Papeles del Este

Nº 9 (2004)

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Competitividad y renovación industrial. El papel de la inversión extranjera directa en el desarrollo de la industria eléctrica de Hungría

Miklós Szanyi

Resumen:

El proceso de producción en la industria de ingeniería eléctrica se compone de dos fases caracterizadas por la intensidad distinta de factores. Para estas fases la localización espacial óptima se encuentra internacionalmente. De ahí que la industria de producción de los componentes eléctricos sea una de las ramas manufactureras más internacionalizadas. El análisis de la industria en Hungría demostró que las actividades de este sector vienen determinadas por las empresas de propiedad extranjera. En los subsectores con el grado mayor de propiedad extranjera los indicadores de rendimiento siempre estuvieron en unas cotas superiores al promedio. Éste es el indicio de que las compañías multinacionales de esta rama industrial operaron de una manera más eficiente, tuvieron niveles más elevados de productividad y crecieron más rápidamente que las compañías locales. El análisis demuestra también que la mayoría de las empresas multinacionales estaban aisladas y

en la inmensa mayoría de casos operaban con otras filiales de la multinacional en el país, si es que lo hacían. Por ello, los efectos de desbordamiento que pudieron materializarse, teniendo en cuenta su capacidad superior en comparación con las empresas locales, fueron bastante limitados. Los socios locales difícilmente entraban en los canales de abastecimiento. La falta de suministro local fue pues tanto el resultado de la renuencia de las multinacionales en el establecimiento de nuevos contactos de cooperación, como de la falta de competencia de las empresas húngaras.

Palabras clave: Hungría, ingeniería eléctrica, inversión extranjera, empresa multinacional, efecto desbordamiento, competitividad.

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Competitiveness and Industrial Renewal. The Role of Foreign Direct Investments in the Development of the Hungarian Electrical Industry*

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Abstract:

Production process in electrical engineering industry is sequenced into a series of phases with different factor intensity. These phases find their optimal spatial locations internationally. Therefore, production of the electrical appliances industry is one of the most internationalized manufacturing branches. The analysis of the industry in Hungary showed, that the sector's activity was determined by foreign-owned companies. In the sub-sectors with high degree of foreign ownership performance measures were always above average. This indicated that multinational companies of the branch operated more efficiently, had a higher level of productivity, grew faster than local companies. The analysis also proved that most of the multinational firms were isolated, cooperated mostly with other multinationals' affiliates in the country, if with any. Therefore, the spillover effects that could come from their superior capabilities towards local firms, were rather limited. Local partners hardly entered supplier links. The lack of local supplies was a result of both the reluctance of multinationals to establish new cooperation contacts, and the lack of competence at Hungarian firms.

Key terms: Hungary, electrical engineering, foreign investment, multinational firms, spillovers, competence.

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Miklós Szanyi

There are two major branches of manufacturing industry that seem to have developed the most complicated international and global business networks, the electrical industry (NACE DL) and the automotive industry (NACE DM). Parts of the electrical industry supply also the automotive. These two branches seem to be most globalized, since not only markets or the production of finished products or main activities is distributed across the world. The international labor division goes much further and deeper. Products of these two branches are very complex and consist of parts and subassemblies on a wide range of technological sophistication. Hence, there is much room to settle discretional activities to locations that provide most favorable conditions for the various activities. The electrical equipment sector produces products of a large diversity ranging from computers, electric engines cables and batteries, semi-conductors, telephones and TV-sets to electro-medical equipment watches and clocks.

In the spreading of global labor division transition economies of Central Europe also played a significant role. The impact of transnational corporations on host economies was discussed in a huge body of literature that we are not going to summarize now. This paper rather focuses on a few selected issues. The major aim of the paper is to analyze how foreign investors contributed to the restructuring of one single branch of Hungarian manufacturing and hence to the restoration of the branch's international competitiveness. The analysis concentrates on statistical figures and also on some anecdotal evidence. We compare the branch's development in various transition economies, as well as with the development of the other manufacturing industries.

The changes and impacts on competitiveness can be traced back in various dimensions. First is the increase in absolute and relative size of the branch. Another important issue is the ownership pattern, the increasing role of highly efficient transnational corporations in the production. A further important aspect is the improvement of the output structure. This means a steady increase in the level of added value, which also means increasing technological sophistication with options for spillover effects. This also means the introduction of new products and activities

including in some cases high level corporate functions like logistical planning, account management or even R&D. We believe, that these improvements were most pronounced in the case of electrical industry. Thus, electrical industry served as a main engine of modernization of the Hungarian economy. But this branch also illustrates the quick changes that may occur in the global labor division system due to changes in the quantity, quality and price of the various production factors. The electrical equipment sector deserves special focus also because of its strategic importance for the whole economy. It is a major source of innovation and base of the "new economy" of the 21st century (ICT technology).

1. Statistical overview

The electrical and optical equipment sector plays an important role in the CEE economies. The sector is one of the major employers with 5-10 % of manufacturing labor force and with a production value of 4-25 % of manufacturing output or 2-18 % of GDP. As is seen from Table 1. The sector is of paramount importance in the case of Hungary, with by far highest production and employment shares. But it is an important sector in the other CEECs as well. Only Bulgaria lags behind significantly, although this country played an important role in the specialization system of the CMEA before the transition period. Bulgaria also had a sizeable electrical sector, but unlike in most other transition economies, in Bulgaria up till now there was no significant recovery of the sector.

