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Production Network Development in Central/Eastern Europe and Its Consequences

Chunji YUN

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II. List of Abbreviations

ASEAN	Association of Southeast Asian Nations
ASEAN4	Four main member of ASEAN, viz. Indonesia, Malaysia, Thailand and the Philippines
AV	Audio-Visual
BRIE	Berkeley Roundtable on International Economy
CEECs	Central and Eastern European countries
CEEC10	Bulgaria, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia
CMEA	The Council of Mutual Economic Assistance
E.A.	East Asia
EU	European Union
EU-15	The fifteen member countries of the EU prior to the new accession on May 1, 2004
FDI	Foreign Direct Investment
HS Code	Harmonized System Code
IC	Integrated Circuit
ICRE	Institute of Integration of the Czech Republic into European and World Economy
ITDH	Hungarian Investment and Trade Development Agency
MNCs	Multi-National Corporations
NAFTA	North American Free Trade Area
NIEs	Newly Industrializing Economies, viz. Hong Kong, Singapore, South Korea and Taiwan
OPT	Outward processing traffic or trade
PRUS	Poverty Research Unit at Sussex
RCA	Revealed Comparative Advantage
SITC	Standard International Trade Classification
TIX_{ij}	Trade Intensity in Terms of Export between *i* country and *j* country
TIM_{ij}	Trade Intensity in Terms of Import between *i* country and *j* country
WIIW	Wiener Institut für Internationale Wirtschaftsvergleiche

1. Introduction

On May 1, 2004, ten Central/Eastern European and Mediterranean countries formally participated in the European Union (EU). 'New Europe' becomes the largest economic zone, following North American Free Trade Area (NAFTA) in GDP and East Asia in population, while it is entering the new stage where 25 countries with more different historical and social backgrounds and at more varying level of economic development act in concert with each other under the single institutional framework. On the other hand, before this formal integration or just after starting transition, Central/Eastern European countries (CEECs) have been incorporated into the EU economy. In the context of the collapse of the socialist economic regime, they have found the way of survive in reintegration into Western Europe. This paper focuses on *de facto* economic integration between the previous EU member countries and CEECs[1].

Directing our eyes on production, investment and trade, today's globalized or regionalized economy is driven by fragmentation of production processes and their spatial or geographical reconfiguration. Participation of emerging countries into the globalizing economy means incorporation of them into global/regional production networks. In response to rapidly changing technology and intensified market competition, multinational corporations (MNCs) have built up a complicated production and distribution system across the national borders. Now, it would be no exaggeration to say that there is no way other than to participate in the cross-bordered networks in order to achieve economic and industrial development in the transformative global manufacturing [*Berger et al 2001; Dicken et al. 2001; Henderson 2002*]. The opening up of CEECs took place at this quite specific time in the stage of the world economy. Therefore, their *de facto* integration into EU has progressed in the form of incorporation into regional production networks organized mainly by EU-based MNCs.

This paper aims at examining how the eastward expansion of EU-based production networks has transformed the industrial structure of CEECs. It is organized as follows. First, in next section, we will make a survey of reorganization of CEECs into EU-15 as the starting point of our argument. The subject of section three is to illustrate how EU-based production networks incorporate CEECs as their nodes in terms of regional input-output linkage, focusing on three sectors; apparel and textile, electronics and automobile. Finally, it will inquire into the consequential domestic industrial structure.

[1] This paper mainly covers the following countries; Bulgaria and Romania in addition to newly accession countries of Czech, Hungary, Poland, Slovakia, Slovenia, Estonia, Latvia and Lithuania. Hereafter, we call these 10 countries 'CEEC10', while the previous 15 EU members 'EU-15'.

2. *De Facto* Integration of CEECs into EU

2.1 Reorientation of Trade towards EU

CEEC10, which fell into so-called 'transformational crisis' or 'transition depression' in the early 1990s, are on a steady growth path since the year of 2000. Apart from Poland which instantaneously achieved positive growth in 1992, Czech, Hungary, Slovakia and Slovenia got back on a recovery track around 1994, followed by the Baltic countries headed by Estonia, and finally in the end of the decade, Bulgaria and Romania joined this tide. The process was not stable except for in Hungary and Slovenia, but from 2000 onward all of CEEC10 have recorded annually about 4 percent GDP growth on average. Most of them considerably succeed in stabilizing their economies [*Ali, Nowak and Roschl 2003: 14-15, Kolodko 2002 chapter3, WIIW 2003*].

The growth trajectory is based on the outward-looking strategy. In fact, they are featured by a high degree of *openness*. Their export dependent ratios (as a percentage of GDP) are nearly 50 percent or more, except for Poland and Romania whose population scales are relatively large and therefore more depend on domestic demands; among them, those of the economies which recovered most rapidly from transition depression are quite high, with 61.5 percent in Czech, 64.5 percent in Hungary and 84.2 percent in Estonia in 2002. On the other hand, their import dependent ratios are also high, with 93.6 percent in Estonia, 78.9 percent in Slovakia, 66.7 percent in Hungary, 63.7 percent in Czech, 59.7 percent in Lithuania and 56.1 percent in Latvia. Certainly, those of Poland and Romania are relatively low also here, but, even so, reach 33.2 percent and 41.2 percent [*data from IMF International Financial Statistics, various years*].

Under the former socialist international division of labor, trade dependent ratios of CEEC10 were higher even before transition to the market-based economy. Hence this might not be novel. However, it should be noted today that the high open economies have been built through '*geographical reorientation*' towards EU-15. The collapse of the Council of Mutual Economic Assistance (CMEA) shifted CEECs from supply-constrained to demand-constrained economies, which has been one of the critical driving forces to deepen trade relationships between EU-15 and CEEC10 [*Commission Staff Working Paper 2003a: 5-6, Kaminski 2000: 18, Kaminski and Ng 2001: 9*].

In fact, the share of EU-15 for total exports from CEEC10 jumped up from one-third to about 60 percent in 1993, reaching 67.5 percent in 2001. By countries, EU-15 absorbed three quarters of Hungarian exports, more than two-thirds of exports from Czech, Estonia, Poland, and Romania, nearly 60 percent of exports from Slovakia and about half of exports from Lithuania in the year of 2001. Among EU-15, Germany is the single largest absorber for CEEC10. After the unification of East-West, the share rapidly increased from 11 in 1989 to 29 percent 1993, now accounting for more than 30 percent. Particularly it absorbs nearly 35 percent of exports from Czech, Hungary and Poland, more than 25 percent of those from Slovakia and Slovenia [*Eurostat, Statistical Yearbook on Candidate Countries, 2003*].

Also in imports, re-orientation towards EU is drastic (to a lesser extent because of imports of fuels from Russia). Between 1989 and 2001, the shares for total imports changed from 12 to 49.3 percent in Bulgaria, 32 to 61.8 percent in Czech, 40 to 57.8 percent in Hungary, 42 to 61.4 percent in Poland, 22 to 57.3 percent in Romania, 34 to 49.8 percent in Slovakia, 27 to 56.5 percent in Estonia, 27 to 52.6 percent in Latvia and 19 to 44.4 percent in Lithuania[2]. EU-15 accounts for nearly 60 percent of total imports of CEEC10. The single largest partner is Germany, whose share for total imports of CEEC10 as a whole reached 23.9 percent; those of the individual countries except for Bulgaria, Estonia, Lithuania and Romania more or less than 25 percent[3] [*Eurostat, Statistical Yearbook on Candidate Countries, 2003*]. They are already almost fully integrated in the EU in terms of trade. The regional integration process has been developed, dismantling the previous linkages and exclusively incorporating themselves into the core economies.

2.2 FDI and Geographical Reconfiguration of Trade Intensity

FDI-led Growth of CEEC10

Another radical change during the transition process is introduction of foreign direct investment (FDI). The economic recovery process is FDI-led as well as export-oriented. FDI does not only contribute to industrial reorganization and improvement of corporate governance through transferring excellent technology and management know-how, but also paves the road to overcome disadvantages by providing access to international markets through distribution channels of multinational corporations. Thus, FDI has established the most important routes for re-integration of CEEC10 into the world economy [*Frencikova 2003; Kaminski 2000: 28*].

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2 Only Slovenia showed the higher import ratio from EU before transition, keeping it at the level of more than 60 percent.

3 The largest import origin of Bulgaria and Lithuania is Russia with the share respectively 20.0 and 25.3 percent for historical and geopolitical reasons, while that of Estonia is Finland with 18.1 percent, that of Romania is Italy with 19.9. Nevertheless, the second largest origin for the four economies is Germany, with the share respectively 15.3, 17.2, 11.0, and 15.2 percent.

Table 1: Trend of Inward FDI Flows into CEEC10 (million dollars)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech	654	869	2,526	1,428	1,300	3,718	6,324	4,986	5,641	9,305
share	12.2%	16.8%	20.4%	14.5%	11.1%	21.2%	33.1%	23.4%	29.4%	40.4%
Slovakia	179	273	258	358	220	684	390	1,925	1,579	4,012
share	3.3%	5.3%	2.1%	3.6%	1.9%	3.9%	2.0%	9.0%	8.2%	17.4%
Hungary	2,339	1,147	4,815	2,364	2,230	2,084	2,013	1,697	2,599	858
share	43.5%	22.1%	38.9%	23.9%	19.0%	11.9%	10.5%	8.0%	13.6%	3.7%
Poland	1,715	1,875	3,659	4,498	4,908	6,365	7,270	9,341	5,713	4,000
share	31.9%	36.1%	29.6%	45.5%	41.8%	36.4%	38.1%	43.9%	29.8%	17.4%
Slovenia	113	117	151	174	334	216	107	136	503	1,865
share	2.1%	2.3%	1.2%	1.8%	2.8%	1.2%	0.6%	0.6%	2.6%	8.1%
Bulgaria	40	105	90	109	505	537	819	1,002	813	479
share	0.7%	2.0%	0.7%	1.1%	4.3%	3.1%	4.3%	4.7%	4.2%	2.1%
Romania	94	341	419	263	1,215	2,031	1,041	1,037	1,157	1,106
share	1.8%	6.6%	3.4%	2.7%	10.3%	11.6%	5.4%	4.9%	6.0%	4.8%
Estonia	162	215	202	151	167	581	305	387	542	285
share	3.0%	4.1%	1.6%	1.5%	1.4%	3.3%	1.6%	1.8%	2.8%	1.2%
Latvia	45	214	180	382	521	357	347	410	164	396
share	0.8%	4.1%	1.5%	3.9%	4.4%	2.0%	1.8%	1.9%	0.9%	1.7%
Lithuania	30	31	73	152	354	926	486	379	446	732
share	0.6%	0.6%	0.6%	1.5%	3.0%	5.3%	2.5%	1.8%	2.3%	3.2%
CEEC10	5,372	5,188	12,374	9,880	11,755	17,500	19,103	21,301	19,158	23,039
share	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: UNCTAD, FDI Statistic Database.

FDI inflows into CEEC10 more than doubled from 5.4 billion in 1993 to 12.4 billion dollars in1995, steadily increasing up to 23 billion dollars in 2002. And FDI stocks reached 118.3 billion dollars in 2001. By countries, at least, two 'tiers' can be roughly identified; Visegrad countries (Czech, Hungary, Poland and Slovakia) and others [*Pellegrin 2000b*]. The first four countries absorbed 91 percent of total FDI inflows into CEEC10 in 1993, and though decreasing the ratio since then, they accounted for 78.9 percent even in 2001. There are two phases for investment into Visegrad; the first is in the early 1990s, when more than 60 percent of FDI went into Hungary and Poland, and the second is in the late 1990s, when the shares of the two countries decreased, while those of Czech and Slovakia rapidly increased, reaching about 60 percent in 2002. In regard to other CEECs, their shares in general are at lower levels, though Romania in 1997 and 1998 and Slovenia in 2002 enjoyed exceptionally high shares[4] (see Table 1). In terms of FDI stock per capita, there is a stratification; Czech (3,768 dollars), Hungary (3,047 dollars) and Estonia (3,116 dollars) consist of the first tier, followed by Slovenia (2,504 dollars), Poland (1,178 dollars), Lithuania (1,150 dollars) and Latvia (1,170 dollars) the second, and Bulgaria (583 dollars) and Romania (387 dollars) the final (the figure

[4] Poland accounted for 34.7 percent of total FDI stocks in CEEC10 in 2001, followed by Czech with 22.9 percent, Hungary with 18.8 percent, Slovakia with 4.0 percent, Slovenia and Estonia with 2.7 percent, Lithuania with 2.3 percent, Latvia with 2.0 percent, Bulgaria with 3.4 percent, and Romania with 6.6 percent.

inside each parentheses is that of 2002) [*Hunya and Stankovsky 2003: 22*]. The order is, to some extent (apart from Poland and Slovenia), compatible with the above-mentioned sequence of recovery from the transition depression and the order of per capita income of CEEC10 as well.

Geographical Configuration of FDI Relation

Also in regard to FDI, the largest and dominant partner for CEEC10 is EU-15. According to data of WIIW (2003), the share of EU-15 for total FDI stocks of CEEC10 reached 75.1 percent as of the end of 2001; by countries, EU-15 accounted for more than 80 percent of total FDI stocks in Czech, Poland, Slovakia, Slovenia and Estonia and, to a lesser extent, 76.1 percent in Hungary, while even in the relatively small host economies, Latvia, Lithuania, Romania and Bulgaria, the shares range from 50 to 60 percent (see Table 2).

Table 2: Inward FDI Stock in CEECs by Main Investor Countries (2001, million dollars, percent)

Czech			**Hungary**			**Poland**		
Total	**27,092.2**	**100.0**	**Total**	**22,202.6**	**100.0**	**Total**	**41,031.2**	**100.0**
EU15	**22,903.2**	**84.5**	**EU15**	**16,901.8**	**76.1**	**EU15**	**33,579.5**	**81.8**
Netherlands	7,914.0	29.2	Germany	7,542.9	34.0	Netherlands	9,952.3	24.3
Germany	6,544.8	24.2	Netherlands	3,384.6	15.2	Germany	7,700.7	18.8
Austria	2,707.7	10.0	Austria	2,471.4	11.1	France	6,340.1	15.5

	Slovakia		**Slovenia**		
Total	**4,777.3**	**100.0**	**Total**	**3,209.0**	**100.0**
EU15	**3,874.2**	**81.1**	**EU15**	**2,747.9**	**85.6**
Germany	1,081.7	22.6	Austria	1,526.8	47.6
Netherlands	1,007.1	21.1	France	385.9	12.0
Austria	835.0	17.5	Germany	353.9	11.0

Estonia			**Latvia**			**Lithuania**		
Total	**3,160.6**	**100.0**	**Total**	**2,331.5**	**100.0**	**Total**	**2,665.5**	**100.0**
EU15	**2,531.8**	**80.1**	**EU15**	**1,189.7**	**51.0**	**EU15**	**1,709.4**	**64.1**
Sweden	1,246.0	39.4	Germany	267.6	11.5	Denmark	495.7	18.6
Finland	815.1	25.8	Sweden	215.7	9.3	Sweden	430.2	16.1
US	312.3	9.9	Denmark	252.5	10.8	Estonia	267.9	10.0

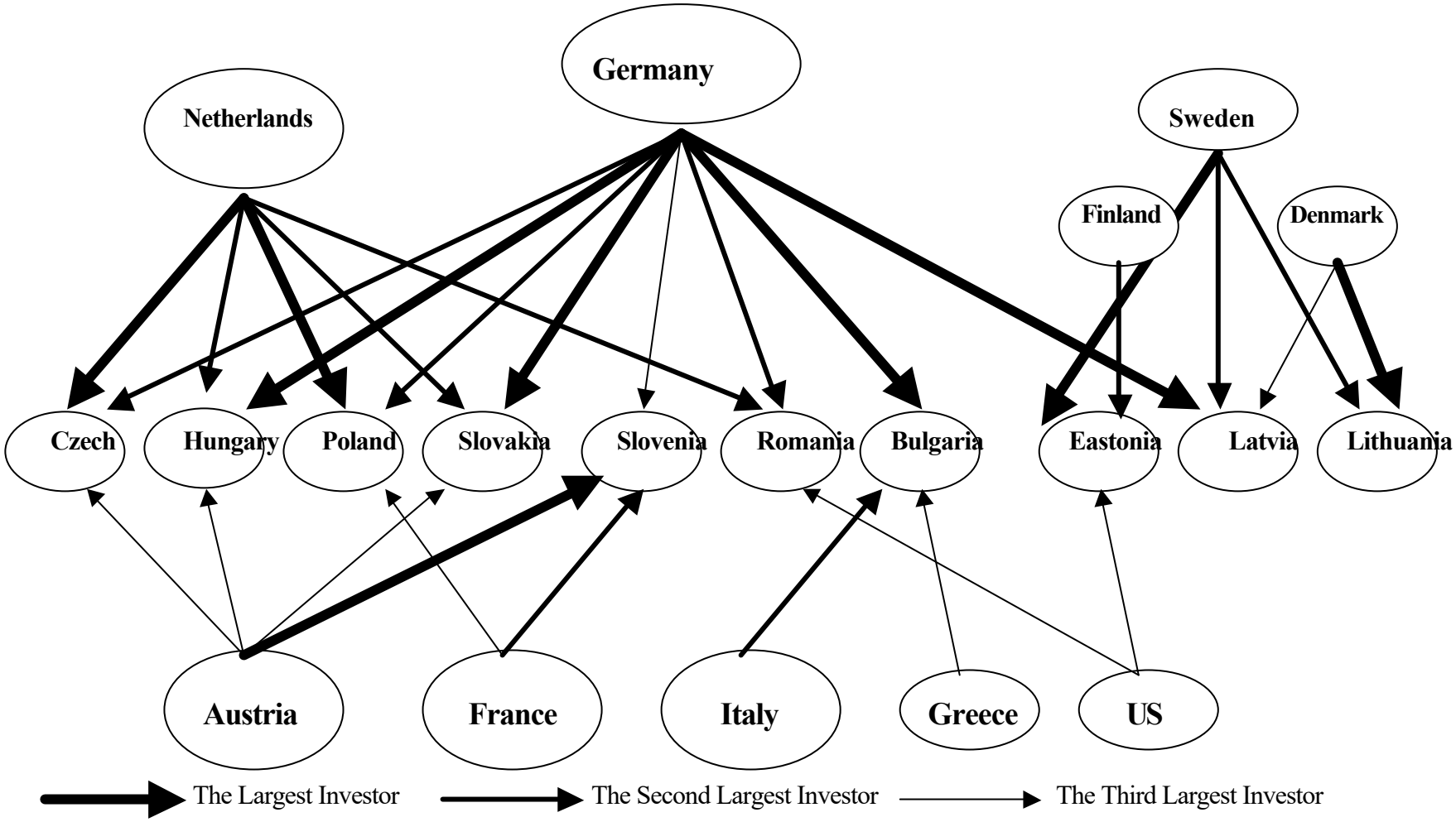
Bulgaria			**Romania**		
Total	**3,974.9**	**100.0**	**Total**	**7,842.0**	**100.0**
EU15	**2,364.5**	**59.5**	**EU15**	**4,561.5**	**58.2**
Germany	523.2	13.2	Netherlands	1,122.2	14.3
Italy	521.7	13.1	Germany	752.0	9.6
Greece	434.4	10.9	USA	624.2	8.0

Note: Hungary, Slovakia, Bulgaria, and Romania; equity capital and reinvested earnings, Czech, Poland, Slovenia, Estonia, Latvia and Lithuania; equity capital, reinvested earnings, and loans.

Source: WIIW (2003).

