

## Integrated in the global value chains – trade developments between Hungary and Asia

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### Abstract

*The international crisis which has been ongoing since 2008 caused severe recession and decrease of internal demand in the EU area. Therefore, European companies began to look for new markets outside the EU. In spite of the large distance, Asia can be one of the regions aimed by exporters. In the case of Hungary, this is even supported by the Hungarian government. The role of Asia has increased between 2000-2012 in Hungarian foreign trade. The article describes the developments and trends of Hungarian exports and imports concerning the Asian countries. The product structure of trade is analysed in detail, geographic and product concentration of trade is shown. We also examine the share of high-tech products in trade with the main important partners of each Asian region. The article concludes that the Hungarian trade with Asia is largely influenced by the global production system of multinational companies.*

**Keywords:** foreign trade, Hungary, Asia, export concentration, global value chains, high technology products

*JEL classification:* F10, F14

### 1. Introduction

The liberalisation of the Hungarian economy and trade in the 1990's induced a considerable inflow of foreign direct investment and trade with Western European countries. As a result, before Hungary joined the European Union (EU), it had already been integrated into the European market through its foreign trade. From 2004 onwards, the EU membership brought a new wave of

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trade intensification with the other new Central European member countries. The international crisis which has been ongoing since 2008 caused severe recession and decrease of internal demand in the EU area and therefore, European companies searched for new markets outside the EU. A hypothesis of this article is that the international crisis can be another impetus for an increase of Hungarian foreign trade, but this time to non-European areas. In spite of the large distance, Asia can be one of the regions aimed by exporters, supported by the “Eastern Opening” policy of the Hungarian government.<sup>1</sup>

Hungary is a small and open economy depending on foreign capital and exports. This is well illustrated by the fact that the share of Hungarian exports in the GDP was 80% in 2011<sup>2</sup>. As far as the geographical distribution, structure and size of exporting companies are concerned, Hungarian export is concentrated. The share of the European Union in Hungary’s exports (imports) was 76% (70%) in 2012.<sup>3</sup> Like other countries, Hungary was seriously hit by the global economic and financial crisis. Partly as a consequence, turning towards others, non-EU markets have been intensified by policymakers and firms alike. Asian countries certainly do not have a big share in Hungarian foreign trade but their role is increasing. The role of the Asian region is still more significant (though decreasing) in Hungarian imports (13.7% in 2012) than in exports (6.4%).<sup>4</sup> In trade policy, “Eastern Opening” is an aim, but we have had little information on traded products and countries. Our article is the first one to thoroughly analyse the development and characteristics of trade between Hungary and Asia.

Asia is a big continent and is made up of very heterogeneous countries; therefore, it is worth making country groupings. In the present article we formed five groups of Asian countries: West Asia, Southern Asia, the Commonwealth of Independent States (CIS), Southeast Asia and Northeast Asia. We analysed the period between 2000 and 2012 based on Eurostat data.

The first part of the article describes the developments and trends of Hungarian exports and imports concerning Asian countries. In the second part, the product structure of trade is analysed in detail. We analyse the concentration of trade and the similar trends, showing the changing structure of trade in time. We also examine the share of high-tech products in trade with the main important partners of each Asian region. Finally, we draw conclusions from the analyses and make some recommendations for policymakers.

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<sup>1</sup> The Hungarian government approved the new foreign economic strategy in 2012. The ‘Eastern Opening’ policy is an integral part of this new strategy. The Hungarian government would like to diversify Hungary’s foreign economic relations towards Asia and aims to double Hungary’s exports in a decade.

<sup>2</sup> Based on Eurostat data. For 2012 the estimated share is 78,7%.

<sup>3</sup> Calculation from Eurostat data.

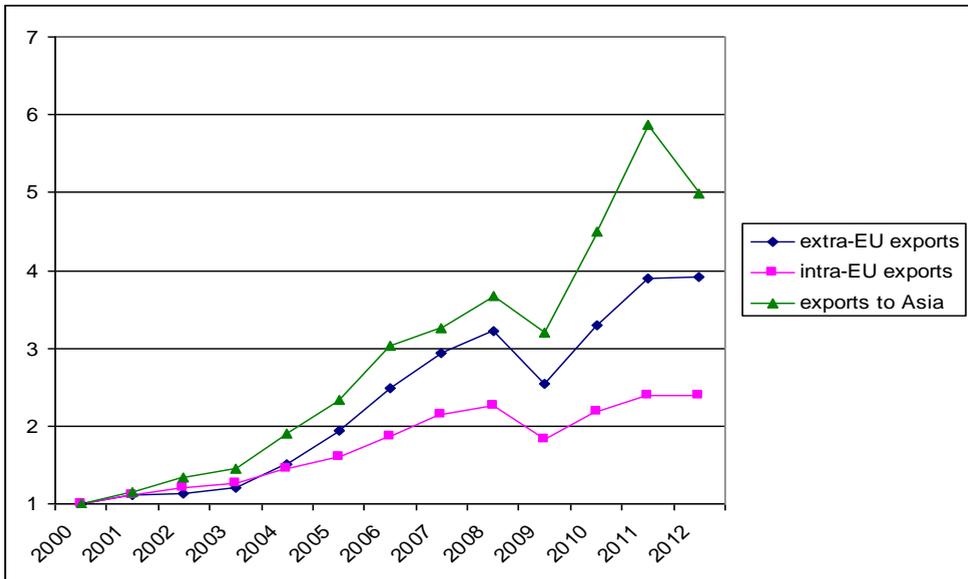
<sup>4</sup> Calculation from Eurostat data.

