ETLA
ELINKEINOELÄMÄN TUTKIMUSLAITOS
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
Lönnrotinkatu 4 B 00120 Helsinki Finland Tel. 358-9-609 900
Telefax 358-9-601 753 World Wide Web: http://www.etla.fi/

Keskusteluaiheita – Discussion papers

No. 1034

Mika Widgrén*

TRADE POTENTIAL, INTRA-INDUSTRY TRADE AND FACTOR CONTENT OF REVEALED COMPARATIVE ADVANTAGE IN THE BALTIC SEA REGION

* *Turku School of Economics, The Research Institute of the Finnish Economy (ETLA), CEPR and CESifo.* *The author thanks Erik Berglöf, Karolina Ekholm, Märten Ross and Ksenia Yudaeva for valuable comments.*

ISSN 0781-6847 01.09.2006

WIDGRÉN, Mika, **TRADE POTENTIAL, INTRA-INDUSTRY TRADE AND FACTOR CONTENT OF REVEALED COMPARATIVE ADVANTAGE IN THE BALTIC SEA REGION.** Helsinki: ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 2006, 26 p. (Keskusteluaiheita, Discussion Papers, ISSN 0781-6847; no. 1034).

ABSTRACT: This paper investigates trade potential, intra-industry trade and comparative advantage in the Baltic Sea Region. The evaluation of region's comparative advantage and intra-industry trade are based on the Balassa index of revealed comparative advantage and the Grubel-Lloyd index respectively. The analysis is carried out at HS 4-digit level. Trade potential is assessed using applying earlier versions of the gravity model of international trade.

The actual trade flows analysis suggest that the BSR has reached its potential importance in intra-EU25+ (EU25, Norway and Russia) trade. In this respect the countries within BSR differ, however, considerably. BSR's share falls considerably below its potential share in Russia's, Latvia's and Norway's European exports. The overall conclusion in trade potential analysis is that the centre of gravity within BSR is likely to move gradually from Stockholm-Hamburg –axis somewhat to the east.

The major part of the analysis concentrates on the factor intensities of the Baltic Sea Region's comparative advantage and its overlap with a sample of other countries. The analysis demonstrates surprisingly big changes in some Baltic Sea Region's countries specialisation patterns. The paper shows that in nearly all countries in the Baltic Sea Region the factor contents of revealed comparative advantage has shifted towards less physical capital intensive and more human capital intensive direction. Especially, Finland, Estonia and Poland are best examples in this respect. In 1996, the picture of the factor contents of the region's comparative advantage was clearly polarised but there has been some convergence after that.

In terms of intra-industry trace the region can be divided to the northern and southern triangles. The former consists of Finland, Sweden and Estonia and the latter of Germany, Denmark and Poland. These two are linked via Sweden.

Key Words: comparative advantage, factor intensity, Baltic Sea region

JEL-codes: F10, F15

1. Introduction

Economic integration or trade liberalisation in general has substantial effects on the location of economic activities. At international or inter-country level countries' comparative advantage determines their specialisation pattern while at intra-national level the forces of new economic geography are at work. The former mechanism works without any mobility of productive factors 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 a lot of economic activities and others with very little or almost none. On the other hand agglomeration forces may lead to sectoral clustering: one sector clusters into one region but 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.

The first topic of this paper is to characterise the Baltic Sea Region (BSR) as a trading area. There are four potential causes that affect the geographical orientation and specialisation patterns in the BSR-countries trade. First, the BSR is peripheral region. Therefore it is likely that the relative importance of the region is higher for those BSR-countries that have recently during the 1990s opened up to trade. On the one hand this boosts intra-region trade and economic activities but, on the other hand, may also make the region more isolated from the rest of Europe. However, the as the BSR-countries form a natural trading area and as at least visible trade barriers are, with an exception of Russia, the same in intra-BSR trade and in trade with the EU it is likely that the trade diversion effects remain very small. Second, the income differences between the BSR-countries are significant. Deepening integration within the area tends to lead to an outflow of capital from the region's high-income to low-income countries and an inflow of labour from low-income to high-income countries. This in turn affects specialisation patterns in intra-region trade. Third, trade policy affects both geographical orientation and specialisation in intra-regions trade. It is worth emphasising that despite the relatively small size and peripheral location there are several trade policy regimes within the BSR. Fourth, a special feature of the region is that it consists of nine small countries and one big country. The former group can be further divided into small countries Finland, Sweden, Norway, Denmark, Poland and Russia and tiny Baltic states. In terms of economic size, Germany is the only big country in the region.[1] The BSR without Russia and Norway accounts for 27 per cent of EU25 total output and the BSR for 30 per cent of the output of EU25 plus Russia and Norway.

