

Sectoral analysis of the Czech Republic imports from China and its comparison with other CEE countries

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Abstract

Czech Republic, similarly to most European countries, runs a huge trade deficit with the People's Republic of China. However, the Czech trade deficit is triple of European Union average and larger than deficit of any similar country in Central and Eastern Europe. Rather than looking at the export side of the deficit we look at imports: could it mean that the Czech Republic is a gate for Chinese imports into the European Union and Chinese imports are used in further manufacturing? In a series of tests we analyze various aspect of the trade deficit, comparing Czech Republic imports with that of EU-15 countries, Poland, Hungary and Slovakia. The result very clear: Czech Republic imports from China does show a very different behavior from imports of other countries. Not only are the Chinese imports into the Czech Republic much larger as a percentage of its GDP, they also show a sectoral structure of imports highly geared towards investment goods and products used for further manufacturing. Gruber-Lloyd intra-industry trade index calculated for Czech – China trade shows the lowest values of all tested countries. All these findings confirm (a very optimistic) hypothesis that Czech Republic is an interesting location for Chinese expansion into the European Union markets.

Keywords: international trade, trade deficit, China, balance of foreign trade, intra-industry trade, sectoral analysis, Gruber-Lloyd index

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The third wave of internationalization

Export performance of the People's Republic of China has grown dramatically in just three decades since the start of economic and political reforms in the PRC at the end of the seventies. During the last decade, however, nature of China's exports to EU countries has fundamentally changed. In the eighties and nineties Chinese imports were dominated by consumer goods, within a relatively narrow groups of labor intensive products, such as clothes or toys. At the turn of the millennium, office and telecommunications equipment, including computers became dominant commodities. Manufacturing in China became indispensable part of production chain of American, Japanese and European multinational corporations. In recent years, particularly since the outbreak of the financial crisis of 2008, there has been one more fundamental change: Chinese companies began direct investment in the European Union, in order to build up their distribution and manufacturing presence. These investments include both the purchase of existing firms (often in financial difficulties), including their brands and know-how as well as construction of new production facilities. Purchase or construction of production capacities for the production of final products will undoubtedly change the structure of Chinese exports to the EU. China will export broader portfolio of products, including an increasing proportion of imported components. The presence of Chinese manufacturing and logistics companies will bring even greater presence of Chinese companies that provide them with needed services: banking, transportation, catering, providing legal or financial advisory.

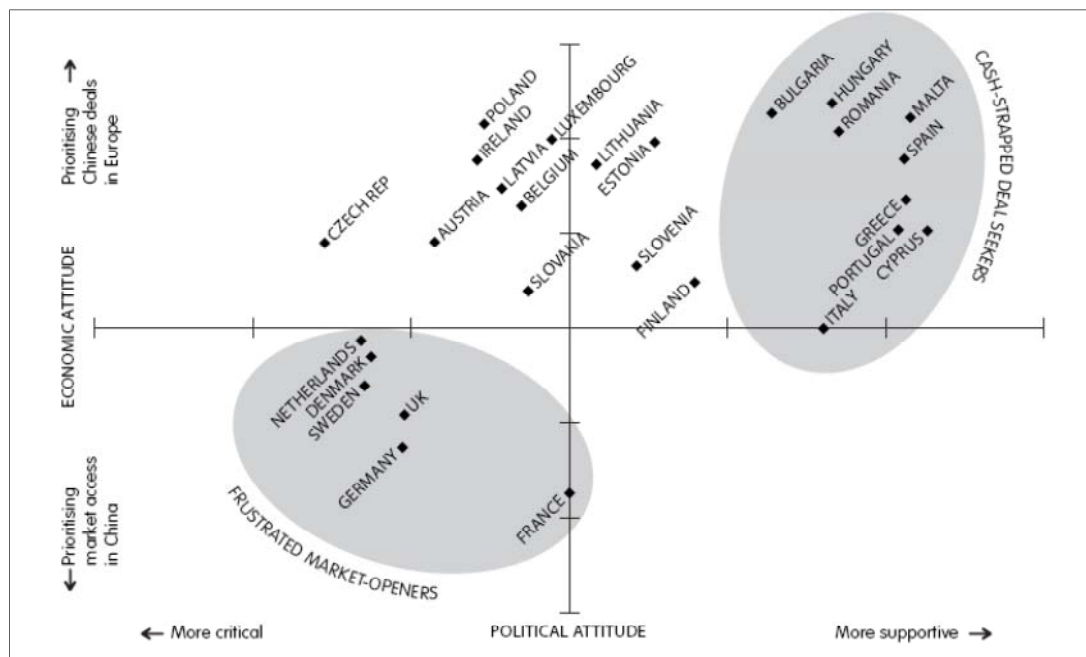
This trend to expansion of Chinese home-grown companies, existing in the whole world, a new term "third wave of internationalization" was coined. It first appeared in book "International Business Marketing in Emerging Country Markets: The Third Wave of internalization of Firms" (Jansson, 2007) describes the increasing importance of large companies from emerging countries in the world economy. The first wave of internationalization took place between the late 19th century and 1970s, and the internationalization process comprised of market economies in Europe and North America. The second wave included Japanese and South Korean companies. These firms boomed at the same time when European and American companies expanded into East Asia. The third wave of internationalization brings entrance of companies from developing market economies of China, India, Russia and Central and Eastern Europe. Some of their new, sometimes exotic firms have themselves become multinational corporations. This third wave is the result of opening of Chinese and Indian markets and the entry of Central European countries into the EU.

Firms from emerging markets differ significantly from relatively well-established multinational corporations. Their primary problem is the lack of global brand awareness, sometimes limited access to financial resources, sometimes high degree of government intrusions but always lack of international managerial experience. A large part of these growing companies, mainly from China and India, were until recently small and medium-sized companies.