## 2. Development of trade with Asia

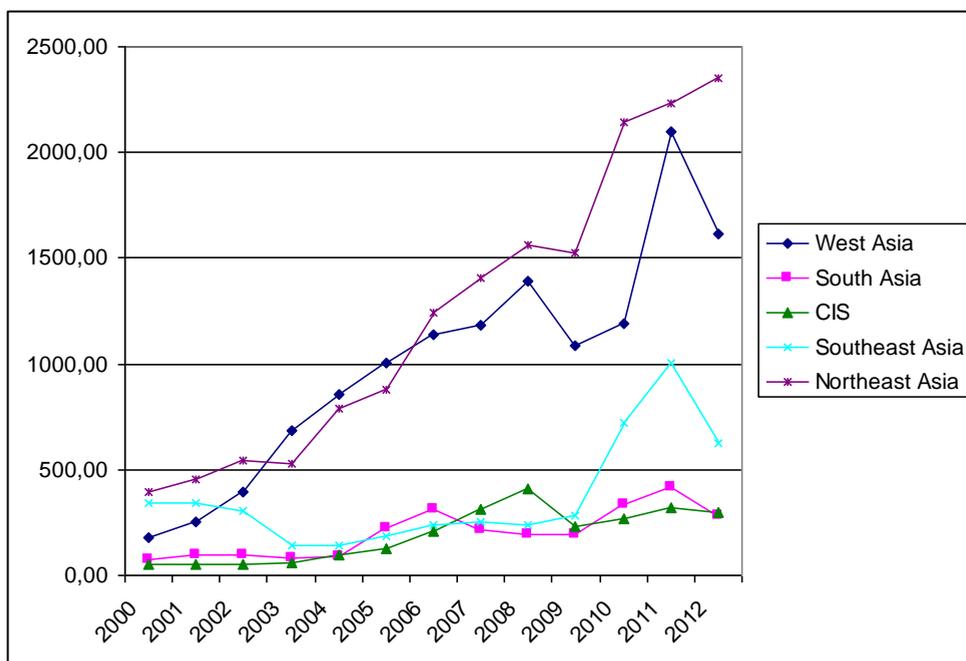
Asian countries are increasingly important trade partners for the European Union. This is well known and was analysed in several articles, studies (see a detailed analysis for example in Gaulier et al., 2012). Recently, the economic crisis and the contraction of European markets reinforced this phenomenon. There has been very little information so far on trade relations between Asian countries and Central and Eastern European (CEE) countries. Based on Chen (2012), we know that after these countries joined the EU, bilateral trade with China increased. At first, Hungary was China's biggest CEE partner, and then it was replaced by Poland. In the past decade the four Visegrad countries were clearly the most important trade partners among the CEE countries for China.

Hungary's most important partner remains the EU, but the importance of Asia in Hungarian trade seems to be increasing. During the decade after 2000, a considerable increase of export to Asia can also be observed, broken in 2009 because of the international crisis (similarly to the loss of dynamism to the EU relation in that year). The increase is more remarkable between 2009-2011 when dynamism overtakes the pace of the intra- and extra-EU export increase. However, in 2012, the export dynamism is broken to all areas but mostly towards Asia.

**Figure 1. Increase of Hungarian export to certain regions (2000=1)**



Source: Eurostat

**Figure 2. Hungarian exports to the Asian regions, million euros**

Source: Eurostat

We get a more detailed picture if we observe the export increase to the various Asian regions.

The following countries belong to the five regional groups<sup>5</sup>:

1. *Commonwealth of Independent States (CIS)*: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
2. *West Asia*: Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen
3. *South Asia*: Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka
4. *Southeast Asia*: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar (Burma), Philippines, Singapore, Thailand, Timor-Leste, Vietnam
5. *Northeast Asia*: Hong Kong, China, Japan, North Korea, South Korea, Macao, Mongolia, Taiwan

A really remarkable increase of Hungarian exports can be seen in Figure 2, especially to West and Northeast Asia.<sup>6</sup> Export increased to other regions too,

<sup>5</sup> We omitted Turkey and Russia for being transcontinental countries and we considered Georgia and Azerbaijan as Asian countries.

but to a much smaller extent. In 2012 exports decreased almost to all regions except for Northeast Asia.

Observing the regional composition of Hungarian export to Asia, table 1 shows – in accordance with the above trends – that it has mainly been directed towards two regions during this period: West Asia and Northeast Asia. The share of Southeast Asia was rather high in Hungarian export at the beginning of the period but dropped radically to 9% already in 2003 and remained low afterwards. However, parallel with the rapid growth of exports, the share of this region was increasing constantly in the crisis years (2009-2011) and dropped in 2012. The share of CIS and South Asia remained below 10% during the whole period – with some small fluctuations.

**Table 1. Shares of Asian regions in Hungarian trade**

	West Asia		South Asia		CIS		Southeast Asia		Northeast Asia	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
2000	17.20	1.41	7.21	1.85	4.74	0.46	32.86	26.46	37.99	69.83
2007	35.09	1.50	6.48	1.98	9.25	3.09	7.51	11.71	41.67	81.71
2012	31.23	1.53	5.51	3.08	5.70	0.72	12.09	11.90	45.47	82.77

*Source:* own calculations from Eurostat data

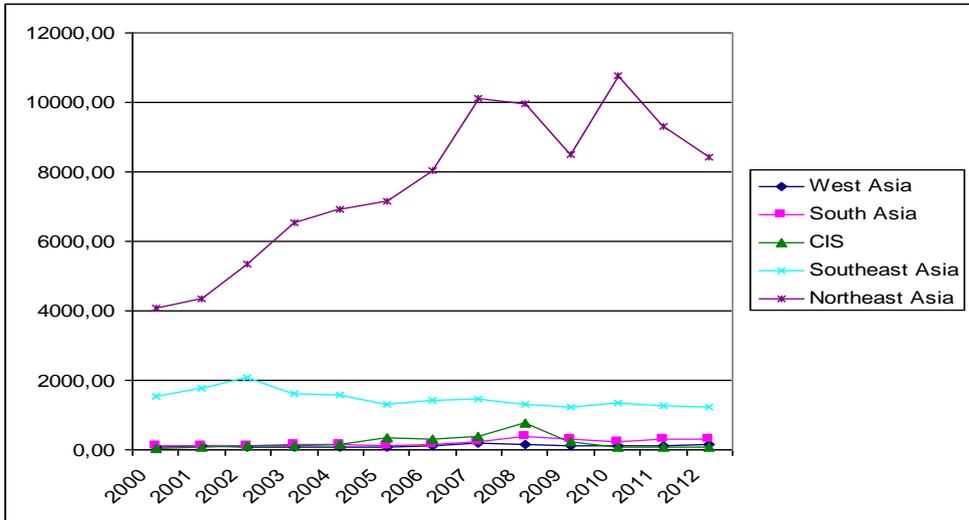
Regarding the Hungarian import from Asia, it has increased in a similar way to imports from the EU. For 2011 and 2012 imports from Asia decreased while imports from the EU increased.

Import increased two to threefold from Northeast Asia until 2010 but, in the case of other regions, it remained almost constant (Figure 3). Regarding the regional composition of imports (see Table 1), among the five Asian country groups, the share of Northeast Asia is outstanding and increasing after 2000. In the meantime, the share of Southeast Asia decreased to 11%. The significance of other Asian regions has been very small.

