



PRIME MINISTER'S OFFICE  
ECONOMIC COUNCIL OF FINLAND



20 September 2006

Mika Widgrén<sup>1</sup>

## Challenges created by the new EU Member States and third countries

This paper is a contribution to the project *Globalisation Challenges for Europe and Finland* organised by the Secretariat of the Economic Council. The project is a part of Finland's EU Presidency programme and its objective is to add momentum to the discussion in the European Union on globalisation, Europe's competitiveness policy and the Lisbon strategy.

---

<sup>1</sup> Turku School of Economics.



# Contents

SUMMARY .....	5
1 INTRODUCTION .....	7
1.1 Preliminaries.....	7
1.2 Evaluating comparative advantage .....	8
2 SPECIALISATION PATTERNS IN TRADE BETWEEN THE EU15 AND THE SAMPLE COUNTRIES.....	11
2.1 Non-EU countries .....	11
2.2 New member states .....	13
3 RECENT DEVELOPMENT WEIGHTED AVERAGE RCA IN SELECTED COUNTRIES.....	14
4 CONCLUSIONS.....	16
REFERENCES .....	19



## EXECUTIVE SUMMARY

This paper investigates the recent development of selected countries' comparative advantage. The main emphasis is if there is evidence on increasing overlap in countries' specialization patterns as this might be a sign of increasing unbundling of industrial output. The analysis shows that that specialization patterns of the new EU member state have become more heterogeneous. This is mainly due to considerable shifts in certain countries' revealed comparative advantage. From the Finnish point of view the most interesting cases in Europe are Estonia and Hungary and China in Asia. The factor content of these countries' exports has shifted rapidly towards intensive use of human capital and, especially in Estonia and Hungary, it has become more similar with Finnish specialisation patterns. At the same time Finnish firms have invested actively to these countries. FDI in these countries is related with telecommunications industry. Finnish firms overall FDI stock almost five-fold during the same period. FDI stock of manufacturing industry has more than four-fold and in services FDI stock is now ten times bigger than a decade ago. Rapid expansion of Finnish FDI stock in Estonia and Hungary and following job creation in Estonian and Hungarian industrial sector has not, however, been associated with job destruction in Finnish telecommunication industry. At least qualitatively it seems that unbundling of Finnish telecommunication industry's production has led to 'hollowing out' tendency Finnish industry, especially in electronics.



# 1 INTRODUCTION

## 1.1 Preliminaries

Economic integration or trade liberalisation in general has substantial effects on the location of economic activities. Differences in comparative advantage across countries determine specialisation patterns at the inter-country level, while at intra-national level the forces of new economic geography are at work. The former mechanism works even in the absence of factor mobility across nations – trade and international factor mobility are substitutes – whereas the latter works when factors of production are mobile and trade is not costless. A combination of trade costs and scale economies generates agglomeration forces that encourage geographical clustering of production and economic activities in general. This clustering may create regions with many economic activities and others with very few or almost none. On the other hand, agglomeration forces may lead to sectoral clustering: one sector clusters into one region while other sectors cluster in other regions. The geographical distribution of economic activities is then very concentrated in each sector but dispersed at the level of all sectors.

Economic integration and globalisation in general has a hump-shaped impact on industrial location. Agglomeration forces are at their strongest when trade costs are intermediate. Consequently, during the so-called first wave of globalisation (see Baldwin 2006), reducing trade costs tend to concentrate manufacturing in the rich North. In the second wave, when trade costs are very low and previously non-tradable tasks become tradable location of production becomes irrelevant. This, in turn, tends to lead to industrialisation in the South and de-industrialisation in the North. The latter phase of globalisation is unbundling industrial production into smaller parts as components or different tasks within a production process can be made in different locations not necessarily close to each other. Especially, the second phase affects tasks that can be easily codified or transmitted electronically.

One way to approach potential unbundling is to utilise data on international trade flows and evaluate different countries comparative advantage. Unbundling is likely to be more intense between countries that have similar specialisation patterns and are located relatively close to each other. The latter can be justified by arguing that although distance has lost a part of its relevance it is still a significant ingredient in gravity models. Similar specialisation patterns lead to increasing intra-industry trade that is often based on input-output linkages within production chain. Agglomeration forces are then at work at inter-country level not only at intra-country level as overlap in comparative advantage might lead to regions not necessary bounden by national borders. High-tech industries

and the Baltic Sea region serve as an example. Abundance in skilled labour might shift tasks from high-wage countries to low-wage countries when their wage gap exceeds their productivity gap. This, in turn, leads to a wage and income convergence between the North and the South. The trade relations between Estonia and Finland serve as a good example.

