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Finding the True Advantage

A Study on the Effects of EU Integration on Industrial Specialization in the Countries of the Former Czechoslovakia

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Abstract

This paper analyzes how the integration into the EU, beginning with the signing of the Europe Agreement in 1991, has influenced the structural dynamics of production and trade in the countries of the former Czechoslovakia. The aim is to assess if the existing differences in economic performance (with a substantially higher per capita GDP in the Czech Republic but a higher rate of economic growth in Slovakia) can be derived from differing industrial specialization and trade patterns, evoked by increased EU integration. OECD trade data on the 4-digit level of the SITC is in the analysis used to calculate specialization indices, cumulative export experience functions as well as revealed comparative advantages concerning trade between the EU15 and the two countries respectively. These measurements are thereafter evaluated to determine the structure of the industrial re-organization taking place due to EU integration.

The analysis shows that both countries have experienced a shift in exported commodities from labor and low skill intensive manufactures to medium and high skill commodities of non-traditional nature. The most important finding, however, concerns export revenue concentration, which is significantly higher in Slovakia compared to the Czech Republic. This might have impeded economic growth in Slovakia and may also weaken the prospects of future success if the dominating industry not manages to maintain its major advantage and keep pace with the global progress.

Key words: economic integration, specialization, export concentration, EU, CEEC

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List of Acronyms

AE	Accelerating Export Index
CEEC	Central and Eastern European Countries
CMEA	Council for Mutual Economic Assistance
EA	Europe Association Agreements
EFTA	European Free Trade Agreement
EU	European Union
FDI	Foreign Direct Investments
GSP	General System of Preferences
IMF	International Monetary Fund
IRS	Increasing Returns to Scale
IIT	Intra Industrial Trade
ITA	Interim Agreement on Trade and Trade Related Matters
NON-AE	Non-accelerating Export industry
NT-AE	Non-traditional Accelerating Export Industry
NTB	Non Tariff Barrier
OECD	Organization for Economic Co-operation and Development
OPT	Outward Processing Trade
RCA	Revealed Comparative Advantage
SITC	Standard International Trade Classification
SPEC	Herfindahl Specialization Index
T-AE	Traditional Accelerating Export Industry

1. Introduction

On the 31st of December 1992 the Republic of Czechoslovakia ceased to exist and after being an independent country for 74 years, formed from territories of the destroyed empire of Austria-Hungary, the state was dissolved into the Czech Republic and Slovakia. The peaceful breakup was a result of severe tensions between the two main ethnic groups which had begun already by the formation of the nation but after the end of communism in 1989 increased and finally culminated in a Slovakian vote for a separation from the rest of the nation (Britannica Elementary Encyclopedia, 2007). At this time the collapse of communism had already induced the countries of Central Europe to direct their attention towards the EU, providing aid and offering preferential arrangements. One of the first steps of EU integration was the signing of Europe Association Agreements, offering more than market access and a deeper, policy-induced form of integration, adapted to the specific situation of each partner state and intending to finally lead to full membership in the Union.

Deeper economic integration involves the potential of aggregate welfare gains but may also transform the economic geography of the accession states creating re-organization of economic activities, both within and between countries. Theories of regional integration and location suggest different outcomes concerning specialization and relocation of economic activities due to increased integration. Commonly they all stress that regional integration *does* affect countries' industrial structures and trade patterns. The remaining question is *how.*

Czechoslovakia signed the Europe Agreement on the 16th of December 1991 and as the nation split new Europe Agreements were formed and the process of European integration continued separately in the two new independent states. Today, more than 15 years later, both countries are full members of the EU (since 2004) and we can to some extent see the results of the integration process so far. What may be somewhat unexpected, however, is the two nations' quite uneven economic performance. GDP per capita based on purchasing-power-parity is about 5500 current international dollars higher in the Czech Republic according to estimates by the IMF for 2007, but at the same time the economic growth in Slovakia is superior (8,2

per cent compared with 4,8 per cent in the Czech Republic) (IMF World Economic Outlook Database, 2007).

Is this difference connected to the fact that the countries have developed different industrial structures and patterns of specialization as a result of the EU integration process?

1.1 Statement of Purpose and Limitations

This paper will analyze *how the integration into the European Union, starting with the Europe Association Agreement signed by the former Czechoslovakia in 1991, has influenced the trade pattern and industrial specialization of the Czech Republic as well as of Slovakia*. The aim is to examine *if the existing differences in economic performance can be derived from differences in trade patterns and specialization of economic activities*. By abandoning the centrally planned economy and opening up for trade with the EU member states the countries were given the opportunity to exploit their comparative advantages and develop industrial structures in line with these. Consequently, two questions worth asking are if the countries enjoy the same comparative advantages, and if they have been successful in transforming their advantages into sustainable sources of economic growth.

The focus of the study is on Slovakia's and the Czech Republic's trade with the EU15[1] using OECD mirror data at the 4-digit level of SITC[2] for the period 1995 to 2004. The method used to examine the patterns of specialization and export diversification will be based on measurements such as the Herfindahl index of specialization and cumulative export experience functions together with revealed comparative advantage to also be able to calculate and study changes in inter and intra industrial trade.

Due to the limited time and some difficulties in finding the appropriate data a few limitations concerning the depth of the study have been necessary. Caused by the lack of trade data provided by the OECD for the period before 1995 and after 2004 the period of the study has been restricted. However, since a large part of the integration between the countries of

[1] The EU15 comprises Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Spain, Sweden, Portugal and the UK.

[2] SITC is the Standard International Trade Classification, a statistical classification of commodities in external trade.

concern and the EU took place between 1995 and 2004 this incident will probably not affect the results too heavily, but the circumstances must in spite of this be taken into account. Moreover, it would have been interesting to study the structural dynamics in trade between the two countries and the rest of the world to see how these patterns of trade and specialization have changed over time. Unfortunately the limited time available and the restricted dimensions of this paper do not allow for it and this may instead be the focus of future research.

1.2 Outline of the Study

The rest of the paper is structured as follows. Section 2 provides a brief overview of the economic policies in the former Czechoslovakia as well as in the two independent states of Slovakia and the Czech Republic. It also discusses the transition into market economy, trade policies during the accession period and implications of the accession to the EU. After examining the policy background section 3 offers a presentation of the relationship to the EU, describing the Europe Association Agreements and their implications for deeper economic integration, and in section 4 we turn to the theoretical framework used in the empirical analysis. Here theories of economic integration and location are described to provide the reader with the results of earlier research and its implications for the case of this study. In the same chapter inter and intra industrial trade and specialization are explained and the measurements used in later chapters are presented. In order to assess the integration-induced impact on the structural diversification of the two countries section 5 empirically implements the theoretical models and measurements presented in the previous chapter calculating specialization indices and cumulative export experience functions. The last section summarizes the paper and conclusions are made regarding the findings of this study.

2. Background

In this section the economic policies concerning industry and trade undertaken in the countries of the former Czechoslovakia from the Soviet period until the beginning of EU integration are presented to provide the reader with an understanding of the significant change the countries have undergone in the last 20 years and of its implications for industrial restructuring.

2.1 Economic Policies in the former Czechoslovakia

During the Soviet period (1945-1990) the relations between the EU and the Eastern integration bloc were turbulent and the economic geography of Czechoslovakia was largely determined by the Council of Mutual Economic Assistance[3] (CMEA, also known as COMECON), deciding on specialization and industry location within the Eastern bloc. The regional specialization was high compared to the EU15 and the countries were pushed to become highly specialized in terms of manufacturing production and employment. To get the necessary manufactured goods not produced domestically they traded with the other countries within the bloc, practically ignoring the large market in the west. The CMEA-determined focus of Czechoslovakia was on produced machinery and consumer goods, disregarding the economic and geographical advantages of the various regions. Instead the arbitrarily specialization of regions and geographic location of industries were guided by non-economic principles such as political power and the confidence in heavy industry and economies of scale. This way of assigning the countries different areas of specialization often made whole regions completely dependent on one large activity (Kancs, 2007 , pp. 2-3). Trade within the CMEA bloc rested on four important principles: (i) The price of a traded commodity was derived from a moving average of the previous five years' world market price for that commodity; (ii) all transaction costs were formally settled in transferable rubles, neither convertible into the national currencies of the countries nor into hard currency; (iii) exchanges

[3] The CMEA was established in 1949 and included the USSR, Albania, Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Poland and Romania, together with the non-European countries of Cuba, Mongolia and Vietnam.

were bilaterally balanced and trade surpluses were generally avoided and; (iv) trade flows were based on government negotiations, resulting in five-year trade protocols specifying deliveries. This resulted in a high distortion of what would have been normal trade patterns and in 1989 Czechoslovakia's trade with the other CMEA states was 47.2 per cent of its total trade compared with a projected normal share of 21.5 per cent (Dangerfield, 1995, p. 5).

Following the collapse of communism in 1989 the CMEA was formally dissolved in 1991 and after undertrading with the EU15 for many years Czechoslovakia and the other Central and Eastern European Countries (CEECs) were finally given the opportunity to create tighter links with the EU as well as among each other and to exploit their comparative advantages in production and trade.

2.2 The Transition to Market Economies

At the beginning of the 1990s foreign economic strategy markedly shifted its focus in Czechoslovakia, clearly prioritizing the integration into the global economy focusing particularly on the EU and EFTA countries. During the era of central planning the CMEA countries had been on the bottom of the EU preferential trading arrangement, subjected to higher tariffs than developing countries and to restrictive and frequently used non tariff barriers (NTBs). However, by the division of Czechoslovakia and the following attempt to transform the countries into market economies (and especially with the bilateral signing of the Europe Agreements further discussed in chapter 3) market access improved substantially and the process of economic and industrial restructuring could begin (Kaminski, 1994, p. 5). Preferential access to EU markets was a major force behind the expansion in EU-CEEC trade taking place during the 1990s (see table 2.1), which to a large extent compensated for the decline in trade with the other CMEA states. Between 1989 and 1992 Czechoslovakia's trade with the ex-CMEA states declined by 47.2 per cent due to the fall of the communist ideology and Soviet imperial behavior (the two factors giving the intra-CMEA trade its priority status) but also as a consequence of the aim to change trading arrangements more in line with those in the non-socialist states. This implied a shift in trading responsibilities from government departments to enterprises as well as the implementation of a single exchange rate and trade at genuine world market prices. Exports and imports were determined by the laws of domestic and foreign demand and payments were carried out in freely convertible currencies. The decontrolling of external trade and the liberalization of imports from the OECD countries

introduced stiff competition in the former CMEA markets, both among domestic producers and those from other CEECs. In particular, exchange of goods of which there had been an excess supply collapsed under the new system and supply shifted from ex-CMEA to OECD states (Dangerfield, 1995, pp. 5-6).

Table 2.1 Increase in EU(15)-CEEC(10) trade over the 1989-2002 period

	Exports to the EU as % of all exports, 1989	**Exports to the EU as % of all exports, 2002**	**Imports from the EU as % of all imports, 1989**	**Imports from the EU as % of all imports, 2002**	**Trade balance with the EU (million euros) 2002**
Bulgaria	5.5%	55.6%	10.8%	50.2%	-606
Czech Republic and Slovakia	Czechoslovakia: 18.2%	Czech Republic: 68.4% Slovakia: 60.5%	Czechoslovakia: 17.8%	Czech Republic: 60.2% Slovakia: 50.3%	Czech Republic: -1673 Slovakia: +982
Estonia	n.a.	68.0%	n.a.	57.9%	+847
Hungary	24.8%	75.1%	29.0%	56.3%	+68
Latvia	n.a.	60.4%	n.a.	53.0%	+620
Lithuania	n.a.	48.4%	n.a.	44.5%	-1290
Poland	31.8%	68.7%	34.2%	61.7%	-9156
Romania	28.5%	67.1%	13.8%	58.4%	-1003
Slovenia	n.a.	59.4%	n.a.	68.0%	-1806

Source: Senior Nello, 2005, p. 414

Slightly surprising, however, the largest gains in CEEC exports to the EU were not, as one would expect, in products subject to extensive liberalization measures. Although the EU originally (1989-93) appeared to be an absorptive market for unskilled labor intensive manufactured goods the growing export industries of the CEECs were often technology and skilled labor intensive (Kaminski, 2001, p. 18). Considering existing prerequisites, the natural advantage of the CEECs would be in labor intensive and natural resource intensive products as well as skilled labor intensive products within labor intensive products. Instead products traded by the former Czechoslovakia and other CEECs were (and are) at increasingly advanced stages of production. The aggregate share of skilled labor and technology intensive products in EU-oriented exports from the Czech Republic as well as from Slovakia increased remarkably during the first years of transition from an average of 37 per cent in 1993 to 62 per cent in 1997 (Kaminski, 2001, pp. 25-26).

The significant change in policy preferences brought about the economic restructuring needed to boost a rapid economic growth. Due to the abolition of subsidies to certain manufacturing

sectors these declined while a few other sectors experienced a fast expansion. Industries like electrical, optical and transport equipment as well as furniture sectors had managed to keep their cost advantage vis-à-vis the EU15 but at the same time the majority of manufacturing industries lost their competitiveness. Consequently, regions specialized in the declining sectors under the CMEA period experienced a decrease in regional specialization and vice versa (Kancs, 2007 , p. 4).

2.3 Economic Policies in the Czech Republic and Slovakia

In the 1990s the world economy started to adopt the policy of global competition and earlier traditional industrial policies began to lose their importance. The economic policies aiming at aiding transition in the former Czechoslovakia can be divided into four broad fields: (i) liberalization of the price system; (ii) convertibility of the currency; (iii) removal of subsidies and (iv) a restrictive monetary and fiscal policy. The largest step in the transformation (and also the focus of it) was, however, the extensive mass privatization program undertaken to ensure the rapid transformation of industry towards new markets and products. This program was sponsored by the government and by means of new laws and institutions compatible with the regulations of the EU it should encourage foreign investments. The goal was to privatize over 4000 enterprises in three years and the scheme to achieve this goal was based on a voucher system. The first wave of privatization where every citizen had the right to buy vouchers was launched in March 1992.

A central feature of the quite smooth process of restructuring was the macroeconomic balance and absence of foreign debt in the former Czechoslovakia. While other CEECs struggled with economic instabilities the government of Czechoslovakia (and later those of the Czech Republic and Slovakia) could concentrate on economic restructuring (Kenny, 1994, p. 29). However, at the same time even the most inefficient producers in the Czech Republic were protected by an initial devaluation, undertaken with the intention to create a process of export-led growth by encouraging firms with already substantial resources to maintain a high level of investment. This strategy failed to direct investments to the most profitable industries but supported at the same time a rapid growth in the already large industries of engineering

(subsidized under the Soviet period), in which the comparative advantage of the country often is said to be, and might so have saved valuable capacity (Carlin & Michael, 1997, p. 101).