Hungarian trade with Asia shows a considerable deficit throughout the period. However, this deficit is caused mainly by the highly uneven trade with Northeast Asia (see figure 4). Here, approximately 70% of the deficit comes from the trade with China. West Asia is the region where Hungary has had an increasing trade surplus during the period. (This is partly due to the growing surplus with the United Arab Emirates.) Trade is almost even with the CIS countries and South Asia, showing little surplus from time to time.

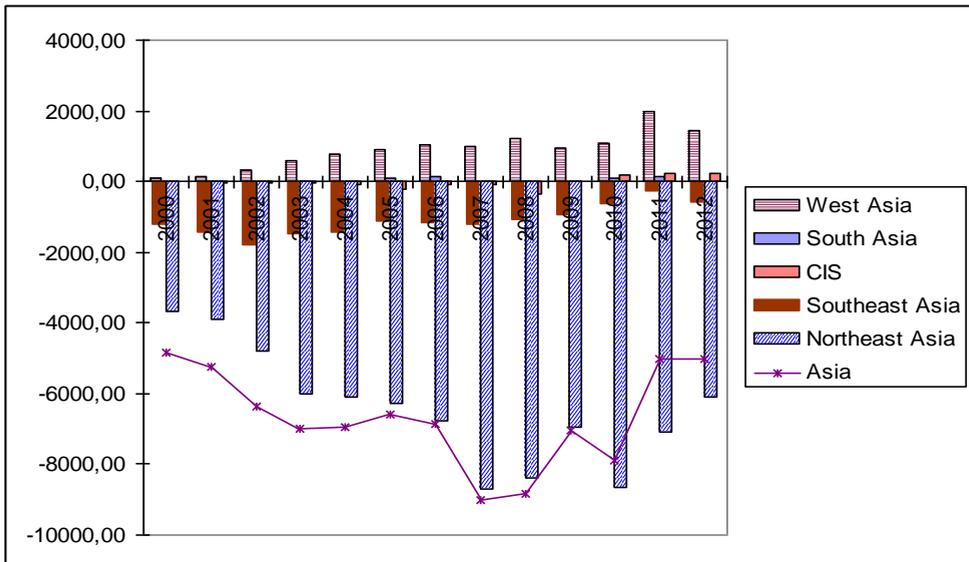
<sup>6</sup> Exports to China especially increased after the prime minister's visit to Beijing in 2003 (see more in Szunomár, 2011).

**Figure 3. Hungarian imports from Asian regions, million euros**



Source: Eurostat

**Figure 4. Foreign trade balance of Hungary with the Asian regions, million euros**



Source: Eurostat

*The most important regions and countries*

As seen above, the role of Northeast Asia is decisive in the Hungarian-Asian trade. By the end of the observed period, China has become by far the most important country of the region. However, this has not always been the case, since Japan held the leading position in imports until 2002 and in exports until 2004. The following years, the share of Japan declined radically and continuously, until it reached a figure below 20% (see Table 2). Other Northeast Asian countries have played far smaller roles in the bilateral trade.<sup>7</sup>

**Table 2. Share of main partner countries in Hungarian trade with Northeast Asia**

	China		Hong Kong		Japan		South Korea		Taiwan	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
2000	11.20	25.20	9.71	2.87	44.30	45.28	13.22	13.92	20.79	12.64
2001	27.63	34.17	8.93	3.16	42.27	39.70	8.98	10.54	11.66	12.38
2002	30.25	41.38	7.54	4.08	37.98	31.18	10.54	11.59	13.31	11.73
2003	29.65	44.61	8.72	4.12	50.39	27.41	6.65	13.72	4.10	10.08
2004	40.78	53.02	8.37	1.39	33.30	24.69	10.37	12.84	6.55	7.95
2005	37.88	53.42	11.24	1.14	33.34	23.37	11.78	14.25	5.34	7.71
2006	49.60	53.67	8.79	0.84	24.70	20.14	13.10	14.39	3.57	10.88
2007	53.59	53.31	8.85	0.67	20.95	18.03	13.41	14.94	2.80	13.05
2008	48.75	56.08	10.33	0.65	22.01	18.58	15.89	13.16	2.69	11.53
2009	58.09	56.97	8.80	0.52	22.49	16.20	8.58	17.30	1.84	9.02
2010	55.01	60.87	9.81	0.53	21.61	13.42	10.50	17.59	2.89	7.57
2011	55.49	66.37	10.36	0.64	19.28	12.30	11.45	13.31	3.21	7.38
2012	59.50	65.19	10.10	0.73	19.1	11.79	7.90	11.77	3.12	10.52

*Source:* author's own calculations from Eurostat

Table 3 offers an overview of the main partner countries of all other Asian regions beside Northeast Asia. (The share of the main partners is given as a percentage of the total export to that region.) The second most important Asian region for Hungarian exports is West Asia. (In Hungarian import, however, the share of this region is negligible, around 1%.) The main partner in this region is the United Arab Emirates, although with considerable fluctuations. The second most important market in the region for Hungarian products is Israel,

<sup>7</sup> North Korea, Mongolia and Macao also belong to the Northeast Asian group but there is almost no Hungarian trade with them.

representing around 20% of exports to the region. The third export partner is Saudi Arabia in this region with a smaller (12-15%) and also changing share.

Regarding South Asia, India is the dominant market while among the CIS countries, Kazakhstan and Uzbekistan are the most important ones. The share of Azerbaijan in Hungarian exports was more significant until 2011 than the share of Georgia, but in 2012, export to Georgia was slightly higher. This is due to an increased export volume of cereal preparations and medicaments<sup>8</sup>. Singapore is the main market in Southeast Asia, followed from afar by Malaysia and Thailand. In the year 2000, the situation was somewhat different. In South Asia, Iran was the main market for Hungarian products, followed by India and Pakistan.

