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Two essays on Hungarian relocations

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Relocation of manufacturing and services activities to the New Member Countries – the case of Hungary

Magdolna Sass

Abstract

Relocation is recently one of the most widely discussed problems, especially in the old member states of the European Union. At the same time, developments in the target countries of relocation are less widely discussed. Hungary, with other new EU member countries, is one of the net target countries of relocation especially from the most developed EU-15 countries. Because of the specificities of this phenomenon, macrodata can be used only to a limited extent and it should be complemented with case study evidence and company level analysis. We compiled a comprehensive relocation database, collected for Hungary for the eight-year period between 2003 and 2010. We analyse this database and compare the results with those of the literature. We examine the nationality of relocating companies, the sectors and foreign locations affected and the job creation/loss impact. Moreover, we make an attempt at analysing the changes in relocations during the crisis years.

Keywords: relocation, Hungary, multinationals, offshoring, offshore outsourcing, crisis

JEL classification: F21, F23

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Feldolgozóipari és szolgáltatási tevékenységek relokációja az új tagországokba – Magyarország példája

Sass Magdolna

Összefoglaló

A relokáció jelenleg az egyik leginkább kutatott probléma, különösen az Európai Unió régi tagállamaiban. Ugyanakkor a relokációk célországait kevésbé vizsgálják. Magyarország, az Európai Unió más új tagországaival együtt a relokáció nettó célországa, s ezek a termelésáthelyezések elsősorban a fejlettebb régi tagországokból érkeznek ide. A jelenség speciális volta miatt a makroadatok csak korlátozottan alkalmazhatók a vizsgálatban, fontos, hogy azokat esettanulmányok és vállalati szintű elemzések egészítsék ki. A tanulmány egy relokációs adatbázist elemez, amely a 2003 és 2010 közötti nyolc évben a Magyarországot érintő termelésáthelyezések adatait tartalmazza. Az adatbázis elemzésének eredményeit vetjük össze a szakirodalmi eredményekkel. Vizsgáljuk a termelést áthelyező vállalatok nemzetiségét, az érintett ágazatokat és telephelyeket és a létrejött, illetve elvesztett munkahelyekre vonatkozó adatokat. Ezen felül a válságnak a relokációkra gyakorolt hatását is elemezzük.

Tárgyszavak: relokáció, Magyarország, multinacionális vállalatok, offshoring, offshore outsourcing, válság

JEL kódok: F21, F23

1. INTRODUCTION

The problem of relocation came to the forefront especially in developed countries, mainly due to their political "sensitivity" evoked by related job losses and relative decrease in the wages of the unskilled. While there is quite substantial research activity devoted to that topic, it mainly concentrates on associated job losses and wage movements in home (mainly developed) countries and developments from the point of view of the host countries are hardly analysed. (Hunya, Sass, 2005) This is true in spite of the fact that for example the new member states of the European Union are among the prime hosts of this type of transfer of production capacities, both in manufacturing and in services. Because of the various definitions used in the literature, first of all it is important to clarify our approach. We define relocation as offshoring and offshore outsourcing (OECD, 2004; UNCTAD, 2004; Kirkegaard, 2005). Offshoring and offshore outsourcing refer to a company's decision to transfer certain activities, which were hitherto carried out inside the company, to another unit of the firm in a foreign location (intra-firm or captive offshoring) or to an independent firm (offshore outsourcing). These and related terms are used in a rather chaotic way in the literature which has be taken into account. Bhagwati et al. (2004) already called the attention as early as in 2004 to the problems of the lack of a consequent use of definitions, but this problem still persists.

The main motive of relocation is to reduce costs and thus increase competitiveness by splitting production and services between various different locations. Thus comparative advantages of several locations, domestic and foreign alike are combined. Relocation is a process in which capacities are moved from the home to the host country. The company terminates the production of some goods or components in the home country, transfers the capacities elsewhere and imports (or exports from there to other markets) the given product or component from a foreign subsidiary or from a foreign company, and thus relocation generates FDI (foreign direct investments) and international trade. (Hunya, Sass, 2005) Concerning FDI, relocation is associated with efficiency-seeking or vertically integrated FDI. It can be connected to both offshoring and offshore outsourcing. Here we concentrate on these cases and we do not deal with those offshore outsourcing projects where a Hungarian-owned firm becomes a new supplier or replaces a foreign supplier to a multinational company. According to our estimation, the number and size of such projects is small compared to those, where FDI is involved.

The paper is organised as follows. First, the applied methodology is described and justified through relating it to other methodological approaches. Second, on the basis of our database, the impact of the crisis on relocations to and from Hungary is analysed. Third,

general characteristics of relocations affecting Hungary are described and related to the results of the literature. The fourth section concludes.

2. METHODOLOGY

Measuring the impact of relocation, offshoring and offshore outsourcing cannot rely on systematic statistics. Old approaches and existing and available data are not able to cover those phenomena, which are related to relocations. For example, FDI, foreign trade or occupation data are not separated according to their attachment to relocations. Thus in the empirical literature, richer databases are created and used for the purposes of tracing the existence, developments, extent and impacts of relocations.

Foreign trade data are used the most often, understandably, given that relocations are usually connected to increased foreign trade, as spare parts, components, other inputs and ready-made products are transported. Campa and Goldberg (1997) showed that in the manufacturing industry of the US, Canada and the United Kingdom the share of imported inputs had been on the increase in the period between 1974 and 1993. Yeats (1998) differentiates parts and components inside machinery trade (SITC 7). Trade flows in machinery parts and components constituted 30 per cent of total world trade flows, and growth in their trade is quicker than that of total world trade. Using the same methodology, Ng and Yeats (1999) and Kaminski and Ng (2001) show the increasing share of trade in machinery parts and components in South-East Asia and in Central and East Central Europe, respectively.

Foreign trade data can be combined with other data in order to grasp more correctly the share of relocated production. Hummels et al. (1998) use the notion of vertical specialisation and input-output tables of nine OECD countries in order to show, that production fragmentation is more significant in smaller sized countries than for larger ones. Moreover, vertical specialisation increases the most in those sectors (machinery industry, chemicals), which have the highest export growth rates. Hummels et al. (2001) calculate the amount of imported inputs included in exported goods. They create a measure using input-output tables, in order to determine the share of not only direct but also indirect imported inputs which are then incorporated into exported goods.

In another approach, input-output matrices are applied, where there is a distinction between domestically produced and imported inputs, thus trying to trace the fragmentation of production and the part of intermediate goods imported from abroad either from independent suppliers (offshore outsourcing) or from an affiliate (offshoring). (Amiti, Ekholm, 2006) Here the problem is with the absence of detailed data on the source of

inputs and thus proportionality is assumed, meaning that a sector uses an import of a product to the same extent as its total use of the product. This latter assumption is challenged by Winkler and Milberg (2009).

A further empirical approach is to use firm-level data, in certain cases combined with other datasets. For example, for Germany Moser et al. (2009) used firm level data for tracing the employment effect of relocations, for Ireland Görg and Hanley (2011), for Japan Ito et al. (2008) used this type of data. In other cases, firm-level data originate from specialised surveys. For example, Marin (2006) used a survey of German and Austrian companies, which invested in Eastern Europe in order to study the determining factors and impact of relocations in this relation. Bachmann and Braun (2011) use a dataset for Germany, based on individual level data from the Institute for Employment Research, which is then combined with industry level data on intermediate products' import. Jabbour (2010) uses data from the 'International Intra-Group Exchanges' survey, which provides information on captive offshoring and offshore outsourcing activities of French manufacturing firms in 1999, which contain data on imported input and source country and the input's industrial classification. This dataset is combined with firm characteristics provided by the annual firm survey of the Ministry of Industry. Moreover, company panel data combined with either input-output tables or with industry level data including data on the import of intermediate inputs are used among others by Farinas and Martín-Marcos (2010) for Spain or by Görg et al. (2008) for Ireland.

A further approach, addressing the problem of the relocation's impact on wages in the home country uses datasets of wages at the level of the individual worker. For example, Geishecker (2008) or Munch and Skaksen (2009) rely on such type of datasets. Furthermore, data on the tasks carried out by individual workers are used for example by Görlich (2010).

While the results differ on the extent and size of relocation (which is also named differently by the authors, though all address the problem of the changes in the international division of labour and the movement of activities between countries inside (offshoring) or outside (offshore outsourcing) of a firm's boundaries), all agree on the fact, that these processes grew dynamically starting from the second-third quarter of the last century and accelerated starting from the nineties.

As it is obvious from an above given short literature review, in principle, various sources of information can be used in assessing the extent of relocation. Basically all projects[1] are realised through foreign direct investments, as equity investments or as capacity extensions of already existing companies financed from either reinvested earnings or/and other capital

[1] Except for the international outsourcing from independent local firms.

type of FDI. Because relocation projects by definition are highly export oriented, thus their impact on the trade of goods and services is substantial, foreign trade data would also be a good source of information. Moreover, due to their impact on the labour market, occupational data could also be used. However, in all cases it is almost impossible to differentiate between relocation-related investments, trade or job creation/loss and non-relocation related changes in these. This is the problem, which the above listed papers try to solve for example by combining various datasets. Of course, the "usual" problems of reliability concerning especially FDI and foreign trade data add to these difficulties. (See more details e.g. in Sass and Fifekova, 2011.)

In this paper we use a different approach from the above listed ones. We compiled a database on declared relocations realised through FDI to and from Hungary, which is based on information from the economic daily Világgazdaság for the eight-year period between 1 January 2003 and 31 December 2010. Other sources, such as other Hungarian economic newspapers and journals, and the balance sheets and websites of the companies were used to complete as fully as possible the database. We have identified 262 relocation cases in the analysed period, 223 to Hungary and 39 from Hungary. Characteristics of these projects will be analysed in the following sections.

Declared relocation means, that either the piece of news says explicitly, that there is a transfer of production capacities from another country, or there is information about a capacity extension in one affiliate parallel with a capacity reduction in another, or there is a capacity extension in one affiliate, while other affiliates'capacities do not change[2]. (This definition of relocation is in line with Veugelers, 2005.) Only the relocation projects of foreign investors have been included, not those by Hungarian companies. Announced investments in Hungary with no additional information about foreign sites were usually not included in the database. We tried to find the following information for each relocation case: date of announcement (or of newspaper article), name and nationality of the investing or disinvesting company, sector of investment or disinvestment, location in Hungary, direction of relocation (from or to Hungary), detailed description of the activity carried out in the (future) company, country of other foreign location involved, labour market impact meaning the envisaged number of jobs created or lost due to the investment. Jobs data are referring in some cases to the immediate job impact, in others to the total number of jobs created or lost due to the given project in the course of several years.