The FDI relationship between EU-15 and CEEC10 has country-specific or geographical aspects. The individual CEEC has its own core economy or economies within EU-15, reflecting their historical or geographical and geopolitical background to a different degree. To illustrate schematically, the top three investor countries are pictured in Figure 1. The figure suggests that Germany shows its dominant presence in all of CEEC10 other than Estonia and Lithuania, and Netherlands does so in Visegrad and Romania, while there is some country-specificity for other main investors from EU-15; Austria is the largest investor for its neighboring Slovenia (though it has strong ties with Visegrad countries), Italy and Greece are the cores for Bulgaria, and France is the second and third largest investor for Slovenia and Poland. More outstanding is the relation between the Scandinavian countries and the Baltic; Sweden is the largest investor for all of three, Finland established close linkages to Estonia, and Denmark to Lithuania.

Figure 1: Top Three Investor Countries of Each Central/Eastern European Countries



Source: Author's own construction based on data from WIIW (2003).

The geographical configuration of FDI has created specific trade relationship. To demonstrate it, let us use trade intensity index. Trade intensity between *i* country and *j* country can be measured both in terms of export and import and each index is defined by the following formulation (see, expression (I) and (II)):

$$\text{(I)}\quad TIX_{ij} = \frac{\frac{X_{ij}}{X_i}}{\frac{M_j}{M_w - M_i}}, \qquad \text{(II)}\quad TIM_{ij} = \frac{\frac{X_{ji}}{M_i}}{\frac{X_j}{X_w - X_i}}$$

TIX_{ij}: Trade Intensity in terms of export between *i* country and *j* country

TIM_{ij}: Trade Intensity in terms of import between *i* country and *j* country

Xij: export from *i* country to j country, *Xji*: export from *j* country to *i* country

X_i: total exports of *i* country, M_i: total imports of *i* country

X_w: world total exports, M_w: world total imports

The denominators of formulation (I) and (II) respectively show the import capacity and the export capacity of *j* country in the world market (namely average import and export capacity of *j* country), while the numerators do the share of *j* country for total exports and imports of *i* country. Therefore, both trade intensity indexes, when they are more than 1, mean that the bilateral trade relation in question is closer than average. Table 3-1 and Table 3-2 present TIX_{ij} and TIM_{ij} of each CEEC10 and CEEC10 as a whole in 1996 and 2001. From the tables, we can find that both in terms of export and import, trade intensities between CEEC10 and EU-15 are strengthened. More specifically, Germany shows quite high values against almost all countries except for Estonia, Bulgaria and Lithuania, while trades of Austria with Slovenia and Visegrad countries, of Italy and Greece with Bulgaria and Romania, and of France with Slovenia are highly intensified. Also here, most prominent is the relation between three Scandinavian countries and the Baltic[5] (see Table 3-1 and Table 3-2). These results are compatible with the linkages of FDI. These strong correlations between FDI and trade intensity imply that CEEC10 participate into the EU-based economic sphere through the individual link-up with the core economies within EU-15. On the other hand, trade intensities among CEEC10 remain at higher levels (see again Table 3-1 and Table 3-2). Among them, outstanding are the three Baltic countries which have historically created an economic zone and Czech and Slovakia which were a single country. Bulgaria and Romania, commonly adopting gradualism approach, deepen their interdependence. Particularly in imports, to a lesser extent, Bulgaria increases its intensities with Slovenia, Latvia with Czech, Poland and Slovakia, and Romania with Poland, Slovakia and Slovenia. These facts suggest that relatively developed economies and relatively backward ones deepen their mutual trade linkages.

[5] In the case of Netherlands, correlations between trade intensity and FDI are not as clear as other core economies, but even so its trade intensity indexes are more than 1 with the countries except for Bulgaria, Estonia and Slovenia.

Table 3-1: Trade Intensity Indexes in Terms of Export (as of the year of 1996 and 2001)

	EU15		Au.		B&L		Dem		Fin		Fr		Ger		Gre		Ir		It		Nl		Por		Sp		Sw		UK	
Year	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01
Bul.	1.0	1.5	0.8	1.5	0.5	1.6	0.5	0.7	0.3	0.3	0.5	1.2	1.0	1.2	7.4	17.5	0.0	0.2	2.5	3.9	0.5	0.6	0.1	0.6	1.0	1.3	0.3	0.5	0.5	0.5
Cz	1.5	1.9	5.0	5.3	0.6	1.0	0.7	0.8	0.7	0.8	0.5	0.9	4.1	4.8	0.4	0.4	0.3	0.8	0.8	1.0	0.7	1.0	0.2	0.6	0.3	0.7	0.6	0.9	0.5	1.0
Est	1.4	1.7	0.2	0.5	0.4	0.3	4.3	4.0	31.0	52.2	0.2	0.2	0.8	0.8	0.2	0.3	0.4	0.4	0.2	0.2	1.0	1.0	0.3	0.2	0.0	0.1	9.4	11.4	0.6	0.6
Hu	1.7	2.1	8.0	7.3	0.7	1.1	0.5	0.7	0.7	1.2	0.7	1.2	3.4	4.5	0.8	0.4	0.1	1.3	2.0	1.6	0.9	1.7	0.1	1.0	0.5	0.8	0.9	0.9	0.6	0.8
Lat	1.2	1.7	0.3	0.6	0.3	0.4	4.4	7.9	4.0	4.2	0.2	0.4	1.6	2.1	0.4	0.7	0.5	1.4	0.3	0.5	0.6	1.4	0.0	0.1	0.5	0.3	5.3	9.2	2.0	2.8
Lith	0.9	1.3	0.4	0.2	0.3	0.5	3.1	6.1	1.6	2.6	0.3	0.7	1.5	1.6	0.1	0.2	1.8	0.2	0.7	0.5	1.1	1.1	0.9	0.2	0.4	0.5	1.4	3.5	0.5	2.4
Po	1.7	1.9	1.5	1.9	0.8	1.0	3.6	3.5	2.1	1.5	0.8	1.1	3.9	4.3	0.5	0.8	0.4	0.3	1.4	1.4	1.5	1.7	0.2	1.1	0.4	0.6	1.9	2.6	0.7	0.9
Ro	1.5	1.9	1.6	2.8	0.5	0.5	0.2	0.3	0.1	0.1	1.1	1.7	2.1	2.0	4.2	6.2	0.1	0.7	4.3	6.5	1.4	1.3	0.2	0.3	0.5	0.6	0.4	0.5	0.6	0.9
Sl	1.1	1.7	5.1	7.5	0.4	0.9	0.4	0.6	0.5	0.7	0.4	0.8	2.5	3.4	0.2	0.4	0.1	0.1	1.3	2.3	0.7	1.0	0.1	0.3	0.2	0.5	0.3	0.8	0.2	0.4
Slo	1.7	1.7	5.1	6.9	0.3	0.4	0.7	1.3	0.4	0.5	1.4	1.4	3.5	3.3	0.3	0.7	0.1	0.2	3.3	3.2	0.5	0.6	0.2	0.2	0.2	0.4	0.5	0.8	0.4	0.5
CEEC	1.5	1.8	3.6	4.4	0.6	0.9	1.5	1.7	1.7	2.4	0.7	1.1	3.2	3.7	1.7	1.8	0.3	0.6	1.7	1.9	1.0	1.3	0.2	0.7	0.4	0.6	1.2	1.7	0.5	0.8

	CEEC		Bul.		Cz		Est		Hu		Lat		Lith		Po		Ro		Sl		Slo	
Year	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01
Bul.	1.6	1.7			0.9	0.7	1.2	0.8	1.6	1.2	2.9	2.0	3.0	1.4	0.9	0.8	7.0	9.9	1.3	0.7	0.5	2.3
Cz	9.8	5.8	3.1	2.5			1.2	1.0	5.8	3.4	2.4	2.9	4.5	3.6	7.7	6.3	1.5	2.7	78.6	33.0	5.7	4.0
Est	6.4	4.2	1.1	0.1	0.2	0.4			0.2	1.4	185.3	129.7	65.4	34.4	1.6	0.8	0.0	0.0	0.1	0.1	0.1	0.1
Hu	4.7	3.1	2.5	2.9	3.9	3.0	2.3	1.2			4.1	1.8	5.4	1.8	4.1	2.4	9.6	9.8	9.5	5.6	8.6	6.1
Lat	5.6	5.8	0.7	0.1	0.9	1.3	59.2	67.0	0.7	0.3			85.1	78.0	1.9	2.3	0.0	0.0	1.3	2.0	0.3	0.5
Lith	6.7	7.7	2.4	0.6	0.8	0.8	40.5	37.9	1.4	0.6	207.0	220.1			4.5	7.6	0.3	0.1	0.2	0.5	0.1	0.1
Po	3.2	3.9	1.8	2.1	6.3	6.6	3.4	3.3	4.0	3.8	6.6	11.0	9.9	20.0			1.3	2.4	6.0	5.9	0.9	2.1
Ro	1.9	2.4	9.0	14.9	0.4	0.5	0.0	0.2	6.9	5.9	0.2	0.3	0.3	0.1	0.9	1.1			2.1	1.2	1.5	3.5
Sl	17.7	10.1	2.3	2.3	58.7	27.8	0.4	0.4	16.0	9.7	2.3	3.0	3.7	1.9	6.7	7.1	1.9	3.8			5.0	5.8
Slo	2.5	2.8	1.1	2.9	3.3	3.0	0.1	0.6	4.1	3.1	1.1	1.8	1.6	2.6	2.4	3.2	1.2	2.5	3.8	3.7		
CEEC	5.9	4.5	2.6	3.1	7.1	4.8	3.9	3.4	4.6	3.2	14.4	14.0	7.5	8.2	3.4	3.0	2.5	3.9	21.2	10.1	3.2	3.4

Note: Bul =Bulgaria, Cz= Czech, Est = Estonia, Hu = Hungary, Lat =Latvia, Lith = Lithuania, Po =Poland, Ro =Romania, Sl= Slovakia, Slo= Slovenia; Au= Austria, B&L =Belgium & Luxemburg, Dem= Denmark, Fin = Finland, Fr =France, Ger =Germany, Gre =Greece, Ir =Irland, It =Italy, Nl =Netherlands, Por =Portugal, Sp =Spain, and Sw =Sweden.

Source: Author's own Calculations based on UN Comtrade Database

Table 3-2: Trade Intensity Indexes in Terms of Import (as of the year of 1996 and 2001)

	EU15		**Au.**		**B&L**		**Dem**		**Fin**		**Fr**		**Ger**		**Gre**		**Ir**		**It**		**Nl**		**Por**		**Sp**		**Sw**		**UK**	
Year	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01
Bul.	1.0	1.4	2.2	2.6	0.4	0.6	0.6	0.8	0.8	0.7	0.6	1.1	1.3	1.3	26.6	44.3	0.2	0.2	1.5	2.2	0.5	0.7	0.4	0.6	0.3	0.7	0.6	0.5	0.5	0.5
Cz	1.6	1.9	5.2	4.5	0.7	0.8	0.7	0.6	1.1	0.8	0.8	1.0	3.2	3.6	0.7	0.9	0.5	0.4	1.3	1.2	0.7	1.0	0.1	0.3	0.7	0.9	0.8	0.9	0.8	0.9
Est	1.6	1.5	0.3	0.8	0.4	0.4	3.0	2.6	43.3	24.7	0.3	0.4	0.9	0.9	0.3	0.5	0.4	0.5	0.5	0.7	0.7	0.7	0.2	0.3	0.2	0.3	5.0	6.6	0.5	0.5
Hu	1.9	1.7	12.5	6.5	0.9	0.8	0.6	0.5	1.4	1.1	0.8	1.0	3.3	2.8	1.5	1.0	0.6	0.3	1.9	1.9	0.8	0.8	0.8	0.6	0.8	0.8	1.1	0.7	0.7	0.5
Lat	1.4	1.8	0.7	1.5	0.8	0.8	3.9	4.2	12.6	10.3	0.4	0.7	1.7	2.1	0.9	0.9	0.7	0.3	0.7	1.3	1.3	1.4	0.1	0.3	0.3	0.7	5.5	5.0	0.8	0.7
Lith	1.0	1.4	0.6	0.8	0.5	0.7	3.7	4.2	4.2	4.3	0.4	0.7	1.5	1.8	0.5	0.7	0.4	0.2	0.7	1.3	0.7	0.9	0.2	0.4	0.5	1.1	2.0	2.3	0.5	0.6
Po	1.7	1.8	1.9	2.0	0.9	1.0	2.3	1.9	2.0	2.1	1.0	1.3	2.8	2.7	0.9	1.3	0.5	0.4	1.9	1.8	1.0	1.4	0.2	0.5	0.9	1.0	1.8	1.9	1.1	0.8
Ro	1.2	1.7	2.3	3.3	0.5	0.6	0.4	0.3	0.3	0.3	0.9	1.2	1.6	1.8	6.6	13.0	0.2	0.2	3.0	4.6	0.4	0.8	0.4	0.3	0.5	0.5	0.4	0.6	0.5	0.6
Sl	1.3	1.4	6.7	4.9	0.4	0.5	0.5	0.4	0.9	0.6	0.7	0.7	2.5	2.4	0.8	0.7	0.2	0.2	1.5	1.3	0.6	0.6	0.4	0.2	0.6	1.0	0.4	0.5	0.3	0.4
Slo	1.8	2.1	8.6	10.0	0.6	0.6	0.4	0.5	0.5	0.4	1.7	2.0	2.1	2.1	0.6	1.7	0.2	0.2	4.2	4.8	0.6	1.0	0.1	0.2	0.9	1.4	0.6	0.8	0.4	0.5
CEEC	1.5	1.7	4.7	3.9	0.7	0.8	1.3	1.1	2.6	2.1	0.9	1.1	2.6	2.6	2.4	3.7	0.4	0.3	1.9	2.0	0.7	1.0	0.3	0.4	0.7	0.9	1.3	1.3	0.7	0.6

	CEEC		**Bul.**		**Cz**		**Est**		**Hu**		**Lat**		**Lith**		**Po**		**Ro**		**Sl**		**Slo**	
Year	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01	96	01
Bul.	2.7	3.1			3.1	2.4	1.1	0.1	2.4	2.8	0.7	0.1	2.3	0.5	1.8	2.0	8.9	14.4	2.3	2.2	1.1	2.8
Cz	7.1	4.7	0.9	0.7			0.2	0.4	3.8	2.9	0.9	1.2	0.8	0.7	6.3	6.4	0.4	0.5	57.7	26.7	3.3	2.9
Est	3.9	3.3	1.2	0.8	1.1	1.0			2.3	1.1	58.3	64.6	40.0	36.6	3.4	3.3	0.0	0.2	1.2	0.4	0.2	0.6
Hu	4.7	3.1	1.6	1.1	5.7	3.3	0.2	1.3			0.7	0.3	1.4	0.6	3.9	3.6	6.8	5.7	15.7	9.4	4.1	2.9
Lat	14.5	13.9	2.8	1.9	2.4	2.8	182.8	125.2	4.0	1.7			204.3	212.5	6.6	10.7	0.2	0.3	2.2	2.9	1.1	1.7
Lith	7.6	8.1	2.9	1.4	4.4	3.5	64.5	33.2	5.3	1.8	83.9	75.2			9.8	19.5	0.2	0.1	3.7	1.9	1.5	2.5
Po	3.4	3.0	0.9	0.8	7.6	6.0	1.6	0.8	4.0	2.3	1.9	2.2	4.4	7.3			0.9	1.0	6.6	6.8	2.4	3.1
Ro	2.6	3.9	6.9	9.5	1.5	2.6	0.0	0.0	9.5	9.5	0.0	0.0	0.3	0.1	1.3	2.4			1.9	3.7	1.2	2.4
Sl	21.4	10.0	1.3	0.7	77.8	32.0	0.1	0.1	9.4	5.4	1.3	1.9	0.2	0.5	6.0	5.7	2.0	1.1			3.8	3.6
Slo	3.2	3.4	0.5	2.3	5.7	3.8	0.1	0.1	8.5	5.9	0.3	0.5	0.1	0.1	0.9	2.1	1.5	3.3	4.9	5.6		
CEEC	5.9	4.3	1.6	1.6	9.5	5.5	6.2	4.0	4.6	3.0	5.4	5.4	6.4	7.3	3.1	3.7	1.8	2.2	17.2	9.6	2.4	2.6

Source: Author's own Calculations based on UN Comtrade Database.

2.3 Upgrading of Export Structure

Re-Industrialization and Increasing Manufacturing Exports

Most CEECs had completed a degree of import-substitution before their transition, taking over production bases created in the era of central planning economy. As of the year 1990, manufacturing sector accounted for about 40 percent of GDP in Bulgaria and Poland, nearly 35 percent in Romania, Slovakia and Latvia, 30 percent in Slovenia and Czech, and 20 percent in Hungary. Those industrial bases worked as the deficits rather than advantages due to their structural distortions and inefficiency at the initial stage of transition, contributing to the transition depression. Though Czech, Estonia and Hungary keep the production levels, manufacturing sector of other CEECs experienced sharp decline; the share of manufacturing decreased down to 20 to 25 percent in Romania, Slovakia, and Slovenia and less than 15 percent in Latvia in 2001. In this sense, recent export-oriented industrialization of CEEC10 might be restated as '*re-industrialization*', where in collaboration with foreign firms, they revitalize the previous industrial base through privatization or create new one through green-field investments [*Kurz and Wittke 1998; WIIW 2003: 9*].

Reflecting the process, the expansion of trades between EU-15 and CEEC10 has been driven largely by manufacturing. Prior to the collapse of their central planning economies, they were, by and large, only suppliers of material to the western countries. However, the shares of unprocessed goods such as agricultural materials, ores, non-metallic minerals drastically decreased through the 1990s. According to Kaminski (2000), the percentages of food, beverage and industrial materials for total CEEC10 exports to EU changed from 47 percent in 1989 to 16 percent in 1998. Instead, manufacturing exports to EU-15 increased by about 160 percent during the period of 1995 and 2001, accounting for 94 percent of total EU-15 destined exports on average. By countries, manufacturing products (classified in SITC 5 to 8) account for more than 80 to 90 percent of total exports in Visegrad countries, Slovenia and Romania and nearly 60 percent to 70 percent in Bulgaria and the Baltic countries in the early 2000s. The shift of export markets from the CMEA to EU drove the export expansion at the initial stage, while industrial restructuring and improving corporate governance through FDI enable CEECs to sustain their penetration into the competitive EU-15 markets with much demand [*Kaminski 2000: 20-23; WIIW 2003: 38, 44*].

