

INTERNATIONAL DIVISION OF LABOUR IN THE CONTEXT OF GLOBALISATION: THE CASE OF THE CZECH REPUBLIC

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Abstract:

Division of labour is the specialization of cooperative labour in specific, circumscribed tasks and roles, intended to increase the productivity of labour. Historically the growth of a more and more complex division of labour is closely associated with the growth of total output and trade, the rise of capitalism, and of the complexity of industrialization processes. The revealed comparative advantage (RCA) measures the intensity of trade specialisation of a country within the world. We try to analyse Czech foreign trade on the base of indices of revealed comparative advantage with respect to world exports into the EU-27 and with the EU-27 Member states and over time. Most important Czech export and import products into EU are different kinds of machines, electrical equipment, and transport vehicles (car industry) and related parts. Presented analysis also indicates that Czech Republic has revealed comparative advantage in SITC sections of 6 a 7 only.

Keywords: division of labour, comparative advantage, absolute advantage, revealed comparative advantage, Czech Republic.

JEL Classification: F10, F23, F41

1. Introduction

In general, trade liberalisation has substantial effects on the location of economic activities (especially on division of labour). Differences in comparative advantage across countries determine specialisation patterns at the inter-country level, while at intra-national level the forces of new economic geography are at work.

This paper aims to examine Czech Republic's relative competitiveness and to compare the structure of specialization in trade vis-à-vis world exports to the EU-27 and exports within the EU-27 Member States. The empirical analysis is based on Balassa's revealed comparative advantage (RCA) index. The paper is structured as follows. First, we discuss theoretical concept of division of labour and absolute and comparative advantage in Section 2. To provide background for the analysis, an overview of Czech Republic's foreign trade structure is presented briefly in Section 3. In Section 4 indices of revealed comparative advantage are developed to examine Czech RCA with respect to world exports into the EU-27 and with the EU-27 Member States and over time. Conclusions are included in Section 5.

2. Division of labour and comparative advantage

The theory of comparative advantage is perhaps the most important concept in the international trade theory. An economic advantage is when one person or group can produce a given result with more economy than another. This is very general, and can be broken down into categories: labour advantage is when production can be carried out at lower labour cost (other things being equal); capital advantage, capital; rent/space advantage, rent (Guillory 2005).

The early logic that free trade could be advantageous for countries was based on the concept of absolute advantages in production. Adam Smith wrote in *The Wealth of Nations* „If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage“ (Smith 1998, 595). He argued that it was impossible for all nations to become rich simultaneously by following mercantilist prescriptions because the export of one nation is another nation's import. However, all nations would gain simultaneously if they practiced free trade and specialized in accordance with their absolute advantage. The idea here is simple and intuitive. If our country can produce some set of goods at lower cost than a foreign country, and if the foreign country can produce some other set of goods at a lower cost than we can produce them, then clearly it would be best for us

to trade our relatively cheaper goods for their relatively cheaper goods. In this way both countries may gain from trade.

Division of labour and specialization occupy a central place in Smith's writing. More direct precursors of Smith on doctrines of the division of labour of course are Petty, Mandeville, Hutcheson and the French Encyclopedists among others. The extent to which Smith's celebrated division of labour principle was directly inspired by the French Encyclopedie has long been a focus of controversy. It cannot be denied after all that the three major advantages of labour specialization Smith famously identified, namely, increase in dexterity in every particular workman, saving of time in passing from one job to another, and invention of machines (Sun 2005). But Smith appears to be the first author to be well aware of the other side of the coin: division of labour plays a crucial role in determining the extent of the market.

For instance, in Smith's theory of the division of labour, differences between individuals of different occupations, "*is not upon many occasions so much the cause, as the effect of the division of labour*" (Smith 1998, 32). As such, the Smithian endogenous comparative advantage sharply differs from many, including notions attributed to Plato and other Greeks, before him as well as many influential ones like the Ricardian exogenous comparative advantage as the cause of division of labour after him (Sun 2005). Smith's absolute advantage is determined by a simple comparison of labour productivities across countries.

The division of labour has also international dimension as Smith wrote: "*The most opulent nations, indeed, generally excel all their neighbours in agriculture as well as in manufactures; but they are commonly more distinguished by their superiority in the latter than in the former*" (Smith 1998, 20).

Though Smith successfully established the case for free trade, he did not develop the concept of comparative advantage. Because absolute advantage is determined by a simple comparison of labour productivities, it is possible for a nation to have absolute advantage in nothing. Adam Smith, however, was much more concerned with the role of foreign trade in economic development and his model was essentially a dynamic one with variable factor supplies.