The justification for our approach is the following. Sturgeon et al. (2006) or Kirkegaard (2005) already suggested that in order to get a better insight into the relocation process, both qualitative and quantitative research, and especially the combination of the two must

[2] In this last case it may be questionable, if such a capacity extension can be regarded as relocation, however, there were only a dozen of such cases in our database.

be carried out. Thus more qualitative research and "field-work", sector or company case studies and analysis of databases from media reports, company questionnaire surveys, interviews and other sources should be used for getting a clearer picture about changes in the international division of labour through relocations. Here we use company level data for trying to find out what are the most important characteristics of relocations to and from Hungary. It must be acknowledged that numerous methodological problems arise even in connection with that approach. One can be for example the mixing of relocated and non-relocated activities. While in the overwhelming majority of cases it can be decided quite straightforwardly if the project in question is a relocation of capacities, there are projects which contain new and relocated activities as well, which cannot be separated. Moreover, a selection bias may also be present: we collected our data from economic dailies, which for sure report on large projects, but certain smaller ones may be left out – in spite of the fact that we found news on relocations affecting even only a dozen of jobs. In Hungary, still there is no negative sentiment attached to the term "relocation" (mainly because the country is a net gainer from the process), that is why in the news it is usually reported explicitly when a given project is a relocation. In spite of these shortcomings, our approach and results may be a good source for reinforcing (or contradicting) the findings of other, mainly econometric analysis. Case study and company level evidence may give further insights into the relocation process. Moreover, our research is more or less unique in the field of analysing developments in a net host country connected to relocations, as this type of research is largely missing from the literature. (As an exception see e.g. Rojec and Damijan, 2008).

3. THE IMPACT OF THE CRISIS

The impact of the crisis on relocations involves two contradictory processes. First, companies are induced to relocate less as the demand for their products is falling steeply during the crisis, which is called the "demand effect". On the other hand, increased competitive pressures stimulate companies to relocate (offshore outsource and offshore) more in order to increase their competitiveness. This is called the "substitution effect". (Gereffi, 2010) The net impact then depends on the relative sizes of these two effects.

There are only a few studies which analyse explicitly the impact of the crisis (in that case that of the business cycle) on international outsourcing. Levasseur (2010) examines the impact of the business cycles on international outsourcing and finds that multinational firms adjust their outsourcing demand according to the business cycle and thus they may be responsible for a part of the business cycle volatility in the Czech Republic and Slovakia. She also calls the attention to the possibly differing behaviour of European and non-European multinationals in that respect. Bergin et al. (2009) analyse the same phenomenon in the

case of the Mexican maquiladoras, and find that the US "export" to Mexico a portion of their employment fluctuation during the business cycles.

Other approaches use mainly the theoretical framework of global value chains, when they try to show how the global crisis is affecting international production and how it is transmitted through the channels of international trade. For example, already early on into the crisis, GVC-related factors were included in the list of the possible transmission mechanisms (see among others Baldwin, 2009 or Milberg and Winkler, 2010). It was hypothesised that the organisation of international production in GVCs caused a greater drop in trade than in GDP[3]. Empirical papers found direct or indirect evidence that involvement into GVCs could play a role as a transmitter of the crisis, however, the sign (positive or negative) and the size of that impact differ from study to study. (See e.g. Cheung and Guichard (2009), Escaith et al. (2010), Behrens et al. (2011) or Stehrer et al. (2011).) As for Hungary, the analyses outline the strong involvement of Hungary in international comparison in global value chains, see e.g. the highest level of involvement of Hungary in Cheung and Guichard (2009) in OECD comparison or in Stehrer et al. (2011) in EU comparison. These papers call the attention to the two contradictory impact of GVC-involvement during the crisis: GVC may act as transmitters of the crisis, at the same time they can provide a stabilisation effect as well.

Our database allows a less nuanced view on the impact of the crisis on relocations in a net receiving country, though it can provide some further details about that effect. According to our database, the number of relocations subsided before the crisis, in 2007, than it went back to the pre-crisis level in 2010. The number of relocations to Hungary reached an eight-year peak in 2010. This may indicate the dominance of the substitution effect. Thus we find it probable that while just before and during the first year of the crisis the demand effect was stronger, the substitution effect may have grown relatively more robust afterwards. The net number of jobs created through relocations also indicates a post-crisis peak, also underlining the dominance of the substitution effect. A closer look at the data reveals however, that the post-crisis peak in the net number of jobs created is mainly due to a few very large automotive projects.

[3] However, there are papers, which could not find strong evidence that international trade linkages acted as transmitters of the crisis (see e.g. Rose and Speigel, 2009).

Table 1

Relocation pre-, during and post-crisis relocations

	2003	2004	2005	2006	2007	2008	2009	2010
relocation cases	43	26	33	34	18	28	34	46
to Hungary	39	24	24	28	15	25	27	41
from Hungary	4	2	9	6	3	3	7	5
net affected jobs*	+7816	+823	+4978	+1976	+2585	+4167	+4313	+10741
top 3 sectors of relocations to Hungary	electronics (12), automotive (6), business services (4)	automotive (6), electronics (4), clothing+ footwear (4)	business services (5), electronics (4), clothing+ footwear (3)	electronics (5), business services, food (4-4)	business services (5), automotive (3)	automotive (6), business services (6), electronics (3)	electronics (9), automotive, business services (4-4)	prod. of vehicle (14), electronics. business services (6-6), pharmaceuticals, R&D (3-3)
top 3 source countries of relocations to Hungary	Germany (16), Austria (5), France, Great-Britain (3-3)	Germany (9), Austria (3), Netherlands (3)	Western Europe (6), Germany (4), Austria (3)	Germany (5), Austria (4), Czech Republic, Denmark, Finland (3-3)	Germany (5), Central and Eastern Europe (2)	Germany (8), Western Europe (3), Italy (2)	Germany (4), Great-Britain, Spain, Western Europe (2-2)	Germany (6), Great-Britain (3), China, France (2-2)
top 3 nationalities of relocating multinationals	Germany (12), USA (10), Austria, Sweden, Switzerland (3-3)	Germany (7), USA (6), Austria (2)	USA (7), Germany (4), Austria, Denmark (3-3)	USA (9), Germany (4), Austria, Denmark, Finland, Netherlands, Sweden, Switzerland (2-2)	Germany (6), USA (3), France (2)	Germany (10), USA (6), Great-Britain (2)	Germany (7), Great-Britain (4), South-Korea, USA (3-3)	Germany (14), USA (9), Austria (3)

Source: database compiled in the framework of the research project financially supported by the Hungarian research fund OTKA (68435)
Note: *any type of data (including estimations or total (multi-annual) number of affected jobs) are available only for 214 cases (181 to Hungary and 33 from Hungary)

As far as the sector composition of relocations is concerned, the automotive sector (production of vehicles[4]), electronics and business services dominated during the analysed period. The automotive and electronics relocations in certain cases could not be separated (these are mainly electronic parts and components produced for cars). These three sectors represent the overwhelming majority of the relocations to Hungary. While in the first half of the analysed period, traditional labour-intensive sectors, such as clothing and footwear were also present in the top three, they disappeared in the second half of the period. Their place was taken by more "science-intensive" activities, such as pharmaceuticals and R&D, which indicate the higher level of inclusion of Hungary in the more recent process of relocations of R&D activities. (See e.g. Sachwald, 2008 or Kalotay, 2005)

[4] Production of vehicles is including automotive projects plus one project producing components for aircrafts and another producing components for trains.

As for the source countries of relocations, the German dominance is obvious, besides that, it is almost exclusively European locations, which are mainly affected. Inside that it is mainly Western European countries, from where capacities are transferred to Hungary. The appearance of China, as an exception, in 2010 may be a sign of back-shoring activities, which may be more present in the post-crisis environment in Europe.

According to the (final) nationality of the relocating companies, they are predominantly German- and US-owned, these two sources of origin of multinationals represent the overwhelming majority of relocating companies. Austrian companies are also quite active, while in our sample, British companies became relatively more active in Hungary during the crisis. In our sample, we could single out certain developments: for example Finnish and Danish multinationals started to be active in relocations to Hungary from around 2005-6, while their Swedish counterparts were continuously active. This latter may be partly due to the Gripen-deal, which involved offset transactions, mainly in the form of foreign direct investments realised by Swedish multinationals in Hungary.

4. CHARACTERISTICS OF RELOCATIONS

One area where our database may provide additional, company-level information compared to the above mentioned approaches, is the possibility to identify the final nationality of the relocating companies. Anonym databases contain information on the immediate owner of a foreign affiliate, which in many cases may be different from the final owner, because of tax optimisation reasons or because of investing the profits of another affiliate abroad or because another affiliate knows better the target market than the parent company or for various other reasons.[5]

According to the (final) nationality of investors, Germany and the USA stand out in relocations affecting Hungary. US multinationals figure relatively highly both in relocation to and from Hungary. (Table 2) They seem to be the most footloose ones, reconfiguring quickly the structure of their international production. According to our database, in the case of manufacturing activities, relocations of US multinationals are connected mainly with the reconfiguration of the European production structure, while in the case of business services, in at least half of the 17 projects, outside European locations (first of all the US, but in none case the Philippines and India) are also affected. In at least five cases, US capacities are transferred to Hungary.

[5] For example, the German Siemens or the Singapore-based Flextronics invested in Hungary through their Austrian affiliates, thus they are considered as Austrian FDI in Hungary. Levasseur (2010) also uses a database in which she can distinguish between the final and the immediate owner of German affiliates in the Czech Republic and Slovakia.

To a lesser extent, this footlooseness is also true for German multinationals, which have the highest number of cases in relocations to Hungary and the second highest number in relocations from Hungary – however, this latter number is only one-tenth of the former number, while in the case of the US that ratio is one-fifth. German multinationals concentrate more on manufacturing relocations, there were only six cases of business services projects. On the other hand, they transfer relatively frequently in international comparison R&D activities to Hungary (3 projects). Austrian companies also use Hungary as a host country to their relocations of manufacturing activities relatively frequently, and they reconfigure their capacities internationally more often than German or even US multinationals, as it is shown by the relation between the number of relocations to Hungary (15) and relocations from Hungary (5). Swiss multinationals relocated also exclusively manufacturing activities to Hungary, mainly in the automotive sector.

Besides other European countries and the US, it is mainly certain Asian multinational companies, mainly from Japan and South Korea, but to a lesser extent and more recently also from India and Israel (and in one case from China), which effectuated more than one relocation to Hungary in the analysed period.