Growth and internationalization of these medium-size firms from emerging countries, often without an established brand and own-developed sales and distribution network, would be almost unthinkable in the past. These days internationalization of these companies is made possible by trend of outsourcing and increasing vertical disintegration of the supply chains. A typical example is the automobile production or the entire semiconductor industry, where most of key companies in the sector are directly positioned as a "fab-less", ie without manufacturing capacities. Vertical disintegration is further supported by rapid decline in transaction costs (transportation, communication, banking and legal costs).

The investment of Chinese companies in recent years in building stable presence on European Union markets, including production and distribution structures, are thus considered to be only the beginning of a new wave of globalization of world economy. All this despite a number of critical objections to the penetration of Chinese firms in Europe, efforts to distinguish "good" and "bad" foreign investment and complaints of non-reciprocal access to government tenders in the EU and the PRC. (Godement & Parello-Plesner)

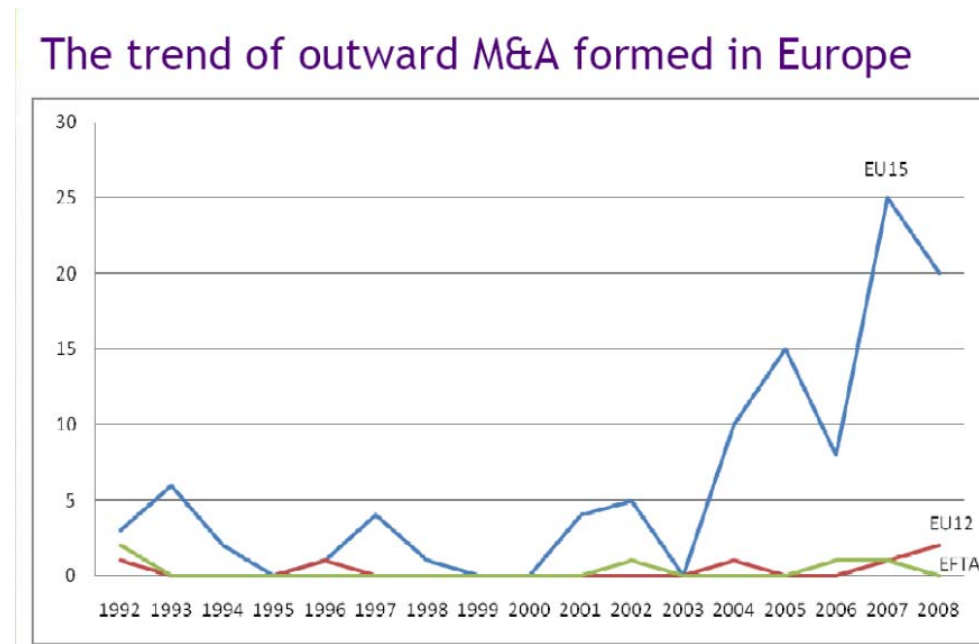
Figure 1 - The approach of individual EU countries to trade with the PRC



Despite all objections the key position of the EU countries seems clear: governments provide their utmost support for their national agencies for promotion of foreign investment (Germany Trade&Invest, Invest in France, Czechinvest, for example) that often creates programs to attract Chinese investment

(Economist, 2011). In contrast to Germany with a clear focus on cooperation with China (and focus in China to cooperate with Germany) is Great Britain, which is a key beneficiary of Indian investment (The Economist, 2011).

Figure 2 - Development of Chinese M & A in Europe (Filipov & Ying, 2009)



The investment of Chinese companies in the Czech Republic

Let's now turn our attention to the Czech Republic. What is its position in this internalization process? With EU membership, relatively low wages and favorable geographical (read logistical) position it should be an optimal location of production destined for EU countries. Undoubtedly, the country has the political will to cooperate with the PRC, including efforts to obtain Chinese investment (Czechinvest, 2011). Czech government agency CzechInvest has one of seven representation office in Shanghai, where it recently relocated from its original location in Hong Kong.

CzechInvest publishes list of five Chinese (PRC) direct investment projects in the Czech Republic. Most published Chinese manufacturing investment is Changhong factory assembling TV sets in town of Nymburk. Shanghai Maling in Teplice is a manufacturer of canned food. The Czech Republic consumes 10% of its production, the rest is exported to EU countries, America and Asia (<http://www.guding.cz/>). Third biggest investment is Yuncheng in town of Pečky, a subsidiary of the largest manufacturer of gravure cylinders in the world (<http://www.yuncheng-cz.com/>). Another manufacturing investment is a firm Baolong – producer of components for automotive industry, such as tire pressure gauges.

Table 1 - Investment Chinese manufacturing companies in the Czech Republic

Investor	Manufacturing sector	Investice (CZK mil.)	Number of employees	Year founded
Sichuan Changhong Electric	Electronics	245.00	300	2005
Shanghai Maling	Food processing	235.00	200	2006
Shanxi Yuncheng Plate – Making Group	Metalurgy	49.90	30	2006
Shanghai Maling II	Food processing	352.00	200	2007
Baolong	Car components	1.00	10	2008

Source: CzechInvest. CzechInvest wants to get more investors from China.

<http://www.czechinvest.org/czechinvest-chce-ziskat-vic-investoru-z-ciny>

Comparison of the number of PRC investment projects with other countries of Southeast Asia, mediated by CzechInvest, shows huge gap: five investment projects from the PRC, against 22 projects from Taiwan, dozens of projects with South Korean companies and hundreds of investment projects from Japan (Czechinvest, 2010).