Table 1. Electrical and optical equipment industry in CEE (1999)

	Production EUR mn	Production % of GDP	Production % of manufacturing	Employment thous. pers.	Employment % of manufacturing
Bulgaria	265,4	2,3	4,3	36,5	6,2
Czech Rep.	3079,4	6,2	7,9	113,0	10,5
Hungary	7361,8	16,3	23,6	116,0	15,6
Poland	6250,3	4,3	7,2	173,2	6,6
Romania	1029,6	2,8	5,0	74,5	4,4
Slovak Rep.	1142,6	6,2	8,4	54,9	11,0
Slovenia	967,0	5,1	8,6	25,2	11,2

Source: Hanzl (2001)

Though production and employment shares are also low in Romania and Poland, the absolute size of the branch is not smaller, than in Slovenia or the Slovak

republic. This means, that these countries, but especially Poland is similarly incorporated in the global production network of the branch like the Czech Republic. Hungary stands out not only because of the high shares of the sector in both production and employment, but especially, because in Hungary shares in employment are much lower than shares in production. This indicates a significantly higher level of per capita production than in other countries, especially in those, where production share is lower, than employment share. In these countries these rough measures indicate a below manufacturing average productivity of the sector (Bulgaria, Czech Republic, Slovak Republic, Slovenia). This result may be an outcome of different intra-sectoral structure, and also lower effective level of productivity of the same comparable activities. Later we argue, that both factors play a role in the higher level of productivity in the Hungarian electrical equipment sector. The truly important issue here is to determine the origins of excessive productivity. Is this a feature of competitive advantage of firms or economies (local production factors), or both? Are these factors dynamically interlinked? Do local factor costs and the quality of production factors influence capital attraction that result in the appearance of highly productive production facilities of competitive multinationals? Does the presence of the multinationals improve qualities of local production inputs? Are there significant spillovers that can further improve location advantages?

In 1989 the shares of the electrical equipment sector were rather similar in the individual CEECs. Bulgaria (now with lowest level) had similarly 8 % sector share like Hungary, and the lowest share was registered in Romania (3%), but this country did not cooperate closely with other members of CMEA. The importance of the sector increased in all CEE countries but in Bulgaria during the years of transition. Most vigorous development was seen in Hungary. Hungary is the only CEE country where the share of the sector is higher than the EU 15 average. This also means, that in all other countries this sector still has a fairly large growth potential. The structure of manufacturing industries is introduced in Table 2. The already high share of electrical equipment sector in Hungary further grew between 1999 and 2002 despite of the dropout of a number of large companies that moved from the country to other low-wage locations.

Table 2. Production shares of selected manufacturing industries of CEECs in total manufacturing 1999 (%)

	Bulgaria	Czech Rep.	Poland	Romania	Slovak Rep.	Slovenia	Hungary	Hungary 2002
D: Total manufact	100	100	100	100	100	100	100	100
DA: Food…	25,2	17,2	25,3	25,1	13,9	14,9	17,0	16,5
DB: Textiles…	6,7	4,4	4,6	7,2	4,2	7,3	3,6	3,0
DC: Leather…	1,3	0,8	0,9	1,7	1,3	1,5	0,8	0,7

DD: Wood…	1,5	2,7	3,5	2,5	3,4	3,2	1,2	1,2
DE: Paper, publ...	4,2	4,7	6,1	3,1	6,1	7,1	4,3	4,3
DF: Coke, petrol.	15,0	2,8	4,6	8,0	6,7	0,4	4,9	4,4
DG: Chemicals…	9,3	6,7	6,8	7,4	6,0	10,0	7,0	6,9
DH: Rubber, plast	2,2	4,3	4,4	2,2	3,3	4,5	3,5	3,9
DI: Non-metal…	5,1	6,4	5,4	4,8	5,2	4,8	2,9	3,0
DJ: Metal prod…	10,3	15,9	10,6	16,3	17,0	12,3	8,1	7,5
DK: Machinery…	11,5	8,0	5,5	5,5	7,3	10,4	4,7	5,6
DL: Electrical…	4,3	7,9	7,2	5,0	8,4	8,6	23,6	27,1
DM: Transport eq	1,9	14,3	10,8	7,7	14,0	9,9	17,0	14,5
DN: Other mfg…	1,5	3,9	4,3	3,6	3,2	5,3	1,2	1,5

Source: Hanzl (2001) and CSO Hungary for the year 2002

During the first period of transformation from 1989 to 1992/5, all CEECs experienced severe transformational recession with steep decline in production first and then in some countries further stagnation. The electrical equipment sector declined as well, by over 20 % per year in all CEECs until 1992. In some sub-branches the decline was more severe, in Hungary, for example, the production of semiconductors and computers was stopped almost completely and output level fell by 80 %. Or between 1992 and 1995 there was no radio receiver production in Hungary (Sipos, 2003). In general, the sector was more affected by recession compared to other manufacturing branches. This was the combined result of the collapse of the previous CMEA-specialization patterns and the Eastern market, a dropout in deliveries to military purposes and in many countries the quick liberalization of the trade regime and the thus increasing import thrust that wiped out from the markets domestic (CEE) products characterized by inferior technical sophistication. On the supply firms were unable to quickly follow the changes in demand, hence many firms went bankrupt. Sooner in countries where no state protection accommodated market shocks, later in other countries, where the state experimented with expensive rescue maneuvers before letting ailing electrical producers die. Only few domestic firms managed to survive at the cost of heavy downsizing and restructuring.

The place of the former local producers was taken over partly by product imports, partly by foreign investment companies. Also, new small domestic producers appeared on the markets after 1993, but especially from 1995. Growth rates were exceptionally high in Hungary boosted by several major greenfield foreign direct investments with over 40 % per year on average between 1993 and 1999. Growth was also quick in Poland and in the Czech Republic with 16 % per year (Hanzl, 2001). When compared with total manufacturing the electrical equipment sector proved to

be one of the highest growing sector (besides automotive) in these three countries. In Hungary, Czech Republic and Slovenia this sector grew quickest. This extraordinary growth was fuelled also by general economic recovery and high growth in other downstream industries like the automotive industry, which also received substantial FDI. The growth pattern was also characterized by quick increase in exports. Multinational corporations fitted the new-old production locations into a new international cooperation network of their own instead of the former CMEA cooperation.