Specialization in terms of RCA

In next place, by using RCA (revealed comparative advantage) index as defined by the following formulation (see, Expression (III)), let us confirm comparative advantage structures of CEEC10 by representative manufacturing sectors; apparel (SITC-84), textile (SITC-24 and 65), office machines (SITC- 75), telecom equipment (SITC-76), electrical machinery (SITC-77) and road vehicles (SITC-78). RCA index of a certain product, when it is more than 1, shows that the sector has a comparative advantage in the country. Through the RCA analysis, we could find the following points about geographical location within CEEC10 (see, Figure 2).

$$\text{(III)}\quad RCA_i^A = \frac{\frac{X_i^A}{X_t^A}}{\frac{X_i^{World}}{X_t^{World}}}$$

RCA_i^A; revealed comparative advantage index of good i in a country A

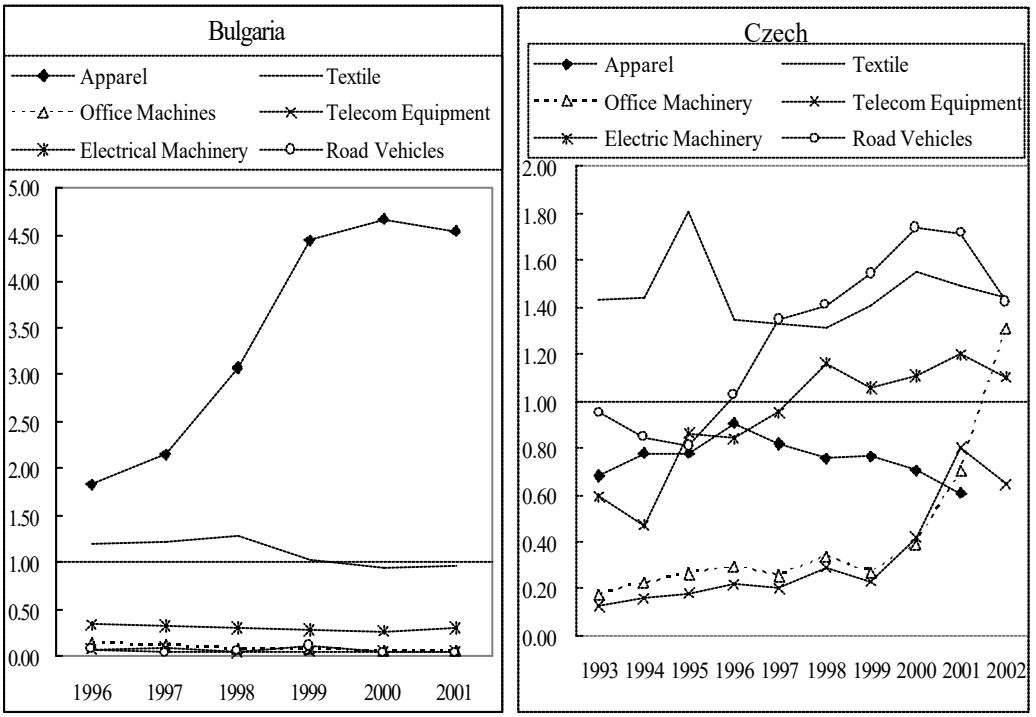
X_i^A; export of good i from a country A, X_t^A; total exports of a country A

The main results by sectors are:

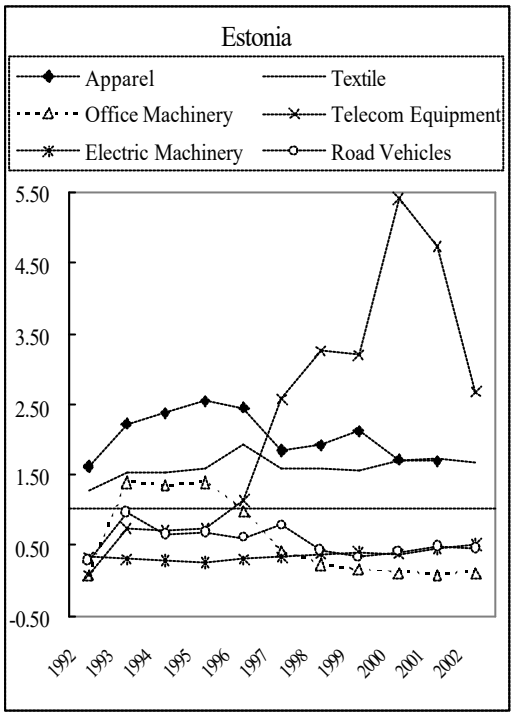
(1) **In apparelsector**, though all of CEEC10 except for Czech show higher RCA indexes, Poland, Hungary and Estonia decline their advantage, while Bulgaria, Lithuania and especially Romania sharply increase competitiveness.
(2) **In textile sector**, the two countries with quite high RCA, Estonia and Lithuania rapidly decreased advantages since the end of 1990s, while Czech and Poland gradually raise their RCA.
(3) **In office machines**, overall competitiveness remains at a lower level but RCA of Hungary is prominently high. However, while the country sharply decline comparative advantage since 2000, Czech increase it.
(4) **In telecom equipment**, Estonia and Hungary alone have much comparative advantage, though the former drastically decreases it since 2000.
(5) **In electrical machinery**, all of CEECs except for Bulgaria and Lithuania steadily improve their RCAs and among them Czech, Hungary and Slovenia have higher advantages.
(6) **In road vehicles**, Czech, Slovakia and Slovenia persistently have higher RCAs, while Hungary and Poland are steadily catching up with them since the mid 1990s.

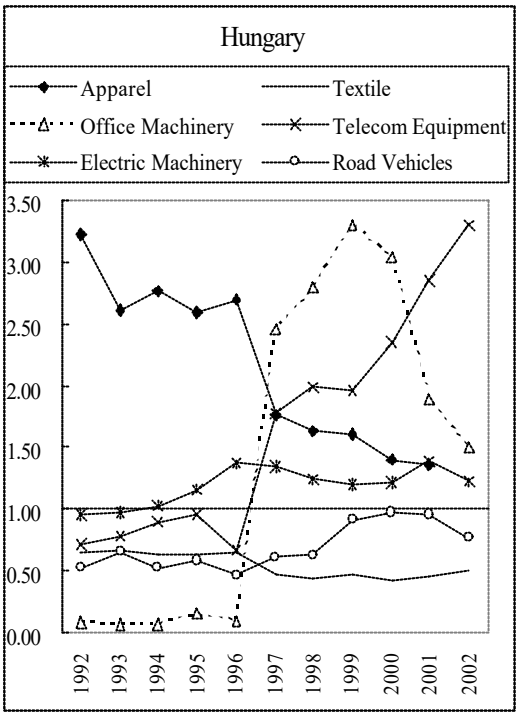
In addition, there are two kinds of export development patterns; Visegrad countries and Slovenia have developed a specific high-tech sector or sectors without loss of their competitiveness in almost all sectors but apparel, whereas others keep their competitiveness of the labor-intensive apparel sector (though in case of Estonia, it increases that of telecom equipment as well), stagnating or decreasing overall competitiveness. These facts mean that there is a more specialized structure emerging within CEEC10; in the more advanced countries, Czech, Estonia, Hungary, Slovakia and Slovenia, it is evolving towards more sophisticated and technology-driven industries. Conversely, labor-intensive industries account for the major part of export in Latvia and Lithuania, Bulgaria and Romania.

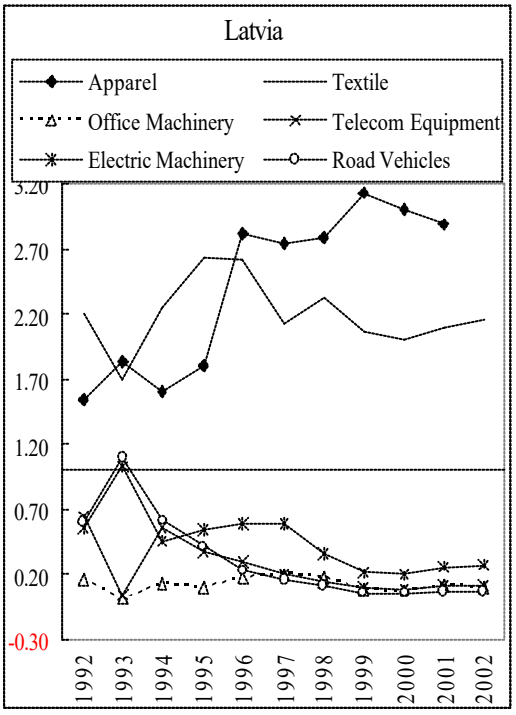
Figure 2: RCA Indexes of Selected Sectors in CEEC10

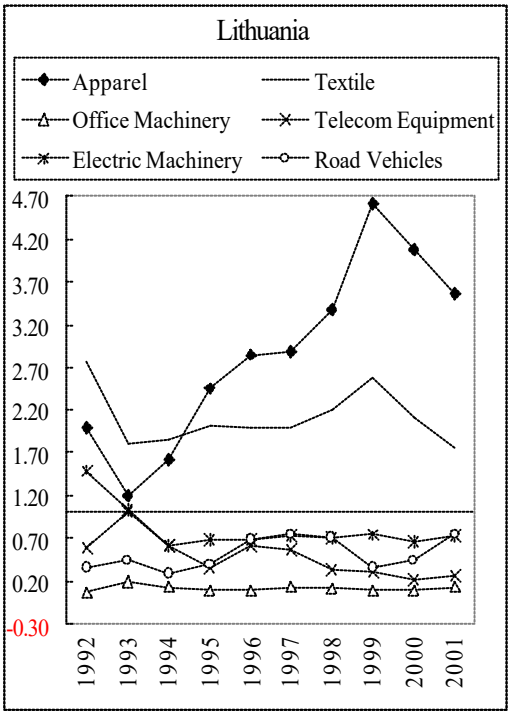


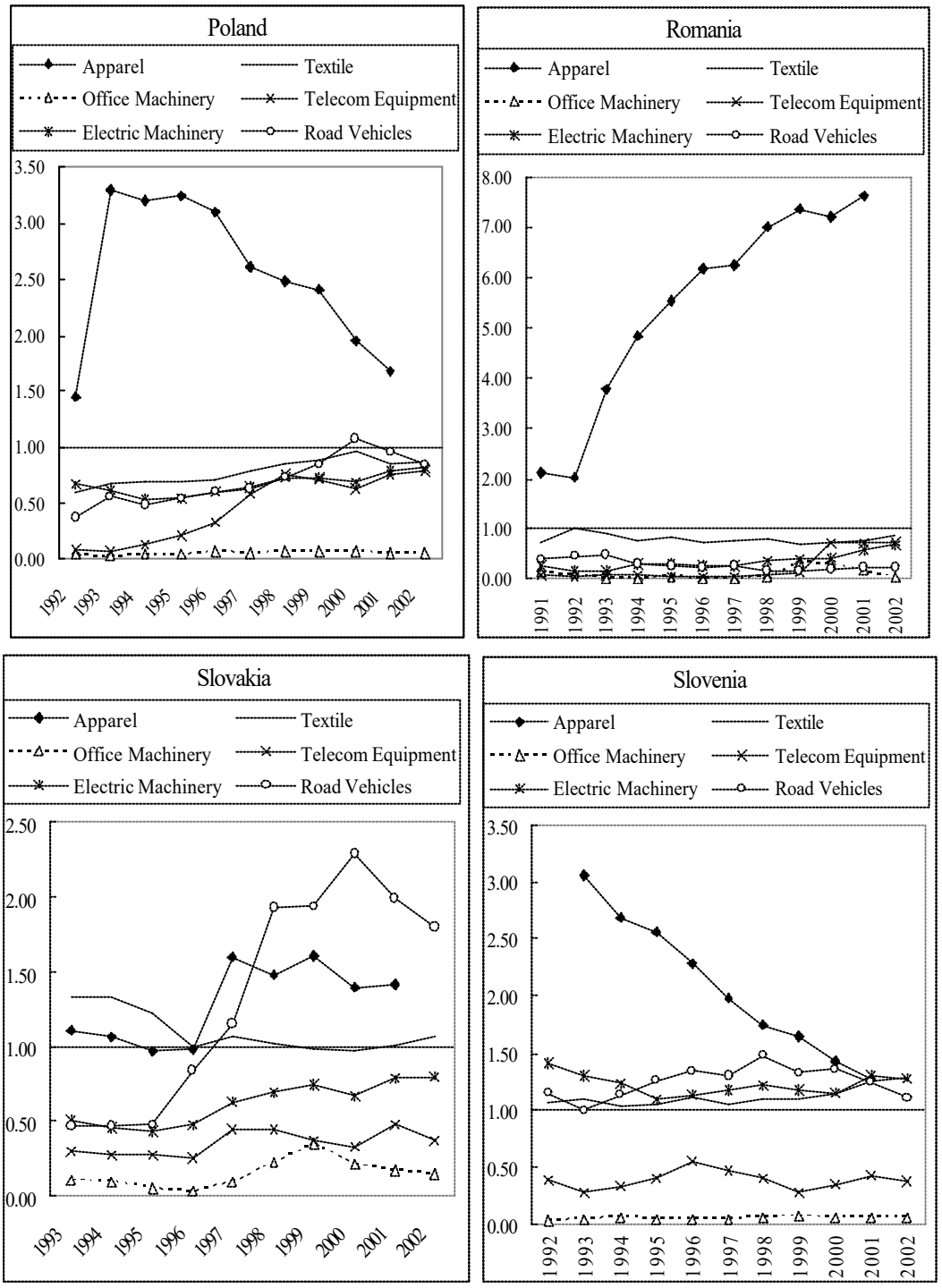
Continuation of Figure 2 on page 13 and 14.


Estonia
Apparel
Textile
Office Machinery
Telecom Equipment
Electric Machinery
Road Vehicles
5.50
4.50
3.50
2.50
1.50
0.50
-0.50
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002


Hungary
Apparel
Textile
Office Machinery
Telecom Equipment
Electric Machinery
Road Vehicles
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002


Latvia
Apparel
Textile
Office Machinery
Telecom Equipment
Electric Machinery
Road Vehicles
3.20
2.70
2.20
1.70
1.20
0.70
0.20
-0.30
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002


Lithuania
Apparel
Textile
Office Machinery
Telecom Equipment
Electric Machinery
Road Vehicles
4.70
4.20
3.70
3.20
2.70
2.20
1.70
1.20
0.70
0.20
-0.30
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001



Source: Author's Calculation based on data from UNCTAD, Handbook of Statistics.

Though data of Bulgaria and Romania are not available, the export specialization pattern is considerably compatible with the distribution of FDI stocks by manufacturing sectors (see Table 4). More than 50 percent of FDI stocks in the Baltic countries concentrate on the low-tech sectors, especially on textile and textile products. In Slovenia and Visegrad countries except for Slovakia, the high-tech sectors account for more than 30 percent of total, while transport

equipment and electrical and optical equipment in Czech, Hungary and Poland show the highest shares.

Table 4: FDI Stock in CEECs by Manufacturing Sectors (as of the year 2001, percent)

	Cz.	Hu.	Po.	Sl.	Slo.	Est.	Lat.	Lith.
Food Products; Beverages & Tobacco	12.6	24.2	25.2	13.9	5.2	22.5	28.7	40.1
Textiles & Textile Products	3.5	3.8	1.1	1.2	2.6	13.8	12.3	16.2
Leather & Leather Products	0.0	0.6	0.1	0.8	-	-	0.5	0.0
Wood & Wood Products	1.3	1.1	5.9	1.0	0.4	16.4	16.1	4.9
Pulp, Paper & Paper Products, Publishing & Printing	6.8	4.2	7.2	5.5	16.9	-	4.9	3.8
Coke, Refined Petroleum Products & Nuclear Fuel	2.8	8.2	-	7.5	-	1.0	0.0	6.4
Chemicals, Chemical Products & Man-made Fibers	8.2	5.5	6.0	6.9	16.4	8.7	9.5	-
Rubber & Plastic Products	6.2	4.7	2.8	1.7	10.9	1.1	3.2	4.0
Other Non-metallic Mineral Products	15.4	6.2	14.0	5.0	6.6	-	6.3	5.6
Basic Metals & Fabricated Metal Products	9.5	6.1	2.0	41.2	8.2	3.9	7.9	1.7
Machinery & Equipment n.e.c.	4.5	5.3	1.2	4.1	12.3	3.3	6.3	1.1
Electrical & Optical Equipment	10.6	19.5	7.7	4.8	10.3	2.9	1.8	7.9
Transport Equipment	17.1	9.6	24.7	5.7	9.7	6.9	0.4	7.2
Manufacturing n.e.c	1.7	1.0	2.2	0.7	0.4	-	2.3	1.2
Other Non-classified Industries	-	-	-	-	-	19.5	-	-
Manufacturing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cumulative Manufacturing FDI (million Euros)	8,897	4,079	24,829	2,328	1,317	613	429	722
Cumulative FDI total (million Euros)	23,323	11,080	60,311	5,313	3,637	2,843	2,521	2,509
Share of Manufacturing (percent)	38.1	36.8	41.2	43.8	36.2	21.6	17.0	28.8

Note: Cz = Czech, Hu =Hungary, Po. = Poland, Sl. =Slovakia, Slo. =Slovenia, Est. =Estonia, Lat. = Latvia, and Lith. =1 Lithuania.

Source: WIIW (2003).

Some previous literature finds similarity of industrial and trade structures of EU-15 and CEEC10, regarding it as one of the important evidences for catching up [*Commission Staff Working Paper 2003a: 8-9; Kaminski 2000: 22; WIIW 2003: 10*]. However, it would be better to see the changes of trade and industrial structure in CEEC10 as a result of their incorporation into reproduction structure of EU-15. The development of external trade and FDI suggests their drastically changing positions within international division of labor, which is organized centering on EU-15. The interdependence could and should be understood in terms of production fragmentation and geographical and spatial spread of value chains carried by EU-based firms. In next section, focusing on three sectors, apparel and textile, electronics, and automobile, we will analyze the complicated production structure. They have achieved the most dynamic growth and development, being the most important sectors connecting CEEC10 to EU15.

3. Evolution of Production Networks

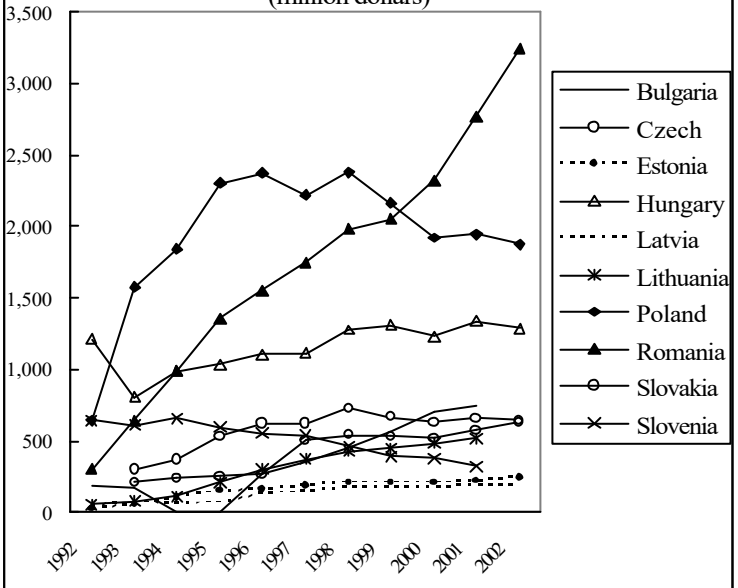
3.1 Apparel and Textile Sector as the Starter

Buyer-driven Networks of EU-based Firms and the Roles of OPT

Creation of Buyer-driven Production Networks

Apparel and textile industry is the most important '*starter*' of late-industrialization and at the same time one of the strongest networking-oriented sectors. The value chains consist of relatively simple and low-technological segments, and therefore it is relatively easy to spread them spatially and geographically. For example, the sector has played the important roles in the East Asian economic development. It has not only persistently driven export growth but also the late-comer firms, especially from NIEs, learned the necessary skills and explicit and implicit knowledge for further industrialization through interactions with and linkages to foreign firms. East Asia is even now the most important player in the world apparel and textile trade. In fact, the region accounts for 41.4 percent of total world apparel exports and 39.4 percent of total world textile exports in 2002. Though the Chinese share is highest with 20.6 percent in apparel and 13.5 percent in textile, NIEs, especially Hong Kong, Korea and Taiwan (so-called 'Asian big three') jointly keep higher shares with 14.9 percent and 21.8 percent [*WTO, International Trade Statistics Database*]. In spite of industrial upgrading, NIEs have still higher competitiveness in apparel and textile sector. It is network-type development that enables such persistent high performance of the East Asian economies in the sector[6].