In assessing the effect of Chinese manufacturing firms on the Czech market one cannot just list the official investment reports. Firstly of all, a large part of Chinese business is based on small businesses, often individual persons or families. The second reason is the high degree of interconnectivity between companies registered in Taiwan, Hong Kong, The Netherlands and other countries. Although these companies have their headquarters outside the PRC, their business is closely connected with China, and manufacturing imports from the PRC can reach high proportions. A typical example is a giant factory Foxconn, also known as Honhai Precision, in Pardubice, the second largest exporter of Czech Republic, producing (rather just assembling) various electronic products, including personal computers, for other brands such as Apple or HP (Foxconn, 2009). The importance of the largest investment projects of Asian countries (Foxconn, Panasonic, Toyota) for Czech economy is summarized in the following table.

Table 2 - Czech Republic largest exporters

Pořadí	Firma	Exports in 2010 (thousands CZK)	Exports in 2010 (thousands CZK)
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1.	Škoda Auto	198 039 000	166 499 000
2.	Foxconn CZ	110 122 515	82 923 282
3.	RWE Transgas	68 530 000	44 775 081
4.	Agrofert Holding	45 938 194	44 955 974
5.	Toyota Peugeot Citroën Automobile Czech	44 715 373	51 821 765
6.	Panasonic AVC Networks Czech	41 027 000	37 777 000
7.	Alpiq Energy	31 672 293	3 783 839
8.	Unipetrol	26 650 000	16 847 000
9.	OKD	25 708 992	17 829 395
10.	Moravia Steel	23 841 153	19 109 057

Objective of this paper

The aim of this paper is to evaluate imports from the PRC to the Czech Republic, in the light of the increasing expansion of Chinese imports into Europe. It is a well known fact that trade balance between PRC and the Czech Republic shows for years a frightening gap, best expressed by ratio of 1:10 between exports and imports. This paper will look at the possibility that the giant trade deficit is caused rather by abnormally high imports into Czech Republic.

Thus, we will verify hypothesis that the Czech Republic is becoming a base for manufacturing activities of Chinese companies and their expansion into other EU markets, and this process leads to statistically verifiable changes in the sectoral structure of trade between ČR and the PRC.

The paper will evaluate position of Chinese companies based on quantifiable specifics of Czech imports from the PRC. Czech imports will be judged on the commodity breakdown HS2 and will be compared both with the EU-15, and comparable economies of Poland, Hungary and Slovakia.

In this paper we assume that consumption of basic consumer goods imported from the PRC, such as clothes, toys, shoes, computer and office equipment, would be relatively similar in all these countries. If imports from the PRC consisted only in consumer goods, the structure of imports or their share of GDP were very similar among the similar countries. If this paper finds significant and systematic differences in the volume of imports, share of imports on GDP or different sectoral structure, we then assume that the difference is caused by imports of investment goods such as components used in further manufacturing.

Source of data

The paper uses publicly available statistical data from Eurostat, chapter External Trade. Eurostat data allow us to examine detailed sectoral breakdown, which is consistent for all EU member countries. In this paper, HS2 data level is used. Verification of the hypothesis will be carried out in series of tests that compare volume and sectoral structure of imports of the Czech Republic with the PRC with the volume and structure of the EU-15 imports, Poland, Hungary and Slovakia with the PRC. The EU-15 in these comparisons represents the advanced countries of Europe and the main comparative base. Poland, Hungary and Slovakia are used to compare CR with the countries with the same initial base and a similar economic structure.

Trade with the PRC and the theories of international trade

The theoretical basis for this paper are two competing theories of international trade: The theory of comparative advantage and New trade theory.

The first one is the Ricardian model of international trade. International trade emerges on basis of different comparative advantages of individual countries that in turn determine production structure of each country. The result of this theory thus would maximum product specialization of individual countries and exclusively cross-sectoral nature of trade between any two countries.

The New trade theory was formulated by Paul Krugman in his article "Increasing Returns, Monopolistic Competition, and International Trade" in 1979. The emergence of new trade theories allowed to leave assumption of perfect competition and replaced it with a then new model of monopolistic competition. The New trade theory states that the main cause of international trade are existence of increasing returns of scale and consumers' desire of for product variety as the variety choice increases benefits of consumers (Krugman, 1979). The New trade theory thus stipulates intra-industry form of international trade. Empirical data shows that this form of trade is dominant among developed economies since the 1960s when the industrialized countries increasingly began to resemble each other in their production factors (technology, human capital and knowledge). Based on data from recent years, it seems that there is a turnaround in this trend and world trade returns to a greater proportion of cross-sectoral trade between developed and emerging economies (Krugman P. , 2009). In his textbook of International Economics (Krugman & Obstfeld, International Economics, Theory and Policy, Sixth Edition, 2003) Krugman himself admits the two motives for the creation of international trade are country specialization in certain products and increasing returns to scale.

Trade balance between Czech Republic, EU-15 and three Central European countries with the PRC

Let's now turn attention to an empirical data and detailed specifics of China's bilateral trade with selected countries, namely Czech Republic, EU-15 and the three Central European countries. It is a well known fact that trade with the PRC is significantly negative for all countries, but the degree of imbalance is shocking: Czech exports to the PRC are just about one-tenth of Czech imports from the PRC.

Table 3- Balance of trade between Czech Republic and the PRC

	Jan.-Dec. 1999	Jan.-Dec. 2000	Jan.-Dec. 2001	Jan.-Dec. 2002	Jan.-Dec. 2003	Jan.-Dec. 2004	Jan.-Dec. 2005	Jan.-Dec. 2006	Jan.-Dec. 2007	Jan.-Dec. 2008	Jan.-Dec. 2009	Jan.-Dec. 2010
IMPORT [mil EUR]	528	755	1 198	1 992	2 417	1 881	1 677	2 606	4 336	4 721	4 303	6 929
EXPORT [mil EUR]	55	72	90	157	213	221	240	318	507	548	602	918
BALANCE (absolutní)	-473	-683	-1 109	-1 835	-2 204	-1 661	-1 436	-2 288	-3 829	-4 172	-3 701	-6 010
BALANCE (procentní)	10,4%	9,5%	7,5%	7,9%	8,8%	11,7%	14,3%	12,2%	11,7%	11,6%	14,0%	13,3%

Trade balance of EU-15 with China is also negative, but significantly less than the balance of the CR.