A massive privatization process was carried out in Slovakia as well, but some differences in contrast to the Czech Republic should be noticed: Firstly, the Slovakian enterprises generally had lower book values and were also less capital intensive than their Czech counterparts; secondly, the labor productivity was lower; and thirdly, the profitability of the firms was on average less than half of the profitability of Czech firms (Shafik, 1993, p. 9). As a result Slovakian firms were sold at prices on average about 40 per cent lower than Czech firms and the Czech interest in Slovakian enterprises went far below the Slovakian interests in Czech firms (ibid, p. 20). Moreover, a favoring of domestic buyers in the privatization process implied a discrimination against potential foreign investors and the on average more diffuse governance compared to Czech firms with large shareholdings by foreign and domestic investors made the initial prospects for corporate governance less favorable in Slovakia. Together with a more competitive industrial structure in the Czech Republic this resulted in a better initial position for restructuring there (ibid, p. 27) and a large deficit of foreign direct investments in Slovakia compared to its neighbor countries further contributed to the insufficient restructuring by conserving many inefficient and uncompetitive industries.

After almost ten years in transition the EU accession negotiations started in 1998-99. These implied an alignment of the countries' economic policies with those of the EU and affected the way industrial policies were carried out. In the case of Slovakia objectives such as the reduction of excess industrial capacities, the re-direction of production factors and the improvement of competitiveness were defined (The Ministry of Economy of the Slovak Republic, 2004, p. 3), but also the Czech Republic had to commit to the new priorities. However, a large part of the realignment to the EU policies was regulated already in the Europe Agreements signed by the countries for the first time in 1991 and further discussed in the next chapter.

3. The Integration into the EU

The first clear sign of integration of the states of the former Czechoslovakia into the EU was the Copenhagen European Council in 1993 where the conditions applicant countries had to fulfill in order to join the EU were set out. One year later, at the Essen Summit, a pre-accession strategy was established to help the accession countries in their transformation and three years thereafter, in 1997, the EU Commission published "opinions" where the countries' readiness to join the Union were evaluated. At the Luxembourg European Council in 1999 a decision was made on the countries allowed to start accession negotiations and the timetable for the same (Senior Nello, 2005, pp. 408-409), making the path to integration clearly visible. What should be kept in mind, however, is that the integrationist process actually started already two years before the Copenhagen European Council as the bilateral Europe Association Agreement between the EU and Czechoslovakia was signed.

3.1 The Europe Agreements

The importance of the Europe Agreements (EAs) in the CEECs' EU integration process has often been underestimated and particularly the trade concessions part of the agreements has been a central feature, significantly helping the accession countries change their patterns of production and trade to promote faster integration. The aim of the EAs (which remained in force until the countries joined the Union in 2004 and thereafter were replaced by accession treaties) was to prepare the CEECs for EU accession and they were therefore based on principles of human rights, democracy, market economy and the rule of law. Even though individually designed, all EAs contained a set of common elements: a political aspect; financial, economic and cultural cooperation; a trade part; and an alignment of legislation. In this chapter, however, the focus will be on the trade component, the Interim Agreement on Trade and Trade Related Matters (ITA), which for Czechoslovakia went into force on the 1st of March 1992, three months after the EA was signed.

A brief overview of the EAs can be given by stating their main provisions: (i) the introduction of free trade in industrial goods within ten years; (ii) improved market access for agricultural

products; (iii) a commitment to harmonize the economic legislation with the EU; (iv) financial and technical assistance provided by the EU; and (v) the potential introduction of free trade in services. The EU also made commitments regarding the gradual elimination of tariffs and/or increase in quotas on sensitive products such as textiles, iron and steel (Kaminski, 1994, p. 1) but due to the hub-and-spoke[4] nature of the EAs the scope to exclude sensitive sectors from each agreement worked in favor of the EU and in the next subsection the conditions of the agreements will be examined more closely.

3.2 Liberalizing Trade under the Europe Agreements

Although the EAs created a free trade area (excluding agriculture) between the EU and each country trade liberalization was not complete. Quantitative restrictions on industrial products were certainly removed as the ITA went into force but textiles, clothing and products listed in the Treaty of the European Coal and Steel Community were exempted from these measures (see table 3.1). Since the CEECs needed more time to become competitive the tariff cuts were asymmetric and while the complete liberalization of the EU market would take six years the CEEC barriers to exports from the EU were allowed to decline gradually over a period of ten years. To protect newly established industries or facilitate industrial restructuring the CEECs were additionally allowed to (for a limited period) apply additional import duties. These duty rates, however, could not apply to more than 15 per cent of the total value of industrial imports from the EU and were not accepted to accede 25 per cent ad valorem. Moreover, they could not be put into practice later than three years after the free trade area in industrial products was created.

Once the ITA was into force neither new tariffs nor instruments with similar effect (including quantitative restrictions) could be implemented. This did not apply to agricultural products for which both tariffs and NTBs could be changed without restraint. Furthermore, the countries maintained contingent protection options (such as anti-dumping measures, safeguards and the permission to introduce bans and restrictions permitted by the GATT) and liberalization was also restricted by rules of origin, stipulating that 60 per cent of the value of goods had to originate in the EU or in the country of concern to make them eligible for preferential treatment. These rules encouraged subcontracting but simultaneously they restrained potential

[4] A hub-and-spoke system means separate agreements between the hub country (the EU) and each spoke country (the CEECs).

investors from outside the EU from investing in manufacturing activities since new production often is dependent on imports of parts (Kaminski, 1994, pp. 6-8). Concerning agricultural products the EAs contained some trade promoting measures. Imports originating in the EU were to be free from quantitative restrictions in the CEECs but for products originating in the countries of the former Czechoslovakia the abolition of quantitative restrictions was implemented only with certain exemptions. Trade in agricultural products meeting EU standards was not completely liberalized until 2003 (Senior Nello, 2005, p. 413).

Table 3.1 EU Trade Liberalization under the EA

Cumulative tariff reduction and growth of quotas (%) for products originating in the countries of the former Czechoslovakia

Free Trade Group	**"one-year-delayed"**	**"four-year-delayed"**	**"quota/five-year-delayed"**		**"MFA"**	**"ECSC"**			**"residual"**	
Goods	Industrial raw materials	Lightly-processed, resource-intensive intermediate goods, e.g. ferro-manganese and ferro-silicon	Products of most industrial sectors, e.g. chemicals, leather, cork, wood, glass, copper, electric machinery, furniture, motor vehicles		Textiles and clothing	Steel products		Coal products	Products often subjected to GSP treatment before the EA	
	Tariffs	Tariffs	Tariffs*	Quotas	Tariffs	Tariffs	Quotas	Tariffs	Tariffs	Quotas
1992	50%	20%	15%	20%	14%	20%	**100%**	100%**	**100%**	**100%**
1993	**100%**	40%	30%	40%	29%	40%				
1994		60%	45%	60%	43%	60%				
1995		80%	60%	80%	57%	80%				
1996		**100%**	75%	**100%**	71%	90%		**100%*** **		
1997			**100%**		88%	**100%**				
1998					**100%**					
Average Tariff Rate before EA	4.4%	3.1%	8.7%		10.7%	5.6%		5.9%	5.7%	
NTB Coverage	40%	100%	20.6%		87.6%	64.4%		0%	3.8%	

Source: Kaminski, 1994, pp. 12-27

*on imports in excess of quotas

**except for Germany and Spain

***Germany and Spain

As can be seen in table 3.1 some products with lowered tariff rates were still subject to extensive NTB protection and those which were not (mainly coal products and goods in the residual group) either constituted a small part of trade in industrial products (coal products

constituted about three per cent of the industrial exports of the former Czechoslovakia) or were already subject to low tariffs due to preferential treatment under the GSP.

3.3 From a Free Trade Agreement to Deeper Integration

As already mentioned, the result of the EAs was a free trade area put into force before the EU accession of the CEECs. However, the other components of the agreements like the political dialogue; general democratic principles; the movement of workers, payments and capital; the establishment of new businesses; the supply of services; economic, cultural and financial cooperation; and the approximation of laws are also important areas of interest in a fully integrated community. The combination of trade liberalization with these kinds of other integrationist arrangements has been shown to increase the benefits for the integrating countries even further and by implying deeper, positive integration among the countries the EAs gave the accession countries an extra incentive to overcome political resistance and transform entire societies to be capable to gain as much as possible.

One of the first visible responses to the deeper integration was an adjustment of the industrial structure and trade patterns in the CEECs. It is, however, impossible to completely separate this integration-induced effect from those effects stemming from the dismantling of central planning, but with the help of the theoretical framework provided in the next section the impact of integration on industrial specialization and trade patterns in the Czech Republic as well as in Slovakia will be analyzed later on. If integration has evoked the same patterns in the two countries one can ask why the economic and social disparities still are substantial. Are there other explanatory factors? If the pattern on the other hand differs between the countries, is that evidence that a certain pattern of industrial restructuring is more profitable than other? However, before this analysis can be carried out, there is a need for an applicable theory and some economic measurements.

4. Theoretical Framework and Measurements

The impact of economic integration on the structural dynamics of industries and trade patterns has been examined by several economists over the last century but it was not until the creation of the European Steal and Coal Community, the European Economic Community and later on the European Union (and the thereafter increasing number of preferential trade arrangements) that new theories on the subject were developed, stressing new effects and implications.

The economic effects of the European single market comprise allocation, accumulation and localization, but contrary to what has been anticipated the increased integration does not seem to have increased sectoral specialization of industries due to industrial concentration in line with comparative advantage. Instead, increased intra industrial trade and specialization of countries within certain sectors (not relating to comparative advantage) have characterized the integration process accompanied by a substantial increase in industrial concentration. To be able to analyze these phenomena in the context of the Czech and Slovakian EU integration some of the most important theories on integration and location, specialization and intra vs. inter industrial trade will now be presented. Together with some relevant measurements they will form the basis for the analysis of trade and specialization patterns carried out in section 5.

4.1 Economic Integration and Location

Over the years theories on economic integration and location of industry stressing the importance of various factors determining the industrial restructuring following integration have developed. In the *traditional neoclassical framework* represented by Ricardo as well as Heckscher and Ohlin differences in relative technology or factor endowments between countries give rise to comparative advantages and hence specialization. The theory, however, does not explicitly treat the existence of spatial determinants of inter-regional competitiveness and therefore not the location of production (see for example Robson, 1998, pp. 234-235). Proceeding to *the new economies of integration*, taking market size effects into account, these suggest that a large home market with a demand bias for a certain good will interact with economies of scale and trade costs, promoting net export of this good. This contradicts the

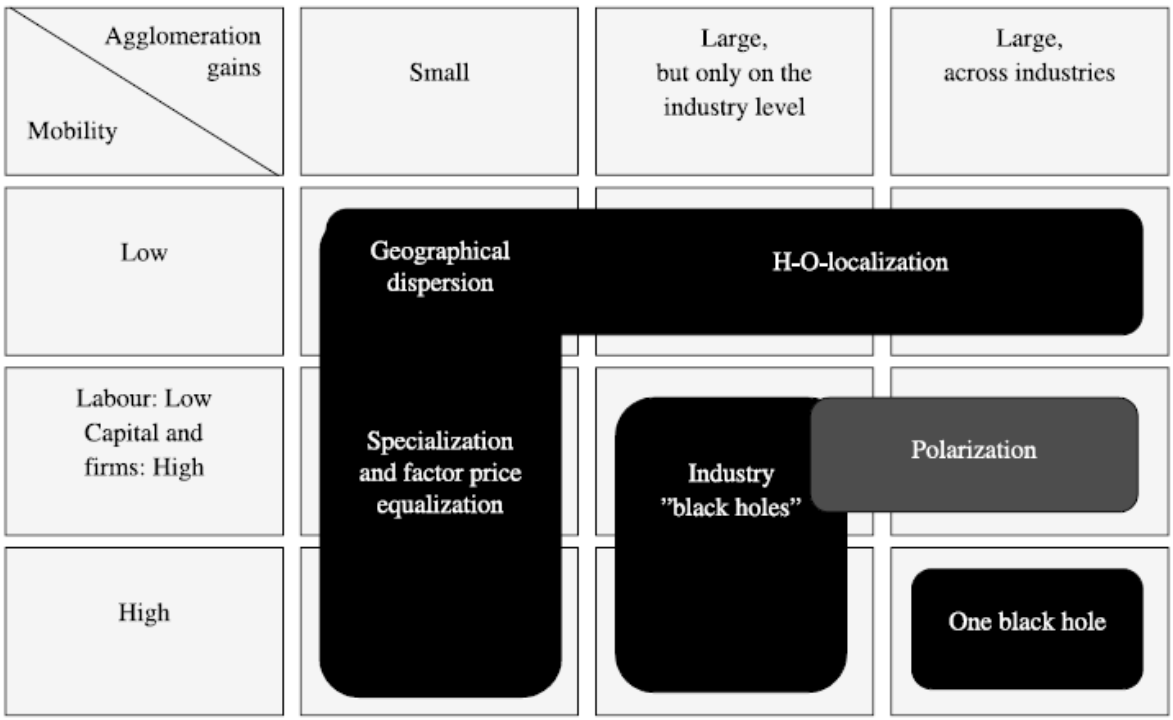
earlier theories where a demand bias caused net import due to production structures determined by relative prices and factor supplies. Consequently, according to the newer theories industry location and production structure might be determined by differing expenditure structures across countries. This is discussed in a paper from 1998 where Haaland et al. even consider localization of demand the most important determinant of economic geography in Europe. The expenditure effect does moreover cause absolute concentration of production, which in turn reinforces the expenditure pattern (cumulative causation). The authors further examine the implication of intra industry linkages on location and derive a strong correlation concerning the absolute concentration of industries (Haaland, Kind, Midelfart Knarvik, & Torstensson, 1999, p. 25).

The importance of linkages within and across industries is a fundamental part of the theories of *new economic geography* (often associated with Krugman and Venables). These theories incorporate economies of scale, imperfect competition and product differentiation in a context where location matters due to the earlier discussed market access effect and transport costs. In the framework transport costs are added to the ordinary production costs and production is located where total costs are minimized. The effects of economic integration on location are, however, ambiguous. A U-shaped pattern is created where production will be dispersed for high transport costs, concentrated to the center with a large market for medium transport costs and located in the low cost periphery for low transport costs. The effect of economies of scale is only temporary since the economies are internal to the firm and can be attained in any location (see for example Robson, 1998, pp. 235-237). Later attempts of explaining industrial clustering incorporate external economies into the model, giving a slightly different outcome. One of the first economists examining this phenomenon was Marshall who attributed the gains from agglomeration to labor market pooling, knowledge spillovers and the existence of specialized suppliers (see for example Krugman & Obstfeld, 2003, p. 147).