In this comment, we concentrate on comparative advantage and evaluate the specialization patterns of the old and new member states of the EU and selected countries from Asia and the Americas in the latter half of the 1990s and early 2000s. Our investigation is based on the concept of *revealed comparative advantage (RCA)*. The basic logic behind RCA is to evaluate comparative advantage on the basis of a country's specialization in (net) exports relative to some reference group. The most general point of reference would be the world as a whole but due to the lack of data we have chosen to use data on intra-EU trade plus trade between the EU and our sample countries in this study.<sup>2</sup> Using these data, we draw some conclusions on how globalisation has affected specialisation patterns in our sample countries and comment the differences and similarities among them.

## 1.2 Evaluating comparative advantage

In this comment, we approach comparative advantage simply through direction of trade flows. This reveals countries' specialization patterns and hence their revealed comparative advantage, though not the source of this advantage. The measure of revealed comparative advantage (RCA), the Balassa index (BI), is simply calculated as the ratio of the share of a given product in a country's exports to another country or region to the share of the same product in that country or region's total exports. If the ratio is greater than one for given product the country is said to have RCA in exports of that good.

RCA alone, however, only shows which goods countries tend to specialize in their trade. It does not reveal the origins of comparative advantage. According to the Heckscher-Ohlin theorem a given country's comparative advantage (or disadvantage) is determined by its factor endowments. A country has a comparative advantage in those sectors that use intensively the productive factors that are abundant in the country. Cross-country trade patterns are determined by differences in comparative advantage: a country will export goods whose production uses intensively the factors that are relatively abundant (and thus comparatively cheap) in that country before trade and import those

---

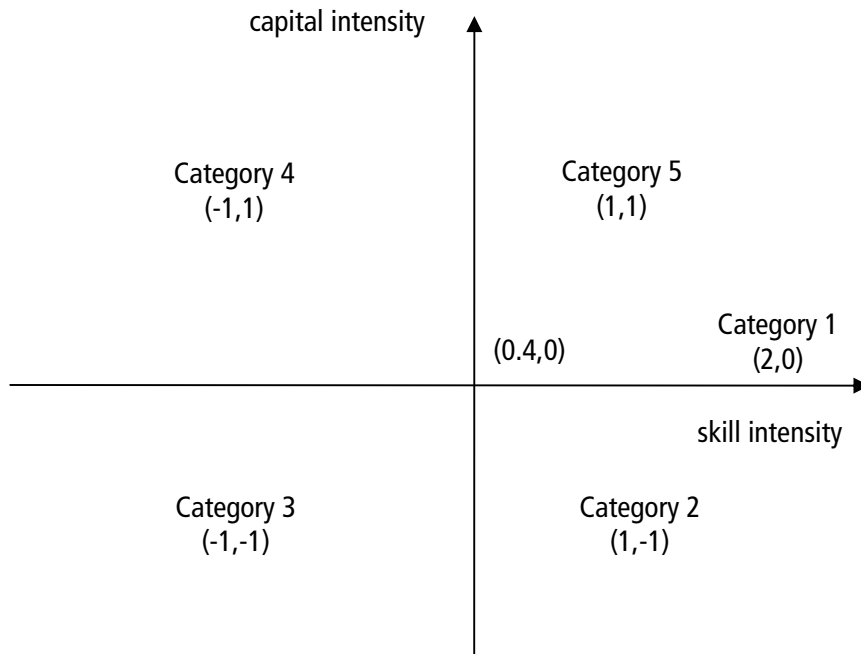
<sup>2</sup> Recently, similar methods have been applied quite extensively in studying specialisation patterns in trade between the EU15 and the new member states and Russia (e.g., Neven 1995, Kaitila 2001, 2004, Kaitila and Widgrén 2003, Algieri 2004, Widgrén 2004).

goods whose production would require the use of relatively scarce (expensive) factors.

To carry out this investigation of the factor content of countries comparative advantage we divide traded goods into five categories according to the factor intensity of their production. To that end, we follow the methodology and classification proposed by Neven (1995) in his study on the eastern enlargement of the EU. Traded goods are categorized, on the one hand, according to capital intensity (high, intermediate, low) and, on the other hand, according to skilled vs. unskilled labour intensity.