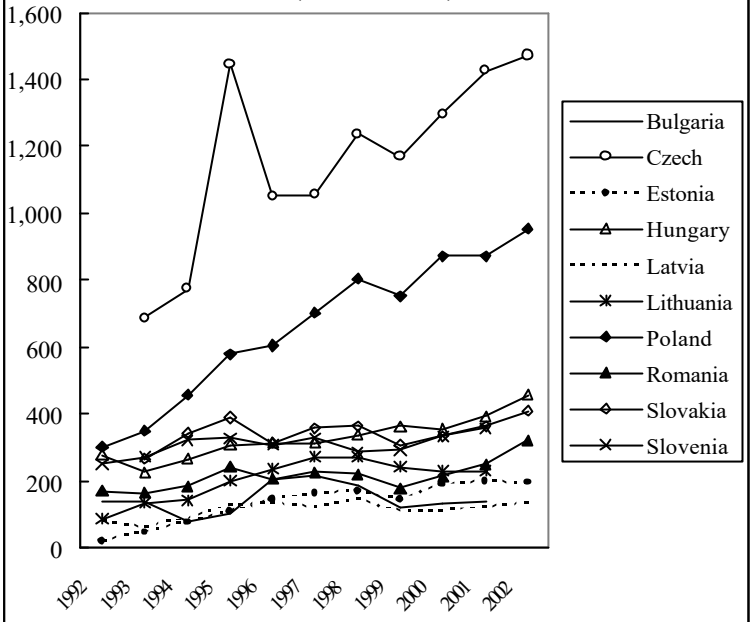
Figure 3-1 Apparel Exports from CEEC10
(million dollars)



Source: UNCTAD, Handbook of Statistics.

6 Gary Gereffi, an advocate of global commodity chain approach, is the most energetic and influential researcher about the apparel commodity chain in East Asia. He published so much literature on this issue but the most well-organized and systematic one is Gereffi (2002).

Figure 3-2 Textile Exports from CEEC10
(million dollars)



Source: UNCTAD, Handbook of Statistics.

Apparel and textile sector is playing the critical role also in export growth and incorporation of CEEC10 into EU-15. As described in the above section, almost all CEECs have higher comparative advantages in the apparel sector. Their apparel and textile exports reached 13.6 billion dollars (or 9.3 percent for total exports) in 2001, 82.1 percent of which were destined to EU-15. Visegrad countries, especially Poland, Hungary and Czech are still the largest exporters (though their comparative advantage structures have considerably changed), with the share 55.3 percent of total apparel and textile exports from CEEC10 even in 2001. More recently, Romania has rapidly caught up with these countries, outpacing Poland, the largest exporter. And the Baltic countries increased its share from 6.6 percent in 1993 to 11 percent in 2001, while Slovenia, the fourth exporter following Visegrad-3, sharply decreased from 13 to 5.2 percent during the same period [*data from UNCTAD, Handbook of Statistics*; see also Figure 3-1 and 3-2]. Needless to say, these changes have also occurred through interactions with EU-15[7].

First of all, apparel and textile networks have been typically organized as '*buyer-driven networks*'. In case of East Asia, the network organizers have been mainly the US large retailers, branded marketers, and branded manufacturers such as Walmart, Sears, Kmart, Liz Claiborne, Gap and Limited, Sala Lee Corporation etc. (to a lesser extent, Japanese general trading companies originating in textile companies). During the past decades, owing to increasing market competition and downgrading of value added at manufacturing stages, they have established and expanded their low-cost sourcing sites across the region, which in turn has driven East Asian hyper export growth in the sector[8].

Apparel and textile networks across EU-15 and CEEC10 have been also developed as buyer-driven production and sourcing networks. In the late 1970s and early 1980s, European

[7] The shares of EU-15 for total apparel and textile exports from the individual CEEC10 are 75.2 percent in Czech, 77.3 in Estonia, 79.0 in Hungary, 74.0 in Latvia, 84.8 in Lithuania, 86.4 in Poland, 71.1 in Slovakia, 74.4 in Slovenia, 91.6 in Romania, and 78.9 in Bulgaria [*Commission of the European Community 2003b: 42*].

[8] Based on buyer-driven production networks organized by the US-based firms, the East Asian countries have kept a larger share in the US apparel imports, with 31.8 percent even in 2002.

retailers increasingly resorted to overseas sourcing to avoid long lead times and high inventory costs and at the same time they began to push apparel and textile manufactures offshore. As a result, by 1988, about 40 percent of clothing companies in Europe were already involved in foreign production, subcontracting or sourcing, with the share of turnover gaining from domestic production decreased from 72 to 60 percent between 1982 and 1992. In the face of growing competitive pressures from low-cost countries, delocalization of labor-intensive phases has allowed European retailers to obtain substantial cost reductions and remain competitive in world markets, keeping in the EU high-skill segments of value chains, such as design, marketing, input supply, or distribution channels [*Commission Staff Working Paper 2003b: 15; Radosevic 2003:53-54*].

More recent market changes accelerated the overseas sourcing strategy. In addition to the fact that the European markets tend to stagnate mainly owing to decreasing share of expenditure on clothing for total household[9], US apparel retailers, such as the GAP, Levi Strauss, Walmart etc. entered the European markets since the late 1980s, leading to restructuring in retail sectors in EU. The result is the substantial concentration. Indeed, in Germany, the five largest apparel retailers, C&A, Quelle, Metro/Kaufhof, Karstadt, and Otto, accounted for a large part of the market, while in United Kingdom, two top retailers, Marks & Spencer and the Burton Group get lion's share[10]. And according to Gereffi, these retailers (and marketers and designers) account for nearly 70 percent of apparel imports in Europe [*Baden 2002: 54, 61-63; Gereffi 2002: 6-7; Gibbon and Thomsen 2002; Palpacuer and Poissonnier 2003*]. As a result of the overseas sourcing, the import penetration ratios of European countries sharply rose, with the ratio of EU-15 as a whole 59.9 percent in 2001; it is quite high especially in United Kingdom, Germany, Denmark, Finland and Sweden, respectively with 69.0 percent, 87.1 percent, 80.0 percent, 70.9 percent (as of year 2000), and 96.2 percent (as of year 2000)[11] [*Japan Small and Medium Enterprise Corporation 2002*].

Table 5: Position of CEEC10 for EU Apparel and Textile Imports

	Apparel (SITC 84)				Textile(SITC 26+65)			
	EU15	Extra-region			EU15	Extra-region		
			CEEC10	East Asia			CEEC10	East Asia
1995	38.7%	61.3%	9.9%	20.2%	63.1%	36.9%	3.3%	7.8%
1996	38.5%	61.5%	10.2%	20.2%	63.2%	36.8%	3.3%	7.8%
1997	38.0%	62.0%	10.0%	21.0%	61.4%	38.6%	3.5%	8.6%
1998	36.2%	63.8%	11.2%	20.8%	60.9%	39.1%	4.0%	8.8%
1999	34.8%	65.2%	10.9%	22.3%	61.1%	38.9%	4.4%	9.4%
2000	31.4%	68.6%	11.0%	23.9%	57.9%	42.1%	5.0%	10.5%
2001	31.4%	68.6%	11.9%	22.8%	58.1%	41.9%	5.7%	10.2%

Source: UN Comtrade Database.

In terms of geographical location, there are at least three types of apparel and textile networks for EU-15; first, sourcing from distant suppliers in Asia, especially East Asia, second, longstanding relationship with CEECs, Turkey and North African countries, and third

[9] Refer to Baden (2002) for more detail analysis of the European markets, especially to Palpacuer and Poissonnier (2003) for the French market and to Gibbon and Thomsen (2002) for the Danish and Swedish markets.

[10] In France, Italy and Spain, the importance of independent retailers declined, while specialty chains, franchise networks, and hypermarkets are rising. The good examples are Zara, Mango, and Beneton.

[11] The import penetration ratio is calculated by the formula, imports / (production + imports – exports).

proliferation of specialized small suppliers entering after the collapse of the Former Soviet Union. The individual EU-15 members have created a degree of specific geographical links with each supplier countries in its historical and cultural background (for instance, links between France and North African countries, between Germany and CEECs, between Denmark and the Baltic countries, and between UK and Asian supplier countries [*Baden 2002: 24-25*]. However, as shown by Table 5, at the EU level, the regional shares of the extra-EU apparel imports are highest in East Asia, while CEEC10 gradually increase their share; the shares of East Asia and CEEC10 for total EU apparel imports increased up to 22.8 and 11.9 percent in 2001[12].

Competitive Disadvantages of Late-Comers and OPT

The expansion of EU-based apparel and textile networks into CEEC10 has been promoted by outward processing traffic or trade (OPT) [13]. OPT refers to trade flows associated with a particular form of sub-contracting carried out by EU-based firms. Under the arrangement, EU contractors temporarily export a commodity to be processed abroad by subcontractors and then re-imported, while they retain the right to market the final product. OPT is granted the formal status within the EU legislation[14], whereby OPT contractors are permitted to export materials with preferential treatment and re-import product after processing abroad without any trade restrictions [*Baden 2002; Breton and Manchin 2003; Celi 2000; Sereghyova 2001; Dyker et.al. 2001; Fabbris and Malanchini 2000; Graziani 2001; Pellegrin 1998, 2000a, 2000b*].

Although OPT arrangement should not be confined geographically to CEECs nor to apparel and textile sector, they have been dominant partners in OPT activities by EU-based firms, and apparel and textile has been the largest sector in which EU has utilized OPT arrangement; the share of CEECs reached 38.8 percent of total EU exports for outward processing and 46.9 of total EU re-imports after outward processing abroad between 1993 and 1998. By countries, Poland, Hungary, Czech, Slovakia and Bulgaria are the largest partners for EU OPT, with their joint share 78.1 percent in EU-OPT exports to and 77.5 percent in OPT re-imports of EU from CEECs. Apparel and textile accounted for 73.2 percent in 1989 and 65.6 percent in 1997 of EU re-imports from there[15] [*Fabbris and Malanchini 2000: 20-22; Graziani 2001: 217*].

As suggested by M. Hobday in the context of East Asia, the *competitive disadvantages* of late-comer firms lie in the two extreme poles of value chains, R&D (or/and design) and marketing (or/and distribution) [*Hobday1995*]. By utilizing OPT arrangements, European buyers provide design and marketing channel to CEECs-based firms, enabling the latter to overcome their disadvantages. On the other hand, CEECs-based firms undertake the manufacturing stages of value chains, enabling EU-based retailers to outsource at lower costs. In addition, the contractor maintains the right to carry out quality control and to reject the sub-contractor output on the basis of quality, timing of delivery and other contractual conditions'. Therefore, through learning by doing process, the latter could improve their manufacturing and managerial capacities [*Fabbris and Malanchini 2000: 4-5; Pellegrin 2000; Szanyi 2002b: 11*]. Thus, through OPT arrangement, CEECs have been incorporated into buyer-driven networks

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12 This kind of regional shift can be seen in the US apparel networks. The country increasingly relies on its neighbors, Mexico/ Caribbean countries [*Baden 2002; Gereffi 2002*].

13 In the US, the 807/9802 program has played the same roles with OPT [Graziani 2001:218-20].

14 The basic legislative texts are the EC Custom Code (OJL 302, 19. 10.92) and Council Regulation 3036/94 of 8th December 1994 (OJL 322, 15.12 94). OPT licence is granted to only firms respecting some parameters which include that the goods sent abroad for processing should originate in the EU [*Fabbris and Malanchini 2000: 3*].

15 CEECs include CEEC10 plus Albania, DDR (1988-90), Czechoslovakia (1988-92), Yugoslavia (1988-1991), Croatia (1991-98), Bosnia (1992-1997), and Former Yugoslavia of Macedonia (1993-1997).

controlled by EU-based firms and at the same time it was the '*implicit*' common strategy to connect CEECs to the previous EU members.

Geographical Configuration of Networks

Germany and Italy; Two Core Economies

Apparel and textile production networks have been created both in East Asia and Europe through the same dynamics, that is to say, intensified competition and the consequential expansion of overseas sourcing networks by buyers (or retailers). In spite of this, there are some differences. First of all, in East Asia, the core economy of networks is the US (in some cases, Japan), whereas in the case of CEEC10, there are multiple core economies.

Reflecting their domestic market scales, Germany, UK, France, Italy and Netherlands are the five largest apparel importers of EU-15; Germany is the largest importer with 25.3 percent, followed by UK (17.7 percent), France (15.3 percent), Italy (8.8 percent) and Netherlands (6.3 percent) in 2001 (figures in parentheses are the shares for total apparel imports of EU-15). With the expansion of buyer-driven sourcing networks into the low-cost sites, most of their apparel imports come from extra-EU regions; the intra-EU import ratio of the five countries already decreased down to 25 to 30 percent. Among them, Germany and Italy are relatively heavily dependent on CEEC10; CEEC10 accounts for 24.9 percent of German apparel imports, outpacing 23.3 percent of intra-EU ratio. More outstanding is Italy, whose dependence ratio on CEEC10 for apparel imports reached 32.5 percent. On the other hand, in case of UK and Netherlands, reflecting their historical links, the shares of Asia, particularly East Asian countries are higher and therefore those of CEEC10 are just 7.6 percent and 11.1 percent of apparel imports, while France, with strong ties with North Africa (Morocco, Tunisia and Mauritius etc.) in addition to Asia, also imports only 11 percent from CEEC10 [*data from UN Comtrade Database*].

Table 6: Apparel and Textile Network Trade of CEEC10 (million dollars)

Import of Textile		From World	From EU15						From CEEC10
				Germany	France	Italy	UK	Netherlands	
SITC26	1996	1,079	32.6%	40.4%	3.6%	14.1%	8.2%	6.4%	5.5%
	2001	938	46.2%	37.9%	6.5%	11.1%	7.4%	5.9%	4.3%
SITC65	1996	6,719	77.6%	49.8%	5.7%	17.2%	4.1%	5.5%	7.8%
	2001	9,399	77.9%	31.5%	8.7%	28.5%	6.5%	4.6%	6.4%
Total	1996	7,799	71.3%	49.2%	5.5%	17.0%	4.3%	5.5%	7.5%
	2001	10,337	75.0%	31.9%	8.6%	27.6%	6.5%	4.7%	6.2%
Export of Apparel		To World	To EU15						To CEEC10
				Germany	France	Italy	UK	Netherlands	
SITC84	1996	7,392	89.4%	55.9%	6.6%	10.9%	4.4%	6.7%	2.4%
	2001	9,505	87.9%	38.7%	9.0%	19.9%	8.4%	5.0%	4.7%

Source: UN Commodity Trade Database.

These facts suggest that the expansion of apparel and textile networks into CEEC10 has been mainly developed with Germany and Italy their cores. In fact, EU-15 absorbs 87.9 percent of apparel exports from CEEC10, with the share of Germany 38.7 percent and that of Italy 19.9 percent. In addition, EU-15 provides 75 percent of CEEC10 imports of textile as material, 31.9 percent and 27.6 percent of which are supplied by Germany and Italy (see, Table 6).

Actually Germany has been the largest users of the OPT regime; in 1996, at the peak of OPT development, the country accounted for 65 percent of EU temporary exports of apparel and textile to CEECs and 64 percent of re-imports from there. The dominant position is largely attributable to the pioneer roles and relatively liberalized licensing procedures, in addition to the

large scale of its economy and markets. Certainly, OPT tends to decline since 1997, because of launching pan-European system of rules of origin (so-called 'EUR-1'system)[16]. This does not mean that the value chains created by Germany firms in collaboration with subcontractors are absolutely dismantled, remaining the core of apparel and textile networks [*Baden 2002: 52; Fabbris and Malanchini 2000:8, 26; Pellegrin 1998; 2000b: 5*].

Recently, the German position tends to be relativized as the rise of another core economy, Italy. Though the country was a later-comer as a user of OPT (with the share in 1989 just 1 percent of EU OPT in apparel and textile), it has sharply increased its OPT with CEECs, with the shares 15 percent of EU OPT exports and 14 percent of OPT re-imports of EU in 1997 [*Baden 2002: 52; Fabbris and Malanchini 2000: 26*]. In the face of Lira appreciation between 1987 and 1992 in addition to rising production cost, Italian manufacturers launched international subcontracting operation and FDIs in CEECs, keeping at home market research, and product development, and maintaining the productive structures that are capable of responding to small runs and emergency orders in upmarket and niche production [*Grazaini* 1998]. Interestingly, they adopted the acquisition strategy particularly of German apparel manufacturers. Since they had little experience on overseas production, they expanded their own production networks by using the previous German networks[17].

Narrow Path of Upgrading

In light of the experience of East Asia, the geographical reconfiguration or expansion of apparel and textile networks have been accompanied with changes of the roles within them. Labor-intensive apparel production has been sequentially relocated from Japan to NIEs, and then to ASEAN4 and China, while Japan and NIEs have moved up to higher value added lungs of apparel and textile value chains; more specifically Japan has upgraded into the provider of high-tech and small rot textile and textile machinery, while Korea and Taiwan have moved into mass-production type textile production and Hong Kong takes parts of design, marketing and distribution. As a result, there has been a 'triangle manufacturing (named by Gereffi)' created in the region, where Korea and Taiwan firms supply textile and material to factories relocated in Southeast Asia and China, exporting apparel directly or indirectly (via the home countries) to the international markets. In addition, Hong Kong firms function as a middleman, accepting an order from foreign (US or/and Japanese) retailers or traders, designing and making sample, (re-)exporting materials to overseas (say mainland China) factories or subcontractors, and exporting directly or indirectly (via Hong Kong again) to their clients. The main dynamics of the persistent exports of apparel and textile are attributable to the forming of the regional production system [*Gereffi 2002; Graziani 2001*].

By contrast, we cannot find the same linear trajectory in CEEC10 at least at this moment. In spite of more than ten years' development, there are few countries which have upgraded to upstream. Composition of apparel and textile exports from CEEC10 to EU15 is dominantly biased on the former. Czech, Poland and Estonia have steadily increased their textile exports, while others stagnate or even decrease (see again Figure 3-2). Although the former three countries account for more than half of intra-CEEC10 textile imports, the dominant parts of textile are procured from EU-15, especially Germany and Italy. In addition, nearly 80 percent of textile machines are imported from EU-15, also here, with the shares of Germany (36.1 percent) and Italy (26.9 percent) largest [*data from UN Comtrade Database*].

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16 Under EUR-1 system, the materials processed within EU (weaving and dyeing) are called 'preference origin', being provided tax-exemption.

17 For instance, Marzotto, the largest Italian textile group, acquired the German clothing company Hugo Boss, with a lengthy experience of subcontracting mainly in Eastern Europe. Another big group, Miroglio, bought the clothing companies Glaeser, Flick, Skarabeus and Gili in Germany, plus the German textile company Steiger&Deschler (Ulmia). GFT acquired the third German clothing producer, Baumler [*Graziani 199*8].

These facts mean that higher value added segments of production chains, at least as far as their external linkages are concerned, are largely dominated by EU15-based firms. This may be because of asymmetrical scale between EU-15 and CEEC10 and a short-period of development. This is also because the apparel production in CEEC10 has been organized in the form of incorporation of them into the previous EU-based production structure. Vertical specialization like OPT makes it difficult for subcontractors to move up to higher lungs of value added ladders, though it can contribute to enhancing their manufacturing capacity and overcoming the competitive disadvantages.

3.2 Expanding Parts Trade and Production Sharing in Machinery

Expansion of Parts and Component Trade

Though apparel and textile is still the important sector connecting CEEC10 to EU-15, the linkages between both have been developed in more sophisticated sectors such as automobile and electronics, being illustrated by the changes in industrial structure of Visegrad countries, and, to a lesser extent, Slovenia. The shifts of gravity from labor-intensive sectors to high-tech ones also results from expansion of EU-based production networks into CEEC10. As Pellegirn (2000b) argues, the evolutionary process of interrelation between EU-15 and CEEC10 should be associated with the regionalization strategy of EU-based MNCs.

