricultural products, dairy production, gas, etc. It suggests that the Czech Republic have weak industries within this category, and decided to focus elsewhere as the gap has been widened in the time period. A similar pattern shows in production of category B, 'natural –resource intensive products' where the Czech went from a slight advantage to a clear disadvantage in the years since the transitional period. As the category name suggests, it is energy intensive industries such as aluminum production as well as other metals, uranium and kinds of leather and fur skin that are contained within this category. The 2 categories are the only areas according to this categorizing, where the Czech Republic currently has disadvantages and the decline – and thus increasingly disadvantage aligns with the teachings from the Classical trade theories.

Table 4.1: The Czech Republic (RCA Index)

Year / Group	1995	2000	2005	2010	2014
A	0,74	0,50	0,41	0,41	0,34
B	1,13	0,87	0,61	0,52	0,64
C	1,52	1,39	1,16	0,94	1,08
D	0,78	0,83	0,99	1,06	1,12
E	1,37	1,72	1,74	1,96	1,90

Source: author with data from UNCTADstat

The revealed comparative advantages are found with the categories C, D and E, where E especially stands out as the most prolific category of industries. Firstly, the category C has declined since 1995 and is close to a status quo-like position for the Czech trade. In 1995 this was the most promising sector in terms of advantage. It seems that 'unskilled-labor' is less abundant today as it was in 1995 and today just slightly is an area, where the Czech Republic has an advantage compared to the rest of the World. A category that has seen an increase is category D and 'technology intensive products' which has steadily improved from being about the weakest area in the 90's. Category E is over-performing the other categories and as

the index values suggests it is where the focus and advantage has been for a long time and still is or should be in the future. In this category – 'human-capital intensive products' exits the automotive industry for which the Czech Republic is well-known for as well as other supporting industries and the rubber-making industry. The consistency in the level of advantage within this category is a strong indicator of the significance as well as the time period of more than 20 years.

The table 4.2 shows the areas of comparative advantages in terms of SITC nomenclature. The groups 6, 7 and 8 have the clearest evidence of advantage by 2014. It is within manufactured goods, transport machinery and miscellaneous manufactured articles the largest advantages is with SITC group 1 – beverages and tobacco is just at an index value of 1.05 and does not stand out. In the group with the largest revealed advantage, there has been a drop since the 1995 levels – which corresponds to the drop from table 4.1 in 'unskilled-labor', where many products of the SITC 8 are allocated. That shows that when the revealed comparative advantage is still relatively significant, the answer to this is in the groupings outside of category C. The group of 'Measuring, analyzing & controlling apparatus, n.e.s' is the most significant when looking at the exports values in 2014 – so this contributing industries might be found within this. The SITC which contains the automotive industry has increased – and has now a comparative advantage, where in 1995 it did not. The exports values show that the automotives was significant then in 1995 and is even more important in 2014. The development suggests that the automotive industry was not as internationally competitive then as it is today – or the factor endowment has changed in favor of automotive production as it has an increasingly advantage on a worldwide basis. The SITC 6 has been stable since the beginning of the time period. It consists of various kind of iron and steel production, which was the largest export industry in 1995 ahead of the automotives, as well as paper production is of significant share of exports. The production in those areas is still prolific for the future as the advantage remains.

The 'weakest' groups are by far the SITC 3 and 4 of 'Mineral fuels, lubricants and related materials' and 'Animal and vegetable oils, fats and waxes', where the disadvantage has further declined during the time of research. The groups are very specific and contain only a small number of products and industries, mainly within petroleum, crude oil and gas as such it is naturally that the Czech Republic do not possess an relative comparative advantage within those fields.

Table 4.2: The Czech Republic (RCA Index) - SITC

Year	1995	2000	2005	2010	2014
SITC					
0	0,68	0,76	0,71	0,57	0,46
1	0,71	1,15	1,58	1,31	1,05
2	1,24	1,56	1,24	0,78	0,97
3	0,59	0,43	0,27	0,19	0,17
4	0,29	0,57	0,42	0,28	0,20
5	0,99	1,01	0,83	0,66	0,67
6	2,01	2,11	1,94	1,98	2,06
7	0,78	0,80	1,01	1,26	1,30
8	4,30	3,61	4,16	2,91	3,13

Source: author with data from UNCTADstat

For the analysis and the ability to draw conclusions on the basis of comparative advantages, the table 4.3 and table 4.4 will focus on the Czech Republic in relation to the EU to assess whether the differences has been widened or lessened since the EU accession.