Table 4 - Balance of trade between EU-15 countries and the PRC

EU15	Jan.-Dec. 1999	Jan.-Dec. 2000	Jan.-Dec. 2001	Jan.-Dec. 2002	Jan.-Dec. 2003	Jan.-Dec. 2004	Jan.-Dec. 2005	Jan.-Dec. 2006	Jan.-Dec. 2007	Jan.-Dec. 2008	Jan.-Dec. 2009	Jan.-Dec. 2010
IMPORT [mil EUR]	37 242	53 248	57 477	62 233	75 029	93 403	118 490	144 280	171 150	183 257	156 529	207 646
EXPORT [mil EUR]	15 769	20 659	25 172	29 849	35 012	40 727	43 440	53 659	60 081	65 163	68 739	94 311
BALANCE (absolutní)	-21 473	-32 590	-32 305	-32 384	-40 017	-52 676	-75 050	-90 621	-111 069	-118 094	-87 790	-113 335
BALANCE (procentní)	42,3%	38,8%	43,8%	48,0%	46,7%	43,6%	36,7%	37,2%	35,1%	35,6%	43,9%	45,4%

Next table will summarize aggregate trade balance of Poland, Hungary and Slovakia with the PRC.

Also these 3 countries show much gap between imports and exports than the Czech Republic and also shows a significantly improving trend.

Table 5 - Balance of trade between Poland, Hungary and Slovakia (aggregated) and the PRC

PL+HU+SK	Jan.-Dec. 1999	Jan.-Dec. 2000	Jan.-Dec. 2001	Jan.-Dec. 2002	Jan.-Dec. 2003	Jan.-Dec. 2004	Jan.-Dec. 2005	Jan.-Dec. 2006	Jan.-Dec. 2007	Jan.-Dec. 2008	Jan.-Dec. 2009	Jan.-Dec. 2010
IMPORT [mil EUR]	1 852	2 722	3 553	4 773	5 966	6 380	6 830	8 616	12 031	13 940	11 808	15 620
EXPORT [mil EUR]	196	162	341	426	507	837	910	1 402	1 798	2 047	2 487	3 387
BALANCE (absolutní)	-1 655	-2 560	-3 212	-4 347	-5 459	-5 543	-5 920	-7 214	-10 234	-11 893	-9 321	-12 233
BALANCE (procentní)	10,6%	5,9%	9,6%	8,9%	8,5%	13,1%	13,3%	16,3%	14,9%	14,7%	21,1%	21,7%

On individual country level, Hungary confirms its role of preferred locations for Chinese entrepreneurs in the Central Europe, which it has been playing since the late 1980s, when the Chinese community in Budapest reached tens of thousands of people. Hungary's foreign trade with the PRC is larger than trade of Czech Republic and almost as large as the trade of Poland with population 4 times bigger.

Share of trade with China on GDP

In the next test we will focus on the imports from the PRC only. We compare the share of imports from the PRC on country gross domestic product.

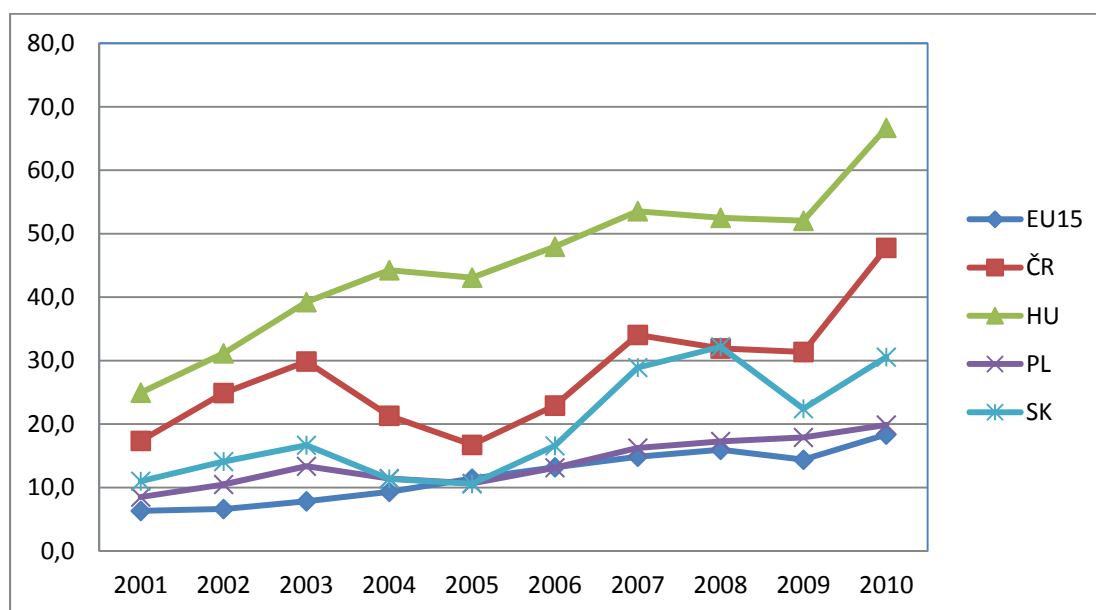
The test is based on the assumption that if imports of Chinese products were limited to simple final consumption products such as clothes, toys, office and cheaper computing and electronics, the share of imports to GDP would be relatively stable. Significantly differing ratio of imports on GDP (in both directions) would thus mean that this fluctuation is made up by imports of goods other than goods of final consumption. This assumption could be questionable in the case of countries that have major sea ports (the Netherlands, Germany), which serves as a gateway for shipping Chinese goods. However, our trade data based aggregate of EU-15 on one hand and four inland Central European countries on the other hand, should eliminate the effect of “first entrance country” where Chinese goods enter the EU market.