David Ricardo was concerned with the static resource allocation problem when he defined the concept of *comparative advantage*, which is determined not by absolute values of labour productivity but by labour productivity ratios. At first glance, there is no reason to think that A, with absolute advantage against B in goods X and Y, would wish to trade either X or Y with B. Another worry is that if B trades in either X or Y with A, he might harm his interests. These initial impressions are completely exploded by considering the nature of trade, and Ricardo's discovery of the law of comparative advantage. It is not absolute advantage that is relevant when considering the gains to trade - it is comparative advantage. That is, if A enjoys absolute advantage, it is still in a position such that the cost of foregoing production of enough units of Y to produce a unit of X means that it would be willing to trade X for Y at a ratio that is favorable to his position. The same is true for B, and if these ratios are not equal, then the direct benefits of trade emerge.

To measure the comparative advantage, Balassa (1965) suggested that comparative advantage could be "revealed" by observed trade patterns that reflect differences in factor endowments across nations. Balassa constructed an index that measures a country's revealed comparative advantage (RCA). Formally the original Balassa index (BI) is presented as:

$$BI = (x_{ij}^k / X_{ij}) / (x^k / X)$$

where x_{ij}^k represents exports of product k from country i to country/region j , X_{ij} is total exports from country i to the reference group, x^k is the reference group's exports of good k , X is the reference group's total exports and EX refers to export shares being used to compute the index. If the index is greater than one for product k , the country is said to have comparative advantage in exports of that good.

Based on Balassa's original concept and Benedicts and Tamberi (2001), two measures of competitive advantage are developed in the paper. The first index (RCA_1) aims to measure Czech Republic's exports advantage with respect to world exports into the EU-27. To measure Czech Republic and Turkey exports advantage with respect to world exports into the EU-27. Formally the index is presented as:

$$RCA_1 = (x_{czi} / x_{cz}) / (X_{wi} / X_w)$$

Where RCA_i denotes revealed comparative advantage index of Czech's industry i to the EU-27, x_{czi} is Czech exports to the EU-27 in industry i , X_{wi} is world industry i 's exports to the EU-27; x_{cz} indicates total Czech exports to the EU-27, and X_w is the world exports to the EU-27.

It does not, however, explain what is behind the comparative advantage. A simple index could not explain an issue as complex as why one nation has a comparative advantage in a given product while another nation does not. The approach taken here seeks to determine to what extent the revealed comparative advantages of two countries in any one market converge. Comparative advantage is "revealed" by observed trade patterns, and in line with the theory, one needs pre-trade relative prices which are not observable. Thus, inferring comparative advantage from observed data is named "revealed" comparative advantage (RCA). In practice, this is a commonly accepted method to analysing trade data (Utkulu and Seymen 2004).

3. Development of Czech foreign trade

Over the last 30 years, the main feature of international trade has been the integration of East Asian economies („Asian Tigers“) into world trade. The emergence of China on the world trade stage in the 80's and 90's seems to have brought an additional boost to the international division of labour (Betschart *et al.* 2005). Another group of countries which have been integrated into world trade, especially into European trade, were ten countries in Central and East Europe during the 90's (see Misztal 2007). During this decade they have made radical economic reforms and have re-integrated themselves rapidly into Western Europe in terms of foreign trade and foreign direct investment (FDI) which have statistically significant impact on GDP growth (for more detailed analysis see Arfaaoui and Abaoub 2010). These countries applied for EU membership and signed association agreements, which liberalised most trade with EU in industrial products (Freudenberg and Lemoine 1999). In sum, the pattern of intra-firm trade that has emerged between Germany and Eastern Europe on the one hand and Austria and Eastern Europe on the other, suggests that some of the Eastern European countries like Hungary, Poland, the Czech and Slovak Republic, Romania, Bulgaria and Russia have clearly become new members in the international division of labour (Marin 2005).

For most Western European economies, globalisation is more of an opportunity than a great because their exports do not compete head-to-head with exports from the emerging countries. For example, the EU15 is strong on high-value-added engineering, pharmaceuticals and services, which are not strong points for the dynamic Asian exporters. Southern and Eastern European economies are more exposed because they are competing for similar businesses, namely the low-wage assembly operations of global production chains. They are also vulnerable because they have a large pool of unskilled labour that is harder to shift into high-value-added, high-tech products. The driving force of the division of labour into two economic zones of 'core' and 'periphery' is global capitalism, as enacted through the strategies of some of the main actors in the globalization process – transnational and multinational corporations (McCallum 1999). The 'core' is situated in the first zone of the advanced industrial states (Old EU Member States and Japan and United States). The 'periphery' is situated in the second zone of the developing countries (New Member States). Transnational companies whose headquarters are based in the core states are utilising increasingly accessible labour from the peripheral states as part of the growing phenomenon of sourcing labour from a global base. The reason this is happening is that globalisation provides an opportunity for international capitalists, through their Transnational Corporations (TNCs), to maximise profits through the use of low cost, low- skilled labour. An increasing polarisation of the core and the periphery results from this use of labour (McCallum 1999).