Development of the electrical equipment sector lost steam in Hungary after 2000. Hungary as production location was fitted into well established cooperation networks, and further developments occurred at slower pace. Recession on world markets also took much of the momentum of further expansion of multinationals of the sector. The period starting with 2001 is earmarked by slower expansion but also by important structural changes within the industry itself. The close link of production and export changes is illustrated by the figures of Table 3.

Table 3. Changes of gross output and export sales of electrical and optical equipment (DL) and transport equipment (DM) industries of Hungary 1996-2002 (previous year = 100 %)

	D: manufacturing		DL: Electrical and opt. Eq		DM: Transport equipment	
	G Output	Exports	G. Output	Exports	G. Output	Exports
1995	100	100	100	100	100	100
1996	103	119	142	179	126	140
1997	115	137	179	205	163	168
1998	116	129	146	159	148	157
1999	112	123	155	161	120	124
2000	121	128	154	157	116	117
2001	104	109	109	115	104	104
2002	104	106	105	106	101	101

Source: Central Statistical Office

The Hungarian economy as a whole and the manufacturing industry in general has been driven primarily by exports. Changes in export sales always exceeded the expansion of output, which indicates that domestic sales grew much slower. Also, the impact of the world economic recession starting in 2001 can be seen in form of lower growth rates both in exports and output. The two most internationalized sectors automotive and electrical equipment stand out in this regard. Their growth rates exceeded manufacturing average in the years of quick expansion, but lagged behind in the years of recession. This means that they depend on world economic growth and transfer both growth impulse in case of world economic boom and slack in downturn

periods. Nevertheless, we believe that the end of the restructuring process also contributed to this slowing down of both sectors after 2000.

2. Sectoral competitiveness

Wages, productivity and unit labor costs in the electrical equipment sector have been much lower in CEE economies, than in virtually all countries of the EU 15. This statement also indicates, however, that wage levels were usually lower, than productivity levels, otherwise unit labor costs had been higher in the CEECs than in the EU 15. Moreover, wage and productivity development during the 1990s even widened the gap in some transition economies, most importantly in Hungary, but also in the Czech Republic and Slovenia. Thus, unit labor costs continuously fell during the 1990s. This situation of dropping ULC changed by the turn of the millennium, most sharply again in Hungary, with real wages increasing definitely quicker, than productivity. The process was fuelled by two factors. Firstly, quick improvements in productivity were achieved during the 1990s with the mass-scale replacement of obsolete technologies in manufacturing. Hungarian productivity levels became comparable with EU 15 averages. In some sectors, like the electrical equipment sector, productivity reached the EU average. From this higher basis it was obviously much more difficult to achieve rapid improvements. On the other hand, due do deliberate government policies (demand stimulation, race for votes in the election campaigns) the average real wage level started to increase in 2000. Wage increases were most profound in the state administration, but through indirect channels it also pushed manufacturing wages higher.

According to the calculations of Hanzl (2001) nominal wage rates per employee in the electrical equipment sector were around 10 % of the Austrian level, they were lower in the Balkan countries (4 %) and highest in Slovenia (27%). The productivity level ranged between the lowest in Bulgaria (13 %) and 45 % in Poland, but in Hungary it even surpassed the Austrian level and reached 110 % in 1999. Consequently, unit labor costs were lowest among CEE countries in Hungary, not exceeding 10 % of the Austrian level (Hanzl, 2001 p.10.)! In 1991-92 this level was still over 50 %! This extraordinarily advantageous for investors situation started to change in 2000 with real wage increases. One may ask here the question if the long period of lagging behind of wages compared to productivity increases unduly changed the share distribution of added value from the participation of labor to capital? To some extent maybe yes. Real wages' increase was almost marginal in Hungary during the 1990s, meanwhile GDP started to grow. Wage increases were rather meager also compared to other transition economies (except the Balkan countries). However, the

miraculous decrease in unit labor costs was mostly achieved by the employment of highly efficient up-to-date technologies, and only to a lesser extent by increased labor performance. Productivity continuously increased by 20-30 % per year over the 1993-2000 period in the electrical equipment sector, meanwhile earnings at a slower rate of 10-15 %. This situation changed after 2000, as it is shown in Table 4. Figures for the years 1999 and 2000 still show very high productivity increases, but then, there is a drop in 2001 and 2002.

For a more careful analysis, however, we have to note, that per capita output is a rather sensitive measure. Output potential is broadly influenced by the capabilities of production factors, but the actual usage of these depends on sales opportunities. The dramatic drop in the productivity figures of the computer industry (NACE 30) is a straight consequence of dropping sales revenues. Sales revenues went back partly due to world economic recession, but partly also because of the shutting down and moving to China of the perhaps "most productive" plant of the branch IBM Storage Products Inc. Thus, the situation is not that bad, temporarily low sales levels push down productivity indexes.

Table 4. Competitiveness and foreign ownership. Changes of some indicators of Hungarian electrical industry 1998-2002 (% change previous year = 100 %, except foreign ownership, which is % share of foreign owners in subscribed capital)

		30	31	32	33	DL	DM	D
1999	Output/employee	83,4	107,0	150,6	109,4	134,8	125,6	111,0
	Average m. earn.	96,5	120,0	123,5	111,1	118,4	116,9	115,9
	Foreign owner	39,6	85,3	85,1	22,4	71,4	74,4	60,5
2000	Output/employee	127,3	136,8	133,6	108,7	129,0	114,2	118,9
	Average m. earn.	111,9	115,2	117,7	116,3	115,9	117,0	116,4
	Foreign owner	30,9	76,0	90,8	31,1	73,0	71,9	61,3
2001	Output/employee	66,8	162,9	91,5	105,5	107,3	96,8	104,3
	Average m. earn.	111,0	111,3	116,7	114,5	113,0	116,0	114,8
	Foreign owner	31,7	86,8	93,8	29,9	80,6	84,5	64,4
2002	Output/employee	80,7	108,5	126,0	86,0	107,5	97,4	104,3
	Average m. earn.	122,0	112,0	112,7	105,1	112,2	112,6	112,8
	Foreign owner	30,3	82,3	92,5	20,9	76,3	82,0	63,5

Source: Central Statistical Office

Besides cost analysis another opportunity to express competitiveness of branches is provided by surveying sales and especially trade performance

development. Branches that are able to expand on sales markets can be regarded competitive: increase in market share is the result of high level of competitiveness. The trade with the EU stands out from this respect. During the 1990s the role of the collapsed former CMEA was taken over by the EU. Also in the electrical equipment sector EU 15 became the major export partner. In the Czech Republic, Poland and Hungary, EU 15 share in sectoral exports was around 80 % in the early 2000s.