Our database allowed us to trace various relocation-related phenomena. First, we can document "stages" relocations, when the multinationals carried out the transfer of capacities in more than one step. For example, the French Schneider (electronics) relocated certain activities in two steps, first in 2007 and second in 2010. In the second relocation, capacities at already existing Hungarian plants in Zalaegerszeg and Gyöngyös were extended. Similarly, the German Continental AG transferred various production and R&D activities in more steps to Hungary in 2003, 2004 and 2009. We can also document how multinationals restructure their production geographically. For example, during the analysed period, the Dutch Philips first in 2003 relocated parts of TV production from France to Székesfehérvár, then in 2006 established an Eastern European regional centre in Budapest, then in 2009, it transferred its European TV-production, except for the development activities from Brugge (Belgium) to Székesfehérvár, which was followed by other activities relocated from Finland, France and Turkey to Tamási in 2010. On the other hand, in 2003 the same company relocated the production of CRT monitors from Szombathely to China. As a recent development, in 2012 Philips reduced substantially employment in its Székesfehérvár plant in March 2012.[6] The US Delphi Calsonic relocated the production of electronic components to Hungary in August 2008, and at the same time it transferred certain production activities to Poland and Slovakia. It is obvious that this US

[6] http://www.napi.hu/magyar_vallalatok/elbocsatasokba_kezd_a_philips_magyarorszagon.513095.html

company uses CEE production plants to supply Western European markets and that it is trying to reduce costs also through benefitting from economies of scale. Furthermore, it is also interesting to see how the various activities follow each other to Hungary. The German Bosch relocated its automotive components production from France to Eger, Hatvan and Miskolc in June 2008, a few days later it announced the transfer of certain R&D capacities from Germany to Budapest, which latter was further extended at the end of the same year. In 2010, it transferred the production of car generators from Wales to Miskolc and Hatvan.

Table 2

Nationality of relocating companies

Relocations to Hungary		**Relocations from Hungary**	
Nationality	**Number of cases**	**Nationality**	**Number of cases**
Germany	63	USA	9
USA	53	Germany	6
Austria	15	Austria	5
Switzerland	13	Great-Britain	2
Great-Britain	11	Finland	2
Sweden	10	The Netherlands	2
The Netherlands	9	Japan	2
Denmark	7	Taiwan	2
Japan	7		
France	6		
South-Korea	4		
Finland	3		
Italy	3		
India	2		
Israel	2		

Source: database compiled in the framework of the research project financially supported by the Hungarian research fund OTKA (68435)
Note: "Mixed ownership structures" in relocations to Hungary: 2 British-Dutch, 2 British-US, 1 Finnish-German, 1 French-Japan, 1 French-German, 1 Dutch-South-Korean, 1 German-Japanese, 1 German-Swiss; nationalities of the final investors are taken into account

In terms of the affected sectors, it is still electronics, automotive (these two sectors so much intertwined, that in some cases it is impossible to categorise the activity in question) and business services that stand out. (Similarly to the results of the previous analysis, published in Hunya, Sass, 2005. This finding is also in line with Kaminski and Ng (2001), who analyse manufacturing trade and show that Hungary is specialised in the production of electronics and automotive components.) (Table 3) This is in line with the findings of Rojec and Damijan (2008), who analyse manufacturing sectors and note, that the new member states are targets of relocations in medium tech and in lower end segments of high tech industries. Levasseur (2010) points out the high possible presence of international outsourcing (offshoring) in the case of the Slovakian automotive industry. In Hungary, besides German carmakers, it is mainly automotive parts and components production, in

which relocations flourish. For example the US Delphi, the Swiss Saia-Burgess, the German Robert Bosch, SAPU or Continental AG relocated substantial capacities to Hungary.

Electronics seem to be more footloose compared to other sectors with lower sunk costs and a lower level of commitment to the host country, as among relocations from Hungary, this sector excels. Developments in the Hungarian electronics sector are analysed among others by Szalavetz (2004), Sass (2006) or Csonka (2011), and all authors underscore the importance of foreign direct investments and relocations in shaping the developments in that sector. For example, a relocation of part of the activities of IBM to China in 2003 turned the statistical indicators of the Hungarian electronics sector upside-down in the course of one year, with plummeting employment and rocketing value-added. There are companies, which spent only a few years in Hungary: the US Artesyn, relocating activities to its Tatabánya plant from Austria in 2003, in 2005 it already transferred its activities from Hungary to Romania, Other important relocating companies include among others the Finnish Elcoteq (closing down in 2011), the German Epcos, the US Jabil or the Dutch Philips.

Relocations in business services are a relatively new phenomenon, they started to grow after around 2000 in Hungary. (For more details see Gál (2007) or Hardy, Sass, Fifekova (2011).) Hungary, together with Poland and the Czech Republic, is among the prime hosts among the new members of the European Union for relocations in this sector. One specificity is that in that activity a global reorganisation of production is more often, according to our database than in manufacturing activities, which latter involve mostly a European reconfiguration of capacities. Thus jobs are transferred in business services not only from but also outside of Europe. To name a few companies, Albemarle, Celanese, IBM or Lexmark from the US, Avis, British Petrol, BT, Vodafone and Diageo from Great-Britain, Deutsche Telekom, Lufthansa and T-Systems from Germany established captive or independent service providers in Hungary during the analysed period.

Food, beverages and tobacco seem to be subject to a reorganisation and concentration of production structures, which produce for the European market. In our database, we found cases, where the European production was concentrated to Hungary (in 2010 the Austrian Ed Haas for PEZ-production), or where production was removed from Hungary to concentrate it elsewhere (the US Kraft Foods, in 2004, relocating Hungarian production to Austria and Slovakia).

Traditional labour intensive sectors, such as clothing and footwear are affected to a lesser extent. This is also reinforcing the results of Rojec and Damijan (2008), according to whom the attractiveness of the new EU member countries for low tech labour intensive production is gradually vanishing. We assume that relocations were already realised parallel with the growth of Hungarian labour costs in regional comparison. Having a closer look at

these projects reveals, that activities with higher value added are relocated to Hungary (e.g. preparation of individually designed and hand-made boots by the French Heschung in 2005), while those with lower value added are relocated to other, lower cost countries, for example to Romania (the Austrian Triumph in 2005) or Tunisia (the German Falke in 2010). In that respect we found that the expectations of Rojec and Damijan (2008), that these activities will be relocated outside the European Union, have been realised only partially, as it seems that Romania offers still a competitive labour cost for this type of activities.

Table 3

Sectors of relocations to and from Hungary

Relocations to Hungary		**Relocations from Hungary**	
Sector	**Number of cases**	**Sector**	**Number of cases**
production of vehicles (incl. parts and components)	46	electronics	13
electronics	44	production of vehicles	4
business services	38	clothing	4
food, beverages, tobacco	16	food	3
textile, clothing, footwear	10	machinery	3
machinery	8	chemical industry	3
plastics	8	other	9
household appliances	7		
pharmaceutical industry	7		
R&D	6		
ICT	5		
toy production	5		
rubber production	4		
paper production	4		
chemical industry	3		
other	18		

Source: database compiled in the framework of the research project financially supported by the Hungarian research fund OTKA (68435)

In terms of the foreign locations affected by relocations, the eight-year period shows that relocations to Hungary are effectuated mainly from other, first of all Western European locations. (Table 4) The high concentration of the parts and components (and assembly) trade of Hungary on the EU-15 countries is also shown by Kaminski and Ng (2001). USA and China are two outside-Europe locations, which are affected in a relatively high number of cases. The phenomenon of back-shoring or re-shoring is illustrated by the Chinese examples. As it was already mentioned, relocations mainly in business services are affecting

US locations. The four cases involving China represent various industries: for example, in 2005 the Austrian Robust Plastik Assembling re-shored its mobile telephone production; in 2006, the Swiss MAM transferred here the production of various baby products (soothers) or the German Marklin, producing model trains, relocated its production to Germany and Hungary in 2010 On the other hand, China stands out as a host country for relocations from Hungary. Out of these eight cases, 6 involve electronics production. Other outside European locations attracted paper and plastics production (Mexico) and clothing (Tunisia). With one project, even locations such as Brazil (electronics), India (automotive) or Malaysia (electronics) are affected.

Here again, the presence of other European locations with similar to Hungary wage levels, mainly in the Central and Eastern European region shows the reorganisation process of European activities. For example, Poland is involved in three relocations in the chemical sector, to Romania, footwear, clothing, automotive and electronics production was transferred (one project each).

Table 4

Affected foreign locations in the analysed relocation cases

Relocations to Hungary		**Relocations from Hungary**	
Affected foreign location	**Number of cases**	**Affected foreign location**	**Number of cases**
Germany	57	China	8
Western-Europe	25	Poland	6
Austria	17	Austria	4
Great-Britain	13	Romania	4
France	12	Czech Republic	3
Switzerland	9	Slovakia	3
USA	8	Germany	2
Spain	7	Mexico	2
Czech Republic	6	Tunisia	2
Denmark	6		
Italy	6		
The Netherlands	6		
Finland	5		
China	4		
Belgium	3		
Eastern Europe	3		
Sweden	3		
Slovakia	3		

Source: database compiled in the framework of the research project financially supported by the Hungarian research fund OTKA (68435)
Note: any type of information available on 233 cases, more than one locations may be affected in certain cases

While our sample allows only a rough estimate of the number of jobs created, it obviously remains below the expectations. As far as relocations to Hungary are concerned, any type of data on the number of jobs created was available for 181 out of the 223 cases of relocation to Hungary. There were five cases in which no new jobs were created. In four cases information is available on the number of jobs lost in the source country and the number of jobs created in Hungary, and the difference is always substantial in favour of the first location. For example, the British Barclays in banking services laid off 1800 employees in Great-Britain in 2008 and the number of jobs created in Hungary was 1700. In a relocation in 2006, the German Carl Zeiss cancelled 270 jobs in Germany and created 100 in Hungary. Altogether almost 45000 jobs were created through the relocation projects in our sample during the analysed eight-year period. About one-fourth of that (assuming that Western European locations include German ones) comes from Germany. As for the number of jobs lost, out of the 39 relocations from Hungary, information is given on that in 33 cases. The total number of jobs lost is 7566, of which one-third, almost 2500 went to China.

Thus the largest "exporter" of jobs in that respect is Germany, the largest European economy, followed by Britain, which became active in that respect more in the second half of the analysed period. (Table 5) France, Denmark and the USA are also relatively important source countries, in the case of the US, 6 of the seven projects operate in business services. It is also interesting to note the relative largeness of the projects (low number of cases and a high number of jobs transferred) in the case of Finland, Italy and China.