Figure 1.1 gives a graphical illustration of the classification. Category 1 is characterised by a high share of wages in value added, very high average wages, and a very high proportion of white-collar workers. These are typically high-tech industries where human capital is used intensively in production. Category 2 comprises production activities intensive in human capital, but low physical capital intensity. This category includes industries which have a relatively low level of investment relative to value added, high wages, and a high share of wages in value added. Manufacturers of electrical machinery and equipment serve as an example from this category. Category 3 includes production intensive in labour and which uses relatively little capital. Average wages are low, and there is a low level of investment and a high share of wages in value added. An example from this category is textiles and apparel industry.

**Figure 1.1** A quantification of Neven's categories



Category 4 includes industries that are intensive in labour and capital. These industries have a high level of investment, relatively low wages, a low proportion of white-collar workers, and an intermediate share of wages in value added. Automobile manufacturing, for instance, falls under this category. Category 5 is dominated by the forest and food-processing industries that are intensive in both physical and human capital. Also the paper industry belongs to this category. Table 1.1 summarises the characterisation of the categories.

**Table 1.1** A summary of the properties of the five industry classification categories

Intensity Category	Human capital	Labour	Physical capital	Example
1	Very high	High	Intermediate	High tech
2	High	High	Low	Electrical equipment
3	Low	High	Low	Textiles
4	Low	Low	High	Car industry
5	High	Low	High	Paper industry

Source: Widgrén (2005).

## 2 SPECIALISATION PATTERNS IN TRADE BETWEEN THE EU15 AND THE SAMPLE COUNTRIES

### 2.1 Non-EU countries

In the following, we evaluate the differences and similarities of RCA in trade between the EU15 and 12 important non-EU15<sup>3</sup> trading partners excluding the new member states. Countries in the sample are selected subjectively based on their general importance in world trade. They include countries in Asia, and North and South America. With respect to the CEE10 countries, we rely on the results presented earlier in Kaitila (2004). We, however, modify his findings to make them comparable to ours.

Table 3 reports the shares of the above-described categories in 2002 and their change from 1996 to 2002. The results suggest that the intensive use of low-skilled labour forms the major base in revealed comparative advantage in Asian countries other than Japan and in Russia. Among the Asian countries examined, Korea and Thailand are, however, exceptions as the total percentage of categories 3 and 4 in these countries is roughly the same as in the EU15. In the NAFTA countries, RCA stems clearly less from intensive use of low-skilled labour than in other countries or regions.

As a general conclusion, the upper panel of Table 3 suggests that intensive use of skilled labour forms the base of RCA in the U.S. and Korea and to a lesser extent in the EU, other NAFTA countries, Thailand and China. The basis of RCA in intensive use of capital is the highest in Brazil, India and Russia. Perhaps more interesting than the levels are the changes in RCA patterns between 1996 and 2002 shown in the lower panel of the table. Here, one can immediately see a clear shift from low-skilled labour to intensive use of high-skilled labour as the base of RCA in China, Mexico and Indonesia.

Note that the same development from intensive use of low-skilled to high-skilled labour occurs also in the U.S. and Korea, which have the highest shares in intensive use of skilled labour as the base of RCA (see the upper panel of Table 3). In the U.S., Canada and Korea, this development takes place also at the cost of capital intensity. With respect to the U.S. and Korea, the development suggests that export specialization occurred in industries characterised by intensive use of skilled labour already in 1996. The other countries are now gradually catching up.

---

<sup>3</sup> We have used Eurostat trade statistics which, unfortunately, do not contain 1996 data for the new member states. That is why we concentrate on the EU15 in what follows.

**Table 2.1** The share of RCA sectors in skill-capital-intensity classes in 2002 and the change in shares from 1996 to 2002 in selected countries and the EU15.