**Table 3a. Main export destinations in each country group (share), 2012**

West Asia		South Asia		CIS		Southeast Asia	
United Arab Emirates	57.66	India	78.09	Kazakhstan	42.30	Singapore	50.53
Israel	17.02	Pakistan	10.52	Uzbekistan	17.60	Malaysia	19.67
Saudi Arabia	12.64	Iran	6.18	Georgia	13.28	Thailand	15.23
Other	12.68	Other	5.21	Azerbaijan	12.91	Vietnam	5.57
				Armenia	5.39	Myanmar	3.36
				Other	8.52	Indonesia	3.02
						Other	2.62

Source: author's own calculations from Eurostat

**Table 3b. Main import countries in each region (share), 2012**

West Asia		South Asia		CIS		Southeast Asia	
Israel	79.88	India	93.10	Kazakhstan	94.43	Thailand	27.72
Oman	10.43	Pakistan	3.10	Uzbekistan	2.14	Malaysia	26.26
Jordan	4.17	Sri Lanka	2.31	Tajikistan	1.42	Singapore	21.03
United Arab Emirates	2.89	Iran	0.92	Azerbaijan	0.82	Philippines	13.26
Saudi Arabia	0.95					Indonesia	8.13
Other	1.69	Other	0.57	Other	1.18	Vietnam	3.56
						Other	0.04

Source: author's own calculations from Eurostat

<sup>8</sup> It cannot be judged yet whether this was a one-off delivery or the beginning of a trend. As for during the period Azerbaijan was a more significant export partner, further on in the analysis we consider Azerbaijan as the third most important country for Hungary in the CIS region.

The geographical structure of Hungarian imports is extremely concentrated; one country dominates in three Asian regions. Table 3b shows the relevant countries and regions. In the case of South Asia and the CIS region, this concentration increased during the examined period. From Southeast Asia import is more evenly distributed.

### 3. Product structure of trade

The previous parts have provided the reader with a broad view on the volume and increase of trade between Hungary and Asian regions and on the main partner countries. At this point we shall analyse the product structure of trade. Table 4 shows the structure of Hungarian exports to the five Asian regions according to the main SITC classification system (of ten product groups). The first thing that catches one's eye is the considerable change during the examined period.

**Table 4. Structure of Hungarian trade to main Asian regions**

SITC	West Asia		South Asia		CIS		Southeast Asia		Northeast Asia	
	2000	2012	2000	2012	2000	2012	2000	2012	2000	2012
Food and live animals	17.52	4.22	1.00	0.74	18.56	9.87	1.83	0.79	23.24	5.51
Beverages and tobacco	0.08	0.05	0.01	0.08	1.78	0.07	0.07	0.09	0.49	0.19
Crude materials, inedible, except fuels	0.28	0.17	1.42	3.41	0.08	0.49	0.12	3.02	5.75	2.22
Mineral fuels, lubricants and related materials	0.86	0.52	0.96	0.52	0.01	0.34	0.13	0.12	0.01	0.06
Animal and vegetable oils, fats, waxes	0.00	0.12	0.00	0.00	7.64	0.00	0.00	0.00	0.03	0.00
Chemicals and related products	27.88	4.44	29.96	8.81	38.28	59.68	5.38	7.79	12.23	4.47
Manufactured goods classified chiefly by material	13.16	3.59	3.09	3.05	8.00	6.05	0.89	2.08	3.93	5.88
Machinery and transport equipment	34.77	83.84	58.19	75.10	14.19	21.49	89.41	78.57	49.93	70.57
Miscellaneous manufactured articles	4.41	3.02	5.37	8.24	11.45	2.00	2.17	7.47	4.33	11.08
Commodities and transactions not classified elsewhere	1.02	0.01	0.01	0.05	0.02	0.00	0.00	0.06	0.05	0.01

*Source:* own calculations based on Eurostat data

In 2000 chemicals and related products occupied a significant share in the export to almost all Asian regions, but for 2012 this share shrank to a small share (4-7%) (except for the CIS countries where their share increased). In the

meantime, the weight of machinery and transport equipment has become generally overwhelming. As written later, this general change in the product structure of exports is largely due to the activity of foreign multinational companies that are present in Hungary.

Regarding the structure of Hungarian imports from Asia, we can also observe a radical change from 2000 to 2012 in the case of almost all regions. The only exception is Northeast Asia where the import structure did not change throughout the period: machinery and transport equipment represent more than 80%.

In the case of West Asia, the import of chemicals and related products increased significantly. Since 85% of Hungarian import from this region comes from Israel, the above-mentioned tendency is mainly due to the import of medicaments and other chemicals from this country. Regarding South Asia, the import from this region is also dominated by one country: India. A similar geographical concentration can be observed in the import from the CIS area, as in 2012 94% of imports came from Kazakhstan, where mineral fuels and related materials are the main import products. The share of chemicals and related products has increased in the imports from Southeast Asia too. This can be due to the fact that medical and pharmaceutical products were the most important import product group from Singapore in 2011-2012.

As we have seen based on a very broad product classification, the product structure of the Hungarian-Asian trade changed during the examined decade. It is worth analysing this phenomenon more deeply. We applied the SITC 3 digit level classification system for this (almost 300 product groups) and calculated the Finger-Kreinin similarity index<sup>9</sup> for bilateral export and import for the year 2000 and 2012.

$F = \min(X_{it1}, X_{it2}) * 100$ , where  $X_{it1}$  and  $X_{it2}$  are the shares of the commodity  $i$  in total exports in year  $t1$  and  $t2$  or in country  $t1$  and  $t2$

Results are shown in table 5.

**Table 5. Finger similarity indices for Hungarian export and import, 2000-2012**

West Asia	UNITED ARAB EMIRATES	ISRAEL	SAUDI ARABIA	
export	0.077	0.319	0.144	
import	0.122	0.300	0.049	
South Asia	INDIA	IRAN	PAKISTAN	
export	0.275	0.158	0.184	

<sup>9</sup> Finger, J.M., Kreinin, M.E (1979), A measure of 'export similarity' and its possible uses, *The Economic Journal*, Vol. 89, No. 356, pp. 905-912.

import	0.234	0.767	0.470	
<b>CIS</b>	<b>AZERBAIJAN</b>	<b>KAZAKHSTAN</b>	<b>UZBEKISTAN</b>	
export	0.475	0.411	0.565	
import	0.002	0.002	0.001	
<b>Southeast Asia</b>	<b>MALAYSIA</b>	<b>SINGAPORE</b>	<b>THAILAND</b>	
export	0.473	0.201	0.346	
import	0.374	0.209	0.226	
<b>Northeast Asia</b>	<b>CHINA</b>	<b>HONG KONG</b>	<b>JAPAN</b>	<b>SOUTH KOREA</b>
export	0.218	0.471	0.459	0.201
import	0.512	0.389	0.589	0.288

*Source:* author's own calculations

The calculations justify the previous assumptions; the product structure of trade has changed radically for several Asian partners. The Hungarian export structure in 2012 was less than 20%, similar to the export structure in 2000 regarding the Arab Emirates, Saudi Arabia, Iran, Pakistan. Similarity is around 20% regarding Singapore, China, South Korea. Similarity is between 20 and 40% regarding the exports to Israel, India, Kazakhstan. Exports remained the most similar (between 40-60%) to Uzbekistan, Kazakhstan, Malaysia, Hong Kong and Japan. The structure remained relatively similar for imports from Iran, Pakistan, China, Japan, less similar in the case of Hong Kong and Malaysia and changed the most for those from the Arab and CIS countries. In the case of Azerbaijan, the import level was very low in 2012 and consisted mainly of fruit juices, iron and steel (base metal) products, whereas in 2000 there were other products imported, mainly cotton. Therefore, the similarity here is close to zero.