Table 5

Top country of origin of jobs created through relocations in Hungary (2003-2010)

Country	Number of cases	Approximate number of jobs created*
Germany	40	10500
Great-Britain	11	4600
Western Europe	14	4300
France	6	2000
Denmark	5	1300
USA	7	1300
Switzerland	8	950
Finland	3	800
China	1	700
Italy	3	700
Austria	13	670

Source: database compiled in the framework of the research project financially supported by the Hungarian research fund OTKA (68435)

Note: *including only cases where any data about the number of jobs is available; when more than one country was given, the number of jobs were distributed equally between them

As expected, the top job creating sectors are electronics, where well-known multinationals, such as Epcos, Jabil, Philips, Kontavill, Schaffner, Clarion etc. transferred capacities to Hungary. (Table 6) Business services are also important from that point of view, and in that sector usually skilled or at least mid-skilled jobs are created mainly for university graduates speaking at least one, but usually more than one foreign language. (See e.g. Hardy et al., 2011) Third is the automotive sector, which again, cannot be really separated from electronics. A good example is the German Robert Bosch, which has three countryside production plants in Hungary and an R&D centre in Budapest, and produces electronic components for cars. In connection with that one has to note tha relatively high number of R&D jobs, which were transferred to Hungary, mainly from Germany.

Table 6

Top job creating sectors through relocation

Sector	Number of cases	Approximate number of jobs created*
Electronics	37	9900
Business services	34	8600
Automotive	31	7200
Plastics	8	2400
Machinery	5	2010
Pharmaceuticals	5	1130
Food, beverages, tobacco	7	1115
Household appliances	3	1070
Medical appliances	1	800
R&D	6	800

Source: database compiled in the framework of the research project financially supported by the Hungarian research fund OTKA (68435)

5. CONCLUSION

Relocation is one of the most widely discussed problems recently, especially in the “old” member states of the European Union. Transferring jobs in manufacturing and services to the new members (and to other locations) with lower wages and tax burdens seems to have become more frequent recently and more threatening in terms of job losses and decreasing real wages for the less skilled and increasing wage differences between skilled and unskilled workers in a growing number of sectors and regions. At the same time, costs and benefits arising in the target countries of relocation are less widely discussed. Moreover, the impact of the crisis on relocations is also rarely analysed. Hungary is one of the net host countries

of relocations. Our research is analysing first, the impact of the crisis on relocations affecting Hungary, and second, various characteristics of relocations.

In the literature, various methodological approaches are used to analyse this phenomenon, because available data do not provide (detailed) enough information on it. According to Sturgeon et al. (2006) and Kirkegaard (2005), macroanalysis should be supplemented with company level datasets for getting a fuller picture about relocations. We compiled a comprehensive company database, collected for Hungary for the period 2003-2010, alongside the methodology used in Hunya, Sass (2005). While there are many methodological shortcomings in connection with our dataset, through the analysis of it, we can supplement, reinforce or contradict the results of the analyses carried out so far in the literature. Moreover, the paper deals with a topic on which very scarce research efforts were spent up till now: certain characteristics of relocations from the point of view of the host country.

As far as the crisis-relocation relationship is concerned, we could not draw strong conclusions, however, we found it probable on the basis of the number of projects and their net job creation effect that the demand effect dominates before and in the first years of the crisis, while towards the end of the crisis the substitution effect may be more important, and it may even counteract to and compensate for the negative effects of the fall in demand.

We found evidence for certain characteristics of the relocation process from the point of view of Hungary. First of all, our findings reinforce the results concerning the sector composition of relocation, with the very much interrelated automotive and electronics sectors dominating, and more recently with business services coming to the forefront, which latter is not yet indicated by the literature, as the part of it analysing CEE host countries concentrates on manufacturing activities. We could show the dynamism of the relocation process in terms of the affected sectors, starting out from traditional labour intensive sectors, which now are more present in relocations from Hungary, mainly going to Romania (inside EU) or to Tunisia. Our database allowed us to analyse the composition of relocations in terms of the final owners of the relocating multinational companies. We found, that these are mainly German- and US-owned, with US (and Austrian) being more footloose, reconfiguring quickly their capacities in connection with the changes in relative wages. We could single out some developments in terms of the "timing" of relocations to Hungary, for example the later start of British relocations or the varying start of Scandinavian investors. It was also possible to have a look at the foreign locations, which were affected by relocations, i.e. from where or to where relocations were effectuated. We could see that the relocations affecting Hungary mean mainly inside European processes. Capacities and jobs are transferred mainly from Western Europe. In the case where US locations are affected, the activity is business services. We could find evidence for reshoring or backshoring as

well. As far as the origion of relocated jobs is concerned, the main job "exporter" to Hungary is Germany (representing around one-fourth of the total created), followed by Great-Britain. On the other hand, around one-third of jobs lost are gone to China from Hungary. As for the sectors, the largest number of jobs are created in electronics, followed by business services, and automotive, which latter is mainly due to the large automotive projects realised in Hungary in 2009-10.

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Relocations in the electronics sector: the case of Hungary

Miklós Szanyi - Magdolna Sass

Abstract

The international, and the European division of labour has changed considerably after 1990 in the electronics sector. Hungary has become one of the leading producer of electronics goods and components, mainly due to the relocation of capacities from other, first of all Western European countries. In this paper, the characteristics of this relocation process are presented. First, the characteristics of the electronics sector in the Central and Eastern European countries are analysed using Eurostat and OECD data and compared to EU-27 indicators. Second, the role of relocations are presented using a database complied for Hungary for the eight-year period between 2003 and 2010 for projects carried out in the electronics sector. We show and make it probable that relocations played a significant part in increasing production capacities in this sector in Hungary – and most probably in other CEE countries as well.

JEL-codes: F21, F23, L63

Keywords: relocation, offshoring, offshore outsourcing, electronics, Hungary, the new member states of the European Union

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Termelésáthelyezés az elektronikai ágazatban: Magyarország példája

Szanyi Miklós – Sass Magdolna

Összefoglaló

A nemzetközi és az európai munkamegosztás is jelentősen megváltozott 1990 után az elektronikai ágazatban. Magyarország az elektronikai késztermékek és alkatrészek egyik vezető gyártója lett, jórészt a nyugat-európai országokból történő termelésáthelyezések révén. A tanulmányban ennek a relokációs folyamatnak a jellemzőit vizsgáljuk. Először bemutatjuk a közép- és kelet-európai elektronikai ipar legfontosabb jellemzőit az elérhető Eurostat- és OECD-adatokat használva, és összevetve a mutatókat az EU-27 megfelelő indikátoraival. Másrészt megmutatjuk a relokációk szerepét egy, a magyarországi elektronikai ipari termelés-áthelyezésekre összeállított, a 2003 és 2010 közötti nyolc éves időszakra vonatkozó adatbázis elemzése alapján. Valószínűsítjük, hogy ezek a projektek jelentős szerepet játszottak a magyarországi – és feltehetően a közép- és kelet-európai – elektronikai ipar felfutásában.

JEL-kódok: F21, F23, L63

Kulcsszavak: relokáció, offshoring, offshore outsourcing, elektronikai ipar, Magyarország, az Európai Unió új tagországai

1. INTRODUCTION

The past two decades have been earmarked by the unfolding of a new techno-economic paradigm that is based on the spread of ICT technologies and services. Innovation research as well as new growth theories paid substantial attention to this process. New institutionalist innovation theory highlighted the complex character of paradigm shifts. The emergence of the new types of technologies and basic products, the spreading utilization of the core resources of the new paradigm in traditional industries and the evolution of new products and services based on these are the main areas of structural change of pioneering nations and countries. The current paradigm shift is based on the production and utilization of info-communication technologies (ICT).

Today's main technology driver is special in the sense that it amalgamates two basic technologies as well as a very substantial part of knowledge-based services. The development path of information technologies and communication technologies converged only most recently, while the software and operating knowledge was developed quite parallel with the two kinds of technologies. This unique development pattern, the convergence of two major technologies, as well as the robust and immediate development of knowledge-based services provided an especially strong and quick momentum for structural changes and new growth patterns in many countries.

While some development literature highlighted the general opportunities of catching up in periods of quick technological and structural change, the analysis of the current ICT-based technology paradigm shift reveals the especially advantageous development opportunities for countries which are in the mainstream of technology changes and the creation of new economic structures. This opportunity is provided by the exceptionally strong growth effect of the paradigm shift. This applies to many emerging economies, countries in transition as well as other nations like China or India. Economic growth had been based on ICT development and especially ICT-based services growth in the US in the decade before the current economic crisis as well. Similarly, various branches of ICT industry and services contribute to a large part of economic growth in India and China.

While the drivers of development and economic growth are clear, the international distribution of the new sources for growth is not equal. This is also one reason why growth rates differ. The different degree of involvement in the new businesses depends on various factors, national resources, endowments, institutions or maybe most importantly, the level of activity of international business. New techno-economic paradigms are bound to major organizational and even social innovations. The current ICT-based development model is

based on the activity of multinational companies. Active involvement in the new emerging business is very much bound to international market players. Hence, better chances of realizing the development benefits of the new technologies are given in countries that are more open to international business.

The phenomenon “globalization” is interpreted in many ways. Globalization can be also interpreted as a bunch of interrelated organizational, management and social innovations. The ever growing internationalization of business means first of all global sales and global sourcing of all kinds of production inputs, as well as the establishment of the organizational frames and operational practices of running cooperation networks with heterogeneous and spatially remote units. The spreading use of ICT technologies supported the globalization process of business. On the other hand, it also enforced companies to go global both in sales and in production. ICT-based production systems changed production patterns to mass customization in many new and traditional industries, increasing the volume of cost efficient production batches. Increased production size required expansion on the markets on the one hand, and continuous search for cost reduction which was enforced by fierce market competition. As a side effect, market concentration also increased, though this did not lead to declining competition in most markets since markets also became global.

Another aspect of the evolution of global production platforms was the macroeconomic and development impact. While the process was driven mainly by companies that utilized new technological opportunities for expanding activities globally, the process also affected their operational environment, markets of production inputs, national economies and governments. Many countries and governments realize that economic development has been bound to the application and efficient absorption of new technologies, and also that this process has been carried out mainly by international business. Therefore, a kind of competition started among countries and governments for the attraction of international investments, especially in technology intensive branches. (See e.g. Kostevc et al., 2011 for transition economies; Antalóczy et al., 2011 for Hungary.) Also, the development of absorption capacities has been promoted in many countries. Obviously, the beneficial impacts of foreign direct investments (FDI) do not stem only directly from the investments, but also considerable spillover effects can be expected, if host economies and societies are prepared to receive and utilize these. (See for example Majcen et al., 2003; Sass-Szanyi, 2004, more recent studies include Muraközy and Halpern (2005) or Békés et al. (2006) for manufacturing, or Gál, 2010, p. 257-258 for financial services.)

The competition for investments considerably altered the internationalization process of individual firms and also industries. New patterns of international labor division evolved, new industries and spatial agglomerations were established and more traditional industrial centers lost importance or underwent fundamental structural change. This international

reorganization of global industries accumulated substantial tensions since it was bound to changes in economic power relations, too. The most important process in this regard was the tremendous expansion of the Chinese economy and India, but other countries and regions also enjoyed very quick development while the restructuring of activities has been slow in some traditional economic power centers, most importantly in Europe.