It is not surprising that just like in the case of production and employment, it is again Hungary which has the highest share of electrical equipment in total exports (around 35%). In other CEECs the export share was proportionally lower in 1999, with 16 % in the Czech Republic, 13 % in Poland and Slovakia, 11 % in Slovenia, 7 % in Romania and only 4 % in Bulgaria (Hanzl, 2001). Export shares were found higher for this sector, than overall production share, which reflects the above-average export intensity of the electrical equipment sector. The share of the sector in total exports grew steadily in the CEECs. Hungary achieved the largest export increase with 460 % between 1995 and 1999. This was the result of the establishment of a large number of greenfield investments in this sector that started operation. When new extensive investments dried up the spectacular increase in export sales also went back to "normal", much lower levels.

The analysis of Hanzl (2001) also drew attention to the even higher share of the sector in total imports. This was due to the import needs of foreign investors (e.g. outward processing) and increased demand for consumer electronics and information technology imports. The only exception again was Hungary, where the sector's share in imports was lower, than in exports. This fact can be explained in several ways, but all of them are bound to a relatively higher developed electrical equipment sector in Hungary. For example, equally high export and import shares indicate a low level of local value added in exports. Another explanation may be a higher share of local consumption (e.g. in consumer electronics) delivered from local factories, which pushes imports lower. Indeed, there is ample evidence of upgrading of both the production and export structure of Hungarian electrical equipment industry. At first sight, when compared with other transition economies a very profound difference can be found in finer trade structure. In 1999 all other countries' exports were heavily concentrated on "electrical machinery and apparatus n.e.c." (NACE 31, 50-60 %), followed far behind by "radio, TV and communication equipment" (NACE 32, 10-37 % of the exports). Exports of "office machinery (NACE 30) and "medical precision and optical instruments" (NACE 33) lagged far behind. The structure in Hungary was significantly different in 1999 with "radio, TV and communication equipment" on first place (large scale investments in cellular telephony and consumer electronics),

and very close second was "office machinery" (large investments by world-leading firms in electronics, computer technique and informatics).

Our own analysis that used the BCG matrix method (Buzás and Szanyi, 2004) detected the rather "uneven" character of the sectors more detailed product groups' performance in Hungarian trade. Between 1998 and 2001 NACE 3 digit level product groups of the branch behaved completely differently. According to the calculations, between 1998 and 2001 (before the two giants' move to China) There were 5 stars, 5 missed opportunities and 5 cash cows in the sector, but no dogs. This means, Stars could increase market share on expanding EU markets, were therefore highly competitive. The 5 missed opportunity product group could not maintain market shares, competitors outgrew them. The 5 cash cows again increased market share, though on declining markets. Table 5. summarizes the results of the BCG analysis.

Table 5. Position of branches in the BCG-analysis. Comparisons of the years 1998 and 2001.

EU-Market			**Domestic market**			
Stars	Questionmarks	Cash Cows	Stars	Questionmarks	Cash Cows	Dogs
312	315	300	300	314	312	311
313	316	311		315	313	331
322	321	314		316	321	333
332	323	333		322	332	334
334	331	335		323	335	

Source: Buzás – Szanyi (2004)

Interesting are the differences between the performances on domestic and export markets. They obviously are influenced by the specialization patterns of the industry. 3 from the stars (312, 313, 332) on EU markets (growing market share on expanding market) are cash cows on domestic market (increasing share on shrinking market), but EU-market star 334 (optical instruments) is a dog on domestic markets. This means: Hungarian production is most likely further processed or used in other countries, meanwhile Hungarian consumption is supplied rather by imports. In fact, we expected the same behavior for other product groups as well. There are numerous businesses that realize most of their turnover in international cooperation deals, which means very high export (and import) shares compared to domestic sales. Branches 313, 314, 315, 316 produce accessories of other larger appliances but they are questionmarks on both markets. Product groups 311 (electrical engines), 331 (medical equipment) 333 (industrial process control equipment) are domestic dogs and questionmarks or cash cows in the EU which would indicate high share of EU exports in domestic production. But all these product groups have not really high share in export or production.

The figures of Table 6. provide further detailed information about the different type of specialization of exports in Hungary. The "imprinting" of foreign investment companies in the export structure are very clear, also in the case of other countries. This holds also for negative examples, for "disinvestments". The drop in Hungarian office machinery exports by 2002 was mainly the result of IBM Storage Products Inc.'s and Flextronics' X-Box production's move from Hungary to China.