It is an interesting question whether these structural changes in the Hungarian export mainly took place before the international crisis or during the crisis itself. Therefore, we calculated similarity indices for Hungarian exports for three sub-periods. The results showed that, in almost all cases, the main changes happened before the crisis, the export structure of 2000 and 2007 being much less similar than the export structure of 2007 – 2011 and 2011-2012.

### *Concentration*

It is useful to analyse how much Hungarian export is diversified or concentrated. According to economic literature, diversification of exports is beneficial because economies highly dependent on exports (like Hungary) are vulnerable to external shocks. As studies (UNDP, 2011, Samen, 2010) show, the size of this impact depends on the degree of the country's export concentration. Higher degrees of export concentration are correlated with greater volatility in

export earnings. The extent of concentration can be seen even better if we analyse the structure based on the above-mentioned more detailed SITC classification.

In order to measure the degree of concentration of the Hungarian exports we calculated the Herfindahl-Hirschman index<sup>10</sup>:

$HHI = [\sum_i s_i^2]^{1/2}$ , where  $s_i$  is the share of the product group in total exports. If the index is 1, it means full concentration.

Table 6 shows the value of HHI indices for the beginning and for the end of the period<sup>11</sup>. Regarding exports, it can be seen that, for 2011-12, the index is extremely high in the case of the Arab Emirates, Singapore and Uzbekistan.

**Table 6. Herfindahl-Hirschman indices for Hungarian export and import**

West Asia	UNITED ARAB EMIRATES		ISRAEL		SAUDI ARABIA			
	Export	Import	Export	Import	Export	Import		
2000	0.270	0.309	0.275	0.230	0.410	0.746		
2011	0.928	0.347	0.358	0.330	0.570	0.530		
2012	0.883	0.387	0.314	0.368	0.490	0.246		
South Asia	INDIA		IRAN		PAKISTAN			
	Export	Import	Export	Import	Export	Import		
2000	0.301	0.219	0.656	0.723	0.377	0.346		
2011	0.575	0.300	0.212	0.913	0.548	0.349		
2012	0.299	0.321	0.231	0.842	0.433	0.375		
CIS	AZERBAIJAN		KAZAKHSTAN		UZBEKISTAN			
	Export	Import	Export	Import	Export	Import		
2000	0.501	0.878	0.283	0.550	0.568	0.937		
2011	0.499	0.713	0.464	0.953	0.722	0.906		
2012	0.483	0.586	0.484	0.967	0.810	0.732		
Southeast Asia	MALAYSIA		SINGAPORE		THAILAND			
	Export	Import	Export	Import	Export	Import		
2000	0.452	0.411	0.787	0.615	0.307	0.355		
2011	0.484	0.460	0.812	0.679	0.653	0.400		
2012	0.483	0.561	0.553	0.602	0.365	0.406		
Northeast Asia	CHINA		HONG KONG		JAPAN		SOUTH KOREA	
	Export	Import	Export	Import	Export	Import	Export	Import
2000	0.257	0.293	0.380	0.373	0.259	0.297	0.686	0.507
2011	0.407	0.560	0.473	0.327	0.282	0.337	0.316	0.503
2012	0.404	0.505	0.445	0.320	0.302	0.258	0.237	0.508

Source: author's own calculations based on SITC 3-digit level classification

<sup>10</sup> See, for example, Hirschman, Albert O. (1945), appendix. <http://www.google.hu/books?id=BezqxPq50dwC&printsec=frontcover&hl=hu#v=onepage&q&f=false>.

<sup>11</sup> The calculations are based on the SITC 3-digit level classification.

Concentration is relatively low (compared to other relations) in the exports to Japan, South Korea, Iran and Israel. It can also be seen that the pattern of concentration has changed through time. The change is the most spectacular in the exports to the Arab Emirates where there is a drastic increase of concentration. In other cases the concentration either increased although to a smaller extent, or it decreased (Iran and South Korea).

Import is highly concentrated from the CIS countries (cotton, natural gas), Iran (fruit and nuts) and Singapore (medicinal products), and rather concentrated from China, South Korea, Malaysia and Saudi Arabia. Regarding West and South Asian and CIS countries, medicine chemical, cotton, textile products and natural gas dominate in Hungarian import; in Southeast and Northeast Asia, it is telecommunication equipment and other high-tech parts and components which are dominant.

Hungarian exports to the Arab Emirates consist almost totally of telecommunication equipment and parts. This is due to the “Nokia effect,” the massive export of the Hungarian Nokia affiliate. The export of telecommunication equipment was significant also to Saudi Arabia and to a smaller extent to Israel. Rotating electric plants (SITC 716), parts and motorcars as well as other motor vehicles (SITC 781) were the most important export products to Israel.

Hungarian export to South Asian countries is less concentrated, especially in the case of Iran. Towards India and Pakistan the above-mentioned telecommunication equipment and parts product group dominates. Telecommunication equipment and parts are the second most important export group to the CIS countries too. Here, however, medicaments (SITC 542) play a dominant role. The main Hungarian export products to Southeast Asia are again telecommunication equipment and parts. In the case of Malaysia, automatic data processing machines (SITC 752) represent a high share too.

Regarding Northeast Asia, apart from the telecommunication equipment, internal combustion piston engines (SITC 713)<sup>12</sup> appear as main export articles to China. Exports to Japan are more diversified, containing meat products, measuring instruments, data processing machines. This is the only country to which the most important Hungarian export product is meat (not manufactured product).

As we have seen, concentration is high in Hungarian trade with Asia, even in those relations where a lot of products are traded (China, Hong Kong, Singapore). The general concentration level of Hungarian exports to Asia is

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<sup>12</sup> The biggest engine factory of the world (Audi Hungaria) is located in Győr, Hungary. Among exporting companies, Audi Hungaria accounts for the highest share not only in the Hungarian total of exports, but also in the Hungarian exports to China.

much higher than the concentration in exports to the EU (0.152) or in exports to all extra-EU territories (0.209)<sup>13</sup>.