The vertical specialization pattern observed in apparel and textile networks is that EU-based firms contract out the labor-intensive segments of value chains into CEEC-based companies in order to establish cost-efficient and flexible production and sourcing system. This pattern stirs the image of *'Maquiladora-type'* of inter-firm relations. However, subcontracting in CEEC10 is different from the Mexican maquiladora; this simple picture of material imports, labor-intensive assembly and finished goods exports cannot explain all of the linkage structure. Rather, the industrial relations between EU-15 and CEECs are already going beyond these simple outward processing arrangements to a creation of complicated production networks based on '*fragmentation*' of value chains and '*production sharing*'. Within those production networks, CEEC-based firms could create upgrading dynamics by linking to technology of EU-based MNCs, while the latter fully exploit the possibilities offered by complementary competencies existing in the enlarged EU economic sphere [*Commission Staff Working Paper 2003a: 15-16; Kaminski 2000: 36;Pavlinek 2004: 52; Pellegrin 2000b: 14; Szanyi 2002a: 8-9*].

Table 7: Parts and Components Export of CEEC10 to EU-15 (million dollars)

	Machinery Exports by Destination			**Share of Machinery for Total Export**		
	World	EU	CEEC10	World	EU	CEEC10
1997	31,647	68.2%	10.8%	29.5%	33.9%	22.6%
1998	42,684	74.0%	8.8%	35.4%	40.6%	22.6%
1999	44,191	77.3%	7.6%	37.4%	42.3%	21.6%
2000	52,886	76.5%	7.4%	39.4%	44.8%	21.8%
2001	59,676	76.6%	7.7%	40.1%	45.6%	22.3%

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	Parts Exports by Destination			Share of Parts for Total Exports		
	World	EU	CEEC10	World	EU	CEEC10
1997	8,436	69.1%	12.9%	7.9%	9.2%	7.2%
1998	11,070	75.9%	9.9%	9.2%	10.8%	6.6%
1999	11,805	81.0%	8.1%	10.0%	11.8%	6.1%
2000	15,732	81.2%	7.5%	11.7%	14.1%	6.6%
2001	18,182	81.0%	7.1%	12.2%	14.7%	6.3%

	Component Exports by Destination			Share of Component for Total Export		
	World	EU	CEEC10	World	EU	CEEC10
1997	2,477	77.1%	11.4%	2.3%	3.0%	1.4%
1998	3,875	82.8%	9.3%	3.2%	4.1%	1.8%
1999	4,066	87.2%	7.7%	3.4%	4.4%	1.7%
2000	5,380	86.3%	6.3%	4.0%	5.1%	1.6%
2001	6,773	84.9%	6.8%	4.5%	5.7%	1.9%

Source: UN Comtrade Database.

Generally speaking, it is very difficult to empirically explore the current status of the spatial fragmentation and sharing of production. However, extensive development of production networks emerges as an expansion of cross-border transactions of parts and components; they reflect the underling production structure [*Kaminski and Ng 2001: 2: Yeats 2001*]. Actually, exports of machinery, especially parts and components have been the fastest growing ingredient in exports of CEEC10. Their machinery exports sharply increased from 31.6 billion in 1997 to 59.7 billion dollars in 2001, while parts and component exports grew more rapidly, increasing from 8.4 billion to 18.2 billion dollars in parts and from 2.5 billion to 6.8 billion dollars in component during the same period. It should be realized that most of parts and components are destined to EU-15, with the shares 81.0 percent and 84.9 percent respectively. As a result, parts account for 14.7 percent of total exports to EU15, with the share of component 5.7 percent in 2001 (the joint value of parts and component is equivalent to 44.8 percent of total machinery exports to them). On the other hand, intra-CEEC10 export ratio decreased from 12.9 to 7.1 percent in parts and 11.4 to 6.8 percent in component. However, this does not mean that those products do not matter in intra-regional trades (see, Table 7). They keep the share for total machinery exports at the level of 37 percent, steadily increasing the export value. Rather, they reduce the percentage of parts, while raising that of components, suggesting some upgrading.

Table 8: Parts and Component Imports of CEEC10 (million dollars)

	Machinery Imports by Origin			Share of Machinery for Total Imports		
	World	EU	CEEC10	World	EU	CEEC10
1997	49,231	69.8%	6.2%	35.0%	41.6%	21.0%
1998	59,522	70.8%	5.7%	37.9%	43.7%	21.5%
1999	58,599	70.0%	5.8%	38.6%	43.5%	22.2%
2000	65,015	66.9%	6.0%	38.4%	44.1%	22.5%
2001	70,882	66.5%	6.5%	38.7%	44.0%	23.4%

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	Parts Imports by Origin			Share of Parts for Total Imports		
	World	EU	CEEC10	World	EU	CEEC10
1997	16,079	71.6%	6.2%	11.4%	13.9%	6.9%
1998	20,114	73.0%	4.9%	12.8%	15.2%	6.3%
1999	20,321	73.2%	4.6%	13.4%	15.8%	6.1%
2000	22,970	70.7%	5.0%	13.6%	16.4%	6.6%
2001	23,699	69.5%	5.4%	12.9%	15.4%	6.5%

	Component Imports by Origin				Share of Component for Total Imports		
	World	EU	CEEC10	East Asia	World	EU	CEEC10
1997	3,506	59.8%	5.3%	20.0%	2.5%	2.5%	1.3%
1998	4,509	56.3%	4.6%	24.0%	2.9%	2.6%	1.3%
1999	4,735	56.3%	5.7%	22.5%	3.1%	2.8%	1.8%
2000	6,264	53.0%	4.0%	23.0%	3.7%	3.4%	1.5%
2001	7,332	52.5%	4.7%	25.1%	4.0%	3.6%	1.8%

Source: Calculation based on UN Comtrade Database.

In terms of imports, to a lesser extent, parts and component play the significant role; their joint value increased from 19.5 billion to 31 billion dollars, accounting for 16.9 percent for total imports (which is equivalent to 43.7 percent of their total machinery imports). With the trade with EU-15 having increased, EU-15 has expanded its position as a 'hub' for CEEC trade in parts and component [*Kaminski and Ng 2001: 15-16*]. However, the geographical distribution is different from that of exports; the import structure of CEEC10 is more open to extra-EU region. It is no doubt that EU-15 is the largest import source for CEEC10 but as far as component imports are concerned, the share of EU-15 is relatively small with 52.5 percent, while extra-EU and CEEC10 countries are the significant sources. Especially East Asia increases its share from 20 to 25 percent (see, Table 8).

The increasingly interactive trade of parts and component between EU-15 and CEEC10 suggests that there has been cross-border supply chains created based on complex specialization and that industrial upgrading of CEEC10 has been achieved within the complicated production networks. The overall picture is that CEEC10 are incorporated into EU-15 as the supply-base of parts and component, while their production system is reorganized in the dynamics of global manufacturing as shown by their input structure linking to extra-region.

Leading Exporters of Machinery Parts and Component

The incorporation of CEECs in EU-based production networks varies considerably across the region [*Kaminski 2000: 37; Kaminski and Ng 2001: 20*]. There are three tiers of parts and component exporters; the first most integrated group consisting of Hungary, Estonia and the Czech, the second group of Latvia, Poland, Slovakia and Slovenia, and third tier comprised by Bulgaria, Romania and Lithuania. In fact, the shares of parts and component for total manufacturing exports in 2001 are largest in Hungary (35.7 percent), followed by Estonia (33 percent), Czech (21.2 percent), Poland (15 percent), Slovenia (12.5 percent) and Slovakia (10.5 percent). Within the third tier, Romania and Lithuania increased the share up to nearly 9 percent, while Bulgaria and Latvia remain at the level of about 3 percent. Among the first and second tier, Visegrad countries account for 85.4 percent of total parts exports and 91 percent of total component exports of CEEC10. Especially Hungary is the largest suppliers, with the share for total CEEC10 exports reaching 33.1 percent in parts and 50.5 percent in components [*data from UN Comtrade Database*].

By products, in parts and component of machine tools (SITC72-74), the shares of Czech are dominant with more than 40 percent, while in office machines (SITC75) and telecom equipment (SITC76), Hungary account for 61.7 percent and 50 percent of total CEEC10 exports. Outstanding in telecom equipment is the share of Estonia, reaching 17 percent. In electrical machinery (SITC77), most of parts exports are carried by Czech (32.2 percent), Hungary (32.1 percent) and Poland (16.1 percent), while in road vehicle (SITC78), Czech has the largest share of 39.5 percent, followed by Poland (21.8 percent), Hungary (19.8 percent) and Slovakia (9.6 percent). In addition, the shares of Slovenia are more than 10 percent in parts of metal working machinery (SITC73) and in those of power generating machinery (SITC71), and Romania also keeps more than 10 percent in the former. On the other hand, parts trade is highly concentrated in a few items in both exports and imports; office machines, telecom equipment, electrical machinery and road vehicles. These four product groups accounted for 79.4 percent of all parts exports and 79.9 percent of all parts imports in 2001 [*data from UN Comtrade Database*]. So, in those sectors, there is a high degree of correspondence between imports and exports, suggesting that production sharing has been developed [*Kaminski and Ng 2001: 12*].

3.3 Electronics Production Networks

Re-genesis of Electronics Sector in CEECs

Before transition, CEEC10 had developed a degree of international division of labor in electronics sector mainly under the CMEA regime. Those productions had been carried by a small number of conglomerates, such as Tesla group and ZAVT in Czech, Videoton in Hungary, Mera and Unitra in Poland, VEF and Alfa in Lativia, Stra Zaora and Microelectornica in Bulgaria, Iskra in Slovenia and so on, many of which could not survive the transition [*Radosevic 2002a: 2-3*].

Nevertheless, the collapse of the electronics firms developed under the socialist regime does not mean a demise of this sector in CEEC10. They turned out to increase its electronics production since the mid 1990s. As already described, Hungary is first on the list, followed by Czech, Poland and lastly Estonia. In fact, Hungary accounted for about 45 percent of total electronics production of CEECs, with Poland 14 percent and Czech 8 percent in 2000 [*Radosevic 2002a*]. The absolute production value of these economies remains at lower level, but the growth rates approach (or in case of Hungary outpaces) those of East Asian economies, the world largest electronics production sites. On the other hand, the re-genesis has achieved as export-oriented production. During the period of 1995 to 2001, electronics exports of CEEC10 drastically increased from 350 million to 1.5 billion dollars in office machines and data processing equipment and from 1.5 billion to 9.1 billion dollars in telecom equipments. In office machine exports, the shares of Hungary and Czech are prominently large, accounting for 60.6 percent and 26.1 percent of total CEEC10 exports, while in telecom equipment, Poland and Estonia in addition to the two countries show high shares, with the joint share of the four reaching 80.5 percent in 2001 [*data from UN Comtrade Database*].

Unlike the apparel and textile sector, the electronics sector in CEEC10 has occurred as a creation of typical '***producer-driven production networks***'. The leading players are no longer the former conglomerates. Foreign firms entering into CEECs through privatization and green field investments reorganize them into vertically integrated inter-firm relationships. Electronics-related FDI concentrates on Hungary, Czech and Poland, accounting for 48 percent, 23.7 percent and 20.0 percent of total foreign electronics investment stocks [*WIIW 2003*]. In those countries, mainly EU-based large multinational electronics firms, such as Siemens, Philips, Alcatel, Nokia, ABB etc. agglomerate, accelerating resurgence and growth. Among them, Philips has established a production complex of its 17 subsidiaries in Hungary, while Siemens and ABB spread their affiliates throughout the region. Following them, the US-based firms, such as IBM, On Semiconductor, GE etc and furthermore Japanese electronics firms,

Matsushita (Panasonic), Kyocera, JVC, and Korean firms (Samsung and Daewoo), and Taiwanese PC makers (First International) participate in electronics complex in CEECs. In addition, EMS (electronics manufacturing service) companies, Solectron, Flextronics, Nat-Steel etc. enter into the region, starting contract manufacturing (see Table 9).

As a result of the agglomeration of foreign firms, for instance, 88 percent of production and 96.9 percent of exports of Hungary in 1999 were attributable to those of foreign firms, 64.7 percent of Polish exports were carried by firms with foreign investment commitment in 1998, and also in Czech, majority own foreign firms account for 67 percent of electrical and optical equipment production in 2002[18] [*data from National Statistical Office of Hungary, Poland and Czech*]. Along with the participation of the electronics giants into CEECs, some of the previous local electronics conglomerates were dismantled to disappear, while others are reorganized and incorporated into supply bases of MNCs. For example, in Czech, Tesla Ecimex starts subcontracting of CRTs (cathode ray tubes) to Toshiba and Tesla Sezam and Terosil are now joint ventures with ON Semiconductor, while Hungarian Videoton manages contract manufacturing for foreign customers [*Linden 1998;Radosevic 2002a; Szanyi 2002b*].

Table 9: Main Foreign Electronics Firms in Selected CEECs

Hungary	**Czech**	Lucent
Philips Hungary	Matsushita	Siemens
Philips Assembly Centre	Epcos	Matsushita(Panasonic)
Philips Monitor Manufacturing	Philips	Daewoo
Philips Component	FIC, Taiwan	Motorola
Philips Payer Industries	First International	APW
IBM Storage Products	Asea Brown Boveri (ABB)	Tohoku Pioneer
Flextronics	Celestica	ICL
Samsung	Flextronics	Unysis
Siemens	Dovatron,DII	Flextronics
Nokia	AVX Kyocera	Qcom AB
TDK	CIS Electronics	Nokia
Nidec	Siemens	Delphi
Elcoteq, Finland	Vishay	Hewlet Packard
Siemens/Matsushita	Mitsubishi, Koyo Seiko	**Slovakia**
Sony	On Semiconductor & Motrola	Sony
DDD Bosch	Trimex Tesla	Siemens
JIT Electronics, Singapore	Foxconn, Taiwan	Alcatel
Clarion, Japan	Telemecanique	Osram
Bosch	Schneider Electric	Cisco
KeyTec BV	YS Japan	**Estonia**
Artesyn Tech	Punch International	Elcoteq

(Continuation of table 9 on next page)

[18] The US-based EMS firm, Solectron, chose Romania as its location of CEECs, which largely contributes to the growth of the country. On the other hand, in the case of Slovenia, as shown by overtaking of Iskra by Siemens, MNCs take over the previous telecom production capacities, not attracting much new investment to the country.

(Continuation of table 9 from preceding

Hungary	Czech	Estonia
Jabil	Cherry Corporation	ABB
Rafi-BBP	Infineon Technologies AG	JOT
DBTel	Deltec	
Zollner	JPM	**Slovenia**
Nat.Steel/Solectron	SCG Holding	Iskratel (Siemens)
Shinwa	IBM	EGO
Yageo, Japan	**Poland**	Kirkwood
Tyco Electronics	Yageo	BSH Bosch
Vishay	Elcoteq	Rexel
SCI	Curtis	IBM
General Electronics	Alcatel	
Ericsson	Thomson	
Delphi Packard	Philips	

Source: compiled by author based on Radosevic (2002b) and UNCTAD Database.

Two Poles of Regional Value Chains: Sales and Procurement

Producer-driven network is characterized by spatial spreading of plants controlled by MNCs. Expansion of production networks across EU-15 and CEEC10 has created the following input-output structure.

Table 10: Geographical Distribution and Share of Parts of Electronics Exports from CEEC10 (million dollars)

	Office Machines				Telecom & Audio-Visual Equipment			
	Total Exports	**Share of EU-15**	**Share of CEEC10**	**Share of Parts**	**Total Exports**	**Share of EU-15**	**Share of CEEC10**	**Share of Parts & Component**
1995	305	80.1%	8.9%	88.3%	1,535	62.0%	13.0%	75.4%
1996	302	75.1%	12.2%	84.9%	1,498	58.4%	15.5%	77.6%
1997	563	84.9%	5.3%	94.3%	3,154	85.7%	8.4%	50.8%
1998	996	90.5%	3.3%	95.9%	4,338	92.1%	5.2%	46.9%
1999	1,467	91.6%	4.8%	97.8%	4,402	92.1%	5.2%	43.9%
2000	2,062	88.8%	6.2%	97.9%	7,060	88.8%	4.7%	40.6%
2001	1,565	86.9%	4.8%	97.5%	9,196	87.5%	5.2%	43.4%

Source: UN, Comtrade Database

First, the regional input-output structure of electronics networks is, of course, featured by a hub and spoke structure with EU-15 the hub; the share of EU-15 for total CEEC10 exports is dominant both in office machines and telecom & Audio-Visual (AV) equipments, with 86.9 percent and 87.5 percent respectively in 2001. Certainly the intra-CEEC10 export value also rapidly increased from 27 million to 75 million dollars in office machines and 49 million to 271 million dollars in telecom & AV equipment between 1995 and 2001. But intra-CEEC10 export ratios are still negligible. Especially, through the resurgence process of electronics industries,

EU-based MNCs have reorganized CEEC10 as their supply base of parts and component. In 1995, most of their electronics exports were attributable to parts (and component) (see Table 10). By products, there are some differences between the two sectors. In office machines, the share of parts exports is persistently dominant, while in telecom & AV equipment, the share of finished goods exports sharply increased, outstripping that of parts and component since 1998 (though the export value of the latter also increased from 1.2 billion to 4 billion dollars) (see again Table 10). CEEC10 are now playing the role of a supplier of finished goods as well as parts and component in telecom & AV equipment networks. This can be confirmed from the import structure of EU-15; though intra-EU imports and procurement from East Asia account for a larger share in parts, component and finished goods of both the sectors, the share of CEEC10 more than doubled in EU parts and component imports and, in telecom & AV equipments it increased from 1.2 to 7.7 percent in finished goods from 1995 to 2001 at sacrifice of East Asian share (see Table 11 and 12).

Table 11: Position of CEECs for EU15 in Office Machinery Imports (percent)

	Parts				**Finished Goods**			
Year	From EU15	From Extra-Region			From EU15	From Extra-region		
			CEEC10	E.A*			CEEC10	E.A
1995	40.4	59.6	0.7	24.3	36.1	63.9	0.9	39.9
1996	39.1	60.9	0.8	26.2	38.9	61.1	0.7	37.7
1997	40.9	59.1	1.3	30.4	40.1	59.9	0.5	37.2
1998	40.5	59.5	1.6	27.6	42.4	57.6	0.4	39.6
1999	40.8	59.2	1.9	27.0	45.2	54.8	0.4	38.1
2000	38.6	61.4	1.6	28.3	40.8	59.2	0.5	39.1
2001	42.6	57.4	1.8	27.0	40.9	59.1	0.6	40.8

* East Asia (E.A.) consists of Japan, China, Hong Kong, Korea, Singapore, Indonesia, Malaysia, Philippines, and Thailand.

Source: UN Comtrade Database.

Table 12 Position of CEEC10 for EU15 in Telecom & AV Equipment (percent)

	Parts				**Component**				**Finished Goods**			
Year	From EU15	From Extra-Region	CEEC 10	E.A	From EU15	From Extra-region	CEEC 10	E.A	From EU15	From Extra-region	CEEC 10	E.A
1995	51.1	48.9	2.5	24.9	37.7	62.3	0.7	29.7	52.3	47.7	1.2	34.5
1996	54.7	45.3	3.1	21.0	37.1	62.9	0.7	29.5	52.1	47.9	1.8	32.5
1997	53.9	46.1	3.3	21.0	40.1	59.9	0.7	29.5	52.0	48.0	4.0	28.0
1998	56.2	43.8	3.3	19.3	38.4	61.6	0.8	27.0	58.5	41.5	5.7	26.1
1999	53.7	46.3	3.3	19.1	37.9	62.1	0.9	26.8	58.2	41.8	5.5	27.9
2000	47.3	52.7	4.5	21.2	34.3	65.7	1.0	28.7	52.8	47.2	7.0	31.2
2001	48.6	51.4	6.2	19.5	40.3	59.7	1.6	26.7	52.6	47.4	7.7	30.7

Source: UN Comtrade Database.