A somewhat less grandiose but also important shift has taken place within Europe. The transition process and later the EU accession in Central and Eastern Europe (CEE) opened up business opportunities in the close vicinity of European multinational companies (MNCs). The new markets served in the globalization process both as easy sales expansion territories and as cheap production platforms. European business relied much on the opening up sales and labor markets in globalization strategies. Substantial investments were carried out. Most investments established new production platforms serving the new markets, but also substantial part of FDI enjoyed extraregional importance. In many cases good production opportunities not only created additional capacities but also took over production functions from more traditional sites. While we will define the term "relocation" more in detail later in this paper, we can refer the above process as such. The growing economic role of transition economies, and especially relocations triggered rather important political debates in the European Union. Most important criticism was related to employment: companies "exported jobs" while they relocated certain activities to Central or Eastern Europe.[7]

2. STYLIZED FACTS OF RESEARCH ON ICT DEVELOPMENT AND RELOCATIONS IN CENTRAL EUROPE

In some previous stages of our ICT relocation research we described how foreign direct investment-based development boosted growth in the electrical engineering sector (Sass, 2006; Szanyi, 2006). While in pre-transition times virtually all socialist countries participated in the CMEA labor division in electronics, the capacities were not adequate for the post-transition free market competition and were mostly demolished. Previous expertise in the industry, valuable knowledge base of skilled workers and engineers remained in place offering a good human resource pool for interested foreign investors. New investments started at different times in the transition economies in accordance with the general trends of FDI in Central Europe. (Linden, 1998, Radosevic, 2002) Thus, Hungary became a stronghold of foreign investment-based ICT industry in the region, (see e.g. Sass (2006), partly due to the special regulation on customs-free zones, see e.g. in Antalóczy and Sass (2001)) together with Estonia (Lumiste, 2006) while other countries (e.g. Czech Republic

[7] See a short literature review in e.g. Hunya, Sass, 2005, or for services: Gál-Sass, 2009.

and Poland) caught up later on. Expansion towards south-east seems to be sluggish. More recently there were some new establishments in Romania (Nokia at Cluj and Microsoft in Bucharest), but investments were discontinued during the current crisis. Bulgaria remained virtually untouched. It is not only ICT-manufacturing, but more recently also ICT-related services are important hosts to foreign direct investments. (Gál, 2011).

In our earlier works we figured out how foreign investments contributed to economic development in Central Europe (Szanyi, 2003). ICT in particular proved to be effective in increasing productivity and in improving export performance especially in Hungary. We highlighted that there has been an up-grading in the activity structure of foreign owned companies. (See e.g. Szalavetz, 2004) While they gathered experience with local markets and production conditions they expanded and deepened activities and thus became more embedded in the local economy. This also increased local value added. However, some investments that were based on the utilization of cheap unskilled labor (screwdriver industries) moved from Central Europe to other lower cost locations, mainly to the Far East. This volatility of investments also drew our attention to the vulnerability of the economic structure. In Hungary, for example, the moving of IBM Storage Products caused the loss of several thousand jobs, a measurable drop in ICT exports, but also an increase in the level of local value added of ICT production as a whole. Our conclusion was that despite of the increased risks due to more vulnerability FDI-based development altered Central European economies to their benefit, establishing an up to date economic structure which became integrated in global labor division networks. Further indirect benefits might have stemmed from spillover effects towards the SMEs and other local companies. However, these positive external effects proved to be weaker than expected, mainly because of the low absorptive capacities of host economies (Sass-Szanyi, 2004).

The other line of our research addressed the new international labor division patterns in global and in European context (Sass, 2006). FDI-based development certainly affects all participants of international cooperation networks. The emergence of transition economies of Central and Eastern Europe as new partners provided excellent business opportunities for many European and to some extent also overseas companies. The quick liberalization of consumer markets fuelled European economic growth for over a decade, and cheap and efficient production opportunities also contributed to increasing competitiveness of companies investing in the region. FDI projects were carried out in two basic ways. Participation in privatization programs could be regarded as a special type of M&A deal, while there were also massive greenfield investments in the region. (See e.g. Szanyi, 2001 or Antalóczy and Sass, 2001.)

From the viewpoint of changes in international labor division the mode of investment is perhaps less interesting, although our research discovered significant relationship between

this and the likelihood of local supplier network development (Sass – Szanyi, 2004). More important issue is in that respect the relationship of the new investments and existing capacities, the impacts of FDI on donor economies. The first major wave of investments in Central Europe during the 1990s was mostly determined by capturing the new markets via purchasing or establishing new capacities in the region. These investments hardly affected affiliates back in the home countries of investors. However, in the second half of the decade, but especially in the 2000s efficiency seeking investments also took momentum. These investments frequently meant relocations of existing capacities from more developed to less developed countries. While the issue will be detailed to some extent later in this paper we want to emphasize that relocations directly affect the activities of firms in their home countries as well. Previous research proved that these effects may have both negative (job loss) and positive (increased global efficiency and incomes) for the home country. (See more details in Hunya, Sass, 2005)

In this paper we would like to publish some new results of our ongoing research on ICT relocations. We will provide new statistical data about the characteristics of ICT sector in Central European countries during the 2000s. The main lesson of this analysis is that investments in ICT sector grew rapidly also in this decade, and was only little affected by the current crisis. The effect of the crisis was bigger in Hungary, where the sector has already been established and global contraction of the industry was not balanced by new investments. We also could demonstrate the sources of competitiveness in Central Europe but also the process of excessive labor cost growth over productivity growth. Another negative phenomenon was the low level and stagnating local value added content of production, which is in contradiction with our previous observations for the 1990s. We also introduce a new list of ICT relocation cases in Hungary to illustrate the dimensions of the process.

3. THE DEVELOPMENT AND STRUCTURE OF ELECTRONICS INDUSTRY AND ICT IN CEE

The electrical and optical equipment sector plays an important role in the CEE economies. The sector is one of the major employers with 5-20 % of manufacturing labor force and with a production value of 5-28 % of manufacturing output or 2-20 % of GDP. The sector has increased size and share in most transition economies over the past 20 years. 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. Also Czech and Slovak electrical industry grew very rapidly during the early 2000's. But it is an important sector in the other CEECs as well. Only Bulgaria and Romania lags behind significantly.

Table 1.

Electrical and optical equipment industry (DL) in CEE

	Production (mn Euro) and share in total manufacturing (%)			Employment (thousand employed) and share in total manufacturing (%)		
	1998	2004	2008	1998	2004	2008
Bulgaria	289 (4.0)	621 (4.3)	1354 (5.4)	41.5 (6.3)	32.6 (5.1)	40.5 (6.2)
Czech Rep.	3961 (8.5)	13223 (15.1)	19575* (15.5)	154.2 (10.8)	186.9 (13.7)	200* (14.4)
Hungary	5679 (18.2)	19217 (27.5)	23412 (26.6)	101.1 (13.7)	154.0 (18.4)	145 (18.6)
Poland	6401 (7.0)	10011 (6.9)	17689 (7.5)	191.8 (7.0)	178.9 (7.2)	217 (8.1)
Romania	1080 (5.5)	1782 (5.2)	4375* (7.5)	97.1 (4.5)	91.0 (5.4)	121* (8.0)
Slovenia	1411 (10.1)	2163 (10.9)	2389 (10.0)	n.a.	14.8 (6.2)	28 (12.0)
Slovak Rep.	1321 (9.9)	2912 (10.8)	8888 (17.3)	n.a.	60.4 (15.1)	80 (17.9)

Source: Eurostat
*2007

Though production and employment shares are also low in Poland, the absolute size of the branch is much larger, than in Romania, Slovenia or the Slovak Republic. This means, that 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 employment level is much lower than shares in production. We proved in an earlier paper that this result indicated a significantly higher level of per capita production than in other countries, especially in those, where production share was lower than employment share. This result was an outcome of different intra-sectoral structure, and also lower effective level of productivity of the same comparable activities (Szanyi, 2007). Big differences in productivity levels among CEE and also compared to manufacturing averages is demonstrated by value added per employee figures in Table 2.

Table 2

Evolution of productivity in CEE manufacturing and electrical industry 2000-2007

	Value added per employee Manufacturing Industry			Value added per employee Electrical engineering (DL)		
	2000	2004	2007	2000	2004	2007
Bulgaria	3.0	4.2	6.9	2.7	6.0	8.5
Czech Rep.	9.7	15.5	22.8*	8.7	14.2	18.1*
Hungary	12.4	18.0	25.6	12.7	24.0	27.9
Poland	14.5	17.1	22.6	15.0	16.6	22.4
Romania	3.5	4.6	9.2*	4.9	5.9	9.6*
Slovenia	15.9	24.3	29.2	16.2	24.9	27.2
Slovak Rep.	7.4	13.3	18.2	5.7	8.6	17.0
EU 27	...	49.5	52.5*	...	51.6	57.9*

Source: Eurostat
*2007

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 (see Hanzl 2001). After a period of decline (transitional recession) 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 rather impressive increase in the case of the Czech Republic was due to new investments (relocations). Also in Hungary, new investments played a role in this expansion, but also picking up new functions by incumbent companies was significant. In some cases this also meant relocation of activities from more developed countries (GE, Ericsson, Nokia and others' opening of various services branches in Hungary).

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 (especially towards the EU after signing the Association Agreements) and the thus increasing import thrust that wiped out from the markets domestic (CEE) products characterized by inferior technical sophistication. On the supply side 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, mainly from core Europe. 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, partly due to supplies of regional markets, partly due to exports to developed countries. Multinational corporations fitted the new-old production locations into a new international cooperation network of their own instead of the former CMEA cooperation. These investments were primarily market seeking, but due to the limited size of local markets they automatically started exports, too. Efficiency seeking relocation moving labor intensive assembly and production in the international network also started in production segments characterized by demand for cheap unskilled labor.

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. Recovery started again in 2003, but during the 2007-2010 global crisis growth was stopped again as it is shown in Table 3. There were important intrasectoral differences: consumer electronics (DL 32) reduced production and also

employment. Office machinery and computers (DL 30) also reduced production but not employment, and the manufacture of electrical apparatus (DL 31) and measuring devices (DL 33) did not change production and employment very much.