Other central parts of the new economic geography model are the importance of market potential, circular and cumulative causation and the inclusion of agglomerative forces such as cost and demand linkages which may reinforce the effects and even exclude convergence in the long run. Backward and forward linkages (combinations of increasing returns to scale (IRS), trade costs and linkages via input-output structures) are called agglomeration forces and are often considered strong in industries such as metals, chemicals, transport equipment and machinery with significant economies of scale. These industries are frequently expected

to exhibit the U-shaped concentration pattern discussed above as integration reduces trade costs. Contrary to the agglomeration forces there are dispersion forces (congestion and rising prices of immobile factors in areas where industries concentrate relative to locations with less production) reflecting comparative advantage and causing spread of economic activity. According to Midelfart Knarvik and Overman the strength of these forces depends on trade costs and the mobility of goods and factors of production, both affected by integrationist efforts. Immobile factors and trade barriers will together cause local production regardless of the gains from agglomeration but if either goods or factors are mobile the agglomeration and dispersion forces come into play. In the extreme case where all factors are mobile the extent of agglomeration reflects the character of linkages, implying different outcomes depending on if the linkages are within or across sectors. Strong linkages within sectors imply concentration of specific industries whereas linkages across sectors result in one large agglomeration in the core region (see figure 4.1) (Midelfart Knarvik & Overman, 2002, pp. 326-327).

Figure 4.1 Economic integration and location of industry



Source: Midelfart Knarvik & Overman (2002)

However, the outcome described above does not always hold. In the case of the EU Midelfart Knarvik and Overman argue that the structural funds (e.g. investments in infrastructure) and other policy interventions have played a major role in the geographical distribution of factors, preventing or encouraging the relocation of industries. Instead of creating concentration

according to comparative advantage, integration has promoted concentration of industries in regions with already large industrial shares (ibid. p. 347). This view supports the theory of the first mover advantage[5] where manufacturing concentrates in whichever region that gets a head start. When trade costs are low a country with a strong initial position in an industry will have an advantage cumulating over time.

Closely related to this conception is the idea that the pattern of location is strongly determined by the interaction of industry characteristics with the appropriate country characteristics. In a report prepared for the European Commission concerning the location of European industry Midelfart Knarvik et al. among other things conclude that R&D intensive industries have become more sensitive to countries' endowments of researchers and industries with an intensive use of non-manual labor respond to the educational level when deciding where to locate production. Moreover, central regions were shown to attract industries higher up the value chain with an intensive use of intermediate inputs as well as industries characterized by IRS (Midelfart Knarvik, Overman, Redding, & Venables, 2000, p. 2). Concerning industry characteristics, industries with high IRS, a high or medium technology level and final demand bias as well as an intensive use of capital and relatively skilled labor tended to be more geographically concentrated than those with lower IRS, stronger inter than intra industry linkages, higher skill intensity and less significant final demand bias (ibid. p. 23).

All theories of concentration and location presented above are strongly related to patterns of industrial specialization and will (as described in the next subsection) have important implications for the structural dynamics of industries as well.

4.2 Specialization and Intra Industrial Trade

As already mentioned, empirical evidence seem to stress increased specialization of countries within certain sectors and increased intra industrial trade (IIT) in differentiated products as a result of increased economic integration. The reasons why countries specialize in the production of certain goods are closely connected to the theories of integration and location, discussed in the previous chapter. Therefore, theories on IIT and specialization presented in

[5] A first mover advantage accrues to a firm or an industry with an (often large) established production, resulting in low unit costs. This advantage often prevents new industries from entering the market when set up costs are high and a large amount of output is needed to lower average costs.

this section are not that extensive and rather a complement to chapter 4.1. They are, however, essential to understand the structural dynamics arising from increased integration.

In the previous section economies of scale were assumed to play a vital role in the process of industrial concentration and they are surely a necessary condition for product differentiation and intra industrial specialization. At the same time IIT is assumed to be negatively correlated with scale economies and the concentration of industries since this suggests standardization rather than differentiation of goods. The large amount of IIT observed among industrialized nations today is taking place in manufactured inputs and final products ranging from machinery and specialized chemicals to automobiles and cosmetics. There are, however, certain considerations suggesting that this amount is exaggerated. The classification system of goods makes phenomena such as trade based on variations in seasonal growing and outward processing trade (OPT) with exports of intermediates and imports of final goods in the same product category result in IIT where it in reality should have been inter industrial trade. However, in spite of this, it is evident that IIT today is an important occurrence in world trade.

Regarding the theoretical framework, *traditional trade theory* does not encompass IIT since in its structure a country cannot import and export the same product. Instead inter industry specialization occurs in accordance with comparative advantage, creating a rationalization of production. *The new trade theory* emerging in the 1980s incorporated imperfect competition and IRS into the model, relaxing the assumption of homogenous products and introducing product differentiation and the consumer's love for variety. An acknowledgement of similar (and therefore competitive) production structures allowed for IIT and incentives to horizontal specialization within industries due to the combination of scale economies and similarity of demand across countries (see for example Robson, 1998, pp. 48-49). As concluded in the previous section, IRS and moderate transport costs make concentration of production profitable and due to the larger market arising from economic integration gains from specialization arise even for identical countries without a distinguished pattern of comparative advantages. Alone the larger market, allowing for longer production runs and lower average costs, makes specialization advantageous and thus promotes IIT. Which country or region that will end up specializing in which industry is, however, suggested to be arbitrarily decided and a result of minor locational advantages, political policies or historical outcomes (ibid. p. 83). This implies that the major determinants of the structural dynamics of industries and trade

might be country characteristics and investors' perceptions of the market credibility or strategic responses of multinational firms to integration rather than comparative advantages.

Returning to the assumption that the specialization of a country (and therefore also the extent of IIT) will be affected by country and industry characteristics there are several economists who have tried to concretize the factors leading to an extensive amount of IIT. Two of them are Balassa and Bauwens who already in 1988 studied the determinants of IIT in Europe. Their conclusions were the following (Balassa & Bauwens, 1988, pp. 1431-1433):

A positive correlation exists between IIT and:	A negative correlation exists between IIT and:
Average per capita income	Income inequality
Average country size	Inequality in country size
Trade orientation	Distance
Existence of a common border	Economies of scale
Common language	Industrial concentration
Membership in EEC or EFTA	
Product differentiation	
OPT	

4.3 Implications for the Countries of the Former Czechoslovakia

The findings concerning the correlation between IIT and country and industry characteristics together with the new trade theories constitute the basis explaining the specialization pattern and the large amount of IIT among the EU15. However, other opinions do exist. In an article from 2007 Kancs stresses that the specialization pattern among the CEECs will be different and that, on average, EU integration will reduce regional specialization in the CEECs and give rise to a U-shaped specialization pattern inverse to that observed in the EU15 (supported by the new theories of economic integration and discussed in section 4.1). Regarding the Czech Republic as well as Slovakia declining regional specialization is predicted by reduced inter regional transport costs, but at some critical level of lower costs the specialization will increase again and the production structures will become more concentrated. The explanation lies in the CEEC-specific phenomenon of CMEA integration which creates large distortions in regions deeply integrated in the CMEA (Kancs, 2007, pp. 94-95).

Regarding the theories on economic integration and industrial location the empirical evidence presented in section 4.1 would imply a concentration of Czech as well as Slovakian industries since the lion's share of them consists of manufactures characterized by IRS. The new economic geography with its emphasis on agglomeration and dispersion forces as well as the theory of circular and cumulative causation would also support this outcome since the principal heritage from the communist era was a well established manufacturing industry with a substantial first mover advantage compared to newly established industries.

If one should try to predict the consequences of increased EU integration for the countries of the former Czechoslovakia at this stage, based only on the theories presented above, a somewhat mixed picture emerges. On the one hand, if the countries repeat the pattern of earlier EU accession states this would imply an initial concentration of industries in regions with large market access as trade costs fall. As trade costs fall even further, however, industries will disperse, agglomerating in clusters at locations with lower production costs. This implies that the Czech Republic as well as Slovakia would gain advantage the more trade costs fall as the lower cost production would induce industries to locate there. In the process, however, the Czech Republic would probably enjoy an advantage due to its proximity to the German market and a first mover advantage dating from the process of mass privatization discussed in subsection 2.3. The extent of IIT with the EU15 would probably fall below the IIT share within the EU15 due to income inequalities, industrial concentration and inequality in country size. As per capita incomes rise and the extent of OPT increases there will, however, be a larger scope for IIT with the EU15.

On the other hand, the former CMEA integration may create other patterns, suggesting a falling level of sectoral specialization and diversification into new products where the countries enjoy natural advantages. The integration-induced industrial restructuring would promote efficient industries and force others out of business. The amount of IIT with the EU15 would depend on the industrial structure emerging but could be expected to be large if the countries engage in extensive OPT schemes with the EU15.

To be able to analyze the extent of intra and inter industrial trade as well as the industrial specialization vs. diversification in exports some measurements are needed. These are presented in the next subsection.

4.4 Measurements Used

In order to analyze how EU integration has affected the structural dynamics of trade some measurements are necessary. To capture the structural change and the static specialization or diversification of export flows over the period the *Herfindahl index of specialization* and *cumulative export experience functions* are calculated. Further, *accelerating export indices* are calculated to examine if exports are constant over the period or if they are concentrated earlier or later (if they are accelerating or non-accelerating). Since the focus of this paper is on the industrial restructuring a particular interest lies in the accelerating export industries. To study if the growing industries are traditional or not, i.e. if the country has changed its industrial structure or if the focus has remained the same, a measure of *revealed comparative advantage* is calculated to separate the accelerating export industries into traditional and non-traditional accelerating export industries. This measure is moreover used to derive indices of *intra industrial trade*, evaluated to indicate if exports have become more concentrated or dispersed.

To capture trends in export revenue concentration or specialization in trade the first measure to calculate is the *Herfindahl index (SPEC)*:

$$SPEC_t = \sum_i (s_{it})^2 \qquad \textit{where} \qquad s_{it} = E_{it} / \sum E_{it}$$

Here exports by a certain industry i in year t are represented by E_{it} and s_{it} is thus the market share of industry i in total exports in year t. The specialization index stretches between zero and one where an index value close to one is interpreted as a high degree of export concentration/specialization and a value near zero implies strong diversification in exports (Petersson, 2005, p. 787). There has, however, been some criticism directed towards the use of the Herfindahl index. The measurement has been considered biased regarding spatial scale and to possibly create too low values for large geographic regions since the geographical size of a country or region not is taken into account. Moreover, the specialization index does not approach the question of location when calculating industrial concentration, which can be regarded a limitation when the specialization of industries is compared across countries. A third point of criticism concerns the significance of the empirical results derived from the Herfindahl index. Given that the arbitrary specialization and location of industries are unknown it is difficult to interpret the value obtained from the index. Nevertheless, the advantageous part of the measurement is the rather limited amount of necessary data. Production shares (in this case represented by export shares) are the only statistics needed to

calculate index values (Kancs, 2007, pp. 19-21). The serious criticisms concerning the downward bias for larger regions will in the case of this study most probably not constitute a problem since the countries considered are relatively equally sized.

In order to derive the chronological concentration of exports in the studied period the next measure to be calculated is the *cumulative export experience function (c_{it})*:

$$c_{it} = \frac{\sum_{t0}^{t} E_{it}}{\sum_{t0}^{t1} E_{it}}$$

This measure is calculated for each commodity group and t_0 and t_1 represent the first and final year of the studied period. According to its cumulative structure the measure takes a value close to zero at the beginning of the period, successively increasing over time to reach one in the final year. The cumulative function will differ across industries depending on whether exports are concentrated earlier or later in the period or if they remain fairly constant.

The mean of the cumulative export experience function for each commodity group constitutes the next measure, the *accelerating export index (AE)*:

$$AE_i = \frac{\sum_{t0}^{t1} c_{it}}{(t_1 - t_0 + 1)}$$

As already mentioned, the industries (or commodity aggregates) of particular interest in this study are those exhibiting an accelerating export performance. Therefore, commodity groups are ranked according to their AE value and are thereafter divided into accelerating export industries (AEs) and non-accelerating export industries (NON-AEs) by means of a bench-mark value set to 0.40. A value less than the bench-mark value indicates that the industry is of accelerating character whereas a value above indicates a stagnating growth of the industry.

To be able to distinguish between traditional (T-AE) and non-traditional (NT-AE) accelerating export industries a measure of *revealed comparative advantage (RCA)* is calculated for each commodity for the initial year of the period:

$$RCA = \frac{(X_i - M_i)}{(X_i + M_i)}$$

X_i and M_i represent exports and imports of a certain commodity aggregate and due to the character of the equation the resulting value ranges from minus one to plus one, where a positive value indicates a comparative advantage in that commodity group and a negative value consequently implies a comparative disadvantage. An accelerating commodity group with a comparative disadvantage in the initial year is classified as NT-AE and one with an initial comparative advantage as T-AE. This measure is of fundamental importance in this study since it reveals if the countries have been able to restructure their industrial structures or if exports mainly remain in their traditional industries, promoted during the communist era.

By calculating the RCA a measure of *intra industrial trade (IIT)* is implicitly calculated as well:

$IIT_i = 1 - |RCA_i|$ which also can be calculated as : $IIT = 2 * \min(X_i, M_i)/(X_i + M_i)$

To facilitate the comparison between industries and be able to make conclusions regarding the structural dynamics of trade IIT is expressed as a percentage of total trade in a certain commodity group. An IIT value of zero indicates complete inter industrial trade and a value of one represents complete intra industrial trade. There are mainly three ways in which IIT increases: (i) The growth of exports in a NT-AE sector (net import industry) exceeds the growth of imports, implying export diversification into import competing industries. (ii) Faster growing imports than exports in T-AEs (declining RCA in net export industries), implying a lessening of export concentration. (iii) Exports as well as imports increase in an industry, indicating a greater amount of trade in similar products not considering if the industry is of traditional or non-traditional character (Petersson, 2005, pp. 787-788).

There is, however, one problem regarding this static measurement of IIT as using a rather broad definition of an industry may result in large volumes of IIT in significantly different (rather than differentiated) commodities. This concern has already been mentioned in subsection 4.2 and by applying a more narrow industry definition by means of disaggregated trade data at the 4-digit level of SITC the distortions are minimized.

Now when the theoretical framework is presented and the necessary measurements are at hand it is time to begin the empirical analysis where the structural dynamics of trade initially is examined for the two countries separately to thereafter be compared and evaluated in section 6.