The input linkage within production network is more important in examining producer-driven networks organized through geographical relocation of value chains. Actually, the second feature is declining dependence on EU-15, in contrast to that of the export structure; electronics networks across CEEC10 strengthen their backward linkages to East Asian economies. The share of EU-15 for total parts imports in office machines decreased from 53.2 percent in 1995 to 36.2 percent in 2001, while that of telecom & AV equipment, to a lesser extent, also from 68.9 to 57.1 percent in parts and from 50.0 to 47.1 percent in component (see Table 13). It was not an increase of intra-CEEC10 imports but procurements from East Asia that compensated for the decreased share. Indeed the above-mentioned reliance of CEEC10 on East Asia for component imports is largely attributable to telecom & AV equipments; they imported 1.8 billion dollars of component, 93 percent of which were associated with the sector [*data from UN Comtrade Database*].

Table 13: Geographical Distribution of Parts and Component Imports of CEEC10
(as a percentage of total parts and component imports)

	Office Machines			Telecom & Audio-Visual Equipment					
	Parts			**Parts**			**Component**		
year	EU15	CEEC10	E.A.	EU15	CEEC10	E.A.	EU15	CEEC10	E.A.
1995	53.2	1.7	16.1	68.9	3.8	13.4	50.0	5.5	21.6
1996	47.6	1.4	19.2	68.5	2.6	13.2	52.5	5.1	23.2
1997	40.2	0.9	30.8	77.4	2.8	9.1	54.6	3.6	22.1
1998	38.7	0.8	30.1	75.1	2.3	11.5	48.9	2.7	28.3
1999	44.8	1.2	28.6	73.1	2.2	12.7	51.5	1.8	25.3
2000	41.0	3.4	36.3	63.8	1.9	20.8	46.9	1.3	27.1
2001	36.2	3.4	42.5	57.1	3.9	27.0	47.1	2.0	30.0

Source: UN Comtrade Database.

Noteworthy here is the pace. The import shares of East Asia sharply increased from 16.1 to 42.5 percent in office machine parts and from 13.4 to 27.0 percent in telecom & AV equipment parts and from 21.6 to 30.0 percent in its component (see again Table 13). In addition, distribution among East Asian economies has also considerably changed; in office machines, Japan accounted for more than half of total component imports from the region until the mid 1990s but since then, the percentages of other regional economies rapidly rose. Especially those of China and NIEs jumped from 2 to 15 percent and from 5.7 to 14.3 percent in office machine parts. On the other hand, in telecom & AV equipment, the Chinese share changed from 0.6 to 14 percent, while ASEAN4 (Indonesia, Malaysia, the Philippines and Thailand) raised their share from 2.1 to 12.3 percent [*data from UN Comtrade Database*].

These dynamic developments reflect the recent structural changes within East Asian electronics networks, where relocation and agglomeration of low-and-middle end parts production occurred in China, while the Southeast Asian economy, especially Malaysia, upgraded their value-added activities into production of more sophisticated parts and component including integrated circuits (most of which are carried out by MNCs from Japan, Singapore, and the US etc). And NIEs become the IC production giants, as shown by the rise of Samsung in memory chip manufacturing, or Taiwanese companies in foundry production. On the other hand, there is a considerable degree of complementarity between imports from EU-15 and those from East Asia. Based on 4-digit classification of HS (Harmonized System)-code, Table 14 shows the weight of these two areas on total imports of CEEC10. In every item, with the joint weight more than 70 percent, when the share of EU-15 is large, the share of East Asia is small, and *vice versa*.

Table 14: Distribution of Electronics Parts and Component Imports of CEEC10 (percent)

		Share of EU					Share of East Asia				
	HS	CEEC10	Cz.	Est.	Hu.	Po.	CEEC10	Cz.	Est.	Hu	Po.
Parts for office machines	8473	36.6	38.4	31.4	43.7	12.4	41.7	31.0	32.1	46.2	58.8
Transformer, Converter & Rectifier	8504	60.0	73.3	74.5	46.0	53.6	22.9	11.5	14.0	43.2	25.9
Audio-electronic Equipment	8518	47.2	49.0	58.1	51.9	39.6	38.0	39.3	27.8	33.4	47.5
Parts of Audio, Video Equipment	8522	60.6	40.8	50.4	60.4	21.0	32.5	7.1	40.4	33.7	75.6
Unrecorded Sound Recording Media	8523	44.5	60.1	63.6	36.9	46.4	23.0	16.6	17.1	28.5	16.9
		Share of EU					**Share of East Asia**				
	HS	CEEC10	Cz.	Est.	Hu.	Po.	CEEC10	Cz.	Est.	Hu	Po.
Parts for Radio, TV Transmission	8529	49.7	80.6	19.8	48.8	62.9	38.1	7.4	76.6	39.9	22.2
Electrical Capacitors	8532	53.4	68.8	60.8	45.8	35.4	29.0	4.5	33.1	42.2	54.1
Electrical Resistors	8533	61.7	84.3	72.9	51.4	42.2	18.6	9.5	12.0	22.5	32.8
Printed Circuits	8534	58.3	81.9	26.2	55.8	58.3	21.7	9.4	58.2	23.9	23.3
Apparatus over 1 kV	8535	76.1	81.6	78.7	72.8	84.7	1.6	1.2	0.1	5.0	0.2
Switches, Connectors, etc, for < 1kV	8536	74.1	83.4	71.6	66.2	74.6	9.6	4.3	8.1	17.3	9.8
Cathode Valves & Tubes	8540	78.1	88.1	60.4	73.0	88.5	5.8	2.2	34.2	6.4	4.0
Diodes, Transistors, Semiconductors	8541	28.0	40.6	40.8	24.3	24.0	58.2	36.4	51.6	67.1	52.5
Integrated Circuits	8542	37.9	63.0	30.6	23.2	42.5	36.1	24.2	48.3	47.7	31.8
Total		51.2	66.7	31.9	45.2	51.9	29.8	16.4	58.7	38.1	28.4

Note: Cz. = Czech, Est. = Estonia, Hu. = Hungary and Po. =Poland
Source: UN Comtrade Database.

Furthermore, about 60 percent of parts from East Asia are imported by Hungary [*data from UN Comtrade Database*]. This is partly because of the production scale of the country and partly because MNCs locating there have established their own sourcing networks. Reflecting their corporate structures at home, governance of Japanese or Korean production networks is characterized by vertical and centralized integration. Therefore, they are inclined to rely on the supply base consisting of their subsidiaries or affiliates. In Hungary, the Japanese MNCs such as Sony and Matsushita (Panasonic), Korean MNCs such as Samsung set up their strategic production sites in CEEC10 and in addition IBM with long-standing experience in utilizing East Asia as its procurement sites moved on to the country. It is likely that such firms decide the alignment between EU-15 based and East Asia based sites on their own sourcing strategy.

At any rate, the overall input-output structure of electronics production networks embracing CEEC10 has two constitutive features, dependence on EU-15 for market or their incorporation in it as a supply base, and dependence on EU-15 and East Asia as sourcing sites of parts and component. Their intermediary transactions are not completed within the region and even in relation with EU-15. Rather, they are open to extra-region, especially to East Asia.

Specialization and Hierarchical Structure

EU-based MNCs tend to create linkages between their new production sites in CEEC10 and the home base[19]. The main nodes are basically confined to with the previous EU members, and linkages among CEECs are still weak, excepting for those of Czech- Slovakia or the Baltic countries. In this overall structure, some specialization has emerged among these four CEECs.

The basic features of each country, based on trade data of 2001 from UN Comtrade Database, are as follows:

(1) **Hungary** has the position of the most important supplier of parts and component for EU-15. In office machines, the country accounts for 67.4 percent of total parts exports of CEEC10 to EU-15, 93.5 percent of which are destined to Germany, while 44.6 percent of telecom & AV equipment parts exports of CEEC10 to EU-15 and 34.9 percent of their component come from Hungary, with the shares of exports to Germany 60.4 percent and 40.2 percent.
(2) **Czech** is the most important supplier of office machine parts to CEEC10 and the second largest exporter of telecom & AV component to EU-15. The shares are respectively 49 percent and 33.6 percent of total CEEC10 exports.
(3) **Poland** is rising as a telecom & AV component exporter to CEEC10, with the share largest of 34.2 percent.
(4) **Estonia** exclusively functions as the supplier of parts and finished goods of telecom & AV for EU-15, especially Finland and Sweden.

In addition, there is a hierarchical or vertical supply chain formed between EU-15 and CEEC10. A considerable part of the electronics parts imported from EU-15 by CEEC10 are classified in so-called high-tech parts, whereas a large percentage of the parts exported from the latter to the former belong to low-end or middle-end parts for general purpose. More specifically, more or less than 30 percent of imports from EU-15 (except for exports to Estonia) consist of integrated circuits (HS-8542), semiconductor devices (HS-8541) and electronic tubes (HS-8540). By contrast, passive parts, such as transformer, capacitor, resistors etc. account for more than half of CEEC10's exports [*data from UN Comtrade Database*].

In this way, electronics production networks have established some hierarchical structure, and their international divisions of labor are based on '***vertical intra-industrial trade***'. Within the stratified structure, the production sites in CEECs supply low-end and middle-end parts and component, while they assemble and export finished goods, especially of telecom & AV equipments by procuring high-tech and core parts and component as well as capital goods from EU15-based MNCs. Each node is fully and vertically embraced or incorporated into the previous EU-based production system, while electronics MNCs foster the CEECs as their strategic sourcing sites linking to East Asian ones, reflecting global restructuring of the sector.

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[19] For Czech, Hungary and Poland, linkages to Germany have paved the first way to participate in EU-based production networks. Especially the largest producer of CEEC10, Hungary has been embedded in reproduction structure of the German economy. For instance, Germany is the largest destination for CEEC10's exports of office machine parts, absorbing 48 percent of them, 93 percent of which are Hungarian exports. On the other hand, Hungary absorbs 60 percent of total CEEC10 imports from Germany. In telecom & AV equipment, the country accounts for 60 percent of parts and 40.2 percent of component exported from CEEC10 to Germany. In addition, 54.5 percent of finished goods exports from CEEC10 to Germany are attributable to Hungary [data from UN Comtrade database].

3.4 Automotive Networks: Re-integration into West

The Second Resurgence of Automotive Sector

Today, the automotive industry in CEEC10 is faced with the second revival. Indeed, it has a long history including cooperation with western automakers. Hungary started to assemble imported parts in 1903; in the 1920s, Italian Fiat built a joint venture, Polski Fiat, and Ford began assembling and production of component in Poland; and Skoda was established as the first local auto manufacturer based on its own design in the Czechoslovakia. After the stagnation during the WWII, the automotive firms were reconstructed under the CMEA. In the socialist international division of labor, Skoda established the brand of the CMEA in Czechoslovakia, Fiat undertook production in Poland since the 1960s. Hungary was appointed as the part and component supplier, and a Hungarian bus producer, Ikarus, was the largest in Europe. And Renault started license production in Slovenia and Romania (Dacia) [*Havas 2000; Werner 2003: 2*]. The collapse of the socialist regime enmeshed these production bases into stagnation, but now the penetration of West European manufacture or US firms is accelerating restructuring of the automotive industries in CEEC10.

Recent development of automotive sector also concentrates on specific countries, not spread all over the region. In fact, in production volume of motor vehicles including passenger car, truck and bus, Czech is the largest producer, followed by Poland, Slovakia, Hungary, Slovenia and Romania in this order. Especially, Visegrad countries plus Slovenia account for 94 percent of production, while 98 percent of exports to and 85 percent of imports from EU-15 are attributable to these five countries [*data from International Organization of Motor Vehicle Manufactures*].

The resurgence of automotive industries is a product of the strategic reaction to global industrial changes on the part of EU-based MNCs. In the early 1990s, the world automotive manufactures, faced with the saturation in the markets of developed countries, shifted the strategy to expanding their activities into the peripheral market. Globalization or regionalization based on production fragmentation is the main dynamics also in the world automotive industry. Given the geographical proximity and the pool of high quality and cheaper labor forces, it was natural that Czechoslovakia, Hungary and Poland should be the focus for the integration strategy of European manufactures.

The process has been developed in the form of acquisition of the previous production facilities and green-field investments like in electronics sector. Most of the automotive manufactures in Czech, Hungary and Poland were privatized, while the existing assembly plant and component production capacities were virtually modernized. As a result, just in a few years, the automotive industries in CEEC10 have experienced the drastic restructuring in product mix, processing, managerial skills, and marketing, while they are now completely incorporated into production, sourcing and marketing networks organized by EU-based MNCs[20] [*Havas 2000: 5; Kaminski and Ng 2001: 34; van Tulder and Ruigrok 1998; Worrall et al 2003*].

The Rise of CEECs as the Supplier of Component for EU-15

The automotive exports from CEEC10 increased nearly 4 times as much in 2001 as in 1995. At the same time, the export structure, previously with the higher weight on intra-CEEC10 markets, has strengthened the ties with EU-15; the ratio of intra-CEEC10 exports decreased from 14.6 to 8.7 percent, whereas the share of EU-15 for total automotive exports jumped up

[20] About profiles of automotive MNCs locating in CEECs, refer especially to Worrall et al. (2003) and van Tulder and Ruigrok (1998).

from 59 to 82 percent. More outstanding is the change in product mix[21]. Intra-CEEC10 export ratio of parts and component is reduced by half, while the share of EU-15 sharply increased from 51 to 80 percent in parts and 56.5 to 92 percent in component. Though the export to CEEC10 increased (more than twice in finished goods and more than five times in component), this means the complete shift of the growth dynamics of CEEC10 to EU-15 (see Table 15). On the other hand, the composition of exports by products has also considerably changed; the share of vehicles, with 69.7 percent of exports to EU-15 in 1995, gradually declined down to 46.2 percent in 2001. This change is largely attributable to increase of component exports; the share rapidly increased from 6.2 to 26.2 percent [*data from UN Comtrade Database*].

Table 15: Geographical Distribution of CEEC10 Automotive Exports
(million dollars)

	Total			**Parts**		
	World	EU	CEEC10	World	EU	CEEC10
1995	5,375	59%	14.6%	1,504	51%	23%
1996	5,420	57%	17.2%	1,817	53%	24%
1997	9,887	68%	12.9%	2,684	59%	21%
1998	14,096	78%	9.8%	3,424	69%	16%
1999	15,093	83%	8.5%	3,947	77%	13%
	Total			**Parts**		
	World	EU	CEEC10	World	EU	CEEC10
2000	18,122	83%	8.3%	4,617	78%	12%
2001	20,095	82%	8.7%	5,666	80%	11%
	Component			**Vehicles**		
	World	EU	CEEC10	World	EU	CEEC10
1995	348	56.5%	11.9%	3,523	63%	18%
1996	289	40.3%	21.7%	3,314	60%	22%
1997	1,743	86.0%	6.5%	5,460	66%	17%
1998	2,977	88.3%	6.8%	7,696	77%	11%
1999	3,266	90.6%	6.5%	7,880	83%	9%
2000	4,105	92.3%	5.3%	9,401	81%	10%
2001	4,677	92.0%	5.2%	9,753	78%	12%

Source: UN Comtrade Database.

As a result of this development, CEEC10 is now one of the most significant supply bases for EU-15. EU-15 seems to have established the self-contained import structure at least until recently, with the intra-EU-15 import ratios more than 75 percent in parts, components and vehicles. With the rise of CEEC10 as the new automotive production sites, the position of CEEC10 for EU-15 is sharply increasing, more than doubling from 7.7 percent in 1995 to 16.4 percent in 2001. Among them, in regard to component, EU-15 sources 21.5 percent of total imports from CEEC10 in 2001, comparing to 5.9 percent in 1995 (see, Table 16). The composition of automotive imports experienced the similar changes during the same period; the joint share of parts and component outpaces that of vehicles in 2001.

[21] Auto parts are defined as items classified in SITC-7139 and 784, while components as items classified SITC-7132, 77831, 77832 and 71623. And vehicles are passenger cars (SITC-781), lorries (SITC-782), road motor vehicles (SITC-783), and tractors (SITC-722), and works trucks (SITC-74411).

Table 16: Position of CEECs for EU Motor Vehicle Imports (percent)

	Parts				Component				Finished Goods			
	From EU15	From Extra-Region			From EU15	From Extra-region			From EU15	From Extra-region		
			CEEC10	E.A*.			CEEC10	E.A.			CEEC10	E.A.
1995	82.4	17.6	1.9	6.8	77.4	22.6	5.9	5.4	84.8	15.2	1.9	10.1
1996	83.8	16.2	2.3	5.7	78.0	22.0	6.5	8.5	85.2	14.8	2.2	9.6
1997	82.7	17.3	3.0	5.4	74.7	25.3	10.2	7.5	82.9	17.1	2.6	11.1
1998	82.5	17.5	3.7	4.8	73.6	26.4	13.2	7.0	81.1	18.9	3.9	11.2
1999	81.2	18.8	4.5	4.8	72.3	27.7	14.5	6.5	80.3	19.7	4.1	11.2
2000	79.1	20.9	5.4	5.5	66.3	33.7	18.8	7.0	80.8	19.2	4.8	10.3
2001	78.1	21.9	6.5	5.4	62.6	37.4	21.9	6.0	82.2	17.8	4.8	8.7

*East Asia (E.A) consists of Japan, China, Hong Kong, Korea, Singapore, Indonesia, Malaysia, Philippines, and Thailand

Source: UN Comtrade Database.

Dual Networking and Sub-linkages

Given the asymmetrical scales between EU-15 and CEEC10, the degree of production sharing is more reflected on the import dependence of parts and component. The reliance of CEEC10 on EU-15 is dominant also in imports of every product[22]. Combined with the above-mentioned heavily dependence on EU-15 as export markets, trade structure of CEEC10 has been largely embraced in relation with EU-15. However, some significant change has occurred in transactions of component; the share of EU-15 decreased and instead that of intra-CEEC10 rose from 6.2 to 14.5 percent (see, Table 17). CEEC10 are the component suppliers not only to EU-15 but also to CEEC10 themselves. This is different from other sectors, apparel & textile or electronics. Thus, reorganization of the sector is characterized by the '*dual networking*'. Automotive industry in CEEC10 has been developed, depending on EU-15 both for markets and procurements, while their incorporation into EU-based production networks simultaneously promotes input linkages among CEECs.

Table 17: Geographical Distribution of Automotive Imports of CEEC10 (million dollars)

	Total			Parts		
	World	EU	CEEC10	World	EU	CEEC10
1995	7,173	74%	9.2%	2,100	76%	16%
1996	8,608	68%	9.8%	2,667	65%	15%
1997	12,918	74%	8.4%	5,363	76%	9%
1998	16,061	68%	7.5%	6,930	59%	7%
1999	15,859	77%	7.8%	7,030	81%	7%
2000	16,021	79%	8.6%	7,051	82%	7%
2001	17,888	81%	9.1%	7,172	84%	7%

(Continuation of table 17 on next page)

[22] Automotive trade balance of CEEC10 with EU-15 has got into the black since 1998.

(Continuation of table 17 from preceding page)

	Component			Finished Good		
	World	EU	CEEC10	World	EU	CEEC10
1995	694	82.2%	6.2%	4,379	72%	7%
1996	704	65.6%	8.9%	5,236	69%	7%
1997	1,194	69.8%	8.7%	6,360	74%	8%
1998	1,642	69.1%	8.0%	7,490	75%	8%
1999	1,654	65.3%	12.9%	7,175	76%	8%
2000	1,552	71.5%	12.2%	7,418	78%	9%
2001	1,590	71.9%	14.5%	9,127	79%	10%

Source: UN Comtrade Database.