Industries can be divided into five basic categories according to properties used in the process of production (Widgrén 2005). Category 1 is characterised by a high share of wages in value added, very high average wages, and a very high proportion of white-collar workers. These are typically high-tech industries where human capital is used intensively in production. Category 2 comprises production activities intensive in human capital, but low physical capital intensity. This category includes industries which have a relatively low level of investment relative to value added, high wages, and a high share of wages in value added. Manufacturers of electrical machinery and equipment serve as an example from this category. Category 3 includes production intensive in labour and which uses relatively little capital. Average wages are low, and there is a low level of investment and a high share of wages in value added. An example from this category is textiles and apparel industry. Category 4

includes industries that are intensive in labour and capital. These industries have a high level of investment, relatively low wages, a low proportion of white-collar workers, and an intermediate share of wages in value added. Automobile manufacturing, for instance, falls under this category. Category 5 is dominated by the forest and food-processing industries that are intensive in both physical and human capital. Also the paper industry belongs to this category.

The present analysis is based on OECD RCA indicator and on the annual time series data on EU-27 exports and imports, compiled by EUROSTAT. The data have been collected at 1 and 2-digit Standard International Trade Classification (SITC) over the period of years 1999 to 2006 or 2008. SITC is a statistical classification of the commodities entering external trade. It is designed to provide the commodity aggregates required for purposes of economic analysis and to facilitate the international comparison of trade-by-commodity data. While the OECD uses a wide range of SITC sections (0-Food and live animals; 1-Beverages and tobacco; 2-Crude materials, inedible, except fuels; 3-Mineral fuels, lubricants and related materials; 4-Animal and vegetable oils, fats and waxes; 5-Chemicals and related products, n.e.s.; 6-Manufactured goods classified chiefly by material; 7-Machinery and transport equipment; 8-Miscellaneous manufactured articles; 9- Commodities and transactions not classified elsewhere in the SITC). Eurostat introduced classification of 6 sub-sections (0+1 Food, drinks and tobacco; 2+4 Raw material, 3 Mineral fuels, lubricants and related products, 5 Chemicals and related products; 6 +8 Other manufactured products and 7 Machinery and transport equipment). In this study, we use both approaches, because both databases do not provide all the necessary data for the detailed analysis.

Figure 1 illustrates development of Czech foreign trade with world. Both volume of exports and imports has risen yearly between the years 1999 and 2008. Volume of imports was higher than volume of exports every year till 2005. Trade balance has become positive from this year.

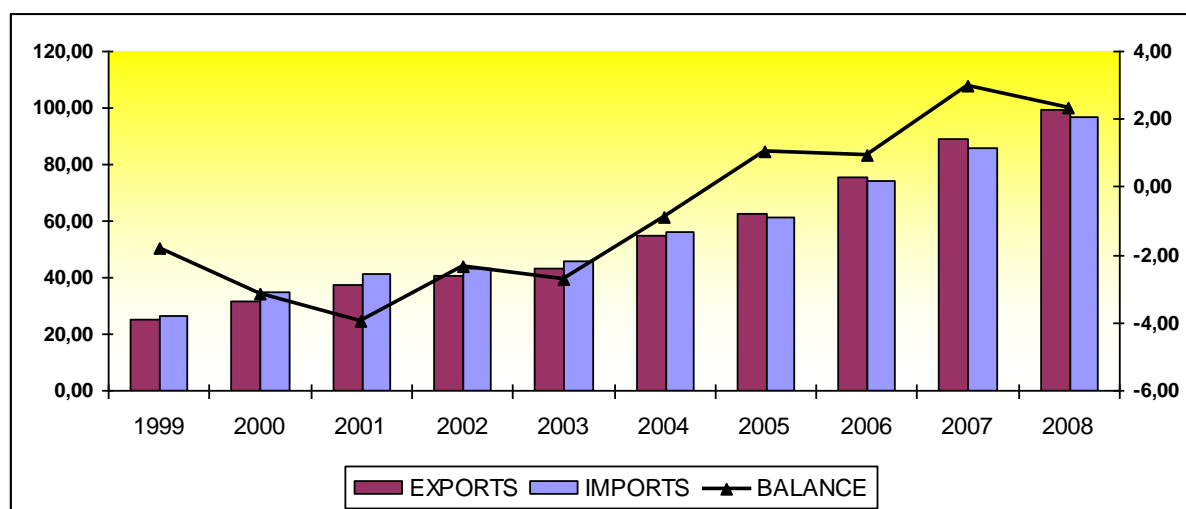


Figure 1. Development of Czech foreign trade

Source: Eurostat

The next table represents trade volume indices by declaring country. The value index is calculated as the percentage change between the trade value of the current month and the average monthly trade value of the previous year. Growth of Czech external trade (% change reached 148 % in the year 2008 against the year 2000) belonged to the highest ones in the group of new Member States (see Table 1).