The EU15 and the EU27, naturally, do not differ much in terms of the Balassa Index as the EU15 has the most weight still today - and to large extent, the values of EU15 will corresponds to the similar of EU27. It is evident in the RCA index values. The categories of revealed comparative advantage are within the same areas. However, the values differ from the individual Czech ones. The EU15 (and EU27) has the status-quo in terms of 'natural-resource intensive' production, the value at 1.01 (1.02) is the proof hereof. Similar can be concluded from category D, which also is at a value close to 1. That leaves only category E as an area of interest. Like the Czech Republic, the EU as a whole can as well said to possess an relative comparative advantage within 'human-capital intensive' production, although the value is not very significant. The tendencies of the time period shows an increase within category D and E since the year 2000, while the category B is on the decline.

Table 4.3: EU15 and EU27 (RCA Index)

2000	A	B	C	D	E
EU15	0,70	1,01	0,85	1,06	1,26
EU27	0,70	1,02	0,91	1,04	1,26
2010	A	B	C	D	E
EU15	0,67	0,91	0,84	1,14	1,30
EU27	0,66	0,91	0,88	1,11	1,35

Source: author with data from UNCTADstat

Table 4.4: The Czech Republic vis-à-vis EU15 (RCA Index)

2000	A	B	C	D	E
EU15	0,71	0,86	1,62	0,78	1,36
2010	A	B	C	D	E
EU15	0,61	0,57	1,11	0,92	1,49

Source: author with data from UNCTADstat

The Czech Republic relative to the EU15 shows that in the year 2000, the most significant difference was within the area of 'unskilled-labour', where the Czech Republic used to be abundantly favourable endowed compared to that of the EU15. However, today the advantage for category C is relatively small – and the comparative advantage follows the tendency from the CR vis-à-vis the World of category E. The tendency in comparison with the EU15 is that the Czech Republic is relatively well-endowed with a high skilled work force and possesses large amount of human-capital – increasingly advantage over the EU15 average. It shows progress – and narrowing the gap – within the field of technology i.e. category D. The table supports the notion that the Czech exports used to be heavily focused in the areas of unskilled labour due to a relatively lower wage level, but the 10 years that have

passed in the time series, the shift have been to human-capital production, and thus focus on the factors of production than wage and lower skill level.

4.2 Measuring Intra-Industry Trade (IIT)

The table 4.5 shows the level of intra-industry trade by SITC group on a different level of aggregation. The data differs on each level as high accumulation will greatly overestimate the actual level. For the 1 digit all are well above 60% for all selected years with one exception, hinting high levels of IIT. The levels in 1995 are at a similar level as in 2014 overall and thus no significant rise in an average consideration. In the 3 digit level, the IIT decreases by differing amounts. In some groups the decrease is quite significant, and the drop tends to be less in 2014 suggesting more 'actual' IIT. At 3 digit level, the degree of IIT tend to be highest in the same groups as the Czech Republic were shown to have an revealed comparative advantage in. SITC 1, 6, 7 and 8 shows the highest values of GLI in both 1995 and in 2004 – in the 'middle period', the SITC 4 shows levels at a similar amount. Contrarily, the lowest amount of IIT is discovered in SITC 2 and 3, which at times has much lower levels – it naturally relates to the industry; fuel, electricity and gas are examples of goods not mutually traded as the consumer has very limited preferences towards one kind of another, while the SITC 2 consists of items heavily dependent on natural-resources, which either a country is endowed with or not.

Table 4.5: The Czech Intra-Industry Trade According to Level of Aggregation – SITC

	Number of SITC digits							
Year	**1995**		**2000**		**2010**		**2014**	
Digit	1	3	1	3	1	3	1	3
SITC								
0	85%	50%	82%	56%	79%	60%	91%	67%
1	94%	71%	98%	81%	85%	77%	84%	75%
2	100%	48%	93%	50%	88%	55%	94%	60%
3	64%	26%	46%	25%	70%	45%	55%	46%
4	61%	56%	73%	67%	93%	78%	86%	68%
5	80%	63%	74%	56%	76%	65%	78%	70%
6	85%	71%	95%	71%	99%	72%	97%	71%
7	82%	73%	100%	71%	86%	72%	82%	73%
8	95%	77%	97%	77%	98%	79%	87%	77%