Share of imports to GDP is calculated as total imports from the PRC, divided by gross domestic product of the country or the EU-15 as a whole. The value of 47.8 for the Czech Republic in 2010 means that for every 1000 EUR of gross domestic product there are 47.8 Euros of imports from the PRC. As a rule, the higher the number, the higher share of imports from the PRC on the GDP of the country.

Table 6 - Share of imports from China on country GDP (multiplied by 1000)

Importy/HDP	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU15	6,3	6,6	7,8	9,3	11,4	13,2	14,9	16,0	14,4	18,4
ČR	17,4	24,9	29,9	21,3	16,7	22,9	34,1	31,9	31,4	47,8
HU	25,0	31,1	39,2	44,3	43,1	48,0	53,5	52,5	52,0	66,7
PL	8,5	10,5	13,4	11,4	10,7	13,1	16,2	17,3	17,9	19,9
SK	11,0	14,1	16,7	11,4	10,6	16,6	28,9	32,2	22,4	30,6

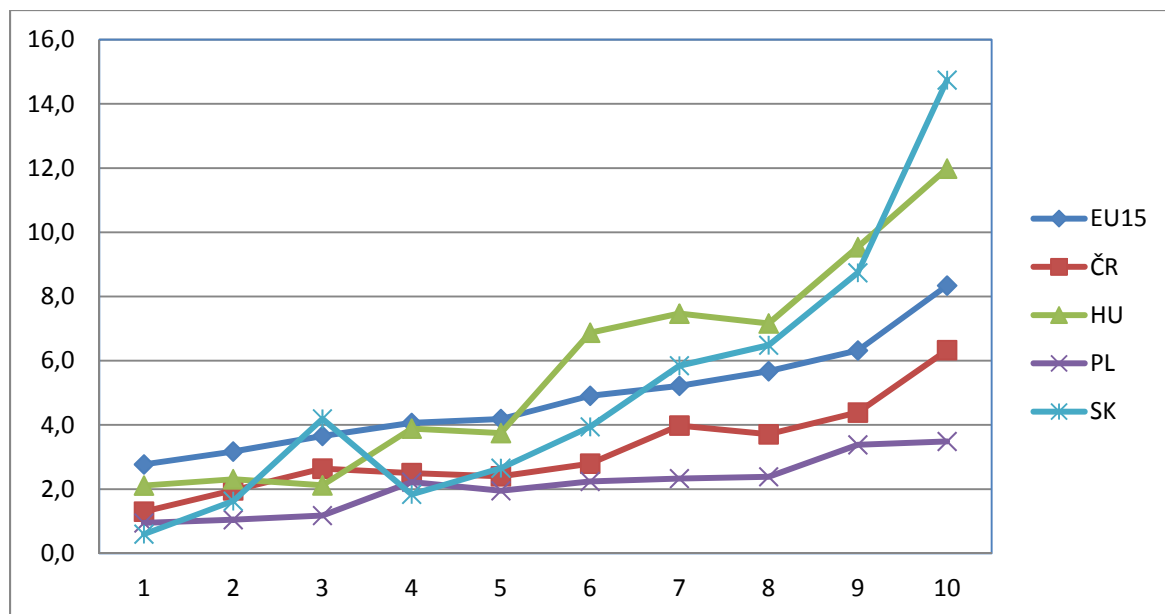
Figure 3 - Share of imports from China on GDP over time



The chart shows that imports from China into Czech Republic represent higher proportion of Czech GDP then in EU-15 countries by a factor of three. The difference might indicate higher level of activities of Chinese companies and their local importers than those observed in EU-15 or in Poland. However, Hungary has an even larger share of imports on GDP.

To compare share of imports from China the following chart shows share of exports to China . One can see dramatically increasing importance of exports to the PRC for each country, mainly in case of Slovakia and Hungary. The share of exports to GDP of the Czech Republic is lower than that of the EU-15.

Figure 4 - Share of exports to China on country GDP



The sectoral structure of imports from the PRC

The following chapter will compare the sectoral structure of imports from the PRC. The comparison is again based on Eurostat data, classification HS2, which divides the total imports into 99 sectors. In the first step we compare 10 most important sectors of the imported goods. The contribution of each sector is calculated as the sector turnover divided by the total imports. The calculation was done on figures for 2010.

Table 7 - Share of HS2 sectors on imports from the PRC

odvětví	EU15	CZ	HU	PL	SK
85 - ELECTRICAL MACHINERY AND EQUIPMENT AND PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS, TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, AND PARTS AND ACCESSORIES OF SUCH ARTICLES	26,4%	40,0%	82,3%	26,8%	53,1%
84 - NUCLEAR REACTORS, BOILERS, MACHINERY AND MECHANICAL APPLIANCES; PARTS THEREOF	20,7%	38,4%	10,0%	28,0%	16,4%
62 - ARTICLES OF APPAREL AND CLOTHING ACCESSORIES, NOT KNITTED OR CROCHETED	5,4%	1,7%	0,1%	3,3%	2,4%
61 - ARTICLES OF APPAREL AND CLOTHING ACCESSORIES, KNITTED OR CROCHETED	4,6%	1,5%	0,2%	2,8%	2,7%
95 - TOYS, GAMES AND SPORTS REQUISITES; PARTS AND ACCESSORIES THEREOF	4,3%	1,7%	0,6%	2,3%	2,8%
94 - FURNITURE; BEDDING, MATTRESSES, MATTRESS SUPPORTS, CUSHIONS AND SIMILAR STUFFED FURNISHINGS; LAMPS AND LIGHTING FITTINGS, NOT ELSEWHERE SPECIFIED OR INCLUDED; ILLUMINATED SIGNS, ILLUMINATED NAME-PLATES AND THE LIKE; PREFABRICATED BUILDINGS	3,8%	1,2%	0,4%	3,7%	1,7%
89 - SHIPS, BOATS AND FLOATING STRUCTURES	3,4%	0,0%	0,0%	0,1%	0,0%
64 - FOOTWEAR, GAITERS AND THE LIKE; PARTS OF SUCH ARTICLES	2,5%	1,9%	0,1%	1,6%	2,0%
29 - ORGANIC CHEMICALS	2,1%	0,4%	0,4%	1,2%	0,4%
42 - ARTICLES OF LEATHER; SADDLERY AND HARNESS; TRAVEL GOODS, HANDBAGS AND SIMILAR CONTAINERS; ARTICLES OF ANIMAL GUT (OTHER THAN SILKWORM GUT)	2,1%	0,8%	0,3%	1,1%	0,8%