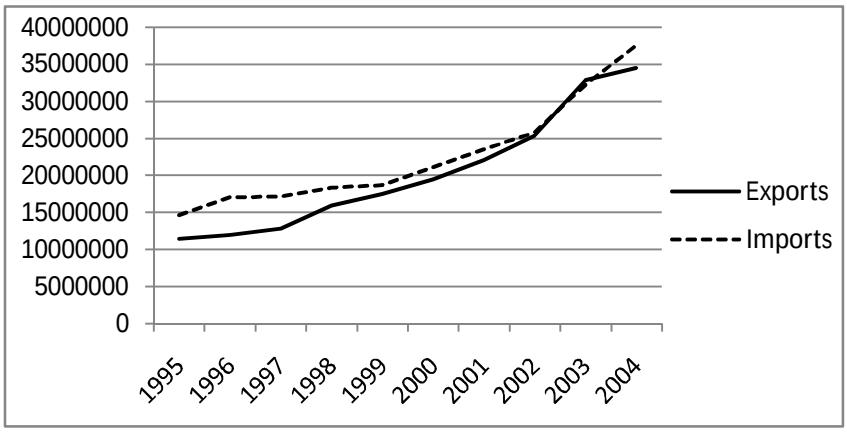
5. Trade Patterns, Industrial Structure and Specialization

As already mentioned, the economic integration into the European Union has boosted trade and changed production patterns in the two countries of the former Czechoslovakia. In this section an empirical analysis is carried out to conclude if the differences in economic performance existing between the countries can be derived from the pattern of structural change in industrial specialization. To determine the dynamic changes in production OECD trade data at the 4-digit SITC level concerning trade between the EU15 and the Czech Republic and Slovakia respectively has been used in the calculation of the measurements presented in the previous section. The period of interest is 1995-2004 when most trade liberalizing and integrating measures were undertaken corresponding to the EAs. Initially each country is analyzed separately and in section 6 the differences are illuminated and the conclusions from the investigation are presented.

5.1 Export Performance in the Czech Republic

As revealed in figure 5.1, Czech trade with the EU15 has increased during the whole period of integration. Simultaneously a change in the industrial structure has emerged with a range of products increasing and others diminishing their importance in Czech exports. However, one can ask if this change is due to the fact that the country is specializing according to its comparative advantage or if there are other factors at play such as first mover advantages or industrial linkages determining the new dynamics. This is in the following subsections closer examined by means of two classifications: (i) an accelerating export index (presented in section 4.4) calculated from cumulative export experience functions, separating industries into non-accelerating (NON-AEs) and accelerating industries (AEs) and supplemented by a RCA measure, separating accelerating industries into traditional (T-AEs) and non-traditional (NT-AEs) accelerating export industries; (ii) an index ordering commodity groups according to their skill intensity and degree of processing (see Appendix 1 for a transformation of the SITC into this index) used to characterize the accelerating industries.

Figure 5.2 Czech trade with the EU15 1995-2004

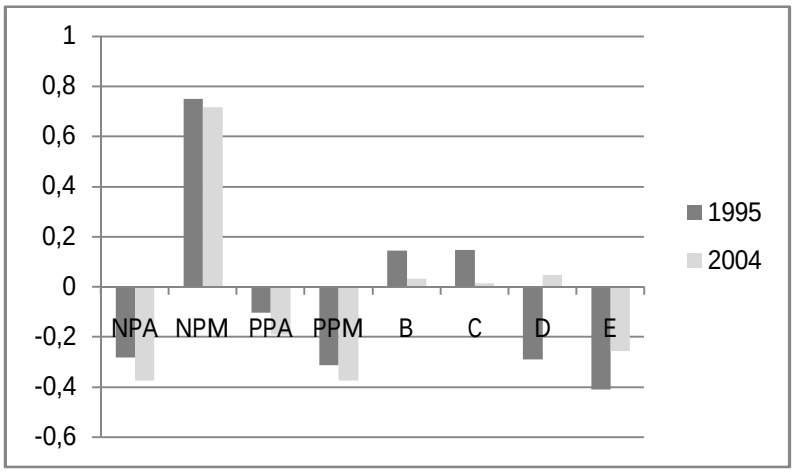


Source: Own calculations based on OECD data

5.1.1 Revealed Comparative Advantage

As the EA went into force complemented by other integrationist measures a first step of industrial restructuring could be taken and the Czech Republic was after a long time of CMEA-determined trade and production patterns free to adjust according to its true strengths. This subsection aims at investigating in which sectors the Czech comparative advantages are to be found and if these have changed over time. The measurement used to assess whether a comparative advantage exists or not is RCA, presented in section 4.4. This is a measure of net exports in total trade where a positive value indicates an advantage and a negative value consequently indicates a disadvantage. By the calculation of RCA values at an aggregated level for the industries of the skill/degree of processing index the industrial strengths (and their structural change over the studied period) of the nation are elucidated (see figure 5.2).

Figure 5.2 Czech RCA values for the aggregates of the skill/degree of processing index



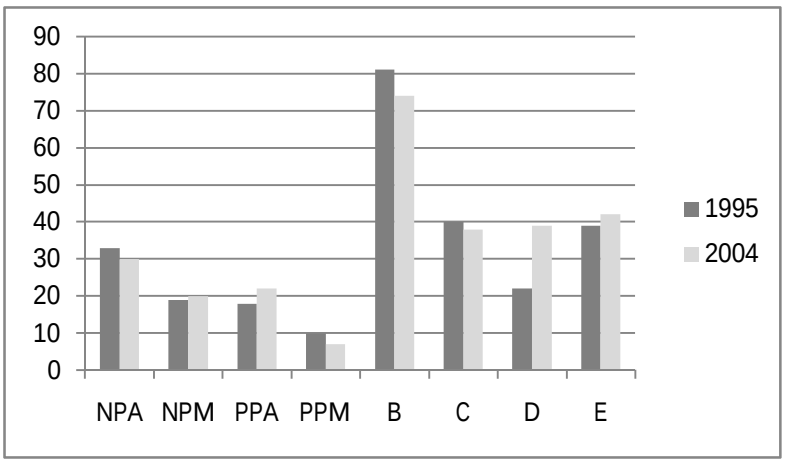
NPA	narrow primary agriculture
NPM	narrow primary minerals, metals and fuels
PPA	processed primary agriculture
PPM	processed primary minerals, metals and fuels
B	labor intensive and resource based manufactures
C	manufactures with low skill and technology intensity
D	manufactures with medium skill and technology intensity
E	manufactures with high skill and technology intensity

Source: Own calculations based on OECD data

The result reveals three index groups with a comparative advantage (although diminishing) over the whole period: narrow primary minerals, metals and fuels; labor intensive and resource based manufactures; and manufactures with low skill and technology intensity. RCA values of the two latter diminish the most over the period, from about 0.14 to 0.03 and 0.014 respectively. In total, six index aggregates displayed negative trends and only two managed to improve their advantages. Manufactures with medium as well as with high skill and technology intensity both improved their positions and the former aggregate even managed to turn its disadvantages into a comparative advantage in 1999.

A closer look at the structural change is given in figure 5.3 where the number of commodity groups with a comparative advantage in 1995 and 2004 respectively is provided for each index group of the skill/degree of processing index. An increased number of commodity groups displaying a comparative advantage in aggregates which overall display a negative RCA trend indicates that despite a negative development most industries in the aggregate have managed to maintain positive RCA values and a few NT AEs (such as sugars and electric current) have even turned their disadvantage into comparative advantages.

Figure 5.3 Number of Czech commodity groups with a comparative advantage



Source: Own calculations based on OECD data

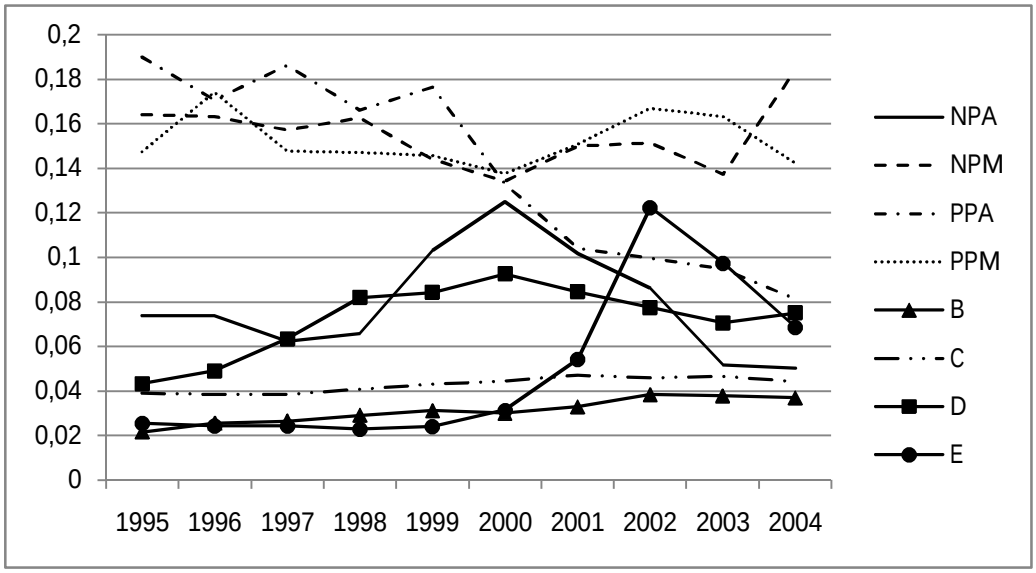
5.1.2 Concentration

When analyzing the dynamic changes in Czech trade patterns another important phenomenon is the concentration of export revenue, calculated by means of the Herfindahl SPEC index. If export revenue is concentrated to a certain type of products the country is said to specialize in these products, hence the SPEC index is used as a measure of export specialization vs.

diversification. The purpose is to assess whether a noticeable change in concentration patterns has occurred during the period of EU integration or not and if it has the subsequent question is in which direction and in which category of industries.

By ordering the industries according to the skill/degree of processing index and subsequently calculate SPEC values for each of them three interesting findings regarding the Czech export concentration can be derived from the figure below.

Figure 5.4 Czech Herfindahl indices according to skill/degree of processing index group



Source: Own calculations based on OECD data

Firstly, labor intensive and resource based manufactures and manufactures with low skill and technology intensity display a relatively constant level of concentration. The same is true for manufactures with high skill and technology intensity until 1999 when export concentration increased for this commodity aggregate. Mainly responsible for the increased SPEC value (from 0.024 to 0.12 between 1999 and 2002) were five commodity groups: *SITC 7523: complete digital central processing units, SITC 7525: peripheral units, including control and adapting units, SITC 7611: color television receivers, SITC 7643: telegraphic and radiotelephonic transmitters* and *SITC 7646: parts of apparatus of division 76000*. However, after 2002 exports in this aggregate dispersed again as some commodity groups with large export market shares in the past (such as digital data processing machines and central processing units as well as television picture tubes) became less important in the aggregate high skill export basket. Secondly, there are industries which have experienced increased export concentration but after 2000 have displayed export revenue dispersion. These are

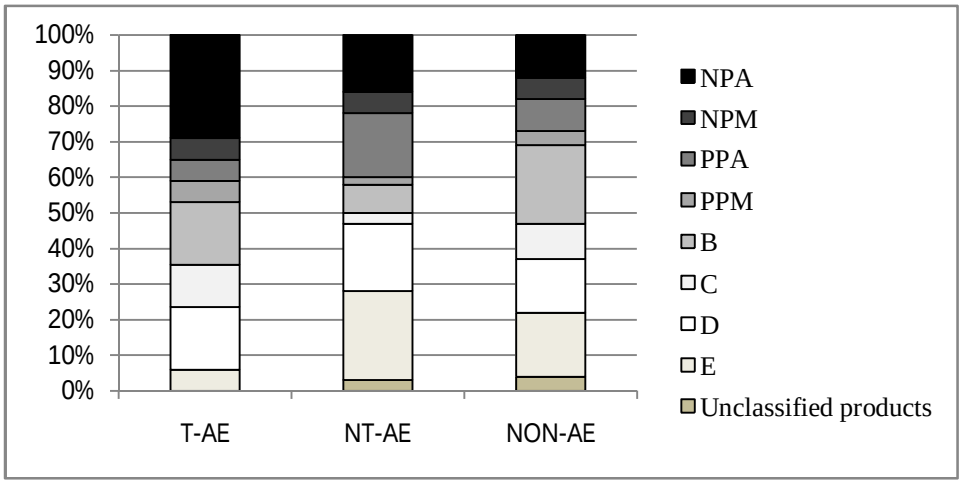
manufactures with medium skill and technology intensity as well as narrow primary agriculture. Thirdly, the only commodity aggregate exhibiting a trend of declining export concentration over the whole period is processed primary agriculture, demonstrating a declining reliance on exports of pulpwood and chemical wood pulp.

Even though figure 5.4 depicts the structure of the various industry aggregates over time and reveals if exports in each aggregate are concentrated to a few commodity groups or spread more evenly among the commodities produced it does not indicate if total export revenue overall is concentrated to one or a few particular industries. To allow that analysis a closer study of the industries with the largest export market shares is carried out in subsection 5.1.4. Next, however, cumulative export experience functions are calculated to assess which industries that have displayed the most accelerating export pattern during the studied period and if these coincide with those enjoying a comparative advantage or not.

5.1.3 Cumulative Export Experience Functions

By using the measurements presented in subsection 4.4, calculating cumulative export experience functions for all goods traded between the Czech Republic and the EU15, Czech exports to the EU15 are divided into non-accelerating (NON-AE) and accelerating (AE) export industries. The accelerating industries are further separated into traditional (T-AE) and non-traditional (NT-AE) accelerating industries depending on whether they enjoy an initial comparative advantage or not. In this subsection the aim is at investigating if Czech export growth mainly has occurred in products enjoying an initial comparative advantage or if other factors have influenced the production structure. Further, an analysis of the aggregates (T-AEs, NT-AEs and NON-AEs) is carried out to assess if they are characterized by different commodity types, implying a shift in the Czech production structure. To give an overview of the three categories derived from the cumulative export experience functions and their role in the change in the structural dynamics of trade and production patterns figure 5.5 depicts the composition of each category.

Figure 5.5 Composition of T-AEs, NT-AEs and NON-AEs in the Czech Republic 1995-2004



Source: Own calculations based on OECD data

Starting with the T-AE aggregate the dominating commodity aggregate from the skill/degree of processing index is narrow primary agriculture, consisting of e.g. oats, sunflower seeds and sugars and making up about 29 per cent of this category. Medium skill and technology intensive manufactures and labor intensive and resource based manufactures make up about 17.5 per cent each, consisting of e.g. electric equipment for internal combustion engines, parts of internal combustion piston engines as well as safety glass and bricks, tiles, slabs and other articles of pressed or molded glass. Two product groups belong to the aggregate low skill and technology intensive manufactures, making up 12 per cent and the remaining 36 per cent are equally divided among processed primary agriculture, processed primary minerals, metals and fuels, narrow primary minerals, metals and fuels as well as high skill and technology intensive manufactures. The products falling under these categories are waste paper, mineral tars, petrol oils and crude oils, as well as electric gramophones and record players.

When turning to the NT-AEs the picture alters. Manufactures with high skill and technology intensity represent one fourth of these industries, clearly implying a shift in production structures. The most accelerating high skill export commodities are those in *SITC 7621: radio broadcast receivers for motor vehicles,* which moreover has managed to turn a comparative disadvantage into an advantage over the period. Further products falling under this category are mineral or chemical fertilizers, telecommunications equipment and radiotelegraphic and radiotelephonic transmitters. Manufactures with medium skill and technology intensity, processed primary agriculture and narrow primary agriculture make up 19, 18 and 16 per cent of the NT-AEs respectively, represented by e.g. dish washing machines of household type,

cereal grains and unmilled corn. The remaining 22 per cent are spread rather evenly among the five index groups left over. Consequently, labor intensive and resource based manufactures are slowly loosing importance in the Czech export basket and instead manufactures with medium and high skill and technology intensity and also to some extent processed primary agriculture are becoming vital in the new structure of production and trade.