Source: author with data from UNCTADstat

The degree of IIT is higher when you analyze the levels based on factor intensities as in table 4.6. It is based on 3 digit calculations as well, but the numbers of groups or categories are lower, thus when the allocation is denser and accumulation of IIT tends to be higher. The change or lack of as in table 4.5 is the same case with factor intensities. The degree of IIT fluctuates through the time period, but – apart from in two categories – returns to the same level as in 1995 and the degree would have said to be already at a high integrated level even in the 90's. The two differing examples are category D and E with reversely values levels. Category D increases by a large amount while E loses degree of IIT and thus going in the reverse direction.

Table 4.6: The Czech Intra-Industry Trade According to Factor Intensity

Year / Group	1995	2000	2005	2010	2014
A	82%	73%	81%	83%	81%
B	96%	87%	78%	76%	86%
C	79%	81%	85%	89%	82%
D	76%	84%	97%	96%	98%
E	94%	87%	83%	78%	76%

Source: author with data from UNCTADstat

As described previously, it is useful to distinguish between the kind of IIT that exists – whether it is horizontal (HIIT) or vertical (VIIT). By the calculation method based on unit-value ratios to determine, which end of the range it belongs and thus decide for HIIT or VIIT, will affect the way to understand the values.

Firstly, the values for horizontal and vertical IIT in 2010 fluctuates compared to the other years – more groups placed within the range of HIIT in this specific year. It may be coincidences that put the values within the range, or an affect of the financial crisis that has skewed the data. Nonetheless, by 2014 the data is very similar to that of 2000-2005 in regards to the degree of horizontal intra-industry trade of the total share of IIT.

It shows that the degree of IIT diminishes at a lower level of aggregation with a roughly ¼ from 1 digit to 3 digit. The share of IIT in the total Czech trade is stable at 84-86% since the year 2000 at 1 digit, while it at is within the range of 62-67% at the 3 digit level. The relationship between the horizontal and vertical components of the total IIT is found at 8-10% to 53-58% if we do not regard the 2010 values for inclusion. The ratio and levels have not changed considerably during the time period. The tendencies is that the degree of horizontal could be rising slightly as well as the level of IIT of the total trade has been increased in 2000. Although, the Czech level of IIT was – before EU accession – at an already relatively high level.

Table 4.7: The Czech Total Intra-Industry Trade According to Level of Aggregation

Year	**2000**		**2005**		**2010**		**2014**	
GLI	Number of SITC digits							
	1	3	1	3	1	3	1	3
Total	84%	62%	85%	64%	86%	67%	84%	67%
Horizontal	11%	8%	11%	8%	30%	23%	12%	10%
Vertical	73%	53%	74%	55%	56%	44%	72%	58%

Source: author with data from Czech Statistical Office

5. Discussion

The three previous chapters have provided the theoretical background for understanding the development in the Czech trade structure and explaining the results from the empirical study. Further inputs were given for the historical context and the development, both economically and politically for the Czech Republic highlighted with graphical illustrations that intended to further the understanding of data results.

The transition period was new area of study with predefined guidelines as how to overcome it successfully and fast, and such the Czech Republic in that period is an interesting case study on its own. Janda & Münich (2004) and A. Kuznetsov (McDonald & Daerden, 2005) both divided the period into different phases to describe the methods that were taken when as well as defining the situation the Czech was in at the time. As Figure 3.1 and Table 3.2 showed it was a period of recession and decline in terms of GDP level. While the Czech salaries increased, it did not channel into domestic demand and that became the trade deficits as well as other factors contributing. It was presented that the Czech Republic was not the worst example; actually Czech Republic had relatively only a few years of recession compared to the other CEECs.