Percentage of industry structure suggests significant differences in the structure of imports. In line with our expectation that consumer and investment goods behave in a different way we look at the composition of country imports from this point of view. In the case of EU-15 countries and Poland imports of investment goods (sectors 85, 84, 89, 29) and consumer goods (sectors 62, 61, 95, 94, 42)

show a ratio of 50:50. Other countries show a significantly different share of investment and consumer goods. Very rough results:

EU15	50:50
Poland	50:50
Slovakia	70:30
Czech Rep	80:20
Hungary	90:10

In the next step we make a precise calculation of share of investment and consumer goods imports to individual countries. For this purpose, all 99 sectors of the classification HS2 divided into two parts: (capital) investment goods and final consumption(consumer) goods. A higher proportion of investment goods (investment goods sectors in fact) in total imports from the PRC then signals that the country imports a higher share of goods usable for further processing.

The problem is the exact distribution of imported goods into just two groups. For some sectors, such as sector 85: “Electrical machinery and equipment”, which includes products such as computers, televisions and other audio and video equipment, we cannot accurately determine whether these are a consumer or investment goods. A closer look at the detailer HS 4 level classification reveals that the majority turnover in this sector is done in computers and office machines and we allocate sector 85 to investment goods.

Table 8 - Top 10 sectors - investment goods

	CR	Share on Imports			
		EU15	HU	PL	SK
85 - ELECTRICAL MACHINERY AND EQUIPMENT AND PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS, TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, AND PARTS AND ACCESSORIES OF SUCH ARTICLES	39,980%	26,410%	82,348%	26,830%	53,107%
84 - NUCLEAR REACTORS, BOILERS, MACHINERY AND MECHANICAL APPLIANCES; PARTS THEREOF	38,385%	20,713%	10,038%	27,996%	16,442%
73 - ARTICLES OF IRON OR STEEL	1,219%	2,062%	0,693%	2,250%	1,874%
87 - VEHICLES OTHER THAN RAILWAY OR TRAMWAY ROLLING-STOCK, AND PARTS AND ACCESSORIES THEREOF	1,158%	1,508%	0,277%	2,442%	2,116%
39 - PLASTICS AND ARTICLES THEREOF	1,105%	1,926%	0,953%	2,476%	1,936%
90 - OPTICAL, PHOTOGRAPHIC, CINEMATOGRAPHIC, MEASURING, CHECKING, PRECISION, MEDICAL OR SURGICAL INSTRUMENTS AND APPARATUS; PARTS AND ACCESSORIES THEREOF	0,927%	1,844%	0,561%	1,927%	1,556%
76 - ALUMINIUM AND ARTICLES THEREOF	0,679%	0,476%	0,185%	0,955%	0,477%
70 - GLASS AND GLASSWARE	0,531%	0,588%	0,323%	1,117%	1,523%
81 - OTHER BASE METALS; CERMETS; ARTICLES THEREOF	0,517%	0,379%	0,033%	0,106%	0,055%
28 - INORGANIC CHEMICALS; ORGANIC OR INORGANIC COMPOUNDS OF PRECIOUS METALS, OF RARE-EARTH METALS, OF RADIOACTIVE ELEMENTS OR OF ISOTOPES	0,392%	0,424%	0,060%	0,403%	0,028%

Table 9 - Top 10 sectors - consumer goods

odvětví konečné spotřeby	podíl na dovozu				
	ČR	EU15	HU	PL	SK
64 - FOOTWEAR, GAITERS AND THE LIKE; PARTS OF SUCH ARTICLES	1,875%	2,526%	0,133%	1,589%	2,004%
95 - TOYS, GAMES AND SPORTS REQUISITES; PARTS AND ACCESSORIES THEREOF	1,705%	4,325%	0,570%	2,319%	2,810%
62 - ARTICLES OF APPAREL AND CLOTHING ACCESSORIES, NOT KNITTED OR CROCHETED	1,660%	5,358%	0,116%	3,260%	2,390%
61 - ARTICLES OF APPAREL AND CLOTHING ACCESSORIES, KNITTED OR CROCHETED	1,453%	4,612%	0,192%	2,773%	2,739%
94 - FURNITURE; BEDDING, MATTRESSES, MATTRESS SUPPORTS, CUSHIONS AND SIMILAR STUFFED FURNISHINGS; LAMPS	1,174%	3,776%	0,386%	3,689%	1,657%
42 - ARTICLES OF LEATHER; SADDLERY AND HARNESS; TRAVEL GOODS, HANDBAGS AND SIMILAR CONTAINERS; ARTICLES	0,826%	2,083%	0,262%	1,079%	0,752%
82 - TOOLS, IMPLEMENTS, CUTLERY, SPOONS AND FORKS, OF BASE METAL; PARTS THEREOF OF BASE METAL	0,445%	0,701%	0,165%	1,144%	0,483%
48 - PAPER AND PAPERBOARD; ARTICLES OF PAPER PULP, OF PAPER OR OF PAPERBOARD	0,338%	0,423%	0,090%	0,420%	0,302%
20 - PREPARATIONS OF VEGETABLES, FRUIT, NUTS OR OTHER PARTS OF PLANTS	0,204%	0,219%	0,009%	0,314%	0,164%
44 - WOOD AND ARTICLES OF WOOD; WOOD CHARCOAL	0,156%	0,657%	0,038%	0,534%	0,173%

The result is summarized in the following table.