By studying the distribution of accelerating industries between T-AEs and NT-AEs one can moreover assess if export growth mainly has occurred in industries with an initial comparative advantage or if growth is induced by other factors. In total, there are 156 NT-AEs, 17 T-AEs and 586 NON-AEs (see Appendix 2 for a list of T-AEs and NT-AEs). The industries with an initial comparative advantage are categorized as traditional whereas those with a comparative disadvantage are classified as non-traditional. It is evident that export acceleration primarily has occurred in industries lacking a comparative advantage. Out of the 275 product groups enjoying a comparative advantage in 1995 only 17 fall under the category of accelerating exports. Taking all accelerating industries into account 47 of 156 NT-AEs have managed to create a comparative advantage during the period and 13 of the 17 T-AEs have even managed to improve their advantages, indicating a positive trend in industrial restructuring.

Hitherto the structural change in Czech comparative advantages has been elucidated and it has turned out that the two industry aggregates catching up the most, in terms of RCA as well as export acceleration, are manufactures of medium and high skill and technology intensity. Export revenue in these aggregates has moreover become slightly more concentrated over the studied period, indicating a more specialized production pattern. Medium and high skill industries represent a vital part of the NT-AE aggregate where the most significant export acceleration is found. What remains to be seen is if NT-AEs constitute a large fraction of Czech total exports or if export revenue remains concentrated to T-AEs or NON-AEs. This is in the next subsection scrutinized by an analysis of the top five commodity aggregates in Czech exports concerning T-AEs, NT-AEs as well as NON-AEs.

5.1.4 Structural Composition of the Czech Export Basket

Even though many NT-AEs are accelerating considerably, gaining importance in the Czech export basket, one should not forget that a large fraction of exports still is made up by NON-

AEs (about 64 per cent 2004). During the period 1996-2001 four of the five largest industries in total exports fell under the NON-AE category. These were *SITC 7810: motor vehicles for transport of passengers and goods, SITC 7721: electric apparatus such as switches, relays, fuses, plugs etc., SITC 7731: insulated, electric wire, cable, bars, strip and the like* (all medium skill intensive) and *SITC 8211: chairs and other seats and parts* (labor intensive). The only accelerating aggregate among the top five was *SITC 7849: other parts and accessories of motor vehicles* (a NT-AE of medium skill intensity). In 2002 a new high skill intensive NT-AE, *SITC 7523: complete digital central processing units,* became the third largest export industry and kept this position for the last three years of the period, signifying the industrial restructuring described in the previous subsections. This change and the various aggregates' significance in exports are depicted in table 5.1, displaying the five largest product groups in each of the three AE aggregates discussed in section 5.1.3 in the last year of the period, 2004.

Table 5.1 The five largest NT-AEs, T-AEs and NON-AEs in Czech exports 2004

SITC commodity group	Skill index group	AE index	Export share 2004	RCA 1995	RCA 2004
Non-traditional accelerating exports			*0.31143*		
7849 Other parts & accessories of motor vehicles	D	0.36173	0.08861	-0,047	0,156
7523 Complete digital central processing units	E	0.24010	0.03208	-0,715	0,793
7611 Television receivers, colour	E	0.28649	0.01845	-0,986	0,674
7643 Radiotelegraphic & radiotelephonic transmitters	E	0.21636	0.01584	-0,960	0,348
7415 Air conditioning mach.self contained and parts	D	0.32027	0.01415	-0,292	0,609
Traditional accelerating exports			*0.04751*		
7783 Electr.equip.for internal combustion engines, parts	D	0.32291	0.01414	0,013	0,421
7139 Parts of int.comb.piston engines of 713.20/30/80	D	0.32888	0.01111	0,019	0,256
6251 Tyres, pneumatic, new, of a kind used on motor cars	D	0.38745	0.00909	0,778	0,241
6647 Safety glass consisting of toughened/laminat.glass	B	0.37821	0.00544	0,499	0,568
6517 Yarn of regenerated fibres, not for retail sale	B	0.36509	0.00135	0,449	0,411
Non-accelerating exports			*0.64106*		
7810 Passenger motor cars, for transport of pass.& goods	D	0.42674	0.07762	-0,163	0,409
7721 Elect.app.such as switches, relays, fuses, plugs etc.	D	0.42413	0.03182	-0,368	-0,060
7731 Insulated, elect.wire, cable, bars, strip and the like	D	0.43398	0.02331	0,052	0,271
8211 Chairs and other seats and parts	B	0.43924	0.02246	0,436	0,624
6997 Articles of iron or steel, n.e.s.	C	0.44828	0.01166	0,400	0,208

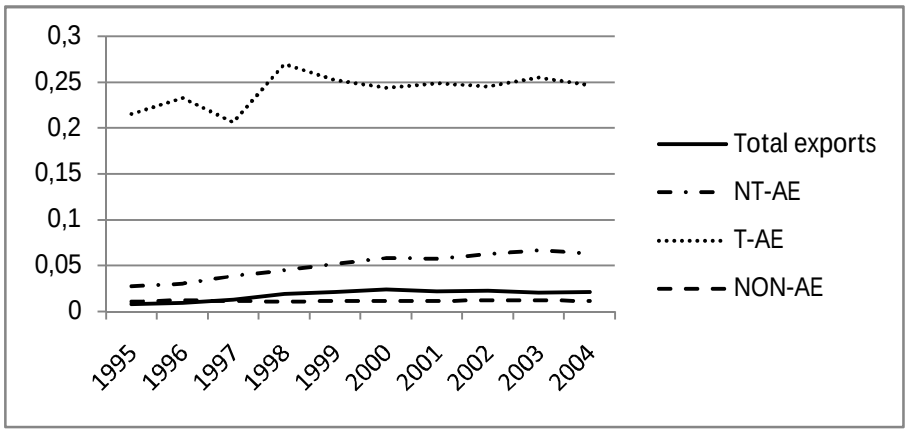
Source: Own calculations based on OECD data

The table reveals the change discussed above but signifies at the same time the continued importance of non-accelerating industries in exports. What the table moreover indicates is firstly the in general higher rate of export acceleration in NT-AEs compared with T-AEs and

secondly the fact that while all the largest NT-AEs have managed to turn their comparative disadvantages into advantages over the period, some of the T-AEs have reduced their competitiveness. It is also evident that several of the industries catching up are of high skill intensive nature (as discussed in previous sections). However, medium skill manufactures and to some extent also low skill manufactures still constitute a substantial part of Czech exports.

The share in total exports for the various AE aggregates indicates an increasing importance of NT-AEs, standing for about 31 per cent of export revenue in 2004 (compared with 7.4 per cent in 1995). Since this aggregate consists of 156 product groups in contrast to the 586 NON-AE product groups, representing about 64 per cent of total export revenue, the implication is a higher degree of concentration in the NT-AE aggregate. This is further illuminated in figure 5.6 where SPEC indices are calculated for the three aggregates as well as for total exports.

Figure 5.6 Herfindahl indices for Czech exports to the EU15 1995-2004



Source: Own calculations based on OECD data

Over the period an increase in export concentration can be noticed especially for NT-AEs but also total exports exhibit a slight increase. T-AEs are experiencing the highest concentration and an increase is noticed until 1998. Thereafter concentration decreases and for the rest of the period the SPEC value fluctuates around 0.25. Total export concentration stabilizes at a low level in 1999, indicating a rather diversified production structure. The trend of increasing NT-AE concentration levels off, implying a stabilization of export revenue distribution.

As already discussed in section 4.2 the amount of industrial concentration and specialization is closely connected with the level of intra industrial trade. Therefore the next measure to calculate is one showing the IIT shares of the three AE aggregates as well as of the aggregates

of the skill/degree of processing index. The aim is to assess if the structural change in Czech production has caused the same development as in former cases of European integration.

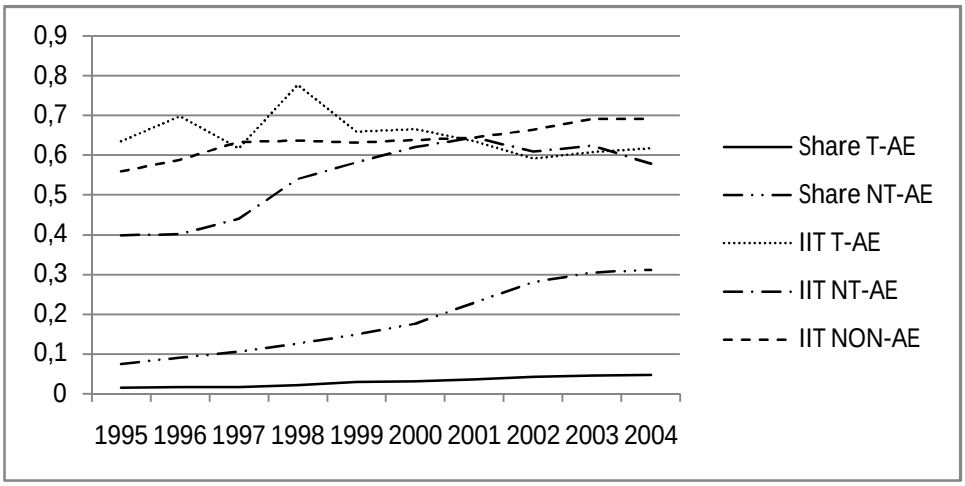
5.1.5 IIT Share of Traditional and Non-Traditional Products

As in the case of earlier European integration and already discussed in section 4 economic integration often implies an increasing amount of intra industrial trade among the integrating countries as the larger market promotes concentration, longer production runs due to economies of scale and sectoral specialization in differentiated products traded among the nations at an intra industry level. The aim of this subsection is to examine if this has also been the case in the Czech Republic and if there exist any clear pattern indicating in which type of commodities this intra industrial trade takes place.

As depicted in figure 5.7 the Czech share of IIT increased for all commodities at the earliest stage of integration, suggesting lowered transaction costs and gains from agglomeration, a trend continuing until 1998 (although T-AE IIT was quite fluctuating during this period). A decline in T-AE IIT thereafter, accompanied by a disproportionately large increase in exports compared to imports, indicates improvements in these industries leading to a diminished necessity for imports. The IIT share was, however, still above that of NT-AEs and NON-AEs until 2001, a year with two occurrences worth mentioning: Firstly, the share of NON-AE IIT exceeded the IIT share of the accelerating industries and secondly, the share of NT-AE IIT reached its peak and began to decline. The latter phenomenon is perfectly in line with the new economic geography theories of economic integration discussed in section 4, suggesting that specialization will exhibit a U-shaped pattern as transaction costs fall due to integration. An increase in IIT for NT-AEs accompanied by a decrease in net imports (the aggregate even displayed net exports in 2003) implies a diversification of exports into import-competing industries with products earlier obtained through imports instead produced domestically.

A further explanation is to be found in the importance of certain industry and country characteristics for the level if IIT (discussed in subsection 4.1). Since the IIT share is assumed to be negatively correlated with economies of scale and concentration this may explain the downward trend in NT-AE IIT from 2000 and onwards. Motivating the NON-AE pattern in the figure below are their rather dispersed character and their significant fraction of labor intensive products not subject to IRS to the same extent as industries in the NT-AE group.

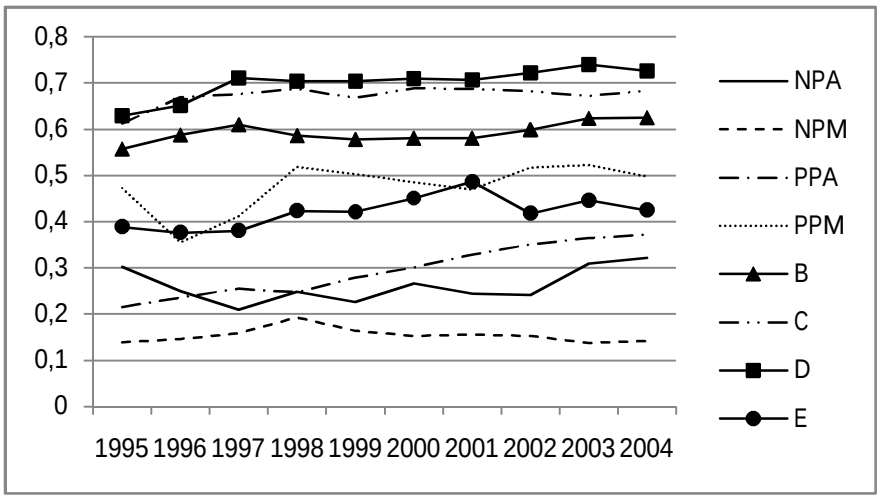
Figure 5.7 Share in total exports and IIT of T-AEs, NT-AEs and NON-AEs in Czech trade with the EU15



Source: Own calculations based on OECD data

This assertion is further confirmed when the level of IIT according to the skill/degree of processing index is analyzed. As figure 5.8 reveals IIT shares are quite constant for several of the commodity groups but differ substantially among them with the highest IIT share registered by low and medium skill intensive manufactures (subject to strong inter and intra industry linkages) and the lowest share registered by narrow primary minerals, metals and fuels, narrow primary agriculture and processed primary agriculture (industries often characterized by rather standardized goods).

Figure 5.8 Share of IIT according to skill/degree of processing index group in the Czech Republic



Source: Own calculations based on OECD data

Before the focus is set on the export performance of Slovakia a brief summary of the findings in this section is provided.

5.1.6 Czech Responses to Increased Integration

In the Czech Republic an increased concentration is noted in the non-traditional accelerating industries over the period but also in the traditional accelerating industries an increase is noticed between 1997 and 1998. An increasing export revenue concentration in industries of medium skill and technology intensity as well as in narrow primary agriculture (due to the reliance on passenger motor cars as well as rape and colza seeds) reached its peak in 2000 and declined thereafter. At the same time exports in high skill and technology intensive industries became increasingly concentrated to fewer commodities. The largest export market shares are noted in SITC category 7, machinery and transport equipment, as well as in industries of medium skill and technology intensity.

The initial comparative advantage lies in narrow primary minerals, metals and fuels, labor intensive as well as low skill intensive manufactures. Over the period, however, a shift can be seen with a declining advantage for these industries and instead manufactures with medium and high skill and technology intensity are catching up. These industries, together with processed primary agriculture, are moreover those demonstrating the fastest acceleration and high export concentration in the NT-AE group. Over the analyzed period these industries have experienced an increased share of IIT which, however, seems to decline when transaction costs are reduced even further. The IIT share in T-AEs was quite fluctuating until 1998 when a steady decline set in, implying increased amount of self-sufficiency in these industries.