Table 3

Production and employment in the Hungarian electronics industry 2000-2009

	2000	2004	2007	2009
Gross output (bn. HUF)				
Total manufacturing	12442	16187	21206	18731
DL 30	798	546	662	379
DL 31	1350	1227	1609	1609
DL 32	1071	2787	3219	3009
DL 33	135	189	287	287
Value added (bn. HUF)				
Total manufacturing	2618	3960	4814	4711
DL 30	54	102	53	53
DL 31	239	426	480	509
DL 32	141	333	316	367
DL 33	52	79	92	113
Employment (thousand)				
Total manufacturing	991	953	935	854
DL 30	14.4	7.9	6.7	10.6
DL 31	66.7	67.0	67.4	69.7
DL 32	57.2	94.8	100.5	61.4
DL 33	21.9	21.0	15.9	16.6
Value added per gross output (%)				
Total manufacturing	21.0	24.5	22.7	25.2
DL 30	6.8	18.7	8.0	14.0
DL 31	17.7	34.7	29.8	31.6
DL 32	13.2	12.0	9.8	12.2
DL 33	38.5	41.8	32.1	39.4

Source: OECD Stan database and own calculations

While the previous table contained data and information using the standard NACE classification categories, literature also created another category. ICT is considered as the conglomeration of both hardware and software production, moreover also the extension of services that are based on the ICT hardware and on the communication platforms of internet. Though our paper is mainly about relocations in the ICT hardware business (NACE 30 and 32), it is also worthwhile to take a look on the service side of the business, which is NACE 64 (postal and communication services) and NACE 72 (business services). OECD STAN database provides us with member countries' detailed statistics, albeit everything in local currency, current prices. This makes direct comparisons difficult due to a number of serious methodological problems. Derivate figures however, may deliver much useful

comparative information. We tend to use this database now because the latest available figures of Eurostat are for 2007.

Table 4 describes the main development patterns of the ICT industry in 4 countries of Central Europe for the 2000s. This data corroborates well with figures of the electrical industry and show a clear advantage of Hungary by 2000 and the quick catching up of both Slovakia and the Czech Republic thereafter. What is more interesting here is the relatively low figures of Austria the more developed country chosen for comparison. The share of ICT sector is not only lower, but even declining in this country. Another important message of the table is the peculiar difference among the countries during the most current global crisis in 2009. ICT growth slowed down in the Czech Republic and also in Slovakia, but did not decline like in Hungary. This may be due to the different phase of sectoral development in Hungary and the other two countries. While in Hungary main market players got established by the early 2000's in the other two countries the process of establishing business presence has not been completed by 2008. The primary investment activity has been continued. There are also some sectoral differences visible also in this dataset with NACE 32 (communication equipment) on the lead in Hungary and Slovakia and NACE 30 (computers and components) in the Czech Republic. Parallel to this, communication services (NACE 64) are relatively stronger in Hungary and Slovakia, while computer services (NACE 72) are strong in the Czech Republic. Interestingly, Austria has virtually no ICT hardware production, but relatively well developed computer service sector.

Table 4

Size and importance of ICT sector in selected countries 2000-2009

		Hungary			Czech Republic			Slovakia			Austria		
		2000	2008	2009	2000	2008	2009	2000	2008	2009	2000	2008	2009
Gross production in % of GDP	30	2.7	0.9	0.7	0.4	2.1	2.1	0.2	0.1	0.1	0.1	0.0	0.0
	32	3.6	5.8	5.7	1.4	2.5	2.4	0.7	3.7	4.1	1.7	0.7	0.6
	64	2.4	2.0	2.0	2.1	1.8	1.9	1.8	1.7	1.8	2.4	1.8	1.8
	72	0.9	1.2	1.4	2.8	1.5	1.7	0.6	1.1	1.2	1.2	1.3	1.4
	Total ICT	9.6	9.9	9.8	6.7	7.9	8.1	3.3	6.6	7.2	5.4	3.8	3.8
% share of employed persons in total employment	30	0.3	0.3	0.3	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0
	32	1.3	2.0	1.5	0.7	0.8	0.7	0.6	0.8	0.8	0.9	0.4	0.4
	64	1.3	1.6	1.8	1.4	1.3	1.3	1.8	1.2	1.2	1.8	1.2	1.2
	72	0.6	1.3	1.0	0.9	1.4	1.5	0.7	1.2	1.3	1.1	1.3	1.3
	Total ICT	3.5	5.2	4.6	3.1	3.7	3.7	3.2	3.3	3.4	3.8	3.0	2.9
Value added in % of total value added	30	0.6	0.3	0.3	0.3	0.1	0.3	0.1	0.0	0.1	0.0	0.0	0.0
	32	1.2	1.5	1.5	0.6	0.6	0.5	0.2	1.4	1.0	1.3	0.5	0.5
	64	3.7	3.1	3.1	2.9	2.8	2.8	9.8	2.3	2.4	2.0	1.7	1.7
	72	1.3	1.8	1.8	1.2	2.0	2.1	2.9	1.6	1.6	1.2	1.4	1.4
	Total ICT	6.8	6.7	6.7	5.0	5.5	5.7	13.0	5.3	5.1	4.5	3.6	3.6
Number of employed persons (thousand)	30	14.4	12.6	10.8	5.7	10.6	10.1	1.8	2.5	2.9	1.2	1.3	1.6
	32	57.2	83.9	61.4	32.4	43.9	38.8	12.1	18.5	18.3	33.8	18.5	16.8
	64	84.9	65.6	70.4	70.4	66.4	69.6	35.9	27.9	27.1	71.0	51.8	50.0
	72	27.1	52.7	37.8	44.5	73.6	78.5	13.8	26.7	28.2	41.4	54.6	55.7
	Total ICT	183.6	214.8	180.4	153.0	194.5	197.0	63.6	75.6	76.5	147.4	126.2	124.1

Source: OECD STAN database, own calculations

4. FACTORS OF SECTORAL COMPETITIVENESS: WAGE LEVELS AND PRODUCTIVITY

When looking at competitive advantages of Central European locations we must of course compare with patterns of core Europe, the largest investors. 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 (ULC) continuously fell during the 1990s. This situation of dropping ULC changed by the turn of the millennium, most sharply 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.

Table 5

Average personnel cost per employee in branches of the electrical industry (thousand Euro)

		EU 27	BG	CZ	H	PL	RO	SI	SK
DL	2000	n.d.	1.9	n.a.	6.3	n.d.	2.4	n.d.	4.6
	2004	35.0	2.4	7.9	9.8	6.6	3.3	16.2	6.3
	2008	38.2*	4.3	11.0*	13.3	11.2	5.9*	19.1	10.2
DL 30	2000	n.d.	2.1	n.a.	6.1	n.d.	1.6	15.3	5.0
	2004	n.d.	2.8	8.2	10.6	7.1	2.1	19.2	7.7
	2008	38.4	5.2	10.6**	14.8	13.1	6.4*	25.0	11.4
DL31	2000	n.d.	2.0	n.a.	6.3	n.d.	2.3	13.1	4.4
	2004	33.0	2.4	7.7	9.9	6.8	3.1	15.9	6.0
	2008	35.7	4.2	10.6	12.0	11.5	5.5*	18.7	9.7
DL 32	2000	n.d.	2.3	n.a.	6.4	9.1	3.1	17.8	4.5
	2004	n.d.	2.9	8.6	10.4	7.8	5.3	18.2	6.6
	2008	n.d.	5.1	12.7	14.4	11.3	9.0*	20.1	10.7
DL 33	2000	n.d.	1.6	n.a.	5.8	n.d.	2.1	12.9	5.5
	2004	n.d	2.1	7.8	7.8	5.5	7.1	14.8	7.3
	2007	37.7	3.9	10.2**	10.9	10.0	6.5	18.4	11.8

Source: Eurostat
*2007, **2006

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 %.

Wage development in comparison to manufacturing average is illustrated in the third section of Table 6, too. While in Hungary ICT sector's wage advantage was strong in all the four sub-sectors already in 2000, this high difference did not evolve in Austria, remained moderate in Slovakia and in the Czech computer business. We do not risk a detailed explanation here, but would like to stress that resources of wage competitiveness started to plunge in Hungary. But this issue needs to be evaluated in comparison with productivity development, which is measured by per capita value added in this table too. In this regard we can see steady increase between 2000 and 2008 in almost all segments. Outlier is the figure of Czech computer industry in the starting year with extraordinary high value added figures. We could not check for the reason of this extraordinary value, but can suspect a major change in the composition of the sector, similar to Hungary's case with IBM Storage Products. In all four countries global crisis resulted in dropping productivity figures. The main reason of this might be a difference in production and sales trends and employment (layouts). Wage competitiveness of the Czech Republic and Slovakia might have improved in the ICT sector during the 2000s. We can see bigger increases in per capita value added than in labor compensation. This does not hold for Hungary, where wage increases seem to surpass productivity increases.

An interesting aspect of competitiveness is the relative weight of local value added in total production. The higher local contribution to products of global cooperation networks, the more income is generated. Higher income levels may provide larger pool for compensation both labor, capital and state. It is therefore of paramount interest to increase local value added in production. Figures in Table 6 indicate that transition economies of Central Europe produce 20-25 % of manufacturing value added locally. The same figure for the more developed Austria is 35 %. Thus, there still is a gap, which is also reflected in compensation levels (wage levels in our analysis). Though there is a general tendency for services to produce significantly higher local value added than any manufacturing branch, this discrepancy is most extreme in the three transition economies. Share of value added in gross production has been low in the two ICT-related manufacturing branches, but what is more striking, the figure has clear descending trend.

Table 6

Competitiveness and performance of ICT sector in selected countries 2000-2009

		Hungary			Czech Republic			Slovakia			Austria		
		2000	2008	2009	2000	2008	2009	2000	2008	2009	2000	2008	2009
Share of value added in gross production (%)	30	8.0	11.1	14.0	27.6	2.4	4.6	10.6	6.1	29.1	17.1	40.4	42.2
	32	13.2	10.5	12.2	15.7	8.7	8.2	26.4	14.3	9.7	39.4	35.8	37.8
	64	60.7	63.2	63.0	50.0	55.0	54.9	57.1	53.5	54.6	42.7	44.9	44.8
	72	53.9	58.2	58.6	55.4	46.3	44.5	47.8	55.6	56.8	49.0	48.5	49.2
	Manuf.	21.0	22.3	25.1	25.1	21.0	23.6	23.0	23.3	23.6	36.5	32.0	34.3
Per capita value added (in local currency. current prices)	30	1.46	3.1	3.06	1093	455	854	10.0	5.6	12.8	50.0	53.1	43.8
	32	1.54	2.11	2.48	370	484	441	11.0	44.4	30.9	69.6	75.4	67.9
	64	2.01	4.25	3.88	812	1408	1296	21.3	50.1	51.2	52.7	84.9	82.8
	72	2.84	4.82	7.06	547	895	864	16.7	35.6	33.5	53.0	63.9	62.4
	Manuf.	2.64	5.30	5.52	389	568	565	13.3	25.8	23.0	57.2	77.4	71.7
Per capita labor compensation (in local currency. current prices)	30	4.44	4.60	4.91	189	330	307	7.2	10.0	7.6	33.3	43.1	43.1
	32	2.47	4.15	5.98	194	341	347	6.4	12.1	12.6	47.7	50.2	51.3
	64	4.93	10.8	9.53	276	449	430	8.0	16.8	17.2	31.0	35.3	36.9
	72	5.31	7.70	11.5	262	539	524	10.0	19.4	19.6	34.0	38.6	37.4
	Manuf.	1.51	2.75	2.72	192	313	298	6.4	11.7	11.6	33.7	42.3	43.0

Source: OECD STAN database, own calculations

5. FOREIGN OWNERSHIP, RELOCATIONS AND COMPETITIVENESS

The main purpose of this paper was to analyze relationships of competitiveness and FDI through production relocation in one particular segment of manufacturing: the ICT sector. Therefore, we do not want to draw general conclusions of the topic here, but concentrate on this single sector. Currently two main new topical issues stand out. The first is new experiences with 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 a previous paper 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. Up till 2000 FDI flows were characterized almost exclusively 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, as 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 the 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. They meant in some cases production relocation from other countries. 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.