Table 6. Detailed export structure of the electrical sector in 1999 and 2002 (% of total DL exports)

	Bulgaria	Czech Rep	Poland	Romania	Slovak Rep.	Slovenia	Hungary 1999	Hungary 2002
30 Office m. computers	**2,1**	**7,2**	**1,8**	**14,4**	**17,2**	**2,1**	**32,4**	**16,6**
31. Electrical mach.	**48,6**	**64,0**	**55,4**	**70,3**	**66,5**	**59,8**	**30,1**	**40,4**
311 El. motors…	17,9	14,4	10,0	19,4	18,4	26,2	5,5	1,5
312 El distrib & control	10,8	18,3	8,3	3,7	3,3	9,4	5,7	2,8
313 Insul wire & cable	4,6	8,7	8,2	3,8	6,2	2,8	3,0	1,0
314 Accumulators..	0,5	4,9	3,9	0,6	0,0	2,0	0,0	1,2
315 Lightning eq lamps	9,9	2,2	10,2	5,6	3,0	3,9	5,6	11,7
316 Electr. eq nec.	4,9	15,5	14,7	37,3	35,5	15,6	10,3	22,7
32 Radio TV telecom..	**27,2**	**19,9**	**37,3**	**10,4**	**13,4**	**12,0**	**33,6**	**41,2**
321 El valves..compon	8,4	12,4	9,1	1,6	5,4	7,4	5,7	5,3
322 TV radio tel transmit	3,7	2,4	2,5	8,0	1,6	1,0	1,1	2,6
323 TV radio rec & record	15,1	5,1	25,7	0,8	6,3	3,5	26,7	33,3
33 Instruments, watches	**22,1**	**8,9**	**5,5**	**5,0**	**3,0**	**26,0**	**3,9**	**1,8**
331 Medical eq	1,1	1,7	2,1	1,0	1,2	2,8	0,9	0,5
332 Measuring testing eq	11,1	4,6	2,8	2,7	1,6	16,9	2,2	1,0
334 Optical & photgraph eq	8,3	2,3	0,2	1,1	0,2	5,3	0,7	0,3
335 Watches & clocks	1,5	0,3	0,5	0,1	0,0	1,0	0,0	0,6
DL electrical & optical equip	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**
DL in EURO mn	**88**	**2634**	**2167**	**398**	**752**	**591**	**5792**	**11168**

Source: Hanzl, 2001 and Central Statistical Office with own calculations

The different production and export structure in Hungary may provide some explanation of the sectors' outstanding development pattern. Éltető (1999) and others also drew attention to the fact, that in Hungary's trade structure the so called high technology products have a larger, and increasing share than in other CEECs. Table 7. contains data of the developments in export structure of Hungarian manufacturing. The most conservative observers would also agree, that there was substantial up-grading in the structure, especially during the second half of the 1990s. The marginalization of resource-based exports is an especially welcome development, since Hungary has always been rather poor in natural resources, and had to import them in order to run facilities in these branches that only produce low value added. On the other hand, the very high share of high technology products covers activities

of mixed nature. There are simple assemblies, like in some electronics products, but also activities with fairly high local content and local value added.

Table 7. High tech, medium tech and low tech products in EU exports

	1985	1990	1995	2000
Market share	**0,3**	**0,3**	**0,5**	**0,9**
1. primary products	0,3	0,5	0,4	0,4
2. Resource based manufactures	0,4	0,5	0,5	0,5
3. manufactures not based on res	0,2	0,3	0,5	1,1
Low technology	0,4	0,5	0,8	0,8
Medium technology	0,1	0,2	0,5	1,3
High technology	0,1	0,1	0,4	1,1
4. Others	0,1	0,2	0,2	0,1
Export structure	**100,0**	**100,0**	**100,0**	**100,0**
1. primary products	26,9	20,8	10,5	4,5
2. Resource based manufactures	32,9	27,1	18,4	9,8
3. manufactures not based on res	39,2	50,5	70,0	85,1
Low technology	22,6	27,2	25,9	14,9
Medium technology	12,7	18,2	32,6	44,9
High technology	3,9	5,1	11,6	25,2
4. Others	1,0	1,6	1,0	0,6
Principal exports	**2,8**	**4,9**	**23,9**	**50,2**
Internal combustion piston engines	0,1	0,1	7,2	12,4
Autom. data processing machines	0,1	0,0	1,0	10,1
Passenger motor cars	0,0	0,1	1,8	6,6
Sound equipment	0,0	0,0	1,1	3,4
Telecommunications equipment	0,2	0,9	2,4	3,4
Equipm. for electricity distribution	0,1	1,1	3,7	3,3
Parts, accessories of motor vehicles	0,3	0,5	2,0	3,1
Parts of electrical equipments	0,1	0,2	0,9	2,8
Electrical machinery	1,7	1,5	3,1	2,7
Television receivers	0,1	0,5	0,9	2,4

Source: UNCTAD (2002)

But do these results really indicate better performance? Two factories' move from Hungary to China significantly altered the sector's production and export structure. This indicates, that firm-specific features, advantages might have had an important role in these firms' Hungarian operations. Local competitive advantages seem to have played little role, when such large-scale investments moved almost overnight from one to another location. Moreover, despite of the dropout of some 5 % of total Hungarian exports after these moves, trade deficit did not deteriorate, in

these cases imports were also very high: the activity was rather assembly with very low local value added. Screwdriver industries should be therefore separated from those which have longer term perspectives in a given country, produce more local value added, and intend to increase its level. One measurement method was developed by WIIW based on differences of unit export values. The unit value of total EU imports is compared to the unit value of imports from individual countries. The so-called price/quality gap indicator expresses these differences. A below unit price level indicates less sophistication and/or inferior quality in the exports of a given product group. Table 8. provides the figures for the 1995-1999 period.

For the average of the 5 years, and for the year 1999 the indicator was negative for exports of electrical equipment exports from all CEECs to the EU except Hungary. Largest gaps were registered in the trade with the two Balkan countries and with the Czech Republic, meanwhile trade with Slovakia, Slovenia and Poland was close to equal, but still negative. Hungary showed an astonishingly high + 0,30 in 1999 (prices were on average 30 % higher, than in the average of total EU imports). The indicator improved in all countries between 1995 and 1999 (Hanzl, 2001). As Table 8 shows, the price/quality gap indicator varied across segments of the sector. Most positive values can be found in "Radio, TV and telecommunications equipment and apparatus" (32). Hanzl (2001) also lists lighting equipment and lamps (315), watches and clocks (335).