The necessary, but vastly privatisation process began as Hanousek (2004) noted for the Czech Republic that had the smallest private sectors among the CEECs by 1989. The 'voucher' privatization kept many companies under Czech control, but those struggled increasing with competing with the foreign and on the foreign markets, as well as 'tunneling' was a common practice. These things did not help the Czech Republic 'catch-up' with the Western Europe fast. In retrospect, Janda & Münich (2004) hypothesizes that it may had been better choosing another strategy for privatization, although at the time – vouchers were a success at first, and was fitting for the Czech society. By today, The Czech Republic has to live up to the standards or convergence criteria as any other EU country, and as thus The Czech Republic is now a developed country. The Czech competitiveness report from before 2012 had as n objective to reach the average EU level by 2013. It was delayed due to the financial crisis, but has been achieved in regards to some fields. (Czech Ministry of Industry and Trade, 2012)

The statistics on the Czech Republic, illustrates some of the differences that still exists between the Western Europe in regards to productivity, tertiary education share educational and labour costs, although in the area of expenditure per pupil, the Czech is spending relatively high. As we in the author's home country (Denmark) always compare to the rest of the Nordic countries, it is naturally to compare the Czech in relation to the V4 as well. The benefits of a Czech comparative advantage due to being ahead in a field will likely cost directly in their similar industries. The graphs were chosen in order to spot any tendencies that the Czech Republic is in fact more well-educated than assumingly so, as it showed that the advantage and focus on 'unskilled-labour- production has been decreasing since the transition and moving towards 'technology' and 'human-capital' production. This is a good indication that the Czech Republic has integrated closer to the Western Europe than before. As Strøjer-Madsen et al. (2001) noted that countries tend to trade more with countries of similar factor endowments; and the Czech trade has increased significantly.

The above notion was backed by the trade pattern in terms of partner countries, were the Czech Republic are trading heavily with its closest neighbours. This is common feature for most countries in the World trade though. The geographical location of the country benefits to this as well, as surrounded by mountains, the "Pan-European Corridor IV" goes directly through the country, and it has benefitted from investments into logistics as a result. (Czech Ministry of Industry and Trade, 2012). It can be noted that the share of EU has increased during the time period, which can be related directly to the accession to the EU in 2004.

Classical Trade Theory and specifically the Factor Proportions model states that a country will specialize in the production that utilizes the production factor, which a country is relatively abundantly endowed with. From the empirical results and the RCA Index, it shows that the Czech Republic in 1995 had a comparative advantage within 'unskilled-labour' and 'human-capital' and while ignoring the results from 2014, it would suggest following: that the Czech worker were relative highly skilled or trained, while being relatively cheap, thus allowing for them to be utilized in sectors that demand a lot of labour regardless of "extra-skills". Although, the assumption of the factor proportions theory is that the production factors are homogenous, so labour is labour without distinguishing – this is not the case. According to Figure 3.5, the labour costs are still relatively low on an EU level, but relatively higher than some of the nearby countries or those further to the East. Therefore an increased

specialization within ‘human-capital’ category can be explained as the relative factor endowments have changed. This is further backed by the increase in productive. Higher productivity would demand higher wages as well, and thus attracting or allocating the work force into other sectors. The RCA index therefore revealed the relative Czech comparative advantages, and the areas where the Czech Republic is abundantly endowed with the intense production factor. In regard to the trade pattern and the vast importance of the EU, the classical theories would explain it as normally due to the Czech Republic having a comparative advantage in the same areas as Table 4.4 illustrates. The Leontief’s Paradox would be evident as the Czech import of ‘motor vehicles’ would be large as well, as consumer preferences create a market for intra-industry trade.

The Czech commodity specialization illustrated in Figure 3.8 and Table 3.9 aligns with Krugman and economies of scale. It seems that the Czech exports are densely concentrated within a “few” sectors or industries that accumulates large shares of the total exports, especially the exports of ‘Motor vehicles’ that alone accounts for 10%, not included related supplying industries. The automobile-hub of the Czech Republic resembles the example of Silicon Valley, where clustering industries in one geographical area can give increasing returns and lower unit-costs as the demanded work force draws to the area and the expertise concentrates. This tendency explains the increasingly comparative advantage whether it is in relation to the EU or the World within the categories of the automobile industry for the Czech Republic. From the data of exports, this suggests that labour has been moved from the metal and steel industry towards the industries of specialization increasingly, as ‘Iron and steel bars’ did not appear within the top export categories in 2014.

Conclusion

The trade structure of the Czech Republic were illustrated through changes in commodity structure, trade partners, changes in relative comparative advantages and the degree of intra-industry trade.