Table 1. Export volume index (2000=100)

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	Change in %
European Union (27 countries)	100.0	102.9	104.9	106.3	116.6	125.1	133.3	140.6	144.3	44.3
Bulgaria	100.0	111.0	119.6	133.7	148.7	165.7	182.7	196.8	209.9	109.9
Czech Republic	100.0	112.6	121.7	129.1	160.5	175.3	204.5	235.6	248.7	148.7
Estonia	100.0	101.9	106.2	121.7	143.9	181.7	219.8	218.7	218.2	118.2
Cyprus	100.0	110.6	107.2	104.4	188.9	284.9	245.0	229.4	222.4	122.4
Latvia	100.0	110.0	117.9	131.1	156.4	201.0	225.6	252.1	272.9	172.9
Lithuania	100.0	126.3	147.1	162.7	194.2	234.2	258.2	268.9	316.3	216.3
Hungary	100.0	111.0	121.5	128.4	150.6	169.2	201.0	231.5	238.8	138.8
Malta	100.0	80.0	81.4	81.5	85.5	86.4	97.8	96.9	84.1	-15.9
Poland	100.0	112.2	121.6	136.8	165.7	188.7	222.3	247.9	262.9	162.9
Romania	100.0	110.0	126.3	137.0	156.9	172.4	188.6	213.4	228.4	128.4
Slovenia	100.0	106.4	113.1	118.2	133.3	150.8	174.2	200.0	205.2	105.2
Slovakia	100.0	110.2	121.5	148.4	159.6	172.5	215.8	270.0	303.5	203.5

Source: Eurostat

We can use for more detailed analyses of Czech foreign trade development through the standardized SITC classification. Not all commodities had increasing trend with the same intensity in volume of exports during the period between the years of 1999 and 2008 (Figure 2). A growth of exports was the most pronounced characteristic of the section Machinery and transport equipment and other manufactured products. For other sections, it has recorded only a slight increase in the volume of exports. A similar pattern was observed on the import side (see Figure 3).

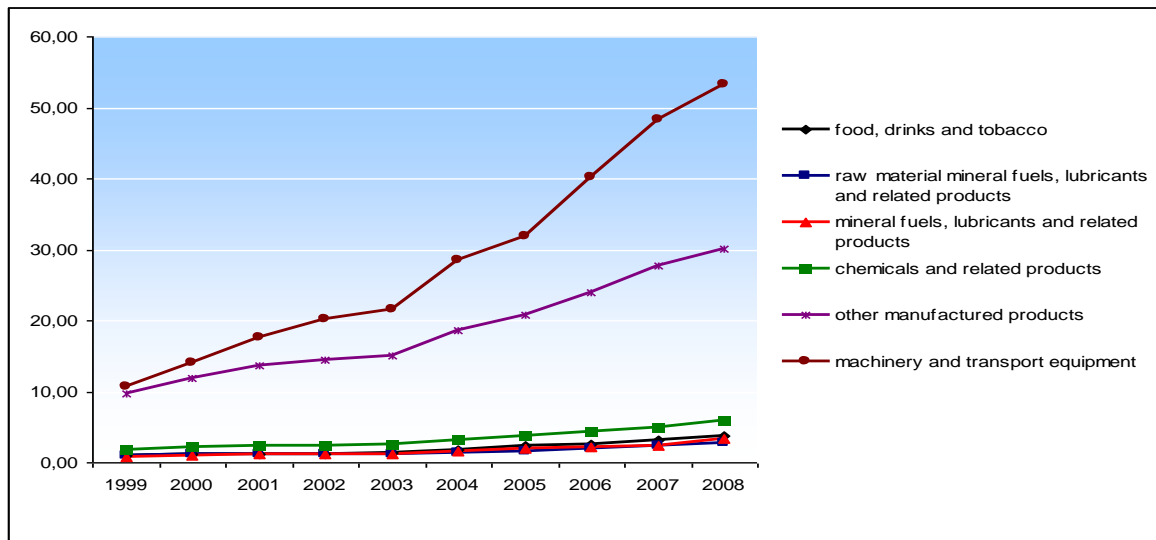


Figure 2. Development of Czech exports according SITC classification (in 1000 million Euro)