Table 8. Price/quality gap indicator for CEEC exports to the EU in electrical and optical equipment (DL)

	Bulgaria	**CZECH REP**	**Poland**	**Romania**	**SLOVAK REP**	**Slovenia**	**Hungary**
1999							
30 Office m. computers	-0,303	-0,429	-0,417	-0,346	-0,158	0,162	1,061
31. Electrical mach.	-0,312	-0,234	-0,080	-0,281	-0,195	-0,134	0,160
32 Radio TV telecom..	-0,017	0,064	-0,057	0,383	0,139	-0,139	0,046
33 Instruments, watches	-0,539	-0,438	-0,474	-0,563	-0,345	-0,181	-0,410
DL electrical & optical equip							
1995	-0,402	-0,239	-0,252	-0,433	-0,282	-0,237	-0,087
1996	-0,477	-0,293	-0,288	-0,460	-0,374	-0,238	-0,066
1997	-0,432	-0,228	-0,224	-0,393	-0,313	-0,269	0,012
1998	-0,375	-0,152	-0,044	-0,207	-0,189	-0,231	0,061
1999	-0,304	-0,219	-0,103	-0,262	-0,157	-0,148	0,318
Average 1995-1999	**-0,398**	**-0,226**	**-0,182**	**-0,351**	**-0,263**	**-0,225**	**0,048**
Change in % 1995-1999	**4,8**	**2,3**	**6,6**	**9,1**	**5,8**	**2,3**	**8,6**

Source: WIIW database in Hanzl (2001)

The lesson of the price/quality gap indicator supported again the previous picture of some kind of superior performance of Hungarian electrical equipment sector. On the other hand, the extraordinarily high figure for computers (+1,061) suggests that the high sector average hides large differences in this sector in Hungary. The fairly low (-0,41) value for instruments for example is very much at the average of the investigated countries. In a more detailed list in Hanzl (2001, p.23.) readers can identify not less than 9 negative figures out of the 15 in the case of Hungary as well! It seems, that a few branches did extremely well, and their outstanding performance pushed averages also very high, presumably because their weight in export sales was also high. Especially strong Hungarian branches were the following ones: lighting equipment (+0,53), a traditionally strong Hungarian branch now run by General Electric, electrical equipment, n.e.c. (0,45), another stronghold with lots of foreign investments (Siemens, ABB, Bosch and others). TV and radio receivers, sound video recorders (+0,42) again a strong industry with high shares in exports, largely dominated by Phillips, Sony, TDK and a few other well-known brands. Office machines and computers (+0,23) also had high shares in exports and the branch was dominated by very few multinationals, like IBM, Flextronics and others. Electric motors, generators and transformers also had positive value (+0,02) but its share in exports was marginal. It is not very difficult to see, that branches with strong foreign penetration in local production achieve the better price/quality gap values. Data of the largest Hungarian exporters are included in Table 9.

Table 9. Exports by the 12 leading foreign affiliates (2000)

Name	Country	Branch	Value (USD million)	% of total exports
Audi Hungaria Motor	Germany	Automotive	3187	11,2
IBM Storage Products	USA	Electronics	2240	7,8
Philips Magyarország	Netherlands	Electronics	2027	7,1
GE Hungary	USA	Electronics	639	2,2
Opel Magyarország	USA	Automotive	628	2,2
Flextronics International	Singapore	Electronics	430	1,5
Alcoa Köfém	USA	Aluminium	314	1,1
Magyar Suzuki	Japan	Automotive	300	1,1
NABI	USA	Automotive	249	0,9
Samsung Electronics	Korea	Electronics	241	0,8
Electrolux Lehel	Sweden	Machinery	212	0,7
Visteon Hungary	USA	Electronics	187	0,7

Source: UNCTAD (2002)

A further frequently used method of trade performance analysis is the use of Bela Balassa's known RCA indicator. The RCA indicator (revealed comparative

advantage) in fact is a trade specialization index, and shows those branches where one or another country have above average specialization in trade. Thus, the index does not tell much about the "quality" of specialization: the evaluation of the results is left for the observer's subjective opinion. The indicator can not provide information about the real content of the trade flows either, but together with WIIW's price/quality gap indicator we can evaluate if one country's strong specialization on say "high technology" product groups really covers high tech activities or at least substantial local contributions to the high-tech products. A snapshot comparison of CEECs is provided for the year 1999 in Table 10. Hungarian specialization indexes do not provide much surprise. As expected the same branches showed strong specialization, which also provided positive price/quality gap values, and weighted the most in the export structure of Hungarian electrical equipment sector (see Tables 6 and 8).

Similarly, the RC index was negative in all other countries which reflects their negative sectoral trade balances. Also, when compared to total manufacturing's RCA data indicate a "comparative disadvantage" of the sector in all other CEECs. The "disadvantage" or "despecialization" was largest in the Balkan countries and smallest in Slovenia. But here again the question is open, how to interpret the figures? The very high negative values indicate, that in the given product group there is virtually no export activity maybe no local production. In the internationally highly competitive and complex industries like the electrical equipment industry today's firms can no longer operate based on domestic market sales only. On the other hand, most CEECs are small or at best medium size economies (Poland and perhaps Romania medium), with limited production input capacities. In this case, there must be some kind of specialization, it is virtually impossible to produce everything and have high specialization indexes in all product groups.