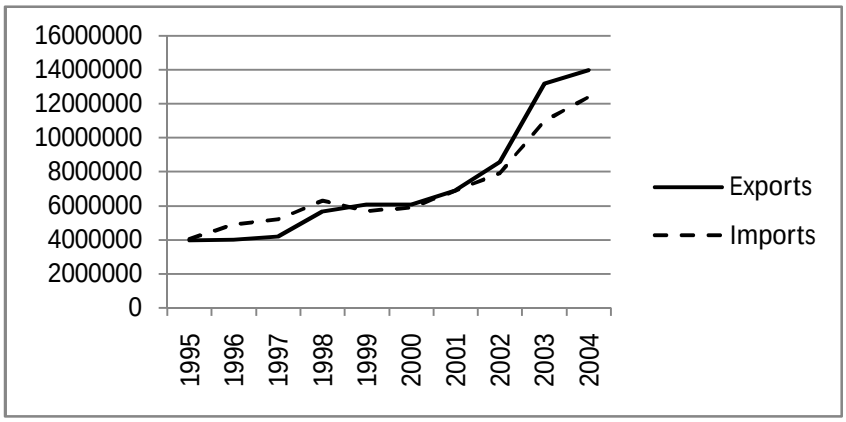
To be brief, an industrial restructuring has taken place in the Czech Republic, implying an adjustment of the production structure in line with the true advantages of the country. This pattern of restructuring shall in section 6 be compared with the change in structural dynamics simultaneously occurring in Slovakia and it is to that development the next section is devoted.

5.2 Export Performance of Slovakia

Trade between Slovakia and the EU15 has experienced a steady increase during the whole period of integration. Starting out from fairly balanced trade (a slight net import is noted in 1995) imports initially grew faster than exports and it was not until 1997 (when tariffs and quotas on substantially all industrial products were abandoned) that Slovakian exports

gathered momentum. In 1999 the ongoing trend was reversed and the country became a net exporter in trade with the EU15.

Figure 5.9 Slovakian trade with the EU15 1995-2004



Source: Own calculations based on OECD data

The purpose of the following subsections is to empirically assess what kind of industrial re-organization and dynamic changes in trade patterns Slovakia has undergone during this period, beginning with an analysis of revealed comparative advantages.

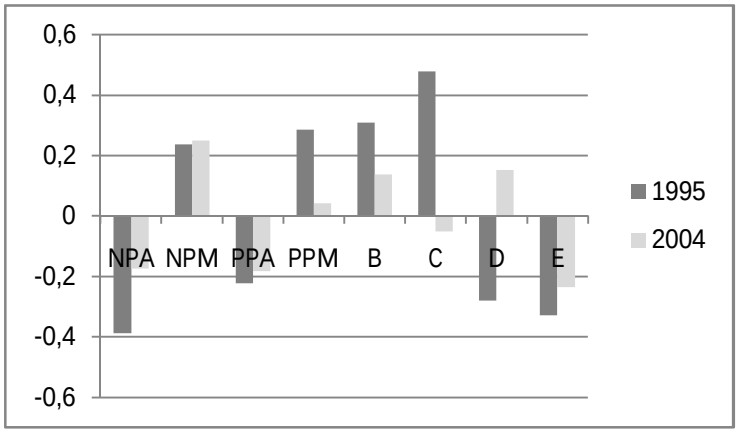
5.2.1 Revealed Comparative Advantage

As in the case of the Czech Republic, in this subsection RCA values are calculated for the aggregates of the skill/degree of processing index to assess in which industries Slovakia has its initial comparative advantages and if a change can be noticed in the time of EU integration.

As visible in figure 5.10 four index aggregates displayed positive RCA values in 1995: narrow primary minerals, metals and fuels; processed primary minerals, metals and fuels; labor intensive and resource based manufactures; and manufactures with low skill and technology intensity. However, over the period all of them experienced declining advantages and for low skill manufactures (with the highest RCA value of 0.476 in 1995) the RCA value even turned negative in 2002. The RCA decrease for narrow primary minerals, metals and fuels ceased in 2004 and RCA eventually increased to a level about 0.01 over the initial level in 1995. A trend of improved positions is noticed in the industries with initial disadvantages with the most remarkable change in medium skill manufactures, changing the disadvantage

into a comparative advantage in 1999. A substantial progress is also noted in narrow primary agriculture with a RCA increase from -0.39 to -0.17 over the period.

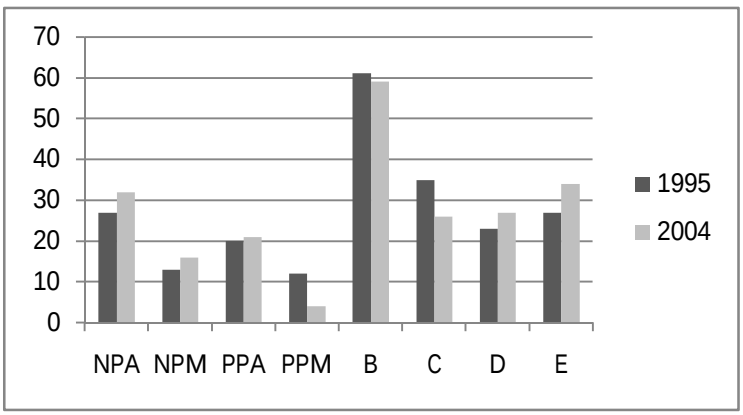
Figure 5.10 Slovakian RCA values for the aggregates of the skill/degree of processing index



Source: Own calculations based on OECD data

These changes are further depicted in figure 5.11, showing the number of Slovakian product groups in each aggregate with a comparative advantage in 1995 and 2004 respectively.

Figure 5.11 Number of Slovakian commodity groups with a comparative advantage



Source: Own calculations based on OECD data

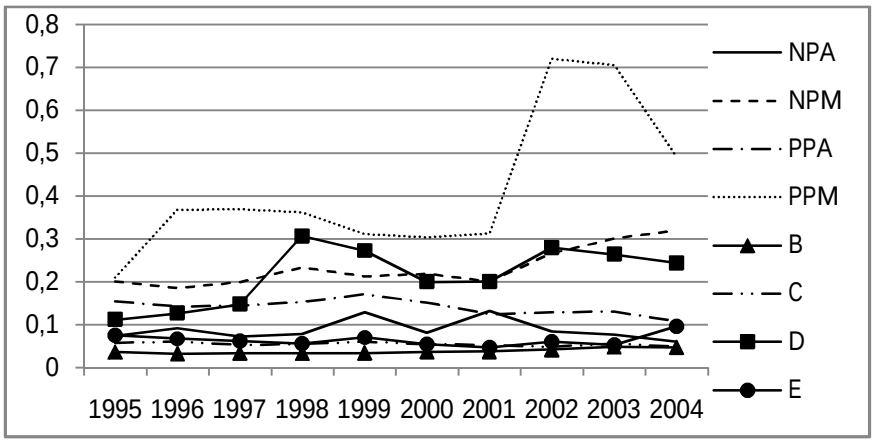
Before turning to the next subsection, discussing concentration in the various aggregates, a few things should be mentioned. Firstly, although RCA in labor intensive and resource based manufactures has diminished significantly it is still by far the aggregate with most industries enjoying a comparative advantage; secondly, the reason why the increased number of medium skill industries with an advantage does not correspond to the RCA increase in figure 5.10 is the fact that the export growth mainly is found in industries already enjoying a comparative advantage; and thirdly, a structural change is revealed where the number of medium and high

skill industries as well as narrow primary agriculture industries with an advantage eventually exceeds the number of low skill intensive industries with a comparative advantage, verifying the substantial RCA loss in low skill industries depicted in figure 5.10.

5.2.2 Concentration

An indication of Slovakian export concentration is given in figure 5.12 where export revenue concentration is calculated for the aggregates of the skill/degree of processing index. Whereas labor intensive and resource based manufactures as well as low skill and technology intensive manufactures display almost the same concentration as in the Czech Republic high skill and technology intensive manufactures do not repeat the Czech pattern and a marked increase of concentration is not noted until 2003 when exports of *SITC 7525: peripheral units, including control and adapting units* and *SITC 7611: Color television receivers* expand disproportionately much. However, the initial concentration is higher in Slovakia. Concerning narrow primary agriculture the export concentration resembles the Czech pattern except for a decline in concentration in 2000 related to diminishing exports of *SITC 2224* and *SITC 2226: sunflower, rape and colza seeds.*

Figure 5.12 Herfindahl SPEC indices according to skill/degree of processing index group



Source: Own calculations based on OECD data

The three aggregates narrow primary minerals, metals and fuels, processed primary minerals, metals and fuels and medium skill and technology intensive manufactures all display rather high values of export concentration compared to their Czech counterparts. Concentration in medium skill industries mainly mirrors the export pattern of *SITC 7810: passenger motor cars, for transport of passengers and goods* which in 1998 represented 53 per cent of medium

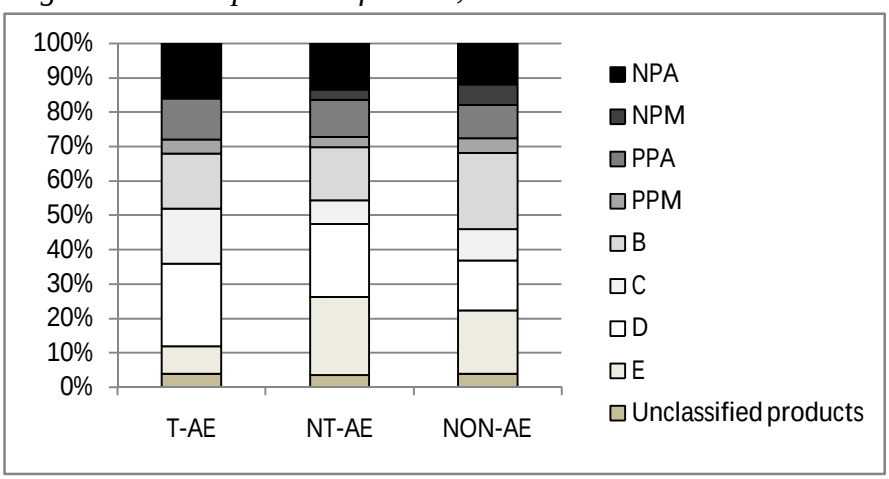
skill intensive exports. However, the most remarkable aggregate is processed primary minerals, metals and fuels, exhibiting a far higher concentration than all other aggregates due to its reliance on *SITC 6841: unwrought aluminium and aluminium alloys*.

The overall immense export concentration in Slovakia implies a large dependence on a small number of industries/commodity groups. A country displaying this pattern may encounter difficulties by the transformation and industrial restructuring since the already dominant industries enjoy a major first mover advantage and it may be difficult to establish new industries even if they in fact are more efficient, representing the true national comparative advantage. The next step is hence to examine if the substantial export concentration has hindered new industries from growing or if an industrial restructuring in line with the comparative advantage structure described in section 5.2.1 has been able to emerge.

5.2.3 Cumulative Export Experience Functions

As stated already, cumulative export experience functions facilitates the separation of industries into T-AEs, NT-AEs and NON-AEs. The Slovakian structure of these aggregates is quite similar to its Czech counterpart (see figure 5.12). However, some dissimilarities should be noted: (i) in the Slovakian T-AE aggregate there are no narrow primary minerals, metals or fuels, (ii) the fraction of narrow primary agriculture in T-AEs is significantly smaller in Slovakia while the fraction of processed primary agriculture is larger and (iii) in NT-AEs the smaller parts of agricultural products are compensated by larger parts of labor intensive and resource based manufactures as well as of low skill and technology intensive manufactures.

Figure 5.13 Composition of T-AEs, NT-AEs and NON-AEs in Slovakia 1995-2004



Source: Own calculations based on OECD data

When looking at the number of industries in each of the three AE aggregates moreover a suggestion regarding the export growth pattern can be made since it becomes clear if the most extensive growth has occurred in industries enjoying an initial comparative advantage or if other factors have influenced the industrial restructuring.

In Slovakia 227 out of 729 export industries exhibit an accelerating export pattern. However, when these industries are separated into T-AEs and NT-AEs it turns out that only 25 of them enjoyed an initial comparative advantage. Consequently there are 202 product groups with an initial disadvantage which have managed to improve their export performance substantially over the period (68 industries actually turned their negative RCA value into a positive one over the studied period and 13 improved their already positive values).

It is evident that Slovakia has undergone a process of industrial restructuring during the period of EU integration. In the initial year 227 commodity groups enjoyed a comparative advantage. Nine years later, however, 87 of them had turned their advantage into a disadvantage. Medium and high skill intensive manufactures as well as narrow primary agriculture are the industries gaining advantage at the expense of processed primary agriculture as well as labor and low skill intensive industries. The medium and high skill intensive industries are further those experiencing the most extensive pattern of export acceleration but also labor and low skill intensive manufactures make out sizeable fractions of the accelerating industries, indicating that they still are important in the Slovakian export basket. Overall, export revenue is concentrated to a smaller number of commodity groups in the aggregates of the skill/degree of processing index than in the Czech Republic and some industries, such as high skill intensive manufactures, even exhibit increasing export revenue concentration. In the next subsection a closer look is taken at the five largest export industries in the three AE index aggregates. This will reveal if the structural change described above is of substantial importance or if the largest proportion of exports still consists of non-accelerating industries managing to keep their large market shares.

5.2.4 Structural Composition of the Slovakian Export Basket

As in the case of the Czech Republic, a substantial part of exports is still made up by NON-AEs (almost 42 per cent in 2004). What, however, distinguishes the Slovakian export basket from its Czech counterpart is the significant reliance on T-AEs. As revealed in table 5.2, T-AEs stood for nearly 36 per cent of total export revenue in 2004 (compared to 10 per cent in 1995) while NT-AEs increased their share in exports from almost 3 to 22 per cent.