Source: Eurostat

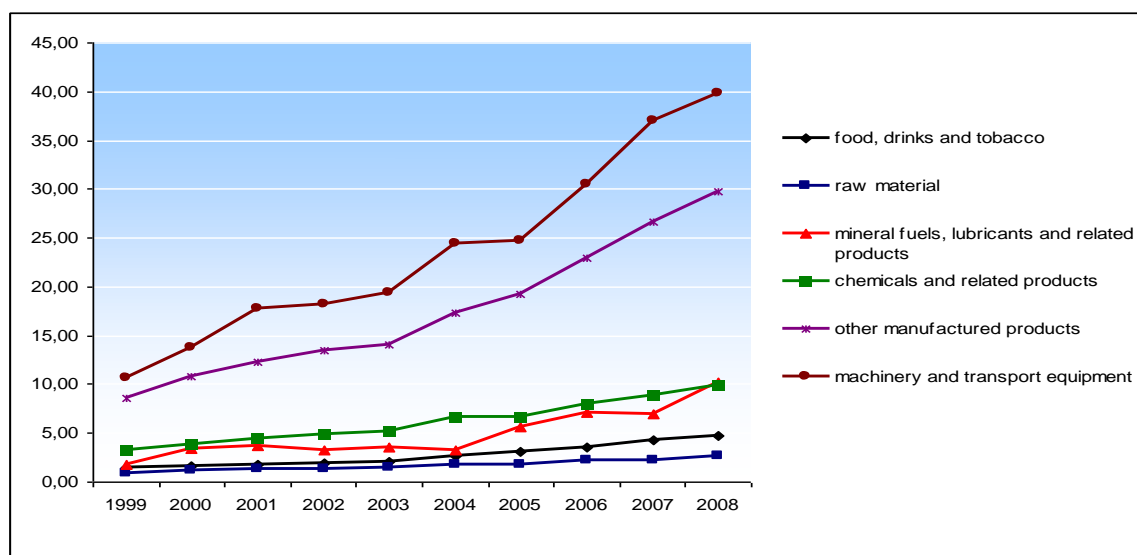


Figure 3. Development of Czech imports according SITC classification (in 1000 million Euro)

Source: Eurostat

An attractive look at the development of the Czech Republic exports to the EU-27 offers next table that summarizes the evolution of exports by SITC classification, respectively it includes the contribution of individual sections in total exports to the EU-27. From this it is clear that the EU internal market represents for Czech exporters foreign destination “number one” for their products in all these SITC sections, when this share does not fall below 70%. For some sections (2 +4 and 3) is even close to 100%. So strong orientation of Czech exports to the EU market, however, presents some risks for the Czech economy, especially in the case of such an outbreak of European economic recession, as they did in the last year.

Table 2. Share of Czech exports into EU-27 in total Czech exports

SITC section	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
0+1	0.59	0.61	0.62	0.65	0.68	0.73	0.73	0.76	0.76	0.76
2+4	0.94	0.93	0.92	0.91	0.91	0.91	0.88	0.91	0.92	0.93
3	0.95	0.95	0.94	0.95	0.97	0.97	0.98	0.97	0.97	0.97
5	0.84	0.82	0.82	0.80	0.81	0.81	0.78	0.80	0.80	0.80
6+8	0.88	0.87	0.86	0.86	0.86	0.87	0.85	0.85	0.85	0.86
7	0.88	0.85	0.87	0.86	0.88	0.88	0.86	0.86	0.85	0.84

Source: Eurostat

Table 3 illustrates the structure of Czech Republic’s trade presenting industry’s share with respect to total trade. As is evident from Table 2, the most noticeable element is dominance of machinery and transport equipment in the share of exports. Its share 43 % in 1999 has been increasing steadily to the year 2007 with 54 %. Then the share of this industry has fallen slightly to 53 % in 2008. Indeed, automobile industry was the main driving force of massive economic growth from 2003 to 2008. Second important export industry was manufactured goods classified chiefly by material. Its share has fallen from 26 % in 1999 to 20 % in 2008.