The Czech Republic is heavily dependent on trade with its neighbours and within the European Single Market, those countries has the predominantly largest share of the external trade. Germany is by a significant amount, the largest export market for the Czech producers, although the share of Germany has dropped slightly since the transition period. In a depiction of the largest export markets, it is noteworthy that the US nor China did appear among the top 10 of the most important markets. As the total Czech trade has increased, the level of trade with the EU has followed since before the accession to the EU.

The commodity structure has changed slightly in the period of 1999 to 2014. Whereas in 1995 the main Czech export good was within 'Iron and steel bars' it is in 2014 'Motor vehicles', and the iron and steel production is not as significant today. In terms of factor intensities, the Czech Republic has shifted from the production on good intensively uses 'unskilled-labour' to the areas of 'technology' and most significantly 'human-capital' intense products. The Czech Republic has relative comparative advantages in the production of those good today as well as in 'unskilled-labour' by a limited amount for the latter. The commodity structure is in general specialized on only a few industries or sector as Table 3.9 shows that the eight SITC rev. 3 sub-categories at 3 digit level with the highest amount of export value accounted for approximately 20% in 1995, whereas it was almost 38% in 2014.

The classical approach to international trade developed by Ricardo and Heckscher-Ohlin is very simplistic and the assumptions cannot be applied to the Czech Republic directly. However, the classical trade theories would expect the Czech Republic to have a relative comparative advantage in labour intensive production – as the labour costs were much lower at the time of transition and still is today as of Figure 3.5. So when the specialisation happened within the 'human-capital' products, it must have been because the Czech Republic was abundantly endowed with human-capital in the transition period. Krugman et al. (2012) sees the specialization as a result of economies of scale and a chance of utilizing increasing

returns by allocating resources and labour on only a few industries. This aligns well with the evidence from the share of the largest eight export categories.

By moving closer to Western Europe economically and with the integration into their markets and then the European Single Market, the Czech Republic has changed its trade structure gradually towards those of the EU and the GDP, wages, cost of labour is slightly converging to this. The Czech Republic is heavily linked to European Business Cycle today – and especially the German economy.

The degree of intra-industry trade (IIT) is relatively high for the Czech Republic. It depends on what level of aggregation, and what kind of IIT it consists of. As of the total Czech trade, IIT levels are in the range of 84-86% on the 1 digit level and 62-67% on the 3 digit level. Horizontal IIT consists of just a minor part of the total IIT, whereas Vertical IIT is the largest share.

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The Czech Statistical Office:
czso.cz/

The World Bank:
http://www.worldbank.org/

Eurostat:
ec.europa.eu/eurostat

United Nations Conference of Trade and Development – Statistical Database:
unctadstat.unctad.org/

Appendices

Apendix I

Distribution key for allocating according to factor intensity intensively used in the production of a good or sector.

((http://www2.econ.uu.nl/users/marrewijk/eta/intensity.htm), Marrewijk (2007).)

From UNCTADs classification at SITC rev. 2 - 3-digit

Groupings at 3 digit level.

Group A.: Primary products

001- 011-012-014-022-023-024-025-034-035-036-037-041-042-043-044-045-046-047-048-056-057-058-061-062-071-072-073-074-075-081-091-098-111-112-121-122-211-212-222-223-232-233-244-245-246-247-248-251-261-263-264-265-266-267-268-269-271-273-274-277-278-281-282-286-287-288-289-291-292-322-323-333-334-335-341-351-411-423-424-431-941.

Group B: Natural resource intensive products

524,525-
611,612,613,633,634,635,661,662,663,667,671,681,682,683,684,685,686,687,688,689

Group C: Unskilled-labour intensive products

651,652,653,654,655,656,657,658,659,664,665,666-793-
811,812,821,831,842,843,844,845,846,847,848,851,894,895

Group D: Technology intensive products

511,512,513,514,515,516,522,523,541,542,562,571,572,573,574,575,579,581,,582,583,584,584,585,591,592,593,598-
711,712,713,714,716,718,721,722,723,724,725,726,727,728,736,737,741,742,743,744,745,749,751,752,759,764,771,772,773,774,775,776,778,792-871,872,873,874,881,882,883,884,893

Group E: Human-capital intensive products

531,532,533,551,553,554-
621,625,629,641,642,672,673,674,675,676,677,678,679,691,692,693,694,695,696,697,699-
761,762,763,781,782,783,784,785,786,791-885,892,897,898,899

Rest are placed under the category: Non-classified products

911,931,961,971,999