	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>3+4</i>	<i>1+2+5</i>
EU15	30.6	20.6	6.8	38.0	4.0	44.8	55.2
Brazil	3.0	24.9	5.0	39.9	27.1	44.9	55.1
China	23.0	13.3	24.7	38.4	0.6	63.0	37.0
India	7.7	8.0	37.4	42.2	4.7	79.6	20.4
Korea	43.1	9.8	17.7	29.3	0.0	47.1	52.9
Mexico	39.5	25.0	1.7	25.5	8.3	27.2	72.8
Russia	6.8	5.0	0.1	83.7	4.4	83.8	16.2
Thailand	26.9	14.9	16.8	35.6	5.8	52.4	47.6
Turkey	1.0	8.9	46.5	34.5	9.2	81.0	19.0
U.S.	51.7	33.7	1.6	9.4	3.6	11.1	88.9
Canada	26.3	20.9	3.3	26.9	22.6	30.2	69.8
Indonesia	15.2	16.1	36.5	25.4	6.8	61.9	38.1
Japan	31.5	22.1	2.4	44.0	0.0	46.4	53.6

	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>3+4</i>	<i>1+2+5</i>
EU15	10.6	-8.1	-2.1	-0.4	0.0	-2.6	2.6
Brazil	0.3	-1.7	-1.1	5.2	-2.7	4.1	-4.1
China	15.5	2.1	-9.1	-8.2	-0.4	-17.3	17.3
India	3.2	-4.0	0.5	2.4	-2.2	2.9	-2.9
Korea	2.6	-0.6	1.7	-3.6	0.0	-1.9	1.9
Mexico	18.3	9.6	-1.0	-25.4	-1.5	-26.4	26.4
Russia	-0.6	0.8	-0.4	-0.3	0.4	-0.6	0.6
Thailand	0.0	-2.3	-0.1	7.3	-4.9	7.2	-7.2
Turkey	-5.2	1.0	-3.9	12.5	-4.4	8.5	-8.5
U.S.	2.5	5.7	-0.9	-4.9	-2.5	-5.8	5.8
Canada	5.1	7.2	1.2	-4.5	-8.9	-3.4	3.4
Indonesia	10.0	-0.6	-1.7	-7.0	-0.7	-8.7	8.7
Japan	-3.0	1.3	0.1	1.7	0.0	1.8	-1.8

Source: Author's calculations.

The EU is an interesting exception. Its specialisation is increasingly based on industries that use high-skilled labour intensively, though this takes place at the cost of intensive use of intermediate-skilled labour (Category 2) rather than low-skilled labour.

## 2.2 New member states

Table 2.2 gives the figures for the CEE10 countries with the difference being that the reference year is 1993 instead of 1996. Compared to our sample countries, specialisation in the CEE10 countries is based more on intensive use of low-skilled labour. With the exception of Hungary, the Czech Republic and Estonia, the new member states are in this respect comparable to India, Russia and Turkey. Specialisation in the new member states also seems to be based more on intensive use of capital.

**Table 2.2** The shares of CEE10 countries' RCA sectors in skill-capital-intensity classes in 2002 and the change in shares from 1993 to 2002.

	1	2	3	4	5	3+4
Bulgaria	4.4	6.7	48.8	35.8	4.2	84.6
Czech Rep.	12.9	23.8	10.7	51.3	1.3	62.0
Estonia	26.0	10.6	21.3	39.4	2.7	60.7
Hungary	25.8	17.8	11.3	44.3	0.8	55.6
Latvia	2.1	2.6	24.5	69.8	1.0	94.3
Lithuania	12.9	8.5	42.4	31.2	4.9	73.6
Poland	4.6	14.0	23.5	53.7	4.3	77.1
Romania	1.5	10.6	68.5	18.5	1.0	87.0
Slovakia	7.4	13.5	17.6	59.6	1.9	77.2
Slovenia	3.8	25.5	15.1	55.4	0.2	70.5
	1	2	3	4	5	3+4
Bulgaria	-4.0	-1.0	13.2	1.4	-9.5	14.5
Czech Rep.	5.5	11.9	-16.2	3.4	-4.6	-12.9
Estonia	20.6	3.4	-4.4	-18.6	-1.0	-23.0
Hungary	16.3	5.3	-27.6	10.5	-4.5	-17.1
Latvia	-3.2	1.1	8.4	-3.8	-2.5	4.6
Lithuania	-4.2	6.7	22.3	-15.9	-8.9	6.4
Poland	-1.0	7.8	-18.3	15.8	-4.3	-2.5
Romania	-1.4	7.3	-1.1	-3.3	-1.7	-4.3
Slovakia	-0.1	6.4	-16.0	16.4	-6.7	0.4
Slovenia	1.9	6.2	-19.9	12.9	-1.1	-7.0

Source: Kaitila (2004).