Table 5.2 The five largest NT-AEs, T-AEs and NON-AEs in Slovakian exports 2004

SITC commodity group	Skill index group	AE index	Export share 2004	RCA 1995	RCA 2004
Non-traditional accelerating exports			*0,22331*		
7842 Bodies for the motor vehicles of 722/781/782/783	D	0,15661	0,06187	-0,913	0,993
7611 Television receivers, colour	E	0,18637	0,02326	-0,183	0,914
7525 Peripheral units, including control & adapting units	E	0,30376	0,01656	-0,978	0,438
7638 Other sound recorders and reproducers	E	0,21445	0,01064	-0,947	0,726
7712 Other electric power machinery, parts of 77100	D	0,34169	0,00939	-0,585	0,317
Traditional accelerating exports			*0,35984*		
7810 Passenger motor cars, for transport of pass.& goods	D	0,34922	0,28411	0,187	0,808
6252 Tyres, pneumatic , new, of a kind used on buses, lorries	D	0,28425	0,01855	0,977	0,912
7491 Ball, roller or needle roller bearings	D	0,37850	0,01232	0,212	0,415
7751 Household type laundry equipment	D	0,32907	0,01042	0,370	0,808
7915 Rail&tramway freight and maintenance cars	C	0,39517	0,00728	0,976	0,310
Non-accelerating exports			*0,41685*		
7849 Other parts & accessories of motor vehicles	D	0,42078	0,04927	-0,375	-0,379
7731 Insulated, elect.wire, cable, bars, strip and the like	D	0,43024	0,04771	0,051	0,431
8510 Footwear	B	0,42990	0,02183	0,706	0,832
8219 Other furniture and parts	B	0,44631	0,01476	0,508	0,735
8211 Chairs and other seats and parts	B	0,40683	0,00997	0,409	-0,013

Source: Own calculations based on OECD data

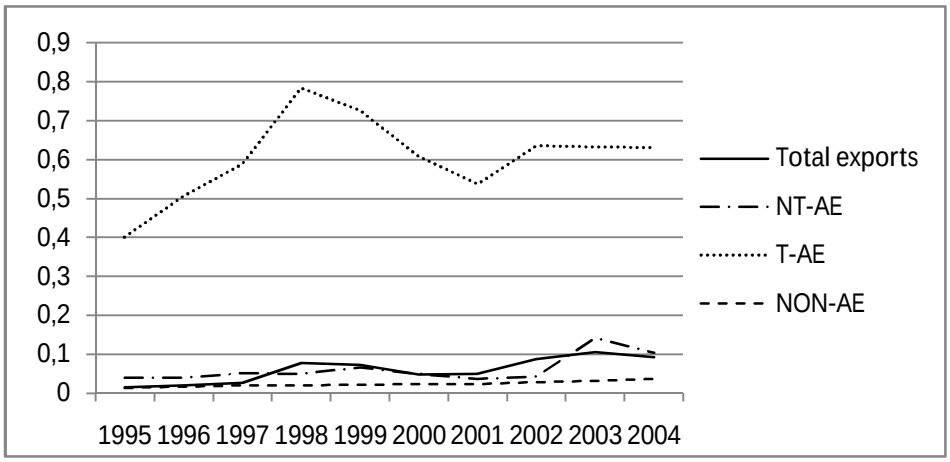
This implies that the accelerating industries represent a large fraction of Slovakian exports but what are even more noteworthy, Slovakian T-AEs represent a larger fraction of total exports than NT-AEs do. This is particularly interesting since the number of T-AEs only is 25 compared to the 202 NT-AEs and implies a higher economic dependence on T-AEs. Although NT-AEs have gained market shares the reliance on T-AEs induces a slightly smaller shift in production structures compared with the Czech Republic and simultaneously labor intensive

NON-AEs such as footwear and furniture continue to make out a crucial part of exports. Another central fraction of the export basket, concerning all aggregates, is manufactures with medium skill and technology intensity where export revenue is concentrated to a rather small number of products.

Between 1996 and 2001 the five largest export industries were *SITC 7810: motor vehicles for transport of passengers and goods, SITC 7731: insulated, electric wire, cable, bars, strip and the like, SITC 7849: other parts and accessories of motor vehicles* (all of medium skill intensity), *SITC 6841: unwrought aluminium and aluminium alloys* (processed primary minerals, metals and fuels) and *SITC 8510: footwear* (labor intensive manufactures). Except for SITC 7810, which is a T-AE aggregate, these are all of NT-AE nature (as opposed to the Czech Republic where the most important exports were of NON-AE character). This picture altered slightly in 2002 as the labor intensive NON-AE commodity aggregate *SITC 8211: chairs and other seats and parts* became the fifth largest export aggregate and the next year an even more substantial change came about as the medium skill aggregate *SITC 7842: bodies for the motor vehicles of 722/781/782/783* climbed from 52nd to 2nd place accompanied by the high skill aggregate *SITC 7611: color television receivers* (both NT-AEs) which in 2004 became the fifth most important export commodity after SITC 7810, SITC 7842, SITC 7849 and SITC 7731. These shifts imply a Slovakian production structure where products higher up the value chain become more important in the export basket but still the largest export shares consist of medium skill and technology intensive manufactures from SITC category 7, machinery and transport equipment, with the five most important commodity aggregates representing almost 50 per cent of total export revenue in 2004. What moreover should be mentioned is that four of these five aggregates also are found among the seven largest export industries in the Czech Republic and that Czech exports are superior in each industry with the exception of passenger motor cars where Slovakia is the larger exporter.

To further illuminate the concentrated structure of Slovakian exports described above figure 5.14 depicts export revenue concentration in the three AE index aggregates as well as in total exports during the time of EU integration.

Figure 5.14 Herfindahl indices for Slovakian exports to the EU15 1995-2004



Source: Own calculations based on OECD data

The figure reveals a rather volatile but slightly increasing total export concentration, fundamentally determined by the concentration in T-AEs. From a value of 0.014 in 1995 export concentration increased moderately until 1997 when a stronger increase set in, driven by the enhanced T-AE concentration. When the trend of concentration in T-AEs 1998 shifted into a trend of dispersion this was consequently reflected in total export revenue dispersion, although slightly compensated by increased concentration in NT-AEs. A second change occurred in 2001 when T-AE exports again experienced increased concentration, leveling off the next year. However, total export concentration continued to increase due to increased NT-AE export concentration resulting from export revenue values more than redoubling for *SITC 7842: Bodies for the motor vehicles of 722/781/782/783* compared to the previous year.

The already pronounced higher export revenue concentration in Slovakia is hereby verified once more and its connection to the larger concentration in T-AEs where *SITC 7810: passenger motor cars for transport of passenger and goods* represented 62 per cent of T-AE exports in 1995 rising to 79 per cent in 2004 with a top value of 88 per cent in 1998 (corresponding to shares in total exports of 6.3 per cent in 1995 rising to 28 per cent in 2004 with a top value of 31 per cent in 2003) is clearly elucidated.

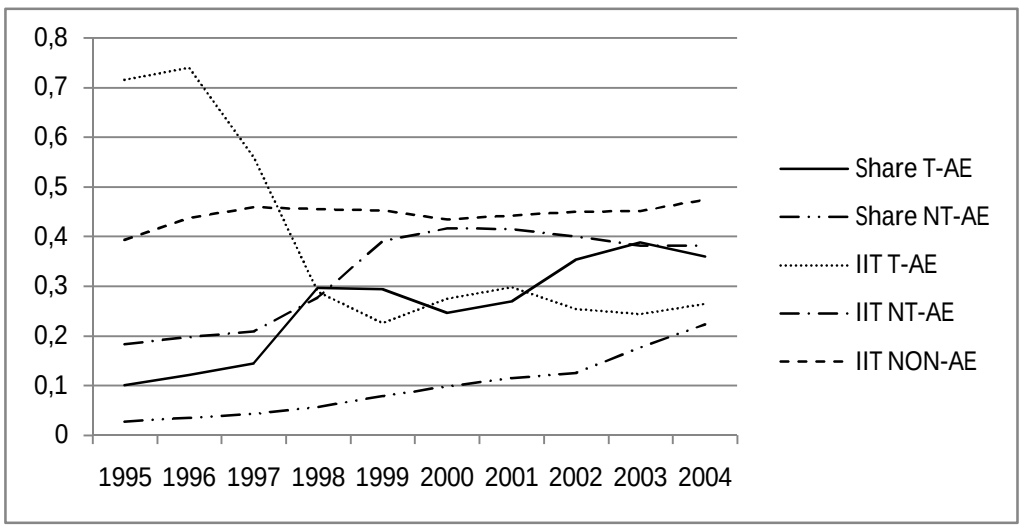
Something further distinguishing the Slovakian trade pattern from the Czech one is the non-continuity of exports concerning several NT-AE products. Either are the products not exported until in the last two or three years of the observed period or they are exported earlier but rather irregular with for instance minor exports in 2000 and 2001 and a notably higher value of exports in 2004. Slovakian NT-AEs with continuous exports over the whole period

mainly fall under SITC categories 6 and 7 (manufactured goods, machinery and transport equipment). Even though the Czech Republic also exhibits accelerating exports in these aggregates further commodity groups are also continuously exported, implying a more diversified production structure without that strong reliance on certain sectors. To further analyze the structure of specialization in Slovakian exports the shares of intra industrial trade are in the next subsection calculated for the various commodity aggregates.

5.2.5 IIT Share of Traditional and Non-Traditional Products

As Slovakian IIT is examined in order to assess if two way trade in differentiated products has increased a couple of interesting results appear. Firstly, the share of IIT in T-AEs significantly dropped between 1996 and 1999 followed by a slight increase lasting until 2001 when the IIT share again diminished (this time, however, more moderately). Together with increased net exports this further supports the earlier stated export concentration. Secondly, although at a lower level, the share of IIT in NT-AEs mirrors the pattern of the Czech Republic with an increasing IIT share, culminating and thereafter decreasing at some critical level of lower transaction costs. Thirdly, net imports in NT-AEs decreased from 1999, implying a diversification of exports into import competing industries. Concerning NON-AEs, the same slightly increasing pattern as in the Czech Republic can be noticed but at a lower level.

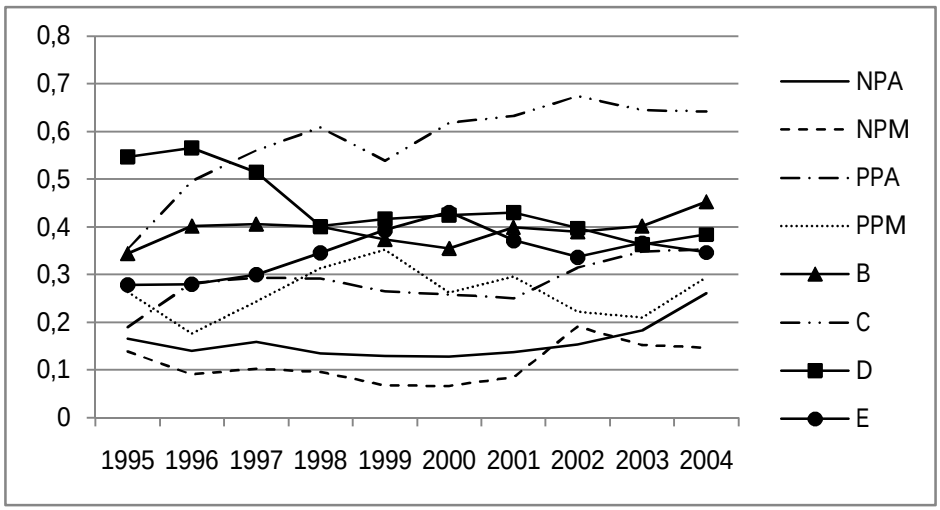
Figure 5.15 Share in total exports and IIT of T-AEs, NT-AEs and NON-AEs in Slovakian trade with the EU15



Source: Own calculations based on OECD data

The pattern emerging when IIT shares are calculated for the aggregates of the skill/degree of processing index is depicted in figure 5.16, suggesting a clear increase in IIT of manufactures with low skill and technology intensity whereas the IIT share of medium skill intensive manufactures declines. Concerning the aggregate of low skill commodities the IIT increase is accompanied by a steady trend of diminishing net exports finally turning into net imports in 2002. This is not due to decreasing exports but to significantly increasing imports of among others *SITC 7915: rail and tramway freight and maintenance cars, SITC 6997: articles of iron or steel* and *SITC 6940: nails, screws, nut, bolts etc. of iron, steel and copper.* As already depicted in figure 5.12, concentration in this aggregate is relatively low compared to other aggregates and as shown in figure 5.11 this is also the aggregate losing comparative advantage in most products over the period. The noted IIT increase with rising imports of intermediate goods constitutes a central support to the increased exports of higher skill commodities requiring these intermediates in production (such as the accelerating industries of SITC 7). A piece of graphical evidence is the diminishing IIT share in medium skill intensive manufactures depicted in the figure below. In this aggregate net imports turned into net exports between 1998 and 1999, an occurrence not possible without increased production as well as imports of the necessary intermediates.

Figure 5.16 Share of IIT according to skill/degree of processing index group in Slovakia



Source: Own calculations based on OECD data

In general the IIT shares in Slovakian industries are lower than their Czech counterparts, clearly illuminating the connection between the IIT level and industrial concentration discussed in section 4. One last comment before turning to a brief summary of the Slovakian trade and production pattern concerns the trend of increasing IIT in almost all commodity

aggregates in 2004. The explanation is quite simple and can be observed already in figure 5.9 where Slovakian trade with the EU15 is portrayed. In 2004, as Slovakia became a full member of the EU and trade in goods was completely liberalized, imports from the EU15 boomed, resulting in increasing IIT. The only sectors with faster growing exports were narrow primary minerals, metals and fuels as well as high skill intensive manufactures where exports in a few particular commodity groups outweighed the rising imports.

5.2.6 Slovakian Responses to Increased Integration

Before the findings of this study are concluded and a discussion of policy implications is carried out a short summary of the empirical results from this subsection is provided to recapitulate the most important characteristics of the structural change emerging in Slovakia during the period of increased EU integration.

First of all, Slovakian exports are notably concentrated to a few commodity groups, mainly in the T-AE aggregate. In 2003 these industries stood for 40 per cent of total export revenue with *SITC 7810: passenger motor cars for transport of passengers and goods* representing as much as 30 per cent of total exports. The most accelerating industries, however, are of non-traditional nature consisting to a large part of labor and low skill intensive manufactures. The initial comparative advantage industries in Slovakia are of labor and low skill intensive character and a small shift with medium and high skill industries gaining advantage can be noticed. The growing industries are displaying a pattern of increasing export concentration (especially at the end of the period) making it even harder to disperse production into new industries. This has resulted in a significant decrease in IIT for T-AEs, particularly in medium skill and technology intensive manufactures. The increased IIT in low skill and technology intensive manufactures does not indicate dispersion into new import competing industries but is necessary for the growth of medium skill and technology intensive industries.

Overall only a small structural change can be noticed in Slovakian exports as the expanding non-traditional industries only represent a smaller fraction of total export revenue. The explanation lies in the significant dependence on the traditional industries, which delays and to some extent also prevents the industrial restructuring needed to boost economic growth.

6. Conclusions, Preliminary Predictions and Discussion of Policy Implications

The purpose of this thesis was to examine if the differences in economic performance existing between the Czech Republic and Slovakia, once unified in the former Czechoslovakia, can be attributed to the period of structural change and the industrial restructuring taking place during the 1995-2004 integration into the EU. To be able to carry out this analysis trade flows between the EU15 and the two countries respectively have been studied to enable a report on the dynamic trade structure and industrial performance emerging from increased integration. In this section a final comparison of the two countries is carried out to answer the fundamental question and derive possible policy implications from the findings of this paper.