### *Technology-intensity*

The degree of economic and technological development of a country can be reflected in its production and export structure. The share of high-technology products in the export can be an important sign of development in several cases. However, in the case of developing countries, economic trade literature questions real technological development behind the export of high-tech products (Mani, 2000; Srholec, 2005). It is argued that there is no real innovative activity, technological achievements behind this export, but this is due to the fragmentation of the production, the effect of global production networks (vertical specialisation) established by multinational companies. One product is produced in several countries; therefore, there is an important quantity of trade in its intermediate products and parts.

The fragmentation of production has increased to a considerable extent in the last decade, especially in the electronic, clothing and automotive industry (Lall et al., 2004, Kimura et al., 2005, Srholec, 2006, Vogiatzoglou, 2012, Túry, 2013). What is more, international trade in the global production networks has risen much faster than “normal” trade. Asian developing countries especially participate in this process with China at the front. The intensity of production fragmentation depends on certain factors like technically separable stages, factor intensity, the technological complexity of production and the weight of the product (transportable to large distances). These factors especially facilitate the production segmentation in electronics (Lall et al., 2004).

Participation in these global production networks means producing the labour intensive phases of high-tech intensive production (Srholec, 2005). As a consequence of the increased fragmentation of production, the assembly of an electronic product or a part can be similarly intensive in cheap labour as the assembly of any other machine. Therefore, countries where R&D intensity is low can also manifest high shares of high-tech exports. This is true for several Asian countries except for some high-income countries like Japan, Singapore, Taiwan, South Korea and certain Chinese regions (Srholec, 2005). The increasing role of China in the global network of information, communication and technology industry is proven by Amighimi (2005). In order to assemble them, the electronic parts of products are imported, which is manifested in a high share of high-tech import in these countries. Cross-border movement of parts and products within the same production network increases the trade of these developing (Asian) countries, “artificially” generating international trade with each crossing (Athukorala, et al., 2006, Mani, 2000).

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<sup>13</sup> Based on Eurostat data for 2012.

As a consequence, the competitiveness of countries can be overestimated based on gross export data and on indices (such as revealed comparative advantage) calculated from gross exports. This is especially true for open countries that rely heavily on imported intermediates. Based on the world input-output table data, Timmer et al. (2012) show that the use of imported intermediate inputs and the inclusion in global value chains has increased radically between 1995 and 2008 in the case of the Visegrad countries.

Based on the analysis of the product structure, we can assume that there is a considerable share of high-tech products in the Hungarian trade with Asia. Table 7 shows the value of trade in high-tech products in 2011-12 with the main trade partners being in Asia. The list of high-technology products is given by the Eurostat<sup>14</sup> based on their OECD definition (see the list in the Annex).

It can be seen that high-tech trade in general is very uneven, and the balance is extremely positive for Hungary in the case of the Arab countries, India and the CIS countries, also positive in the case of Israel and Hong Kong, but very negative in the case of China, Japan and South Korea. The high-tech export to Singapore and Thailand exceeded the high-tech import in 2011 but this was reversed in 2012. In general, Hungarian high-tech export decreased in 2012 to almost all main Asian partners and in several cases this decrease was radical.

**Table 7. Trade of high-technology products between Hungary and Asian partners, million euro**

	UNITED ARAB EMIRATES		ISRAEL		SAUDI ARABIA		INDIA		IRAN		PAKISTAN	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Htimport	0.80	1.84	22.49	25.18	1.14	0.58	9.35	27.82	0.10	0.03	0.30	1.27
Htexport	1,335.83	853.22	76.27	38.84	105.20	111.38	230.06	98.91	2.73	3.36	18.39	16.14
	AZERBAIJAN		KAZAKHSTAN		UZBEKISTAN		MALAYSIA		SINGAPORE		THAILAND	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Htimport	0.03	0.01	0.01	0.68	0.00	0.00	156.97	227.84	284.69	206.43	92.46	81.17
Htexport	47.32	8.13	57.12	29.33	5.32	4.55	98.45	45.89	515.00	188.01	103.27	33.88
	CHINA		HONG KONG		JAPAN		SOUTH KOREA					
	2011	2012	2011	2012	2011	2012	2011	2012				
Htimport	3,447.39	2,832.29	18.86	19.33	439.15	250.50	606.09	243.26				
Htexport	179.95	188.91	112.42	102.13	84.75	93.84	66.76	27.85				

*Source:* author's own calculations based on Eurostat data. Hungarian import from the given country and Hungarian export to the country

We also calculated the share of high-technology products in the Hungarian trade with the main Asian partners. Table 8 shows the relevant shares in Hungarian exports and imports in the case of each country. We can see that

<sup>14</sup> [http://epp.eurostat.ec.europa.eu/cache/ITY\\_SDDS/Annexes/htec\\_esms\\_an5.pdf](http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an5.pdf).

Hungarian exports are much more high-tech intensive than imports in the case of the South Asia and CIS countries and are just the opposite in the case of Northeast Asia: here, Hungarian imports are more high-tech intensive than exports (exception is Hong Kong in 2012). Situation is similar with Southeast Asia (except for Thailand where Hungarian exports are more high-tech intensive than imports). High-tech intensity of trade is similar in both ways with West Asia (except for the Arab Emirates where export is almost only high-tech mobile phones). Parallel to the decrease in volume, also the shares of high-tech products decreased in Hungarian exports in 2012.

**Table 8. Share of high-technology products in Hungarian exports to and imports from the main Asian partner countries**

West Asia	UNITED ARAB EMIRATES		ISRAEL		SAUDI ARABIA			
	<i>Import</i>	<i>Export</i>	<i>Import</i>	<i>Export</i>	<i>Import</i>	<i>Export</i>		
2000	1.9	5.0	40.7	2.6	0.1	0.9		
2007	8.5	82.8	21.3	29.7	34.4	69.0		
2009	15.4	84.5	20.3	36.4	50.4	47.9		
2012	41.1	91.6	20.3	14.1	39.1	54.6		
South Asia	INDIA		IRAN		PAKISTAN			
2000	3.1	16.7	5.5	8.8	0.0	6.8		
2007	18.7	19.6	1.8	4.2	0.3	87.1		
2009	23.7	39.8	0.9	5.0	2.9	30.0		
2012	9.5	44.5	0.9	19.1	39.1	53.9		
CIS	AZERBAIJAN	KAZAKHSTAN		UZBEKISTAN				
2000	0.0	13.5	0.0	10.5	0.0	12.3		
2007	0.0	36.6	0.0	47.9	0.0	26.4		
2009	76.5	56.8	0.0	16.5	0.8	6.5		
2012	1.6	21.3	1.0	23.5	0.0	8.8		
Southeast Asia	MALAYSIA	SINGAPORE		THAILAND				
2000	57.3	21.8	69.6	4.6	27.2	20.6		
2007	50.5	30.7	36.8	11.4	32.0	6.9		
2009	72.3	46.9	50.7	35.7	27.6	50.7		
2012	71.6	37.3	81.0	59.7	24.0	35.6		
Northeast Asia	CHINA		HONG KONG		JAPAN		SOUTH KOREA	
2000	43.6	16.2	51.0	15.8	33.9	14.5	27.7	5.0
2007	56.4	25.6	42.0	27.6	35.9	20.4	47.3	15.2
2009	60.0	17.9	39.6	37.3	46.5	25.3	52.1	20.8
2012	51.6	13.5	31.6	43.0	25.2	20.9	24.5	15.0