In terms of specialising in activities which use high-skilled labour intensively (Category 1), Hungary and Estonia differ from other CEE10 countries. The percentage of Category 1 RCA sectors in these countries is comparable to the EU15, Canada, Thailand and China. They have also experienced changes in patterns of RCA similar to China, Mexico and Indonesia: from intensive use of low-skilled to high-skilled labour as the determinant of RCA.

### 3 RECENT DEVELOPMENT WEIGHTED AVERAGE RCA IN SELECTED COUNTRIES

In the following, we make an attempt to summarise our sample countries' RCA in the five above-described categories. We do that by computing a weighted average of countries' category-wise RCA using the distribution of their exports in RCA sectors over the categories shown in Tables 2.1 and 2.2 as the weight. Each category is given a two-dimensional vector value as described in Section 1.2 above. It is worth noting that the coordinate values that describe different categories are rather arbitrary (see Figure 1.1 above).<sup>4</sup> For instance if one country's weighted average on the horizontal skill-intensity dimension is 1 and another country's is 0.5, this does not mean that the former country has RCA in production using skill-intensive labour twice the amount as in the latter country.

The weighted average RCAs are plotted in Figure 3.1. If a country has 20 per cent of its RCA exports in each category, the weighted average RCA (WARCA) would be at point (0.4,0.0). This serves as a good reference point. If a country's WARCA is in the North-East quadrant relative to (0.4,0.0), it has a comparative advantage in sectors that intensively use both physical and human capital. In our sample, Canada, the EU, Japan and Korea are such countries.<sup>5</sup> A country that differs from all the others is the U.S., which has comparative advantage in sectors that intensively use human but not physical capital.

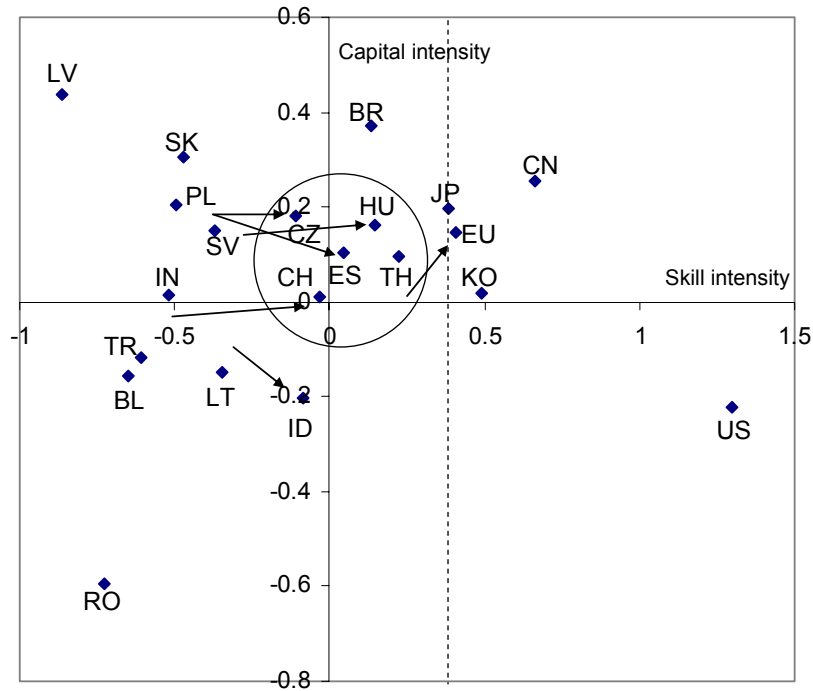
Among the other countries, we have excluded Mexico and Russia from the analysis since only a minor part of their exports can be divided into Neven's categories. Russia would be located very close to Latvia, while Mexico would fall close to Hungary. Comparing the new member states to Asian countries, Figure 3.1 reveals that Estonia, Hungary, the Czech Republic, Thailand and China have similar WARCA values: they are slightly below the origin at the skill-intensive dimension and slightly above the capital intensity origin. The common feature for these countries with the exception of Thailand is that they have moved considerably towards the skill-intensity dimension. In graphical terms, these countries have moved rightwards from outside the circle to inside the circle where Thailand already was in 1996. The circle is plotted just to illustrate the region where most of the countries with big shifts in the factor content of WARCA end up in. To summarize, there seems to be some convergence in WARCA and some of the Asian countries share the development with some of the new member states.

---

<sup>4</sup> For an alternative choice, see Kaitila (2004).