	Share of Investment and Consumer products on imports from China				
	ČR	EU15	PL	SK	HU
Investment goods sectors	89%	71%	78%	85%	97%
Consumer goods sectors	11%	29%	22%	15%	2%

The second test of the sectoral structure will show at which sectors Czech Republic differs from EU-15 countries.

Table 10 - Top 10 sectors with Czech imports larger that EU15 imports

	HS2 sector	EU15	CZ	HU	PL	SK
1	84 - NUCLEAR REACTORS, BOILERS, MACHINERY AND MECHANICAL APPLIANCES; PARTS THEREOF	100%	185%	48%	135%	79%
2	59 - IMPREGNATED, COATED, COVERED OR LAMINATED TEXTILE FABRICS; TEXTILE ARTICLES OF A KIND SUITABLE FOR INDUSTRIAL USE	100%	156%	47%	253%	118%
3	85 - ELECTRICAL MACHINERY AND EQUIPMENT AND PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS, TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, AND PARTS AND ACCESSORIES OF SUCH ARTICLES	100%	151%	312%	102%	201%
4	21 - MISCELLANEOUS EDIBLE PREPARATIONS	100%	143%	88%	158%	25%
5	76 - ALUMINIUM AND ARTICLES THEREOF	100%	143%	39%	201%	100%
6	81 - OTHER BASE METALS; CERMETS; ARTICLES THEREOF	100%	137%	9%	28%	14%
7	74 - COPPER AND ARTICLES THEREOF	100%	123%	25%	165%	224%
8	45 - CORK AND ARTICLES OF CORK	100%	116%	11%	95%	173%
9	23 - RESIDUES AND WASTE FROM THE FOOD INDUSTRIES; PREPARED ANIMAL FODDER	100%	113%	4%	35%	50%
10	02 - MEAT AND EDIBLE MEAT OFFAL	100%	113%			

The test result shows that all the sectors in which the share of imports to the Czech Republic exceeds the share of imports to the EU-15 are “investment goods sectors”. In any case, it is obvious that none of the ten industries is not the typical cheap consumer goods, such as clothes or toys.

The result of these two tests is that structure of Czech Republic imports (and even more in case of Hungary) are fundamentally different from structure of EU-15 and Polish imports from China. Czech Republic imports far more investment goods than any other country.

Intra-industry trade and Gruber-Lloyd index

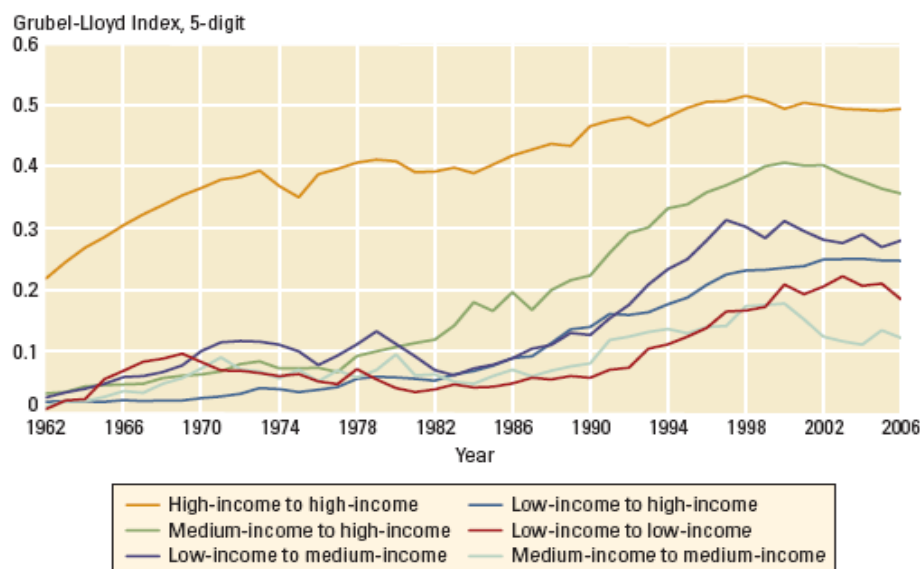
A standard way of measuring trade structure is Gruber-Lloyd index. The G-L index is the most widely used instrument for measuring intra-industry trade between two countries. Gruber-Lloyd index measures coverage of imports (M) by exports (X) that is observed at the sector level (i).

Gruber-Lloyd index has the form:

$$GL = \left\{ 1 - \frac{\sum_i |X_i - M_i|}{\sum_i |X_i + M_i|} \right\}$$

Index values are within the interval from 0 to 1. Zero value means that there is no two-way trade flow in any sector (industry). Business would be done solely on the assumptions the theory of comparative advantage. On the other hand a value of 1 means that countries export and import the same volume of goods in all sectors (industries). Trade thus follows New trade theory assumptions. It is obvious that the resulting value of Gruber-Lloyd index fundamentally affects the breakdown of total trade: trade divided into low number of sectors brings a higher index value and a fine division of trade brings lower index values. Long-empirical calculations GL index shows the following development.

Figure 5 - Long-term evolution of Gruber-Lloyd index



Source: Brühlhart 2008 for this Report.

Note: The Gruber-Lloyd index is the fraction of total trade that is accounted for by intraindustry trade.

Source: Lecture on the occasion of the Nobel Prize handover by Paul Krugman, 2008

http://nobelprize.org/nobel_prizes/economics/laureates/2008/krugman-lecture.html.