*Source:* author's own calculations from Eurostat

Regarding West Asia, exports to the United Arab Emirates and to Saudi Arabia reflect the already mentioned massive export of the Nokia affiliate from

Hungary, increasing the high-tech share from a very low to a high level between 2000 and 2012. In the case of South Asia the situation is similar in the export to India and Pakistan where electronics cause a significant high-tech share because of “telephone sets including those for cellular networks.” Exports to Iran are much less high-tech intensive, and scientific instruments give 48% of the high-tech exports mainly orthopaedic appliances and electrodiagnostic apparatus for medical, surgical, dental or veterinary purposes.

Towards the CIS countries, Hungarian high-tech exports are directed towards Azerbaijan and Kazakhstan where telephone sets are also dominant. Towards the Southeast Asian partners, the share of high-tech exports is high almost entirely due to telephone sets.

The share of high-tech products in the Hungarian exports is the lowest to the Northeast Asian region. Export to Hong Kong shows the highest share in the region, above 40% (due to telephone sets) and exports to China, Japan and South Korea have around 20% or less share in high-tech products. In the Hungarian export to China, scientific instruments are significant high-tech products; in electronics, not only telephones but also their parts and printed circuits are important. This is most probably because of the assembly activity in China. Similarly, cellular phones and parts are also important high-tech export products to Hong Kong. Towards Japan and South Korea the share of high-tech exports is much lower and in the case of Japan not that concentrated as in other cases.

High-technology import of Hungary is rather high in value from China, Japan and South Korea and also from Malaysia and Singapore. Import from these countries is high-technology intensive, which is due to the electronics and telecommunications products. From China and Hong Kong, cellular phone sets and their parts are the most important import products among electronics. Telecommunication equipment dominates in the import from Southeast Asia too. Singapore differs from this general pattern, because pharmaceutical products (heparin and salts) lead as high-tech products. Import of high-tech products practically does not exist from the CIS countries. There are some high-tech imports from India and Israel, mainly in electronics, pharmacy and chemistry. (From India there was also some import of gas turbine parts for turbo jets in 2012 and to Pakistan this item is the only high-tech import from Hungary).

The above-described pattern of high-technology trade between Hungary and Asian countries reinforces previous theories and assumptions on the decisive role of global production networks. The trade of electronic products, mainly mobile phones and parts – the production of which is extremely segmented – plays a dominant role in the trade with most countries. One exception is the case of CIS countries where delivery of other high-tech products (pharmacy, scientific instruments) is also significant from Hungary. The integration of Hungary (and other Visegrad countries) into the global value chains and the drastic changes in the production structure since the late-1990’s were generally

proven by others (Antalóczy, 2012, Rahman-Zhao, 2013, Timmer et al., 2012, Sass-Szalavetz, 2013). Based on a more disaggregated product classification, our article shows that this vertical integration determines the trade between Hungary and Asia too.

#### **4. Companies trading with Asia**

There is a consistent body of literature concerning the experiences and features of European companies trading with Asian countries, mainly China. These partly focus on firms in a particular European country, - like features of Italian, Danish or Swiss firms present in China (summarised in Horváthné, 2012) -, partly analyse several countries together (Gaulier, 2012). Barba Navaretti et al (2013) use a dataset of 15,000 manufacturing companies from seven EU member states (including Hungary) and try to find the answer to the question whether firms exporting to China and India are different from other exporters. They found that there were differences: the companies operating in China and India were on the average significantly bigger, more innovative and productive than other exporters.

As it can be seen from the trade data, foreign multinational companies have an essential role in the Hungarian-Asian trade. There are, however, other players: Hungarian large companies (multinationals) and small or medium-sized Hungarian firms. The way and the degree to which they participate in this trade is different (Table 9).

Regarding the large multinational affiliates, they included Hungary and the Asian countries in their global production network and their intrafirm trade and special trade policy are decisive.

The case of Nokia has already been mentioned. Nokia established its greenfield factory in Hungary in 1999 with the profile of making cellular phones; in 2004 a new investment doubled its capacity. Several Arab and Asian countries were supplied from here until recently (Szigetvári, 2007). This appears in the trade statistics, as we have seen it. 97% of the revenues of the Hungarian Nokia plant stemmed from export sales. In 2012, Nokia downgraded its affiliate in Hungary too. The work of assembling phones was switched to Nokia's plants in South Korea and Beijing.<sup>15</sup> Therefore, in 2012 the huge export of cellular phones from Hungary already decreased.

The second type of firms exporting from Hungary consists of the large domestic companies that have capital strength and a long tradition in their field. One important example is Richter Gedeon Plc. which is one of the biggest Central European pharmaceutical companies, registered on the stock exchange and has the largest R&D centre in the region. The firm has a strong presence in

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<sup>15</sup> Johnson, B. (2012), *Nokia factories shift to Asia: Did it have any choice?*, available at: <http://gigaom.com/2012/02/08/nokia-factories-shift-to-asia-did-it-have-any-choice/>.

the CIS markets not only with exports but also with its own affiliates that export medicines to other Asian countries. The products of the company have been distributed in China since 1998 and there they established a joint venture first in 2010 and then in 2013. The Chinese partner is Rxmidas Pharmaceuticals Company. This joint company has seven regional offices and around 200 employees.<sup>16</sup>

**Table 9. Types of firms trading with Asia**

	<b>Foreign multinationals</b>	<b>Hungarian large firms (multinationals)</b>	<b>Hungarian SMEs</b>
<i>Entering Asian market</i>	Easy	relatively easy, based on former contacts	Difficult
<i>Motives</i>	assembly, intrafirm trade	gaining new markets	Gaining new markets
<i>Volume of trade</i>	large	large, medium	Small
<i>Effect of the crisis</i>	changing locations	not significant, depends on product characteristics	can be strong, negative