Table 10. RCA structure of the electrical and optical equipment sector, 1999

	Bulgaria	Czech Rep	Poland	Romania	Slovak Rep.	Slovenia	Hungary
30 Office m. computers	**-0,95**	**-0,50**	**-0,92**	**-0,44**	**-0,11**	**-0,85**	**0,23**
31. Electrical mach.	**-0,33**	**0,04**	**-0,10**	**-0,07**	**0,06**	**0,02**	**0,14**
311 El. motors…	0,14	0,05	-0,13	0,20	0,12	0,40	0,02
312 El distrib & control	-0,52	-0,11	-0,45	-0,70	-0,67	-0,29	-0,12
313 Insul wire & cable	-0,45	0,07	-0,18	-0,59	-0,25	-0,54	-0,14
314 Accumulators..	-0,86	0,33	0,08	-0,57	-0,98	0,03	-0,83
315 Lightning eq lamps	0,08	-0,17	0,22	0,23	0,24	-0,19	0,53
316 Electr. eq nec.	-0,61	0,20	0,17	0,17	0,41	0,13	0,45
32 Radio TV telecom..	**-0,70**	**-0,35**	**-0,32**	**-0,79**	**0,42**	**-0,53**	**0,09**
321 El valves..compon	-0,13	-0,17	-0,27	-0,87	-0,32	-0,12	-0,35
322 TV radio tel transmit	-0,93	-0,73	-0,88	-0,72	-0,80	-0,91	-0,63
323 TV radio rec & record	-0,43	-0,26	0,23	-0,89	-0,12	-0,41	0,42
33 Instruments, watches	**-0,54**	**-0,38**	**-0,67**	**-0,77**	**-0,74**	**-0,05**	**-0,31**
331 Medical eq	-0,93	-0,52	-0,63	-0,88	-0,47	-0,53	-0,33
332 Measuring testing eq	-0,50	-0,44	-0,69	-0,76	-0,81	0,07	-0,32
334 Optical & photgraph eq	0,01	0,04	-0,87	-0,37	-0,62	0,24	-0,20
335 Watches & clocks	0,24	-0,18	-0,31	-0,74	-0,98	-0,24	-0,71
DL electrical & optical equip	**-0,60**	**-0,17**	**-0,35**	**-0,42**	**-0,14**	**-0,20**	**0,12**

Source: Hanzl (2001)

And here comes the subjective element of how to evaluate one or another specialization pattern? OECD's guidelines concerning the technology intensity (see Table 7) may be an important aspect. High tech branches may provide important growth and modernization impulses for other industries as well. But this is obviously not the case if the local value added is small, the local activity is not high tech, though in all respects statistical figures sketch very positive overall pictures. What if an industry consists of screwdriver factories only? Do these also provide the expected spillover effects? Under circumstances and in the long run maybe yes. The screwdriver industries of the countries in South-East Asia provided the necessary stimuli, and Indian software ventures also show a kind of up-grading in their activities from the original data processing. Obviously, the quality of the local business environment and solid economic policies (industrial policy) are crucial in this respect.

3. Foreign ownership and competitiveness

The main purpose of this paper was to analyze relationships of competitiveness and FDI in one particular segment of manufacturing the electrical equipment sector. Therefore, we do not want to draw general conclusions of the topic here, but concentrate on this single sector. In the previous section we already demonstrated the dominating role of foreign owned companies in shaping the structure of Hungarian manufacturing and exports. Currently two main new topical issues stand out. The first is the currently experienced dynamics of the FDI in- and outflows, the second is the question of spillover effects. In this section we cover rather briefly these two issues in the context of electrical equipment industry.

In our previous tables we already observed, that a fundamental change in the structure of the manufacturing industry and exports was largely due to two sectors electrical equipments (DL) and automotive (DM). These two branches were also responsible for the majority of foreign investments. Not only primary producers settled in Hungary, but also first and even second tier suppliers. Flextronics is a good example of a large first tier supplier. The company supplies a large number of electrical and also automotive firms.

Up till 2000 FDI flows were characterized by inward investment flows. Privatization purchases and greenfield investments both accounted for large amounts of investments. In the electrical equipment sector there were relatively few privatization deals. Partly, because the sector was not that big, than it is today, partly, because many former state firms went bankrupt in 1993-5. The largest deal was that of GE, the purchase of former competitor TUNGSRAM. Also Siemens made important privatization investments (cable production, telecommunication equipment production) and added new greenfield establishments to it. ABB purchased electrical apparatus branch of Hungarian Ganz, Samsung purchased Hungarian TV-maker Orion. But the largest in size establishments were created by greenfield investments, and also, most privatization-rooted ventures were substantially expanded by new greenfield investments. The largest factories were IBM Storage Products, and Flextronics, other major investments were made by Ericsson and Nokia. As it is seen, almost the complete computer sector was created by greenfield investments, large parts of consumer electronics and also telecommunications equipment. Observers agreed that the most important investment incentives were close proximity to Western European markets, reliable, motivated and relatively cheap labor, and fiscal incentives of the government and privatization opportunities. These aspects seem to play a role also in electrical equipment producers' investments.

The case of Flextroncs illustrates the changes in conditions and corporate strategies at the turn of the millennium. By the year 2000 the company invested 80 % of its cumulative regional investments some 800 million $ in Hungary. Flextronics has designated Hungary as one of its potential centers of excellence for electronics development. The strategy is based on the assumption that a balance between costs and capabilities can be maintained only if, by investing more into capabilities, the location is gradually upgraded. Simple handling activity should be replaced or supplemented by design work and product development. Another option is abandoning the location when growing local costs (especially wages) make simple handling activities not profitable. Recent developments, for example moving Flextronics' X-Box production and IBM's hard disk drive assembly to China highlight the need for upgrading from increasingly uncompetitive assembly to more value-added activities. Since development of skills and EU-membership will continuously push up wages in Hungary. After the year 2000 Flextronics considered subcontracting sub-assembly work to lower wage countries not previously selected for investment. Already in 2001 the firm opened a facility in Beregovo in the Ukraine, close to the Hungarian border, and its Nyíregyháza facility to assemble circuit boards for that facility.

Flextronics and IBM were not the only foreign-owned companies to disinvest in Hungary. Meanwhile there were many new investments and capacity expansions in the country after 2000, these were paralleled by the reduction of simpler activities that became unprofitable. Thus, what we witness is a kind of qualitative change in the activities' structure pursued in Hungary by the multinational companies. UNCTAD (2003) listed the most important changes in the stock of foreign owned ventures in the period 2002-mid 2003. Table 11 provides the most important details.