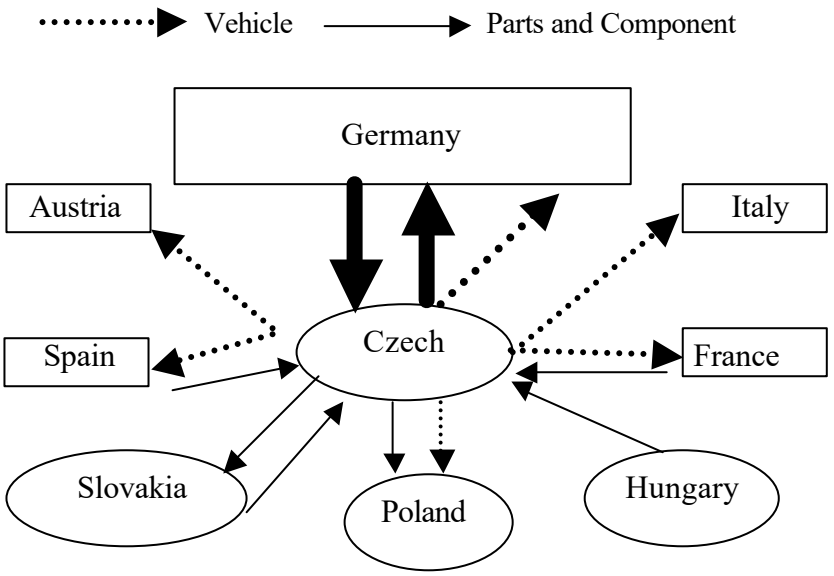
Also in automotive networks, there are multiple core economies, such as Germany, Italy, and France, which have created and strengthened their own linkages to specific CEEC. Those sub-networks or linkages are synthesized into the overall production network. When we pick up the main external linkages based on trade data of 2001 from UN Comtrade Database, the basic features are as follows:

Czech

Czech has transformed its structure through participation in EU-based networks. First, traditionally, CEECs had been the relative significant market (with the share of its exports 23.8 percent in 1995). But EU-15 gradually increased its share up to 74.9 percent in 2001, while the former decreased down to 14 percent. By products, more than half of exports to EU-15 are vehicles, while the share of parts is steadily rising; the former decreased from 60.7 to 51.6 percent, whereas the latter increased from 34 to 41 percent. Thus, the country is the largest exporter of parts as well as vehicles. Czech accounts for 26.5 percent of total vehicle exports of CEEC10 to EU-15 and 52.3 percent of parts exports in 2001. In addition, its commitment to CEEC10 is also significant, accounting for 52.3 percent of intra-CEEC10 parts exports and 51.1 percent of vehicle exports.

Czech automotive sector has kept strong ties especially with Germany; 61.8 percent of parts imports come from Germany, while 52.3 percent of component imports are from EU-15, about 80 percent of which are attributable to the country. And 78 percent of German component consist of piston engines (SITC-7132). Czech procures 8 percent of parts imports within CEEC10, 60 percent of which come from Slovakia. In addition, the share of CEEC10 for total component imports is high with 27.5 percent, more than 90 percent of which consist of piston engines imported from Hungary. On the other hand, Czech exports of parts and component also concentrate on Germany (with 53.6 percent and 61.8 percent respectively). 82 percent of the latter are automotive electrical parts (SITC-7783), suggesting there is a degree of division of labor in component transactions between them. The country also exports 14.2 percent of parts to CEEC10, almost all of which are destined to Slovakia and Poland, while it supplies piston engines to Polish assemblers. Vehicles manufactured within the linkage structure are largely sold in EU-15 markets, with the share 59.6 percent. Among them, Germany is the largest market with the share of 22.8 percent. CEEC10 accounts for 14.4 percent of Czech vehicle exports, 48 percent of which are destined to Poland (see, Figure 4).

Figure 4: Czech Automotive Sub-networks



Source: Author's own construction.

Poland

Poland is the second largest exporters with the share for total vehicle exports of CEEC10 to EU-15 22.8 percent and that for total parts exports 30.6 percent. Its involvement in CEEC10 markets is also large, accounting for 17.9 percent of intra-regional parts exports and 18.9 percent of vehicle exports. Polish plants originally specialized on assembling process. But since the end of 1990s, the country rapidly increased exports of parts and component. Polish exports consist of 26.6 percent of parts, 32.4 percent of component, and 41 percent of vehicles in 2001[23].

Poland procures parts and component from wide range of sources. Among them, Germany and Italy are the two biggest. It imports 42.8 percent of parts and 22.9 percent of component from Germany, with the share of Italy 9.8 percent and 19.9 percent respectively. Most of components imported from the two countries are piston engines. It also imports them from Austria (with the share 16.7 percent). Polish automotive sector has strong ties with Czech. Czech accounts for 8.5 percent of parts imports of Poland, and 7.2 percent of component. On the other hand, Germany is the largest exports market for Poland, absorbing 46.8 percent of parts exports, 56.6 percent of component and 42.3 percent of vehicles. It is followed by Italy with the shares of parts 12 percent and that of vehicles 27.7 percent[24] (see, Figure 5).

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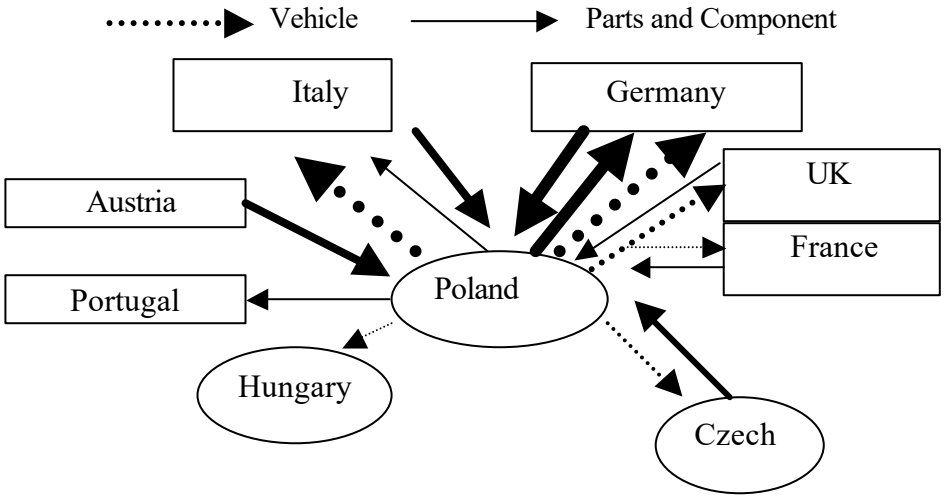
[23] Until 1999, Poland registered trade deficits in automotive trade, owing to large amount of parts and component imports. This is because the previous auto production in the country was mainly based on assembly of imported parts and engines for domestic consumption [*Kaminski and Smarzynska 2001: 19-20*]. But along with the rapid expansion of parts and component exports, trade balance turned to be in surplus in 2001.

[24] Interesting here is the fact that Poland imports piston engines from various sources, while it exports them to Germany, Italy, Portugal, Belgium and UK. In fact, about 80 percent of component exported to the first two countries consist of engines. This suggests a possibility that there are multiple networks intersecting in the country, while Poland plays different roles in different networks; one network utilize the location as assembly sites and another is using it for production of engines.

Figure 5: Poland; Automotive Sub-networks



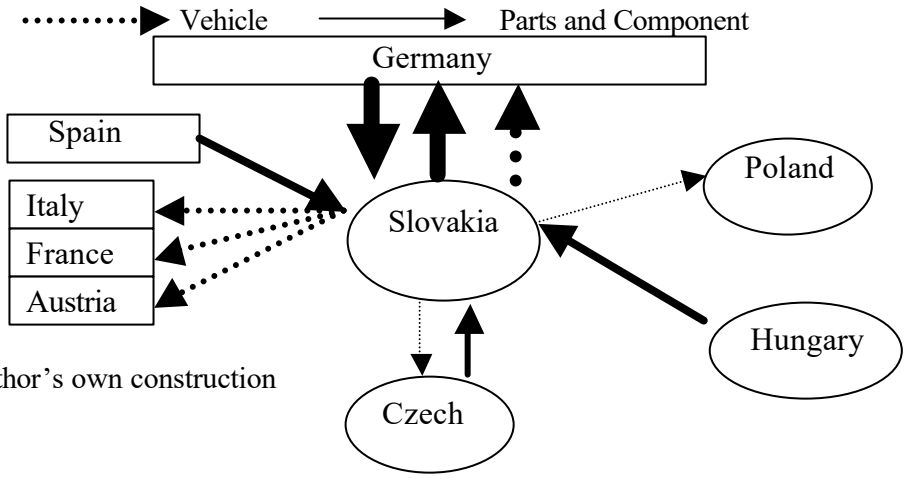
Source: Author's own construction.

Slovakia

Automotive sector in Slovakia has been most drastically incorporated in EU-based networks. Originally, it had strong linkages to Czech, and therefore relatively weak ones to EU-15. While the share of EU-15 for total exports jumped up from 34.0 to 83.4 percent between 1995 and 2001, the share of CEEC10 decreased from 47.5 to 8.7 percent. In parallel with this, its export structure exclusively specializes on vehicle exports, with the share up to 79.5 percent of total exports in 2001. For Slovakia, incorporation into EU-based networks means a transformation into a vehicle assembler or exporter within them.

Therefore, Slovakian external linkages are significantly simple. Like the above two countries, it heavily depends on Germany and Spain for parts and component imports. The shares of the former reached 69.4 percent (parts) and 63.7 percent (component), while those of the latter 15.9 percent and 5.4 percent. The joint shares are nearly equal to those of EU-15. 70 percent of German component consist of piston engines, while most of Spanish component electrical component, suggesting there is division of labor between them. Slovakia keeps strong ties with Czech and Hungary; from Hungary, it imports 13.1 percent of component, and from Czech 4.4 percent. Also here, there is a division of labor, where it procures piston engines from the former and electrical component from the latter. On the other hand, assembled vehicles are destined mainly to all over EU-15, especially Germany (38.2 percent) (see, Figure 6).

Figure 6: Slovakia; Automotive Sub-Networks

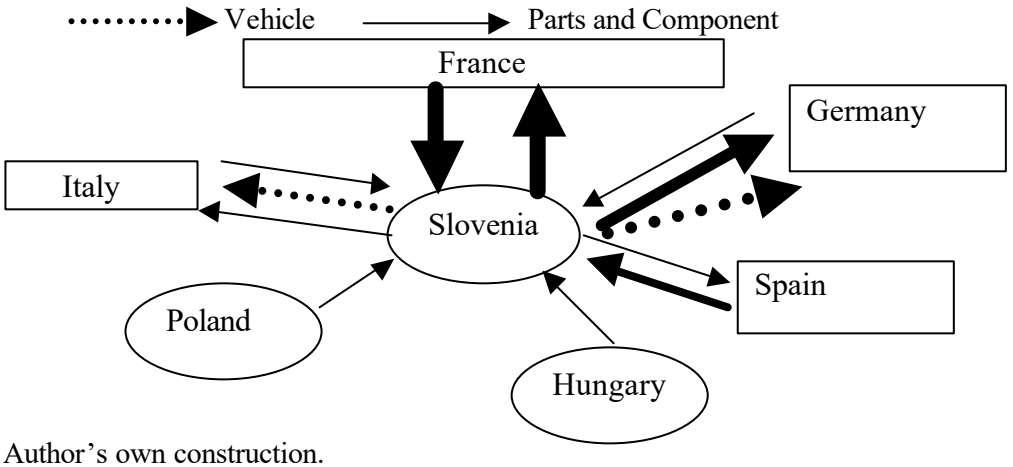


Source: Author's own construction

Slovenia

Slovenia has not changed its automotive export structure through the transition period, keeping the position of a vehicle exporter (though the share of parts exports tends to increase recently). It maintains the percentage of vehicle exports at nearly 70 percent. Slovenia dominantly depends on EU-15 for parts and component imports, with the share 88.6 percent and 93.6 percent. But in contrast to other four countries, the degree of dependence on Germany is quite low. Instead, the largest supplier for Slovenia is France, accounting for 64 percent of parts imports and 52.8 percent of component, 75 percent of which are piston engines. Though its ties with CEECs are relatively loose, it procures a small volume of parts of piston engines and electrical component from Hungary. Germany is the largest market for vehicles with the share 29.6 percent, followed by Italy (21.2 percent) but the share of France in this regard is just 0.1 percent (see, Figure 7).

Figure 7: Slovenia; Automotive Sub-Networks



Source: Author's own construction.

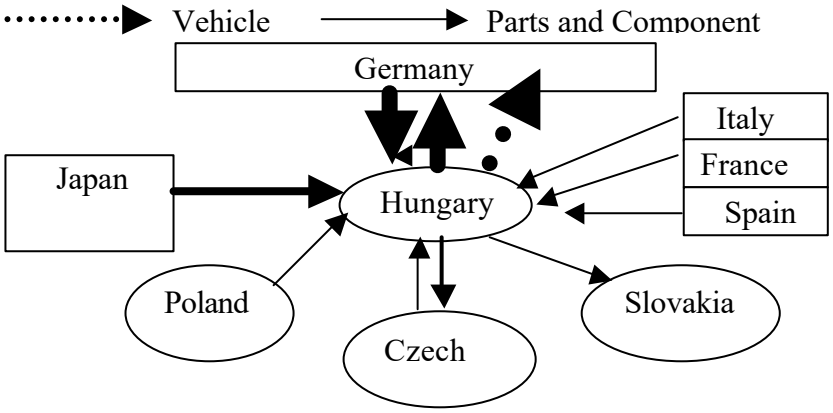
Hungary

Hungary had played the role of parts supplier during the socialist era, with the share of vehicle exports negligible. However, after transition, moving of MNCs on the country has transformed it to a considerable degree. Parts, previously accounting for more than 50 percent of its exports to EU15, decreased its share down to 18.5 percent in 2001. Instead, component exports reach at more than 50 percent. The share of vehicle exports also increased since 1999, with 28.9 percent. Hungary is the important component supplier to CEECs, accounting for 62.4 percent of intra-CEEC10 exports of component, most of which are piston engines.

In regard to parts imports, 89.6 percent of them come from EU-15, about 90 percent of which are from Germany. 63 percent of them consist of piston engine parts. Interesting is its geographical distribution of component imports; the position of Germany is substantial also in Hungary, with the share 31.6 percent, 76 percent of which are electrical components. In contrast to other countries, Hungary significantly depends on extra-EU-15, especially on Japan. The Japanese share for total component imports is 26.1 percent, 80 percent of which are piston engines. On the other hand, 81.1 percent of parts and 93.1 percent of component exported from Hungary are destined to EU-15. Among them, Germany absorbs 54.3 percent and 75.1 percent respectively. And more than 90 percent of the latter consist of piston engines. Hungry has established the position of the largest engine supplier of CEECs; Hungarian manufactures import parts from, assemble them into engines, and re-exports to Germany. Some of the engines are exported to Czech and Slovakia, which account for 5 percent of total engine exports.

Previously the largest markets for Hungarian vehicle exports were Russia, Ukraine and Belarus. Their joint share reached at nearly 60 percent of its total vehicle exports by the mid 1990s. Among them, Russia accounted for 50.2 percent in 1996. However after that, the exports to these three countries sharply declined both in relative and absolute terms, while the share of EU15 shot up; in 2001, 84.3 percent of vehicle exports are destined to EU-15, 90 percent of which are to Germany (see, Figure 8).

Figure 8 Hungary; Automotive Sub-Networks



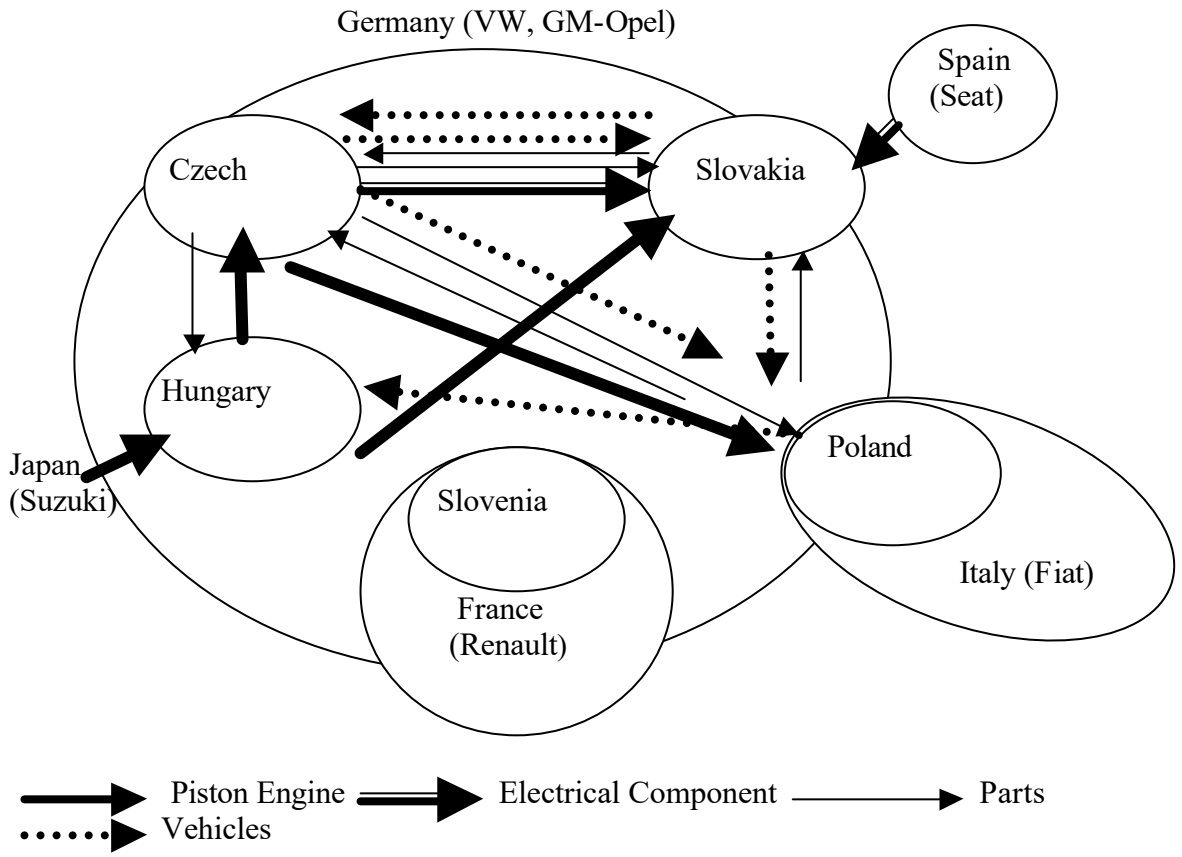
Source: Author's own construction.

Specialization and MNCs' Activities

If we choose the basic linkages, we could draw the overall picture of networks as follows; first, Czech, Slovakia, Hungary and Poland are by and large embraced in Germany-based production networks, while Poland is incorporated into Italy-based networks, and Hungary has the strong supply linkage to Japan. And Slovenia is embedded in France-based networks. In addition to incorporation into EU-based networks, or along with the progress, these five countries have, to some extent, built up linkages to each other. Specifically, Czech and Slovakia keep their traditional ties, strengthening ties with Poland manly through parts and component transactions. On the other hand, Hungary is the important supplier of piston engines for Czech and Slovakia.

This linkage structure is almost compatible with configuration of production of MNCs. In fact, the shares of foreign enterprises for total exports of transport equipments from Poland and Hungary, for instance, reached 69.8 percent in the former in 1998 and 98.3 percent in the latter in 1999 (in the case of Hungary, the share for production 88 percent). And 84.4 percent of production is carried by majority owned foreign firms in Czech in 2002. This sector is virtually dominated by MNCs [*data from each national statistical office*].

Figure 9 Inter-Linkages of Selected CEECs



Source: Author's own construction.