Although Slovakia initially started out at a lower level of trade with the EU15 than the Czech Republic both countries have increased EU trade with about 250 per cent between 1995 and 2004. However, while the Czech Republic is a net importer in its EU15 trade relations Slovakia became a net exporter in 1997 with thereafter steadily increasing net exports, indicating improved conditions for economic growth. By calculating RCA values for various industry aggregates the comparative advantages are found to be in the same type of industries for both countries in the initial year of the study. This is not surprising since the industrial structure of the former Czechoslovakia was determined by the CMEA until 1989. However, over the studied period the advantages have weakened in these industries and in Slovakia the most substantial advantage in manufactures with low skill and technology intensity even turned into a disadvantage. Simultaneously other industries were catching up and RCA improvements could be noticed in five industry aggregates with medium skill and technology intensive manufactures even changing their disadvantage into an advantage. The same scenario is visible in the Czech Republic but there medium skill industry improvements were only accompanied by improvements in high skill industries. In both countries the industries catching up are to be found in the aggregate of non-traditional accelerating export industries and they simultaneously constitute substantial fractions of the same.

The most interesting finding of the study concerns export concentration. Whereas in the Czech Republic the T-AEs increased from 1.4 to 4.8 per cent of total exports over the period and the NT-AEs enlarged their importance from 7.4 to 31 per cent of exports the corresponding Slovakian values are conspicuous. Firstly, the 25 T-AEs represent a larger fraction of exports than the 202 NT-AEs and secondly, the concentration to one single commodity group (*SITC 7810: passenger motor cars for transport of passenger and goods*) is significant. The Slovakian NT-AEs represented about 3 per cent of total exports in 1995, increasing to 22 per cent in 2004. The corresponding values for the T-AEs are 10 and 36 per cent, with passenger motor cars standing for slightly more than 30 per cent of total export revenue in 2003. In the Czech Republic this industry was the second most important, representing almost 8 per cent of total exports in 2004. The largest Czech export industry, *SITC 7849: other parts and accessories of motor vehicles*, represented about 9 per cent. It is not only the T-AE aggregate that enjoys a higher concentration in Slovakia. Also the NT-AE and the NON-AE aggregates display higher export concentration. The only commodity aggregates exhibiting about the same low rate of concentration in both countries are low skill and labor intensive manufactures, all other aggregates display higher values of concentration in Slovakia as exports often are dominated by one or a few commodity groups in each aggregate. These structural dynamics are further reflected in the share of IIT between the EU15 and the two countries respectively. Although the patterns are alike with increasing IIT for NON-AEs, decreasing IIT for T-AEs and a U-shaped pattern for NT-AEs Czech IIT shares are markedly larger.

Regarding the economic performance observed in the Czech Republic and Slovakia with a far larger GDP per capita in the Czech Republic but a higher growth rate in Slovakia the comparison above unquestionably provides certain implications. The initial situation with a substantially higher level of EU trade and a more diversified production structure in the Czech Republic (founded already at the initial stage of economic transition with the mass privatization program discussed in subsection 2.3) has most likely provided the country with a first mover advantage compared to its neighbor. Slovakia has, however, managed to boost trade in a few commodity groups and in this way increased export revenue and growth but it seems like the inability to diversify production and the dependence on a few large industries has inhibited the prospects for an even higher growth rate.

The empirical analysis reveals that among the five largest Slovakian export industries, representing almost 50 per cent of total export revenue, four industries also are among the seven largest Czech industries. An industrial diversification into the production of commodities with strong linkages to manufactured goods, machinery and transport equipment and a specialization in products not extensively produced by the Czech Republic would perhaps have helped Slovakia to exploit comparative advantages better. Instead of engaging in competition (where Slovakia almost always loses due to the Czech first mover advantage) the countries could complement each other by producing differentiated commodities with strong linkages allowing for gains from agglomeration and higher levels of IIT.

The Slovakian lock-in of production may moreover inhibit the future prospects for growth even more when labor costs get aligned to the EU level and the low cost advantage shrinks. The advantage of a large and established motor vehicle industry accompanied by important industries like footwear and furniture will most likely be maintained, but if the production structure remains as specialized as today export revenue might stagnate as new lower cost nations join the common market of the EU. A further aspect of the dangerous reliance on a small number of industries in general and on the automotive industry in particular is the growing global environmental concern stressing the threat of carbon dioxide and the importance of environment and climate friendly transports which may increase the demand for other means of transport at the expense of motor vehicles not complying with the raised requirements. By any such incidence would the Czech Republic probably have a greater prospect of maintaining a high growth rate, mainly since the declining industry doesn't constitute such a large part of total exports but also since industrial diversification usually promotes innovation and development of new and superior products.

This paper is limited in scope to the significance of industrial restructuring and its importance for the prospects of economic growth. A substantial reliance on one particular commodity group in total exports in Slovakia is found to might have inhibited economic growth and may also initiate detrimental consequences in the future if progress doesn't keep pace with global requirements. There are, however, other factors beyond the scope of this thesis contributing to the observed development as well. Political and institutional aspects as well as the industrial structure in trade relations with the rest of the world would have been interesting to study but due to the limited time this may instead be the subject of future research.

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Appendix 1 Translation of the SITC Commodity Groups into the Groups of the Skill/Degree of Processing Index

Skill/degree of processing index group	**NPA**=Narrow primary agriculture	**NPM**=Narrow processed minerals, metals and fuels	**PPA**=Processed primary agriculture	**PPM**=Processed primary minerals, metals and fuels
B=labor intensive & resource based manufactures	**C**=Low skill & techn. intensive manufactures	**D**=Medium skill & techn. intensive manufactures	**E**=High skill & techn. intensive manufactures	**F**= Unclassified products

SITC commodity group	**NPA**	**NPM**	**PPA**	**PPM**	**B**	**C**	**D**	**E**	**F**
00 Live animals other than animals of division 03	11-19								
01 Meat and meat preparations	11-29		41-49						
02 Dairy products and birds' eggs	23, 51-52		24-40						
03 Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof	41-60		71-72						
04 Cereals and cereal preparations	11-21, 30-59		22, 60-88						
05 Vegetables and fruit	41-48, 71-79		61-65, 82-89						
06 Sugars, sugar preparations and honey	11		12-20						
07 Coffee, tea, cocoa, spices, and manufactures thereof	11, 21, 41-52		12, 22-30						
08 Feeding stuff for animals (not including unmilled cereals)	11-12		13-19						
09 Miscellaneous edible products and preparations			13-80						
11 Beverages			10-24						
12 Tobacco and tobacco manufactures	11-13		21-23						
21 Hides, skins and furskins, raw			11-20						
22 Oil-seeds and oleaginous fruits	21-39								
23 Crude rubber (including synthetic and reclaimed)	20-32								
24 Cork and wood	40-50, 71-79		60, 81-83						
25 Pulp and waste paper			11-19						
26 Textile fibres (other than wool tops and other combed wool) and their wastes	13-33, 40-81, 83-90		34, 82						
27 Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)		11-89							
28 Metalliferous ores and metal scrap		14-90							
29 Crude animal and vegetable materials, n.e.s.	11-29								
32 Coal, coke and briquettes		21-32							
33 Petroleum, petroleum products and related materials		30		41-54					
34 Gas, natural and manufactured		14-15							
35 Electric current		10							
41 Animal oils and fats			11-13						
42 Fixed vegetable fats and oils, crude, refined or fractionated			32-49						
43 Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.			11-14						
51 Organic chemicals								11-69	
52 Inorganic chemicals				21-22, 41				23-39, 49	
53 Dyeing, tanning and colouring materials								11-35	
54 Medicinal and pharmaceutical products								11-19	
55 Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations								14-43	

SITC commodity group	NPA	NPM	PPA	PPM	B	C	D	E	F
56 Fertilizers (other than those of group 272)								21-29	
57 Plastics in primary forms								21-23	
58 Plastics in non-primary forms								21-52	
59 Chemical materials and products, n.e.s.								11-89	
61 Leather, leather manufactures, n.e.s., and dressed furskins					12-30				
62 Rubber manufactures, n.e.s.							10-89		
63 Cork and wood manufactures (excluding furniture)					30-59				
64 Paper, paperboard and articles of paper pulp, of paper or of paperboard					11-28				
65 Textile yarn, fabrics, made-up articles, n.e.s., and related products					11-97				
66 Non-metallic mineral manufactures, n.e.s.		71-74			11-66				
67 Iron and steel						12-94			
68 Non-ferrous metals				11-99					
69 Manufactures of metals, n.e.s.						11-99			
71 Power-generating machinery and equipment							11-88		
72 Machinery specialized for particular industries							11-84		
73 Metalworking machinery							61-73		
74 General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.							11-99		
75 Office machines and automatic data-processing machines								11-99	
76 Telecommunications and sound-recording and reproducing apparatus and equipment								11-49	
77 Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)							11-58, 81-88	61-68	
78 Road vehicles (including air-cushion vehicles)						51-58	10-49		
79 Other transport equipment						11-19, 31-38		21-29	
81 Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.						21-24			
82 Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings					11-19				
83 Travel goods, handbags and similar containers					10				
84 Articles of apparel and clothing accessories					21-84				
85 Footwear					10				
87 Professional, scientific and controlling instruments and apparatus, n.e.s.								10-49	
88 Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks								11-52	
89 Miscellaneous manufactured articles, n.e.s.					41-47		31-39		21-28, 51-99
91 Postal packages not classified according to kind									10
93 Special transactions and commodities not classified according to kind									10-99
94 Animals, live, n.e.s., including zoo-animals	10								
95 Armoured fighting vehicles, arms of war & ammunit.									10
96 Coin (other than gold coin), not being legal tender									10
97 Gold, non-monetary (excluding gold ores and concentrates)		10							

Source: Wood & Mayer, 2001, Annex 1: Product classification: pp. 75-82 and UNCTAD, 2002, Annex 1 to Chapter III: Growth and Classification of World Merchandise Exports: pp. 87-92

Appendix 2 T-AEs and NT-AEs in Czech and Slovakian Exports

SITC commodity group	Czech Republic		Slovakia	
	T-AE	**NT-AE**	**T-AE**	**NT-AE**
00 Live animals other than animals of division 03		14-15		
01 Meat and meat preparations	14	21, 29		13-14, 21, 41, 49
02 Dairy products and birds' eggs		23, 40, 51	51	23
03 Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof		71-72		44
04 Cereals and cereal preparations	12, 52	11, 40, 51, 81, 84	30, 59	11, 22, 40, 70, 84, 88
05 Vegetables and fruit		41, 44, 71-73, 75, 83		44, 46, 71, 73, 75-77, 79, 82, 89
06 Sugars, sugar preparations and honey	11	12, 19-20		12, 19
07 Coffee, tea, cocoa, spices, and manufactures thereof		11-12, 22, 30, 41-42		11, 22, 30
08 Feeding stuff for animals (not including unmilled cereals)		12		14
09 Miscellaneous edible products and preparations		13, 80		
11 Beverages		10, 22, 24		10, 24
12 Tobacco and tobacco manufactures		21-23		11-13, 21-23
21 Hides, skins and furskins, raw		14		16
22 Oil-seeds and oleaginous fruits	24	34		34
23 Crude rubber (including synthetic and reclaimed)				
24 Cork and wood		40	50, 60	
25 Pulp and waste paper	11			11
26 Textile fibres (other than wool tops and other combed wool) and their wastes		54, 59, 66		66, 81, 87
27 Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)		13, 41		33, 41
28 Metalliferous ores and metal scrap		15, 71, 74		72, 79
29 Crude animal and vegetable materials, n.e.s.		29		19, 22
32 Coal, coke and briquettes				
33 Petroleum, petroleum products and related materials	30, 52		52	30
34 Gas, natural and manufactured				13
35 Electric current		10		10
41 Animal oils and fats				11
42 Fixed vegetable fats and oils, crude, refined or fractionated		32, 34-35, 41-42	36, 39	33
43 Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.		12		12
51 Organic chemicals		55		11-12, 14, 22, 48, 55
52 Inorganic chemicals		23, 33, 41		21, 23, 33
53 Dyeing, tanning and colouring materials				23, 34-35
54 Medicinal and pharmaceutical products				16-17, 19
55 Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations		41-42		
56 Fertilizers (other than those of group 272)		22-23		
57 Plastics in primary forms				
58 Plastics in non-primary forms		27, 29, 36, 51		26, 35, 37-38, 49, 52
59 Chemical materials and products, n.e.s.		21, 82, 89		11, 13, 21, 82
61 Leather, leather manufactures, n.e.s., and dressed furskins		12		12, 16, 21, 29
62 Rubber manufactures, n.e.s.	51		52-53	81, 89
63 Cork and wood manufactures (excluding furniture)				30, 41
64 Paper, paperboard and articles of paper pulp, of paper or of paperboard		17, 28	13, 16, 28	22
65 Textile yarn, fabrics, made-up articles, n.e.s., and related products	17	11, 14, 31, 42-43, 72-73, 95-96		15-16, 32, 41, 43, 49, 71, 76-77, 79, 83, 95-96
66 Non-metallic mineral manufactures, n.e.s.	46-47	42, 71, 74		31, 41-42, 44, 46-48, 74

SITC Commodity group	CZ T-AE	CZ NT-AE	SLO T-AE	SLO NT-AE
67 Iron and steel	60	47	47	13, 24, 31, 60
68 Non-ferrous metals		72, 91, 99		52, 61, 63, 72
69 Manufactures of metals, n.e.s.	32	75, 96	31, 98	53, 75, 91, 96, 99
71 Power-generating machinery and equipment	39	11, 19, 26, 32, 44, 49		33, 38-39, 44, 61, 63, 69, 87
72 Machinery specialized for particular industries		47, 51-52, 84		33, 47, 52, 63-64, 71-72, 83
73 Metalworking machinery				62, 72-73
74 General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.		12, 15, 21, 23, 29, 31, 34, 51, 91	91, 93	11, 14-15, 21, 23, 31-32, 34, 52, 92
75 Office machines and automatic data-processing machines		12, 22-23, 25, 99		12, 18, 25, 91
76 Telecommunications and sound-recording and reproducing apparatus and equipment	31	11-12, 21, 28, 38, 41, 43, 48-49		11, 28, 31, 38
77 Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	83	23, 32, 42, 51-54, 64, 84	51	11-12, 21, 42, 53-54, 62, 64, 68, 82-83, 88
78 Road vehicles (including air-cushion vehicles)		31-32, 49	10	31, 42, 52
79 Other transport equipment		24, 29, 33	15, 29	21-22, 31, 38
81 Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.		21		21
82 Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings			12	
83 Travel goods, handbags and similar containers				
84 Articles of apparel and clothing accessories				65
85 Footwear				
87 Professional, scientific and controlling instruments and apparatus, n.e.s.		31-32, 41, 43, 45		31-32, 43, 48-49
88 Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks		11, 21	13	11, 42, 51-52
89 Miscellaneous manufactured articles, n.e.s.		22, 28, 74, 96		22, 24, 28, 32, 41, 74, 83, 94, 96
91 Postal packages not classified according to kind				
93 Special transactions and commodities not classified according to kind				
94 Animals, live, n.e.s., including zoo-animals				
95 Armoured fighting vehicles, arms of war & ammunit.			10	
96 Coin (other than gold coin), not being legal tender				
97 Gold, non-monetary (excluding gold ores and concentrates)				

Source: Own calculations based on OECD data