<sup>5</sup> Note, however, that RCA of Canada and the EU was not robust when non-normalised weights were used (see table 7).

**Figure 3.1** Weighted average RCA in sample countries in 2003 and the most substantial shifts in it between 1996 and 2003



The countries whose location has remained very stable on the skill-intensive part are the U.S., Canada, Japan and Korea and the CEE10 countries excluding Hungary, the Czech Republic, Estonia, Turkey, India and Brazil. Indonesia has shifted slightly away from capital-intensive production and has moved considerably towards skill-intensive production. With regard to the latter it is at the same level as China and the other countries within the circle. The EU has shifted in a North-East direction, meaning that its WARCA is based more on intensive use of physical and human capital. It has reached Japan and Korea during the latter half of 1990s and early 2000s.

In sum, Figure 3.1 and the analysis in the previous sub-section demonstrate that there is some convergence in terms of WARCA between the countries whose comparative advantage has already earlier been based on intensive use of skilled labour. In our sample there are examples of these both from Asia and among the new member states. On the other hand, most of the examples are such that their WARCA has been very stable during the past years. In this group we also find examples from Asia and new member states. All countries that had relatively skill-intensive exports in 1996 (x-coordinate greater than 0.4) are such cases. The EU has managed to move to this group between 1996 and 2003.

## 4 CONCLUSIONS

The analysis demonstrates that, among our sample of countries, the U.S. is a clear exception in terms of the determinants of its revealed comparative advantage. Its comparative advantage is based on more intensive use of highly skilled labour than in any other country in our sample and not on physical capital. Asian countries and the new member states have considerable overlap in their comparative advantage. These countries can be divided into three groups: 1) those who converge towards the countries whose RCA is based on intensive use of human capital and not so much physical capital (Estonia, Hungary, the Czech Republic and China), 2) those who do not converge and their RCA is based on intensive use of unskilled labour and not physical capital (Romania, Lithuania, Turkey and India) and 3) those who do not converge and their RCA is based on intensive use of unskilled labour and physical capital (Latvia, Slovakia, Poland and Slovenia). Globalisation is likely to intensify competition between productive firms operating in these areas.

In terms of intensive use of human capital, the EU15 has shifted in a skill-intensive direction. It reached Japan and Korea during the latter half of the 1990s and early 2000s. Also in this group there seems to be considerable overlap in comparative advantage. In terms of intensive use of human capital, the EU15 is not, however, a homogeneous group. The most skill intensive exports are sent by Ireland, the UK and the Netherlands, which are almost at the same level as the U.S. Finland represents the upper average of the EU, with Sweden and Belgium following closely. The other EU nations are in this respect very close to the countries that have been able to increase the use of human capital in their exports and have converged towards the most advanced countries in this respect.

Generally, it seems that revealed comparative advantage has become more heterogeneous among the new member states and Asian countries of our sample. In most of the sample countries there are no significant shifts between 1996 and 2003. Increasing heterogeneity is due to big shifts in certain countries. From the Finnish point of view the most interesting cases in Europe are Estonia and Hungary and China in Asia. These countries have experienced a similar shift towards human capital based WARCA during the late 1990s and early 2000. Unfortunately, the Bank of Finland FDI data do not provide sufficient information concerning China but the data on Estonia and Hungary show that the Finnish-based FDI stock in these countries is considerably higher than in any other new member state. In Estonia, Finnish FDI stock has increased from 43 to 857 million euros between 1996 and 2005 and in Hungary the respective numbers are 26 and 910 million. Estonia is also one of the most important intra-industry trade partners of Finland the share of IIT of total trade being the third highest

after Sweden and Germany. A considerable part of Finnish FDI in Estonia and Hungary is linked with telecommunications industry. Finnish firms overall FDI stock almost five-fold during the same period. FDI stock of manufacturing industry has more than four-fold and in services FDI stock is now ten times bigger than a decade ago.