In addition, the linkage structure can be largely explained by the activities of MNCs locating in each country as follows (see, Figure 9):

The main player in building up networks between Germany and Visegrad countries is Volks-Wagen Group (hereafter VW). VW has production plants in all of those countries, creating supply linkages between them (and to a lesser extent, SEAT in Spain). Furthermore in Czech, 40 automotive component suppliers out of the world top 100 locate their plants centering on VW-Skoda. They contribute to parts exports to VW group members locating not only in Germany but also in Poland and Slovakia [*Kaminski and Ng 2001: 38-39; Kaminski and Smarzynska 2001:15; Werner 2003: 5*]. VW is engaged in production of gearbox in Slovakia and engines in Hungary and Poland. Especially, the increase of component exports from Poland since 2000 are largely attributable to the establishment of the engine plant by the company in 1999. And in 1998, Audi Hungary started to production, which contributed to the increasing share of vehicle exports from the country since the next year. The plant assembles engines for the home market, which also accelerated Hungarian engine export [*Toth 2000: 11-25; van Tulder and Ruigrok 1998*].

GM-Opel is another significant actor, playing the pivotal roles in creating linkages. The US based company controls the European operations through its Germany-based affiliate. Opel Hungary started assembly production in 1992, but with the move of Audi in Hungary in 1998 and with operation of Opel Polska in Poland started, it reorganized the Hungarian plant into the component production and export site, specializing on production of engines, cylinder heads, and gear box. Its engine production reached 400 thousands in 2001 [*ITDH 2002: 10*]. Needless to say, this is inextricably linked to the rise of the country as the regional engine supplier.

Furthermore, the Japanese auto assembler, Suzuki began its Hungarian operation, increasing engine imports from Japan [*Somai 2002; van Tulder and Ruigrok 1998*].

In addition to those big players, Italian Fiat with traditionally deep ties with Poland relocated all of production of small car such as Cinquecento and Seicento, bridging between Italy and Poland, while French Renault, has its joint venture, Revoz in Slovena and a bus producer, Karosa in Czech, strengthening supply linkages between France on the one hand, and Slovenia and Czech on the other [*Dunin-Wasowicz, Gorzynski and Woodward 2002: 9-11; Havas 2000: 5-6; Kaminski and Ng 2001: 36-37; Kaminski and Smarzynska 2001*]. The external linkages of the automotive leaders in CEEC10 have been formed and expanded based on the relationships with the home country of MNCs.

4. Internal Consequences of Production Networks Development

4.1 Dominant Presence of Foreign Firms

As shown by the above analysis, the economies of CEEC10 are fully incorporated into the regional production networks organized by EU-based MNCs. It is the substance of reintegration and the dynamics of industrial restructuring of CEEC10. It is based on reorganization of the former as the supply base for the latter, and is featured by asymmetry and stratification. Nevertheless, the hierarchical structure does not immediately mean simple dependency. As far as there is a developmental ladder, there should be any moment for moving up it. Hence, a question is what enables network participants to upgrade their activity in value chains.

A key is what kind of linkage, in addition to extensive ones, is created within each CEECs [*Pavlinek 2004: 54*]. Any industrial structure in a country consists of linkages among sectors or firms. When the domestic networks function well, there could be many backward and forward linkages occurred within the economy, leading to cohesiveness as a national economy [*UNCTAD 2001: 2-3*]. Incorporation of any economy into global or regional production networks could facilitate various industrial transformations through different alignments of networks. Co-evolution of firms and industrial structure built in dynamics of networks brings about a peculiar developmental trajectory. Then, important is strength of domestic linkages, especially linkages between foreign firms and local firms within the economy.

However at this moment, the presence of foreign firms in those countries is preeminent. Most outstanding is Hungary. In 1999, the share of foreign firms for total capital reached 37.8 percent. 71.8 percent of total sales revenue, 74.0 percent of exports and 71.2 percent of imports were attributable to firms with foreign investment commitment, with their shares for total sales and domestic sales 73.0 percent and 56.4 percent. The Poland and Czech economies are also dominated by foreign firms. In Poland, foreign controlled firms accounted for 31.6 percent of revenue, 54.0 percent of gross profit, 44.1 percent of exports, and 65.9 percent of imports in 1999, while in Czech, 38 percent of revenue, 50 percent of profit after tax and 39 percent of output belong to foreign controlled firms in 2001. To a lesser extent than these three economies, in Slovenia, the presence of foreign firms is large. In 2002, their shares for total asset, equity, value-added, exports and imports of goods are 19.1, 16.0, 17.7, 38.2 and 36.5 percent [*Banka Slovenje; Czech Statistical Office, Dunin-Wasowicz, Gorzynski and Woodward 2002; Eleto 2001: 6-10; Hamar 2002; Szanyi 2002b: 12*].

Focusing on manufacturing sector, the dominant position of foreign firms for each economy is clearer. According to WIIW Database, in Hungary, foreign firms accounted for 72.9 percent of equity capital, 82.2 percent of investment, and 88.8 percent of export sales. In Poland, the shares of foreign firms are more than 50 percent of those items, while to a lesser extent, similar situation can be found in Czech (see Table 18) [*Hunya and Stnkovsky 2003*]. And even in Slovenia, the shares of foreign controlled firms are larger in manufacturing sector than in the whole economy, with 27.6 percent of asset, 29.5 percent of equity, 26.7 percent of value-

added, 39.6 percent of exports and 43.3 percent of imports of goods [*Banka Slovenje data; Rojec and Jaklic 2002*].

Table 18: Share of Foreign Manufacturing Enterprises in Selected CEECs (percent)

	Equity Capital			Employment			Investment			Sales			Export Sales		
	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999
Czech	11.5	27.9	41.8	13.1	19.6	26.9	33.5	41.6	52.7	22.6	31.5	42.4	15.9	47.0	60.5
Hungary	67.4	72.7	72.9	36.1	44.9	46.5	82.5	78.7	82.2	61.4	70.0	73.0	77.5	85.9	88.8
Poland	29.3	43.2	50.5	12.0	26.0	29.4	30.6	51.0	63.1	17.4	40.6	49.0	26.3	52.4	59.8

Source: WIIW Database on Foreign Investment Enterprises.

4.2 Patterns of Local Content Ratio

Focusing on individual firms, domestic linkages between MNCs and local firms in CEECs are characterized by diversity to some extent. There can be at least following three types of local procurement activities seen in CEECs.

First, when relocation of production is carried out in the form of green-field investment, local content ratio tends to be low. Usually, it is considered that green-field investment contributes to the host economy because it brings net increase of capital. But a long as spillover effects to the domestic firms in CEECs are concerned, its contribution is significantly limited. This situation is also preeminent in Hungary. For example, the local content ratios of Audi, GM-Opel and United Technologies Automotive, and Philips are negligible with less than 10 percent, while Hungarian suppliers account for just 20 percent of 100 suppliers of Visteon (Ford) Hungary. And Samsung locally procures 25 percent of total inputs, most of which are only low-end plastic parts. In the case of GM-Opel, inputs procured form local firms are confined to battery and motor oil apart from some auxiliary services [*Havas 2000: 6; ITDH 2003; 8-13; Kaminski and Smarzynska 2001:13; Somai 2002b: 11; Szanyi 2002b: 14*].

Second, the local content ratio is higher in MNCs moving on in the form of privatization. The example is VW-Skoda in Czech; the local content ratio of the firm reached 67 percent in 2002. Another example is Fiat in Poland, whose local content is higher than VW-Skoda, with 75 percent. Even in Hungary, the ratio of privatized firm is high. For instance, GE-Tungsram procures more than 60 percent in the country. These evidences suggest that privatization may promote absorption of the previous domestic networks, leading to a creation of local clusters or supplier networks [*ITDH 2003; 8-13, Newton Analysis 2003b:7; Szanyi 2002: 14*].

Third type of local procurement pattern derives from the example of Magyar Suzuki in Hungary. The local content ratio of the firm reaches 40 to 55 percent in 2002. This is also subject to the pattern of Japanese auto assemblers that they tend to establish their own supplier networks in the host country, owing to their peculiar production system of Just-in-Time. But *this is induced also by EU-level policy, specifically EU rules of origin. Foreign companies other than EU-based ones should meet 60 percent of EU content requirement to export their product to EU and association countries.* Therefore, rising of local content ratio was the necessary condition for Suzuki which regarded the plant in Hungary as the export-oriented production sites for the EU markets. Thus, encouraged by the commitment of the Hungarian government, Suzuki searched for suppliers both in the country and intra-EU region, in addition to requiring Japanese suppliers to move on there. It is expected that this will be true of Toyota/PSA planning to start operations in 2005; the supposed initial local content ratio is 40 percent [*ITDH 2003; 8-13, Newton Analysis 2003b:7; Somai 2002: 7; Szanyi 2002b: 14*].

Certainly, it takes long time to find or foster cost-efficient and quality suppliers and to establish backward and forward linkages with them. Therefore, at the initial stages of overseas operation, it might be usual to depend on imports of input. However, unless local firms

participate in supplier chains organized by MNCs and move up to technological ladder of them, this import dependence will continue. These diversified local procurement patterns suggest that some specific conditions enable a degree of local cluster to agglomerate in the host economies.

4.3 Sign of a Dualistic Economy

Nevertheless, even in the case of production relocation through privatization, a larger part of '*local*' (or EU) content is procured by foreign suppliers or joint ventures with foreign firms. Especially, in the automotive sector, almost all of first tier suppliers are foreign firms. Even in the case of Skoda, VW required big suppliers to move on to Czech to supply to Skoda, alluring some 80 foreign components manufacturer by 1998 in the form of acquisition of indigenous suppliers or building green-field sites. VW-Slovak had 1200 suppliers, only two of which were Slovak suppliers in 2000. Magyar Suzuki had 45 suppliers based in Hungary, some 35-40 suppliers from EU countries, and 3 Central European ones. Though it is fostering and upgrading suppliers' capacities through its single sourcing strategy, most of them are partly or wholly foreign owned. In Poland, Daewoo bought FSO and at the same time required its domestic Korean suppliers to establish joint ventures with Polish suppliers, creating Korean-Korean networks in the country [*Hamar 2002: 11-13; Havas 2002: 19-20;Pavlinek 2004: 55; Radosevic 2003:43-44*].

Those situations bear resemblance to the '*dualistic economy*' or '*enclave-type development*' in Southeast Asian economies, such as Thailand, Indonesia, the Philippines, and Malaysia, where linkages between foreign and local firms are lacked or quite weak and networks organized by MNCs replace domestic linkages of local firms [*Pavlinek 2004: 54; Szanyi 2002b: 12-13*]. Cluster of suppliers is likely to bring about synergy and spill-over effects, but in cluster consisting of foreign suppliers, of course, they are confined to within the foreign firms, not spreading to local firms. This is the reason why backward linkages are weak within each CEEC. Therefore, Hungary and Czech set up policies to strengthen linkages or match between local firms and foreign firms. For instance, Hungary started 'Supplier Traget Programme' in 1998 and 'Supplier Integrator Target Programme' in 2000. And Czech launched 'National Subcontracting Programme', while *CzechInvest* tries to raise local content ratio under 'Czech Supplier Development Programme' [*Radosevic 2003:80; Szanyi 2001: 5-6; 2002b: 15-16; UNCTAD 2001: 16-17*]. We could not evaluate these policies at this moment, owing to a short-period. However, we can say that this kind of policy is necessary for CEECs.

5. Concluding Remarks

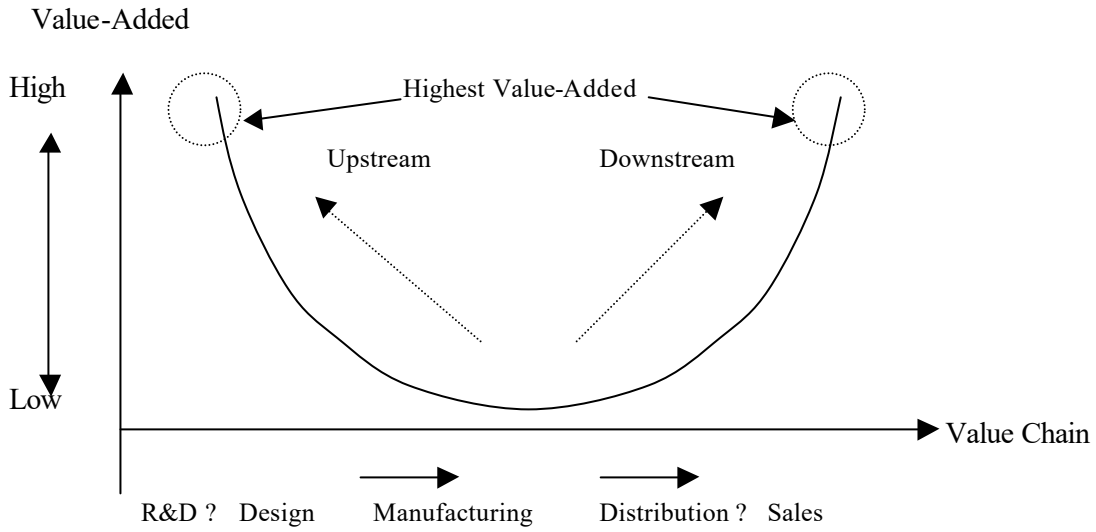
In this paper, we have examined what impact *de facto* integration of CEEC10 into EU-15 gives on their economic development. The process is featured by incorporation into EU-based production networks, through which CEEC10 have created external and internal linkage structures. It results in rapid economic growth and industrial restructuring on the one hand and in dualism economy dominated by foreign firms and with weak linkages to local firms on the other hand. But these are just interim consequences.

MNCs do not regard emerging countries as simple assembly sites using cheaper labor force as argued by authors of 'Newly International Division of Labor (NIDL)' or 'dependency school'. Only if local firms are equipped with appropriate capacities, global players relocate considerably high value-added and sophisticated segments of value chains. Indeed, as shown by some questionnaire surveys, the most important motivations of MNCs to enter CEECs are utilization of cheaper labor forces and the potential markets or penetration into the EU markets via CEECs with the European agreement. On the other hand, endowment of high quality and

high educated human resources is also the significant motivation for MNCs. This implies that there is much possibility for CEECs to upgrade [*Marinova and Marinov 2003b*].

In addition, recent global restructuring of manufacturing sector takes the form of decentralization of production. Intensified competition among MNCs requires them to establish lower cost and more flexible production system, which in turn accelerates relocation of production into peripheral regions and production sharing with late-comer firms from emerging economies [*Borrus and Zysman 1998*]. The geographical relocation of manufacturing segments into low-cost sites, in turn, combined with technological innovation (especially modularization), makes manufacturing technology standardized and its value-added increasingly deflated, eliciting so-called '***smiling curve of value chain***' (see, Figure 10). The figure suggests a possibility that MNCs increasingly specialize in the highest value-added poles of chains, R&D and marketing, in order to maximize their profits without massive capital investment. Thus, even highly sophisticated segments of manufacturing (and design) are likely to be relocated into developing countries.

Figure 10: Smiling Curve of Value Chain in Manufacturing



Source: Author's own Construction.

Late-comer firms including those in CEECs are faced with the '*common*' making mechanism of global manufacturing, fragmentation of production and sharing. Ongoing structural changes in global manufacturing promote decentralization of production, which provides some moment for upgrading, while we should realize that in the same mechanism, there are some pressures to lock them into low value-added segments of value chains[25]. Certainly the moment, possibility and way for upgrading might be different in various sectors. However common is the fact that successful participation into production networks depends on local capacities to establish external and internal linkages. The more national or local networks

[25] In addition, the intensified competition is also likely to raise the risk for re-relocation of production from CEECs to lower cost countries, especially China. For instance, from 2000 to 2001, Mannesmann closed and relocated car audio plant from Hungary to China and Lexmark did production of printed circuit board to the country, while Elcoteq discontinued production of mobile phones in Hungary and Estonia, relocating also to China [*Pavlinek 2004: 55-56; Radosevic 2002a: 42*]. The problem for CEECs is that they could never defeat the competitor with massive cheaper labor forces only by the low-wage strategy.

are developed, the more sustainable their cooperative relation with foreign firms will be[26]. If local production networks are weak or underdeveloped, local firms could not but enter subordinate alliance with them or be excluded from networks [*Radosevic 2002a: 37*].

Thus, a next question is how they can enhance such local capacity. Incorporation into EU-based networks has brought about recovery from transition depression and a degree of industrial upgrading in CEEC10. But the dynamics have not yet been associated with deepening local or internal linkages. For the purpose, it would be necessary for them to build up some institutional framework. It would be the future research subject.

[26] For example, the most successful Polish apparel firm, Vistula SA, has re-established its domestic brand name and through the developmental process, it has organized domestic (or neighbor-country located) subcontractors and thereby it has created its own domestic networks, maintaining external linkages as OEM/ODM [*Radosevic 2003:53-54; Yoruk 2002a: 2002b*]. There are some electronics firms such as Iskra, Tesla Ecimex, VEF and Videoton that have succeeded in transforming into contract manufacturers based on the domestic networks inherited from the socialist era, not dismantling them [*Dyker et al. 2002: 7; Radosevic 2002a: 38; Radosevic 2003:54, Radosevic and Yoruk 2001*].

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Annex I: Parts and Component based on SITC Rev.2.

Parts			
Parts of boilers and auxiliary plant of headings	7119	Parts of the electric power machinery	77129
other than outboard for marine	71332	Switchin g Gear parts	772
Piston engines parts	7139	electric machinery parts	77589
Parts of the engines and motors	7149	Electronic components, parts	77689
Parts of rotating electric plant	7169	Parts of electric accumulators	77819
Parts of the machinery for harvesting	72129	Electrical parts of machinery and apparatus	77889
Parts of spinning machinery	72449	Motor vehicle parts and accessories	784
Loom, knit machinery parts	72469	Parts and accessories for cycles	78539
Textile machinery parts	72479	Parts of trailers	78689
Parts of machinery for paper milling	7259	Parts of the railway, tramway locomotives	79199
Parts of printing and typesetting machinery	7269	Parts of the aircraft	7929
Parts of mineral working machinery	72839	**Component**	
Parts of machines of other industries	72849	Motor vehicles piston engines	7132
Parts of tools of metal	7369	Generating sets with internal combustion piston engines	71623
Rolls for and parts of rolling mills	73729	Ignition, starting equipment, generators, & parts	77831
Parts of refrigerators and refrigerating equipment	74149	Electric lighting equipment; defrosters, etc, parts	77832
Parts of pumps and liquids elevators	7429	Electrical line telephonic & telegraphic apparatus	7641
Parts of app of filters	7439	Microphones; loud-speakers; audio-frequency electric amplifiers	7642
Parts of machinery of loading	7449	Television picture tubes, cathode ray	7761
Packing etc. machinery parts	74523	Other electronic valves and tubes	7762
Machinery parts, non-electrical	74999	Diodes, transistors, photocells, etc	7763
Parts of and accessories for office machinery	759	Electronic microcircuits	7764
Telecom equipment parts and accessories	764		

Source: The United Nations' Homepage (http://unstats.un.org/unsd/comtrade/mr/rfReportersList.aspx).

Annex II: Electronics Parts and Component based on Harmonized System (HS) code

Electronics Parts and Component	HS-code
Parts, Accessories, except Covers, for Office Machine	8473
Electric Transformers, Static Converters and Rectifier	8504
Audio-electronic Equipment, except Recording Devices	8518
Parts, Accessories of Audio, Video Recording Equipment	8522
Prepared Unrecorded Sound Recording Media (Non-photo)	8523
Parts for Radio, TV Transmission, Receive Equipment	8529
Electrical Capacitors, Fixed, Variable or Adjustable	8532
Electrical Resistors and Rheostats except for Heating	8533
Electronic Printed Circuits	8534
Electrical Apparatus for Voltage over 1 kV	8535
Electrical switches, connectors, etc, for < 1kV	8536
Thermionic and Cold Cathode Valves and Tubes	8540
Diodes, Transistors, Semi-conductors, etc	8541
Electronic Integrated Circuits and Micro-assemblies	8542

Source: the United Nations' Homepage
(http://unstats.un.org/unsd/comtrade/mr/rfReportersList.aspx).

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