Table 3. Share of SITC categories in Czech commodity trade with the EU

Exports	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Food and live animals	0.02	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
Beverages and tobacco	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Crude materials, inedible, except fuels	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
Mineral fuels, lubricants and related materials	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.04
Animal and vegetable oils, fats and waxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chemicals and related products	0.07	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.06
Manufactured goods classified chiefly by material	0.26	0.25	0.24	0.23	0.22	0.22	0.21	0.20	0.20	0.20
Machinery and transport equipment	0.43	0.44	0.47	0.50	0.51	0.52	0.51	0.53	0.54	0.53
Miscellaneous manufactured articles	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11
Commodities and transactions not classified elsewhere in the SITC	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00

Source: Eurostat

The following table shows the influence of individual divisions (SITC 2 digit code) on the trade balance in the year 2007. Definitely the greatest positive impact to exports had division "Road vehicles" with almost five times larger value than other divisions. The significant difference is caused in particular by the massive FDI in-flows in this sector during last decade. In the divisions, which had a negative influence on the development of trade balance, there is not as noticeable difference as in the previous case. Dominating divisions were "Petroleum, petroleum products and related materials", "Non-ferrous metals" and "Gas, natural and manufactured," which is a logical consequence of the Czech Republic's energy dependency on imports from abroad.

Table 4. SITC divisions with the most influence on trade balances (in billions CZK, current prices)

Positive influence			Negative influence		
SITC Division	Balance		SITC Division	Balance	
78	Road vehicles (including air-cushion vehicles)	204.2	33	Petroleum, petroleum products and related materials	-105.2
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	39.2	68	Non-ferrous metals	-53.6
69	Manufactures of metals, n.e.s.	32.5	34	Gas, natural and manufactured	-48.0
66	Non-metallic mineral manufactures, n.e.s.	27.5	54	Medicinal and pharmaceutical products	-38.0
75	Office machines and automatic data-processing machines	23.9	67	Iron and steel	-28.2
62	Rubber manufactures, n.e.s.	23.0	57	Plastics in primary forms	-21.0
82	Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	20.4	05	Vegetables and fruit	-20.3
35	Electric current	16.3	58	Plastics in non-primary forms	-16.4
81	Prefabricated buildings; sanitary,	14.5	59	Chemical materials and products,	-14.2

Positive influence			Negative influence		
SITC Division	Balance		SITC Division	Balance	
	plumbing, heating and lighting fixtures and fittings, n.e.s.		n.e.s.		
32	Coal, coke and briquettes	13.1	01	Meat and meat preparations	-10.0
24	Cork and wood	11.5	53	Dyeing, tanning and colouring materials	-10.0
72	Machinery specialized for particular industries	10.9	52	Inorganic chemicals	-6.6
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)	10.5	87	Professional, scientific and controlling instruments and apparatus, n.e.s.	-5.9
89	Miscellaneous manufactured articles, n.e.s.	10.4	84	Articles of apparel and clothing accessories	-5.7
76	Telecommunications and sound-recording and reproducing apparatus and equipment	10.1	07	Coffee, tea, cocoa, spices, and manufactures thereof	-5.7

Source: Czech Statistical Office

4. Revealed comparative advantage

The revealed comparative advantage (RCA) measures the intensity of trade specialisation of a country within the world. The calculation according to OECD is as follow: export share of a product (SITC) of the total exports (of goods) of a country divided by the export share of this product (or type of goods) of the region or the world. If the RCA takes a value less than 1 this implies that the country is not specialised in exporting the product (type of goods). The share of that category of goods (SITC) within the total exports of goods of this country is less than the corresponding world share. Similarly if the index exceeds 1 this implies that the country is specialised in exporting this type of goods. Figure 4 represents changing trends of revealed comparative advantage of the Czech Republic's exports over time. As is seen from the graph the only two sections, which have RCA index higher than 1, are SITC 6 "Manufactured goods classified chiefly by material" and SITC 7 "Machinery and transport equipment". But the trends were different. While the RCA of section SITC 6 fell significantly from 1.874 in year 2000 to 1.471 in year 2006, the RCA of SITC 7 rose from 1.05 in year 2000 to 1.385 in year 2006 (see Figure 4).