**Figure 4.1** Employment in Finnish telecommunication and manufacturing industries (1995=1).

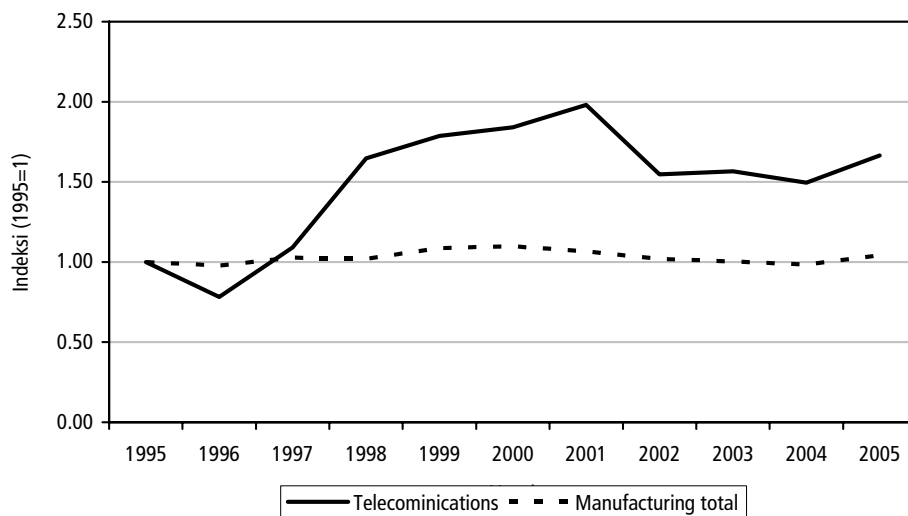


Figure 4.1 shows the development of employment in telecommunication industry and manufacturing industry in total. The figure clearly demonstrates that employment has remained practically constant and increased significantly in telecommunication industry. Hence, the rapid expansion of Finnish FDI stock in Estonia and Hungary this job creation in Estonian and Hungarian industrial sector has not been associated with job destruction in Finnish telecommunication industry. At least qualitatively it seems that unbundling of Finnish telecommunication industry's production has led to 'hollowing out' tendency (see Baldwin 2006) in Finnish telecommunication industry. There some labour-intensive stages of telecommunication industry's production are carried out in Estonia or Hungary leaving R&D and the most high-tech stages to Finland and even increasing industry's domestic employment considerably. Input-output linkages cross the Bay of Finland have benefited and expanded Finnish telecommunications industry and hasn't led to de-industrialisation. Moreover, 'hollowing out' tendency is even more general in Finland as employment in manufacturing industry has remained constant despite the fast accumulation of FDI stock abroad. In sum, Industrialisation of South does not necessarily de-industrialise North but can also be beneficial at least in some specific industries.

The 'hollowing out' tendency has also raised productivity and wages of Estonian and Hungarian workers and the income levels of these countries compared to the old EU states. Indeed, Kaitila (2004) finds some evidence that economic growth and convergence has been faster in those new member states where revealed comparative advantage has shifted towards skill-intensive direction. In Asia, China serves as the best example of such development.

## REFERENCES

- Algieri, B. (2004): Trade Specialisation Patterns: The Case of Russia, BOFIT Discussion Papers 19/2004.
- Balassa, B. (1965): Trade Liberalization and Revealed Comparative Advantage, *The Manchester School of Economic and Social Studies* 33, 99–123.
- Baldwin, R. (2006): Globalisation: a great unbundling, report to the Prime Minister's Office, August 2006.
- Kaitila, V. (2001): Accession Countries' Comparative Advantage in the Internal Market: A Trade and Factor Analysis, BOFIT Discussion Papers 3/2001.
- Kaitila, V. (2004): The Factor Intensity of Accession and EU15 Countries' Comparative Advantage in the Internal Market, *The Research Institute of Finnish Economy, Discussion Papers* 926.
- Kaitila, V. & Widgrén, M. (2003): Revealed comparative advantage in trade between the European Union and Baltic countries, Pettai, V. & Zielonka, J. (eds.): *The Road to the European Union*, Manchester University Press.
- Neven, D. (1995): Trade Liberalization with Eastern Nations: How Sensitive, teoksessa Faini, R. & Portes, R. (eds.): *European Union Trade with Eastern Europe: Adjustments and Opportunities*, CEPR.
- Widgrén (2000): Comparative Advantage, Intra-Industry Trade and Location in the Northern Dimension, in Alho, K.E.O., ed., *Economics of the Northern Dimension*, The research Institute of the Finnish Economy B 166.
- Widgrén, M. (2004): Suomen, Aasian ja uusien EU-maiden suhteellinen etu ja kilpailuasetelmien muutos (Revealed comparative advantage of Finland, Asia and the new EU member states), in Finnish, *The Research Institute of the Finnish Economy, Discussion Paper No. 941*.