Due to almost tenfold gap between Czech Republic imports and exports from the PRC, but is better to use a modified version of Gruber-Lloyd index, called the Q index (Vokorokosová, 2004). Q index is calculated the same way as the standard GL index, but instead of the real quantities of imports and exports it uses calculated "theoretical" volume of exports and imports, which would lead to balanced trade balance between countries.

Index Q is calculated as

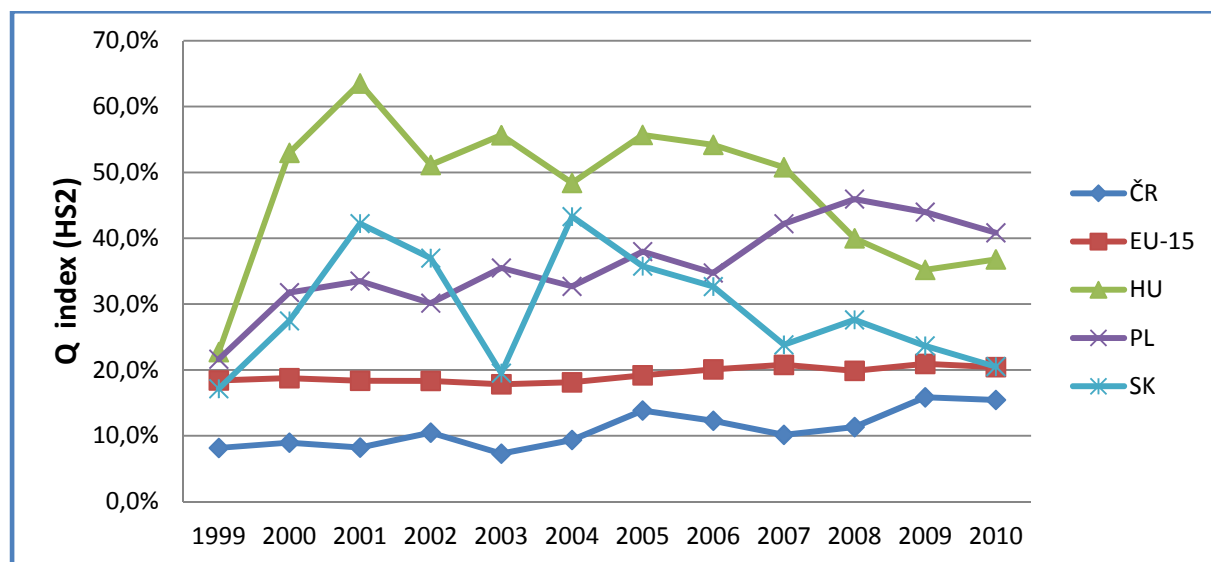
$$Q = \left\{ 1 - \frac{\sum_i |X_i^e - M_i^e|}{\sum_i |X_i^e + M_i^e|} \right\} * 100$$

Q index takes values from 0 to 100; higher values mean higher level of intra-industry trade.

Table 11 - Calculated values of Q index with the PRC at HS2 level

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ČR	8,1%	8,9%	8,2%	10,5%	7,3%	9,4%	13,8%	12,3%	10,1%	11,3%	15,8%	15,4%
EU-15	18,4%	18,7%	18,4%	18,3%	17,8%	18,1%	19,2%	20,1%	20,8%	19,9%	20,9%	20,4%
HU	22,7%	53,0%	63,5%	51,1%	55,7%	48,4%	55,7%	54,2%	50,8%	40,0%	35,2%	36,8%
PL	21,6%	31,8%	33,5%	30,1%	35,5%	32,7%	38,0%	34,7%	42,2%	46,0%	44,0%	40,8%
SK	17,1%	27,4%	42,2%	37,0%	19,5%	43,3%	35,8%	32,7%	23,8%	27,6%	23,7%	20,5%

Figure 6 - Q index values for selected countries



The Q index results again indicate a marked difference in the nature of trade between Czech Republic and China. Lowest values of Q index in comparison with the EU-15 and all neighboring Central European countries show that imports and exports is happening in different sectors. On a less serious note it can be argued that economies of the PRC economy and the Czech Republic are complementary.

Rather surprisingly, Q index for Hungary-China trade differs a lot from Czech Republic Q index values.

Especially as all other tests showed similar nature of Czech and Hungarian trade. It can be argued that the results are distorted by very low level of exports to China. Further refinement of the results provided by a more detailed classification, for example, HS 4, would allow more detailed analysis of the issue.

Conclusions

The paper clearly showed a surprising finding that trade of Czech Republic with China differ significantly from Chinese trade with other countries, including its close neighbors of Poland, Slovakia and Hungary.

Key findings of our series of comparative tests thus are :

- Czech Republic has the largest percentage gap in trade balance with China of all tested the countries. This (otherwise very sad) fact could also mean that big part of imports from China are products used for further manufacturing.
- Share of imports from China on GDP shows huge differences among countries: Czech Republic imports of 48 EUR/1000 EUR of GDP means second place, behind Hungary (66EUR of imports on 1000EUR GDP), but highly above EU-15 figure of 18 EUR.
- Sectoral analysis of imports shows a very different structure of imported products. Czech Republic and Hungary has the highest share of imports of products with investment or further production character. Share of investment products on total imports from China is 89% (Czech Republic), 97% (Hungary), but only 71% for EU-15 countries.
- Analysis of intra-industry nature of trade with China, calculated by modified Gruber-Lloyd index (Q index), shows that the Czech Republic Q index has by far the lowest values of all tested countries. This means that imports and exports happen in almost entirely different sectors.

All these test results show that the Czech economy is characterized by very high volume of imports from China, of which 89% are investment or production goods. We can thus expect their further processing in the Czech Republic and further exports to other EU countries. Despite the official figure of only five Chinese investment projects in the Czech Republic can be assumed that there are much more activities of Chinese or Taiwanese and other East Asian firms taking place in the Czech Republic. The results of the analysis surely deserve further exploration.

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