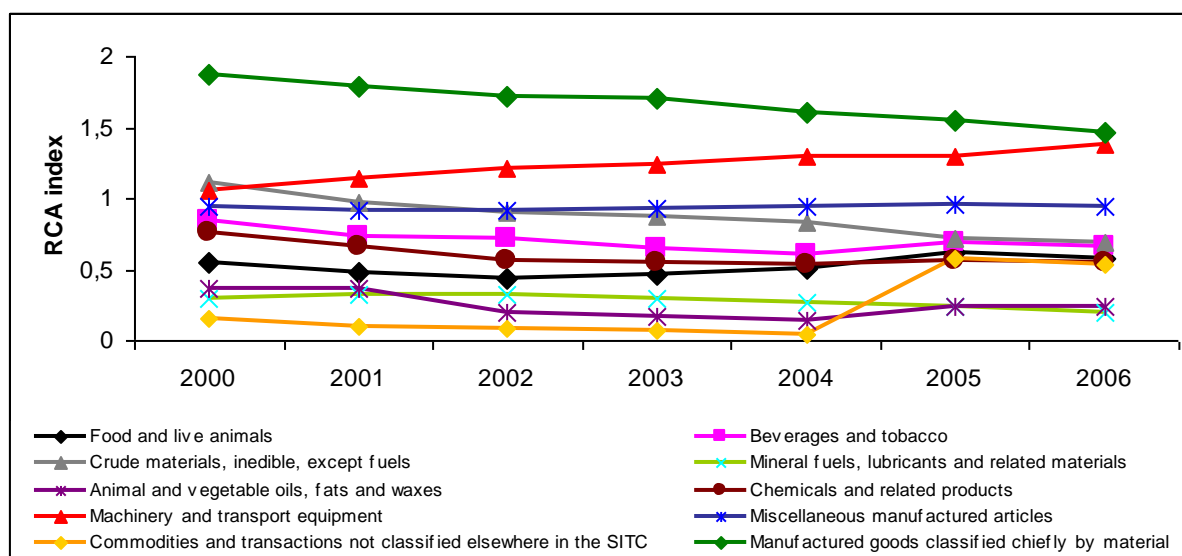


Figure 4. Changing trends of revealed comparative advantage over time

Source: OECD

The next two figures represent development of RCA for sections “Machinery and transport equipment” and “Manufactured goods classified chiefly by material” (2 digits SITC code). First one illustrates development of section “Manufactured goods classified chiefly by material” (division codes 61-69). With exception of divisions “Leather, leather manufactures and “Non-ferrous metals”, all divisions had their RCA value higher than 1, so Czech exports had RCA in these products. In addition, we can observe decline of values for division “Non-ferrous metals”, “Non-metallic mineral manufactures, n.e.s.” and “Manufactures of metals, n.e.s.”. The highest RCA value had division “Rubber manufactures” with the value 3.015 in 2006.

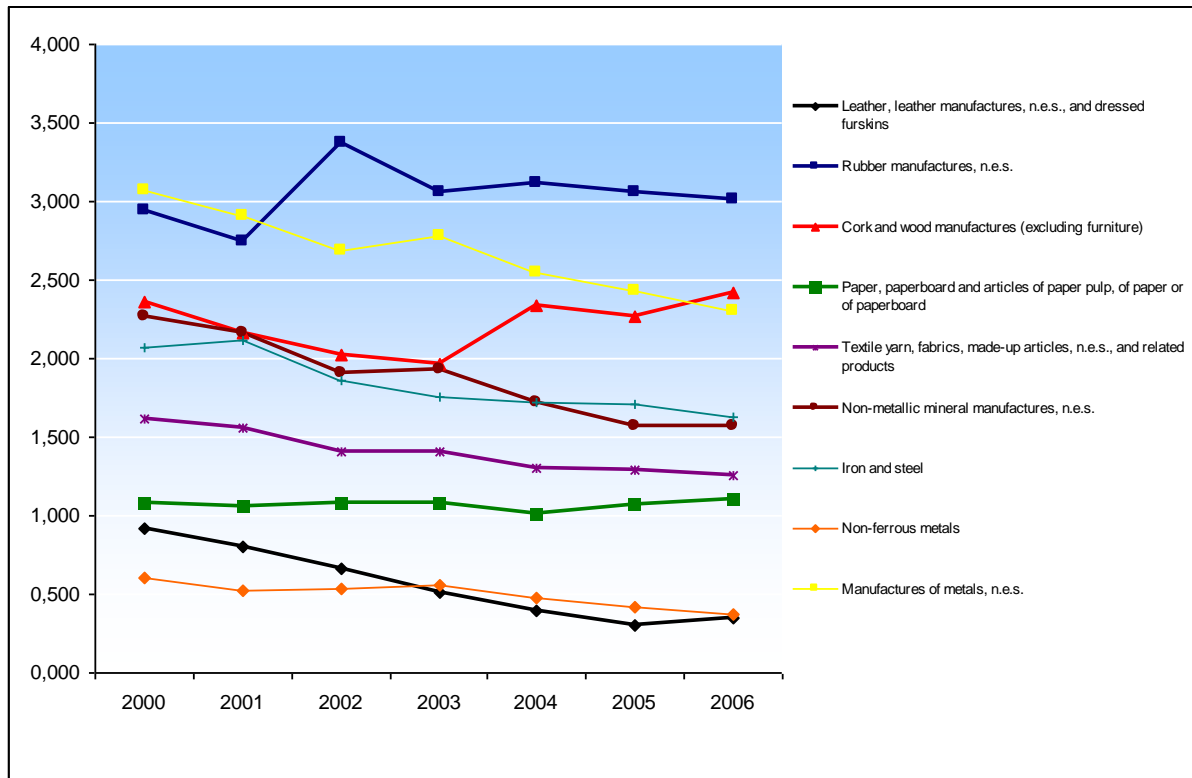


Figure 5. Changing trends of revealed comparative advantage over time for category Manufactured goods classified chiefly by material