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Table 11. Selected cases of expansion and reduction of production capacities by foreign affiliates in Hungary 2002-3

Name of affiliate	Industry	Type of action	Employment impact in Hungary
Alcoa-Köfém	Aluminium	Relocation to H, regional computer center	+150
Artesyn Kft	Electronics	Relocation to H, power supplies for telecom	+100
Audi Hungária	Automotive	Capacity expansion, 8-cylinder engine	+330
Robert Bosch Kft.	Electronics	Relocation to H. car electronics	+500
Robert Bosch Elektroika Kft.	Electronics	Relocation to H. car electronics	+250
Bosch Rexroth Kft	Electronics	New capacity in car electronics	+400
Elcoteq Magyaro.	Electronics	Capacity expansion	+250
Electronic Data Systems	Electronics	New capacity, regional service center	+110
Electrolux Lehel Kft	White goods	Relocation to H, refrigerator production	+400
Flextronics Internat.	Electronics	Expansion of cap. mobile phone production	+2100
Flextronics Internat	Electronics	Relocation from H X-box production	-1000
Foxconn Hon Hai	Electronics	New capacity, computer and phone parts	+1600
GE Capital	Financial ser	Relocation to H, Regional call center	+400
GE Hungary	Electronics	Capacity expansion light bulb production	+100
GE Hungary	Electronics	GE Lighting's regional headquarters	+500
IBM Storage Products	Electronics	Relocation from H hard disk drive production	-3700
Jabil Circuit	Electronics	Relocation to H	+600
Kenwood Electronics	Electronics	Consolidation of regional production bases	-200
Küpper Hungaria	Metallurgy	New capacity foundry and metal working	+80
Magyar Suzuki	Automotive	Capacity expansion	+150
Ortech Europe	Automotive	New capacity for supplies to Suzuki and Opel Polska	+??
Philips Magyaro.	Electronics	Reloc. to H Cathode ray tube TV production	+330
Philips Magyaro.	Electronics	Reloc. from H Cathode ray tube monitor prod.	-500
Philips Magyaro.	Electronics	Expansion of capacities	+1170
Salamander Hungary	Footwear	Closure of factory	-560
Samsung Elektrom	Electronics	Expansion of fac. television production	+??
Samsung Elektrom	EWlectronics	Relocation to H Cathod ray tube production	+500
Sara Lee	Food	Expansion filtered tea for exports	+??
SEWS Magyarország	Automotive	New capacity, car spare parts	+300
Sunarrow Hungary	Electronics	New capacity supplies Nokia	+120
TDK Elektronika	Electronics	Relocation from H to Ukraine	-200
Toyo Seats	Automotive	New capacity	+150
Visteon Hungary	Automotive	Product development center	+30
Visteon Hungary	Automotive	Relocation from H manufacturing of starters	-??
Zenon Systems	Water tretment	New capacity R&D center	+32

Source: UNCTAD (2003)

If we assume that the content of this table is to some extent comprehensive and also typical for the types of direct investment movements that occurred generally in Hungary, we can draw important conclusions. The first is that despite of a few important and significant relocation cases from Hungary to China or to Ukraine, far more expansions and new establishments were carried out, measured by both numbers of cases but also by potential impact on employment. Second, most relocations from Hungary were labor intensive activities in light industry or screwdriver-type activities in electronics. Third, not only existing activities were expanded, in many cases new activities were picked up. There were even some parallel movements within the same company: one activity was replaced by another one, and the later was usually more sophisticated, with higher added value content. Fourth, among the new activities not only production was expanded, but also other types of corporate functions including R & D were settled to Hungary. Fifth: The most dynamic two branches that shaped the picture of capital movements were automotive and electrical equipment sectors.

It also seems, that these two branches lead in the development of local roots as well. Maybe this is only the result of the fact that they are the most dynamic sectors worldwide, and are also very strong in Hungary. Nevertheless, existing empirical evidence suggests, that automotive firms are strong in the establishment of local supplier ties, electrical equipment companies are active in relying on local engineering and research staff. Sass and Szanyi (2004) provided a detailed analysis on the determinants of likelihood and the nature of local supplier ties of multinational companies. They concluded, that overall local supplies are marginal. There are only very few exceptions, when due to special circumstances multinational firms actively promoted linkage creation, transferred knowledge and technology for potential local suppliers to prepare them for the function. The problem with little local supplies was twofold. Multinationals rather relied on traditional suppliers. Many of them followed the "flagship company" to Hungary. On the other side, the current structure of the Hungarian owned industries is not suitable for this role. Hungarian firms are simply to small and weak, have neither technical nor financial background to supply the batches required by the multinationals determined by global demand.

The question of technology transfer from multinational companies (as a type of spillover effects) is discussed by many authors. We believe that in the Hungarian context the problems with establishing supplier linkages also apply here. Hungarian firms are not partners for multinationals. Thus, direct transfers to other companies are not very frequent. Based on empirical surveys Artner (2003a) found that multinationals treated technological knowledge confidential, and did not want to facilitate Hungarian partners' capabilities. On the other hand, Artner (2003b) also

found, that a number of multinationals in Hungary developed ties with Hungarian universities and other think tanks, in order to tap their capacities. The development of such linkages was also promoted by some government tools. In this respect Artner named 5-6 major cooperation cases in the electrical equipment sector, and 2 in the automotive. She concluded, that in these cooperation the flow of knowledge was rather uneven, but there was also some knowledge transfer from the companies (most typically in the form of investments in technical equipment for universities). Based on her studies of linkages and technology-cooperation she criticized multinationals being not interested in knowledge transfer. This statement was also made by other authors, for example in Günther (2002).

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Éltető: "A külföldi működőtőke hatása a külkereskedelemre négy kis közép-

* This paper was prepared for the 5th framework project „Changes in Industrial Competitiveness as a Factor of Integration: Identifying Challenges of the Enlarged Single European Market" (Contract No.:HPSE-CT-2002-00148)

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