There are several Hungarian small and medium-sized companies (SMEs) who ventured entering the Asian markets. China is perhaps the most important market in this respect. Experiences show that they turned to some organisation (state agency, private trade or counsellor agency) for help. There are consulting companies helping Hungarian firms on Asian markets, some even have their own trading house in China. In many cases, SMEs established their own affiliate or a joint venture in the Asian market. Entering these markets proved to be a long, difficult process, which requires adequate resources. Chinese experiences proved that negotiation methods, bureaucratic procedures and forms of communication are different from and more complicated than those considered usual in Europe (Horváthné, 2012). Personal contacts and good knowledge of the language are important. In general, those firms which are competitive on other foreign markets as well, have a well-prepared and organised management and their own proper resources can be successful.

<sup>16</sup> Gedeon Richter, [www.richter.hu](http://www.richter.hu).

**Case study – A small goose feather processing company with family traditions<sup>17</sup>**

**History and profile**

The company was established in 1989 and has been operating as a limited company since 1997. The traditional skill started with the grandfather between 1920 and 1965. Presently, the firm has 18 employees.

The company produces filling material for the garment industry, both raw and washed, processes goose and duck feathers, both handpicked and industrial. The production is based on their wide-range indirect connections to poultry-farmers. The machinery is able to handle and process the incoming raw feathers separately, by farms and thus can avoid the worsening of quality, in contrast to the unifying technology of the big collectors. It is possible to intervene in the sorting process, whenever it is necessary. That is why the processing capacity is limited to 1,200-1,500 kilograms per day.

**Experiences on the Asian market**

The firm has been exporting to South Korea since 2010 and also delivers to Taiwan. Its Asian export has increased to a small extent since then. It was partly the company, partly Asian importer firms that initiated business contacts. The firm was active in searching for partners, asking help from a/the trade agency and the Hungarian Embassy in South Korea. Apart from that, they participate in the Frankfurt Heimtex International Fair where there are possibilities to build new contacts. The firm has good experiences on the Asian market; Korean partners are flexible and pay duely. Future prospects seem to be promising; there is an increasing interest for these Hungarian products, as there is a shortage on the world market of feathers. It also helped that customs duties decreased as a consequence of the Free Trade Agreement of the EU, which Korea has been enforcing since July 2011.

**Effect of the crisis**

The international financial and economic crisis since 2008 had negative effects on the company; it caused certain market losses and financial problems. The firm was established with own resources, no state or EU financing was used. In 2006 – experiencing a boom of demand – the firm undertook a major modernisation with the help of a bank loan. Production tripled, but the crisis came and, in 2008, the bank withdrew its financial support. The company has still not received any investment loans since then, so they cannot expand production further despite the growing demand and orders. The firm has good contacts, good customers in Asia, the necessary technological and professional facilities are given but liquidity problems hinder them in expanding four or fivefold.

The characteristics of the product can be very important. There are successful innovative companies in the high-tech segment, like precision,

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<sup>17</sup> This case study is based on personal questions to the managing director and homepage information of the company.

medical instruments<sup>18</sup> or membranes for water treatment. Often, there are initiatives from the Asian countries coming to Hungary and looking for providers. A major cheese-exporting firm was established and expanded by an Arabic businessman to export cheese and milk products to the Arab countries<sup>19</sup>. The firm was not hurt by the crisis but successfully increased its sales even after 2009.

Financing requirements of the operations on the Asian markets are rather high. This is the field where the recent international economic crisis had negative effects even on those SMEs that have successfully found their market niches (see box).

## 5. Conclusions, recommendations

Asia represents a relatively small part in Hungarian imports and an even smaller share in exports. Exports to Asia, however, have increased more dynamically than exports to other regions during the years since 2000. Hungarian exports are directed mainly to West and Northeast Asia and the majority of imports come from Northeast Asia, mainly from China. Hungarian trade with Asia shows a considerable deficit because of the high value of imports from China.

Our article proved that the product structure of trade changed significantly during the examined period. This was illustrated by the similarity indices calculated for the main Asian partners. Machinery and transport equipment gained a considerable share in trade. Generally, we can say that trade is also concentrated to certain product groups, as it was shown by calculation of concentration indices. Although the volume of trade is relatively small, high concentration can increase vulnerability and volatility of export incomes. There are certain differences among the five Asian regions, and CIS countries differ the most from the general pattern. In several cases the share of high-tech

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<sup>18</sup> Mediso Medical Imaging Systems with headquarters in Budapest is a dynamic supplier of imaging devices to the medical research institutions and hospitals of the world. The business strength of Mediso is based on its R&D activity and continuous development of new products. More than 50% of Mediso employees are engaged in R&D. The firm received the Hungarian Innovation Award twice and in 2012 also the New Product Innovation Award of Frost&Sullivan. The Mediso-affiliated German and Polish subsidiaries and the worldwide distributor network ensures export to 81 countries, among them to almost all Asian ones.

<sup>19</sup> Caravanes Co. Ltd. was founded by a Libanese man in 1989. The company has grown to become one of the largest cheese exporters in Hungary. Export markets of Caravanes have expanded steadily and, in 2009, the construction of a new plant has become necessary to meet the growing demand.

products is very large, being mostly mobile phones and parts, but also automotive products, medicaments.

All the previously mentioned, structural characteristics prove the essential role of multinational companies in trade. In general, the fragmentation of production increased in the world during the past decade and this is manifested in the Hungarian trade with Asia too.

As we can see, our previous hypothesis that the present international crisis can give an impetus to the trade increase with Asia, proved to be true to a certain extent and for a while: the export increase until 2011 was more dynamic towards these countries than towards other regions. However, as Hungarian trade with Asia is largely controlled by multinational companies and their production in the global production chains, the location decisions of these firms can also have the opposite effect. Relocating plants from Hungary, for example, can decrease the Hungarian export capacity significantly and can change the structure of foreign trade too. This seemed to happen in 2012.

Apart from the dominating multinational companies, there are large and smaller Hungarian companies that are present on Asian markets. These can have different motives and experiences and were generally hit harder by the international crisis. Apart from the well targeted short-term efforts, financial resources should be given to SMEs for investment in technology improvement and to the education system to develop proper skills of workforce. These (together with a favourable business environment) can also affect location related choices of multinational firms.

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