Source: OECD

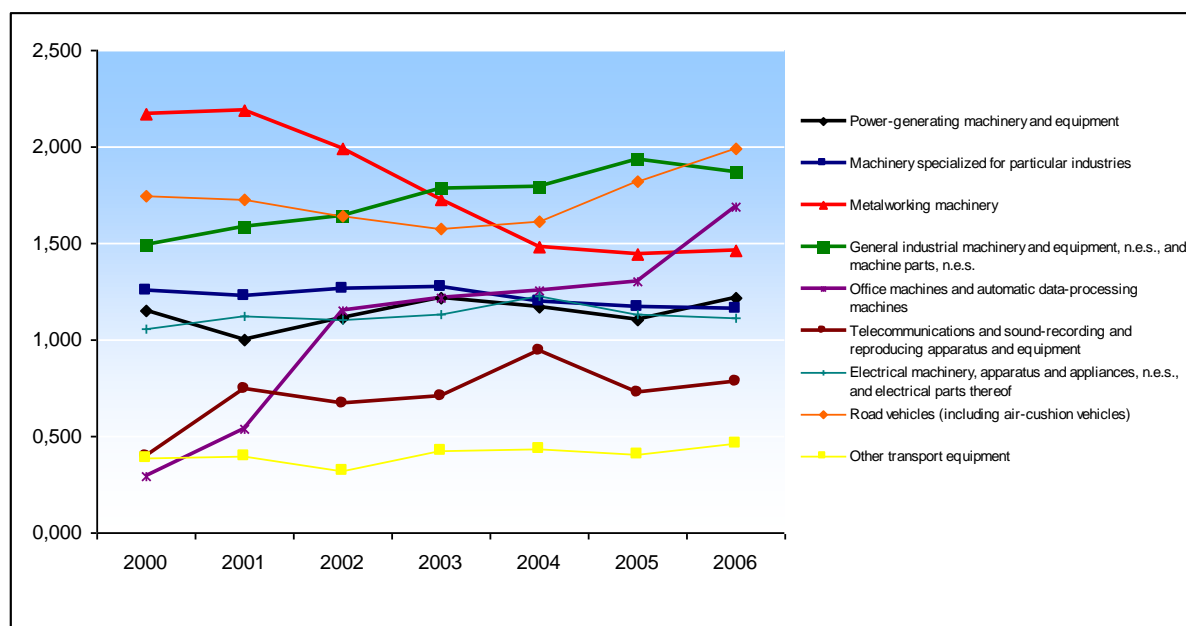


Figure 6. Changing trends of revealed comparative advantage over time for category Machinery and transport equipment

Source: OECD

Development of a SITC section 7 was different to the previous section 6. During the reporting period, the development of this group was quite volatile. For some divisions the value of RCA increased significantly (Office machines and automatic data-processing machines or Road vehicles). For other divisions, the value of RCA stagnated during the period (Machinery specialized for particular industries or Electrical machinery, apparatus and appliances, nes, power-generating machinery and equipment or Other transport equipment). Division Metalworking machinery again went through a significant decline in the value of RCA (see Figure 6).

5. Conclusions

We have presented an analysis of competitiveness of Czech exports in a relation of world and EU trade. We have used revealed comparative advantage (RCA) and standard trade indicators as well. The European Union is by far the most important trading partner of the Czech Republic. The Czech Republic's most important EU export and import products are different kinds of machines, electrical equipment, and transport vehicles (car industry) and related parts. Presented analysis also indicates that Czech Republic has revealed comparative advantage in SITC sections of 6 a 7 only. However, RCA value of section 6 has dropped during observed period. These results complement recent studies which, using price and cost based methods, have found that these industry sectors are internationally competitive. This conclusion can also be derived from the massive inflow of FDI in these sectors over the past decade. It suggests that the Czech Republic has succeeded relatively well in transforming its economy from socialist structures twenty years ago into competitive private ownership today. However, high share of above mentioned commodities in total exports may pose a threat in case of foreign demand shocks, when exports may decline significantly and through this channel an economic crisis may be imported into the Czech economy.

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