It is rather difficult to estimate the extent of relocations in this period. For in most cases privatization deals but also many of the new investments resulted in sizeable increase of total corporate production and sales. The opening-up of new markets of CEECs required an increase of capacities. This applies mainly for consumer markets, but also generally. In case of electrical industry it was not only the huge increase in consumer electronics that required quick increases in production. Also, high replacement ratio of out-dated production machinery, a never before seen boom of infrastructural development, investments in environmental protection etc. required firms to quickly generate large amounts of products. Hence, much of this new demand could not have been served from existing in developed countries production facilities, but only through heavy expansion of branches also in CEECs. Therefore, much of the new investments represented in this early period new capacities that could have been built up also in developed countries, but were established rather in CEECs. Certainly, factories that work for global markets also serve developed countries, and this is the case with many investments in electrical industry. Relocation of activities were rather exceptional in this period.

Veugelers, (2005) regards relocation as a process, in which either there is a transfer of production capacities from another country, or there is a capacity extension in one affiliate parallel with a capacity reduction in another, or there is a capacity extension in one affiliate, while other affiliates‘ capacities do not change.

Table 7.

Definitions concerning relocations

Location of production	Internalised	Externalised (outsourcing)
Home country	Production kept in-house at home	Outsourcing (at home)
Foreign country(offshoring)	Intra-firm (captive) offshoring	Offshore outsourcing

Source: based on UNCTAD, 2004, p. 148

Roughly after 1998-2000, relocations started to play more important role. This was quite natural, since efficiency seeking investments took momentum after an initial introductory period that was characterized by gathering of experience, privatization bargains and strive to quickly capture opening up new markets. Later on more sophisticated cost calculations increased their role in investment decisions. This also meant that already existing facilities in CEECs were treated like other items of the global cooperation network. They also were evaluated and compared to other locations. Hence, they more and more became regular players of global corporations' in-house sourcing competitions and won in many cases, thus expanding "at the cost" of other locations' expansion opportunities. New investments, as well as the moving of various activities among foreign affiliates is regarded as relocation. The rationale of the whole relocation issue is increasing efficiency through tapping new resources or lowering production costs. The main beneficiary is obviously the corporation that can increase markets or efficiency. Winners may also be host economies, especially if the low level of costs is not provided by excessive state support that eats up more than potential benefits of investments. Benefits of donor countries may come more indirectly through increased overall turnover (a kind of spillover effect of overall expansion), profit transfers, increased efficiency through the transfer of activities.

The case of Flextronics 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 was 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 was abandoning the location when growing local costs (especially wages) made simple handling activities not profitable. Later 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. Development of skills and EU-membership continuously pushed 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. [8]

UNCTAD (2003) listed 35 most important cases of changes in the stock of foreign owned ventures in the period 2002-mid 2003. The first conclusion of the analysis of the UNCTAD-sample was 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 (Szanyi, 2007).

Sampling of relocation cases had been continued by the authors for the years 2003-2010, because no other, statistically reliable source was found that could single out relocation cases from inward and outward FDI flows. Table 8 introduces some details of 58 detected in the press or on corporate websites relocation cases in the electronics sector. The first striking fact of the data is the very uneven timely distribution of the cases. In 2003 there were 13 cases and 12 in 2009 and in 2010, while in the meantime only 3-6 cases. The difference is so significant that we may state that relocation of production is more frequent in crisis periods, then in years with stable market conditions and steady economic growth. This observation can be easily explained by our earlier argument about the role of relocations in corporate global strategies. Pressure to find cost efficient locations is more intensive in crisis periods. (See e.g. Gereffi, 2010.)

Like in 2002-3, both inward and outward relocations took place in Hungary in 2003-2010. Though it is difficult to compare, but we may have the impression that outward

[8] The case of Flextronics is also investigated by Kiss (2006).

relocation became more frequent. In many cases news reported about parallel in- and outward relocations or a qualitative up-grading of activities in the Hungarian affiliates. This is also reflected in the “Activity” column of Table 7. On the other hand, there were also cases when previously relocated from Hungary activities were moved back from less developed countries (also from China) mainly due to quality and reliability problems. It is also emblematic, that also Chinese investors appeared in the Hungarian electronics sector: Huawei is suspected to have relocated activities from unknown places (maybe from China) in 2010. In more traditional branches like steel, machinery and equipment, rubber, etc. many Chinese and Indian MNEs have invested during the 2000s. As far as the nationality of other investors are concerned, we can observe a quite even distribution, no clear European dominance is observed. Many American, Japanese and other East-Asian companies relocated to Hungary. The places from where activities were relocated were mainly found in Western Europe. Hence, the spreading of the new labor division pattern within Europe is reflected in the table. We come back to this issue in the next chapter.

The spatial concentration of the investments is still very high: North-Western Hungary is clearly overrepresented. This may be caused partly by previous investment patterns: many capacity expansions were carried out on earlier established facilities. Hence, regional duality, a less favorable result of FDI did not change much. Since only 12 cases of outward relocation and 46 cases of relocation were registered we find a strong job creation effect. Though in many cases no clear estimation on employment was provided, we can state that at least 10.000 new jobs were created during the investigated period (the figure may be significantly higher, up to 15-20.000 if we add average employment data to the unknown cases). Outward relocation affected almost 4500 jobs. In terms of net job creation relocations showed a positive balance, so we can rather speak about a continuous change in activities with an emphasis of qualitative up-grading. In some cases definitely labor intensive production is relocated from Hungary, on the other hand, development and logistics centers are relocated to Hungary.

Table 8

Selected cases of expansion and reduction of production capacities by foreign affiliates in Hungary 2003-2010

	Date of announcement	Company	City	Type of relocation	Activity	Foreign location	Employment impact
1.	2003	Philips (Dutch)	Szombathely	from Hungary	CRT monitor production	China	-500
2.	2003	Jabil Circuit (USA)	Szombathely	to Hungary		Britain (Coventry)	+700-800
3.	2003	Philips (holland)	Székesfehérvár	to Hungary	Traditional TV set production	France	?
4.	2003	Continental Temic (German)	Budapest	to Hungary	Development center (500.000EUR)	Germany	+30
5.	2003	Epcos (German)	Szombathely	to Hungary	Development branch and production from Heidenshem	Germany	+80
6.	2003	Datacon Technology (Austrian)	Győr	to Hungary	Chip assembly unit	Germany, Austria	+50
7.	2003	Kontavill Legrand (French	Szentes	to Hungary	Electronic components	France, Switzerland	Összesen 500
8.	2003	Robert Bosch (German)	Miskolc, Eger, Hatvan	to Hungary	New factory and capacity expansion	Germany, France	+2-2500
9.	2003	Eupec Hungária Kft. (German)	Cegléd	to Hungary	Capacity expansion and logistics center	Germany	+70
10.	2003	Epcos (German)	Szombathely	to Hungary	Capacity expansion	Germany	+100
11.	2003	Robust Plastik Assembling (Austrian)	Győr	to Hungary	Telefax assembly, printed circuits production, capacity expansion	Austria	+100
12.	2003	Shin-Etsu Polymer (Japanese)	Győr	Capacity expansion in Hungary	Cellular telephon component production, new factory	Instead of expanding existing Dutch capacity	+115
13.	2003	Sanmina-SCI Corp. (USA)	Alsózsolca	to Hungary	Establishment of main European center	Sveden	+150
14.	2004.	National Instruments (USA)	Debrecen	to Hungary	Capacity expansion and logistics center planned for later	Instead of logistics center in Amsterdam	+100
15.	2004.	Brooks Instruments (USA)	Székesfehérvár	to Hungary	Moving of the European center, capacity expansion	Holland	? (+40 in production)
16.	2004.	Clarion (japanese)	Nagykáta	to Hungary	New factory for car HiFi production	France	?

17.	2005.	IBM (USA)	Budapest	to Hungary	Expansion of regional services center, downsizing elsewhere	Western Europe	+700
18	2005.	Artesyn (USA)	Tatabánya	from Hungary	Factory closure and moving	Romania	-370
19.	2005.	Robust Plastik Assembling (Austrian)	Győr	to Hungary	Cellular phone assembly for the French customer is located back from China	China	?
20.	2005.	Schifo Kft. (Austrian)	Körmend	from Hungary	To follow main customer Epcos	China	-158
21.	2005.	BenQ (Taiwan)	Zalaegerszeg	from Hungary	Business bought from Siemens	China	?-900?
22.	2005.	Filtronic Plc (UK)	Székesfehérvár	to Hungary	Partial production relocation	Finland	+50 (500 in one year)
23.	2006.	Carl Zeiss AG (German)	Mátészalka	to Hungary	Lens production for eyeglasses (more complex products and R&D remains)	Germany	+100
24.	2006.	Scanfil (Finnish)	Biatorbágy	to Hungary	Closure of Finnish plant, capacity expansion in Hungary	Finland	?
25.	2006.	Delphi (USA)	Szombathely	from Hungary	Labor-intensive production is moved	Slovakia	-400
26.	2006.	Diebold (USA)	Gyál	to Hungary	Closure of plant in Chassis, relocation	France	?
27	2006.	Maxon (Swiss)	Veszprém	to Hungary	Labor intensive production moved	Switzerland?	+350
28	2007.	Schneider Electric (French)	Zalaegerszeg, Gyöngyös, Budapest	to Hungary	capacity expansion and logistics center	?	+70
29	2007.	Sanmina SCI (USA)	?	from Hungary	production for Ericsson	Sveden	-100
30	2007.	A.O.Smith (USA)	Budapest	from Hungary	Boylers and electric engines production	China	-270
31	2008.	AFL Stribel (Alcoa) (German?)	Székesfehérvár	to Hungary	Production	Germany	?
32	2008.	Schaffner (Swiss)	Kecskemét	to Hungary	Magnetic electrical filters (back in 2007 transformator production relocated from Germany)	Switzerland	+50-100
33	2008.	Delphi Corp. (USA)	Szombathely	to Hungary	Car parts production	Western Europe	+150
34	2008.	Dr. Karl Bausch GmbH (German)	Gyöngyös	to Hungary	5 millions EUR investment	Germany?	+100-120
35	2009.	Perlos (Taiwan)	Komárom	from Hungary	?	Brazil	-500
36	2009.	Hisense (Cineese)	Szombathely	from Hungary	European production discontinued, sales and service center remains	China?	-86

37	2009.	Infineon Technologies (German)	Cegléd	to Hungary	capacity expansion worth 17 million Euro	Germany?	+250
38	2009.	Samsung (Korean)	Göd	to Hungary	Plasma TV production moved due to exchange rate considerations	Slovakia	+300?
39	2009.	Elcoteq (Finnish)	Pécs, Cserkút	to Hungary	Activity abandoned in Tallin Pécs facility developed	Estonia	?
40	2009.	Philips (Dutch)	Székesfehérvár	to Hungary	TV production (development remains back in Brugge)	Belgium	?
41	2009.	NexDisplay (Korean)	Szentgotthárd	to Hungary	LCD production	?	+600
42	2009.	Schaffner AG (Swiss)	Kecskemét	to Hungary	?	Switzerland	+?
43	2009.	Harman International (USA?)	Székesfehérvár	to Hungary	Capacity expansion	Western Europe	+260
44	2009.	Specsavers (UK)	Mátészalka	to Hungary	Greenfield investment, supports British facilities	UK	+179
45	2009.	Continental AG (German)	Veszprém, Makó, Vác	to Hungary	Capacity expansion, partly movement from Spain	Spain	+?
46	2009.	Zeiss (German)	Mátészalka	to Hungary	Lens production center	?	450
47	2010.	Huawei (Chinese)	Pécs, Komárom	to Hungary	Communications equipment production and related logistics	(China??)	+120 later 700 alltogether
48	2010.	Becton, Dickinson and co. (USA)	Tatabánya	to Hungary	Move production closer to customers	USA?	+100 (összesen 500)
49	2010.	Sanyo (Japanese)	Dorog	to Hungary	Exports to the EU market	?	+200 (+500)
50	2010.	R.Bosch (German)	Hatvan, Miskolc	to Hungary	New factory, capacity expansion, R&D activity	UK	+400 (from Wales) +70 (R&D) later 1000 alltogether
51	2010.	Elcoteq (Finnish)	Budapest	to Hungary	Headquarters	Luxemburg	?
52	2010.	Sony (Japanese)	Gödöllő	from Hungary	Plant closure and movement	Malaisia	-540
53	2010.	Flextronics (Singapur)	Mór	from Hungary	Partly within Hungary, partly to China	China	-337
54	2010.	Payer (Austrian)	Ajka	to Hungary	Electrical devices	Europe	+500-520
55	2010.	Alois Dallmayr Automaten Device Kft.	Tolna	to Hungary	IT development center serves European locations with „smart solutions”	Germany	?
56	2010.	Philips (Dutch)	Tamási	to Hungary	?? volt már??	Finland, France	+300

						Turkey	
57	2010.	Epcos (German-japanese)	Szombathely	??	2,5-3 million Euro investment	??	+400
58	2010.	Becom (Austrian)	Tatabánya	to Hungary	Digital measuring devices 1,6 million Euro investment	Austria	+70

Source: The Hungarian business daily „Világgazdaság" and company home pages

Concluding remarks: How does the enlarged European economy benefit from investments in the new member states?

Bulk of the foreign investments in transition economies of Central Europe was carried out by companies from the EU 15 countries. Hence, it is the EU 15 or core Europe as region which is mostly affected by the positive and negative impacts of FDI in Central Europe. There is a political debate on whether foreign investments from the EU 15 do more benefit than harm to the donor countries. Most often relocations are considered as more negative, since they are usually bound to firm closures in the donor economies. Especially the negative impact on employment is criticized.

Here we must define what we understand under the term relocation. In the strict sense of the word relocation means moving activities together with production equipment. Disassembling at the older location and setting up of the same facility at the new one. This type of transaction rarely happens, it is cheaper to wait until the equipment is fully depreciated and the new site is equipped with new machinery. This complete change of production sites is many times also connected with changes in the product design. Thus, product and equipment is usually not identical on the two sites. Some of the changes may even be specific for the new location: product design may be changed according to local needs, and the new facility serves the new local market. Sometimes this may even mean that companies cease servicing the home market. The employment loss of such transactions is obvious; nevertheless, the process is advantageous on global level. The 1970s and 80s were characterized by such fundamental changes (see e.g. steel industry, shipbuilding, consumer electronics, textile industry).

Today's international labor division patterns are different. The level of specialization is deeper, and factor mobility increased tremendously (especially that of capital). Also trade and income flows were liberalized in large parts of the globe boosting not only trade of finished goods, but also that of subassemblies among affiliates of cooperating international cooperation networks. In this environment, changes of international labor division usually mean moving certain activities internationally, and not complete production lines. Also very important and typical feature is that cooperation of independent companies' networks and alliances became the nucleus of competition rather, than individual firms. A major advantage of this type of cooperation is flexibility. On the one hand networks may flexibly

utilize a large pool of resources activating only at the necessary levels, on the other hand, flexibility means quick responses to changes in quality and quantity of demand (production is located near the main markets) and also supply (parts of production may be also located at low cost locations). Hence, international production is characterized by continuous changes of the cooperation networks.

In this setting international movement of certain activities is important part of maintaining flexibility of the cooperating networks. In many cases these changes affect independent actors of the networks in form of increasing or decreasing orders of certain deliverables. The core company of the network may decide how to change supplier network. In fact, most multinational companies' global sourcing mechanisms frequently produce impetus for regular changes in the low end of the supplier networks. Strategic partners of course enjoy much higher stability. Though, the stability may also mean that first tire suppliers are forced to follow the international move of their main partners. In this setting relocation may mean very different things. The narrow sense of relocation would mean now the establishment and/or expansion of affiliates' activity with the parallel reduction or ceasing of similar activities in another country. The emphasis is on partial reduction. Not complete production lines are moved, and parts of production as well as important corporate functions may stay back in the home country. The employment reduction is therefore partial and may be offset by the expansion of other parts and activities of the same firm.

It is very important to emphasize, that relocation in this case means moving activities within corporate borders. Nevertheless, activities can also move outside company borders, and this happens more and more frequently when firms concentrate on core competencies. It is therefore important to relate the term "relocation" to the terms "outsourcing" and "offshoring". Outsourcing means moving activities from within corporate borders to outside vendors. In other words this is reducing the size of corporate activities (relying on market) if transaction costs of market coordination of activities is lower. The main aim of outsourcing is increasing flexibility, concentrating efforts on core competencies to create long term competitive advantages. Offshoring on the other hand means searching for low cost locations. The main purpose is cost cutting. In this sense IC manufacturers' move from South-England to Scotland or from West-Germany to Saxony was equally offshoring, similarly to their opening of affiliates in China. Offshoring can involve corporate affiliates in new locations but also orderings from new independent partners. This later transaction is then offshore outsourcing.

What really does relocation mean in this complicated scenery? In the narrow sense relocation would mean moving activities within corporate borders to low cost locations abroad, which means in-house offshoring. Offshore outsourcing on the other hand would

mean searching for new supplier networks in low cost foreign locations. Nevertheless, the net effects of offshore outsourcing for the home country may be identical especially in terms of employment; still, this is not regarded as relocation in the strict sense of the word. It was rather 25-30 years ago when public outcry followed a company's decision to close a site somewhere in core Europe and purchase products from abroad. This battle was fought and lost since then; see the high penetration rate of foreign products in the consumer goods markets of the EU. Now similar sentiments are raised when firms in core Europe wish to reduce and economize (not cease altogether) activities in order to become more flexible and competitive, using relocations to lower cost countries.

Relocation is usually bound to foreign direct investments; it can be regarded as one kind of FDI. It is most typical for vertically integrated export-oriented multinational companies and their aim is to increase efficiency by lowering production costs. However, the other main type of FDI, investments of horizontally integrated firms is usually market seeking. In this case the establishment of foreign affiliate usually does not mean changes (reduction) in other affiliates' activity, it is additional capacity established to serve new markets. However, supplying these new markets through exports from the home country would be still possible; hence these investments do not develop potential (and mostly only theoretically plausible) employment in the home country. In many cases, however, industry specificities decline the possibility of exports altogether. Therefore this paper defines relocation as an international move of production facilities where new facilities are set up in one country and at the same time and due to this new establishment, same kind of activity is scaled back or put off in another country. In the new location, investments should not necessarily mean the establishment of a new branch or affiliate but also the expansion of already existing units. Most important is the parallel, interlinked expansion and reduction at the two locations.

If we try and analyze the potential impacts of relocation (defined as in-house offshoring) on home country we can draw a more comprehensive balance of costs and benefits. Hunya and Sass (2006) summarize the potential impacts in the field of employment, trade and income flows. They emphasize that political debates usually consider only the direct employment effects of relocations, but neither the long term employment, nor other types of beneficial for the home country effects. There is always economic rationale behind firm closures and relocations. The ceasing of activities means increased cost competitiveness of the given company, thus relocation and the purchase of production inputs from abroad may contribute to maintaining of remaining employment. It is also possible that employment in the remaining activities increases if cost cutting sufficiently increases competitiveness and results in increased sales turnover. New jobs can be created if companies launch new more sophisticated product lines instead of the relocated production. This is also a frequent follow-up of relocation transactions and is connected with more concentration on core

competencies and increased competitive advantages. Nevertheless, what is beneficial for the individual firms and for their employees does not mean that there are no losers of this type of up-grading. Though total employment may remain or even increase, the reduction of low-skill jobs may cause considerable unemployment in this segment of the labor market which can be limited by training only at the longer run.

Customers of the home country must also benefit from increased cost efficiency. Under today's circumstances of global economy the spread of contestable markets and the shortening of product life cycles intensifies the pressure of cost competition. This is also the major reason of production relocation: high-wage developed countries' producers must on the one hand pursue intensive innovation activity and search for new solutions and reduce cost of production. Accumulated local knowledge is thus combined with low-cost production. Lower production costs reduce prices, what in fact can be enjoyed also by citizens of developed markets.

Relocation also affects incomes of capital owners. Developed countries possess large pools of capital searching for high profitability investments. Capital gains can be increased when investments are carried out in countries with relatively weaker capital endowments, where rates of return are usually higher. Rates of return can be increased also by host country governments when providing fiscal incentives for FDI. Since capital flows are liberalized in many countries profit repatriation is also free. Capital owners may use their earnings however they wish. It can be invested in the home country in branches with relatively higher rates of return, or in any other country where promising opportunities come up, or they can also reinvest their profits in the country of operation. When spent in the home country repatriated profits increase the wealth of the local firm, or it can be spent on strategically important activities (R&D) or if paid out as salaries it can increase demand for locally produced products and services.

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