Another theme of the analysis in this paper is the comparative advantage and an evaluation of the specialization patterns in the BSR and their development between 1996 and 2002. Our investigation concerning the specialisation patterns 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 its (net) exports relative to some reference group. The most general possibility would be the World but due to data availability we have chosen OECD as the reference group in this study. It is worth noting that the OECD data do not contain the Baltic countries. To proxy Baltic countries' exports we have used their

[1] For a discussion of these causes in the context of the Northern Dimension, see Widgrén (2000).

exports to the EU instead using Eurostat data. Since some 70 per cent of the Baltic countries exports go to the EU it is very likely that their specialisation pattern in exports to the rest of the World is very similar. Moreover, the Baltic countries are relatively small – it is not likely that disregarding 30 per cent of their exports will cause substantial bias.

Recently, RCA has been used quite extensively in studying specialisation patterns in trade between the EU15, the new member states and Russia (e.g. Neven 1995, Kaitila 2001, 2004, Kaitila and Widgrén 2003, Algieri 2004, Widgrén 2004).

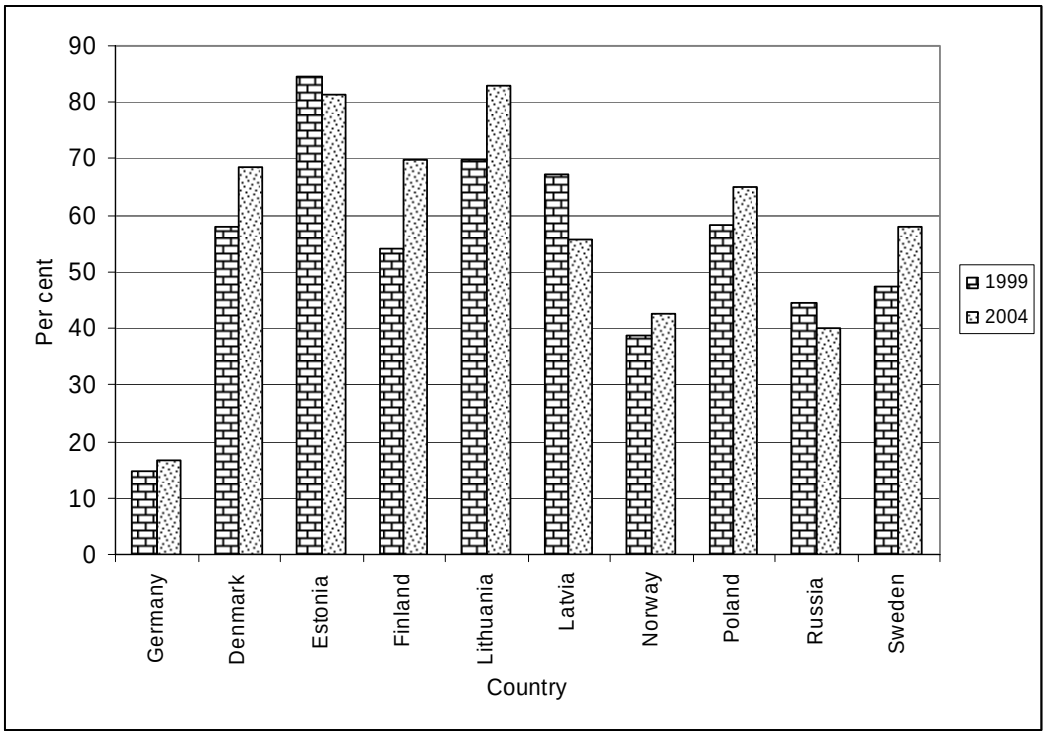
The major drawback of the concept of RCA is backward-looking whereas comparative advantage is a forward-looking concept. Moreover, RCA itself tells only to which goods countries tend to specialise in their trade. As such it does not reveal the origins of comparative advantage. According to the Heckscher-Ohlin theorem nations' comparative advantage (or disadvantage) is determined by factor endowments. A country has a comparative advantage in those sectors that use intensively the productive factors that are abundant in the country. Countries' trade patterns are determined by their comparative advantage: a country will export goods whose production uses intensively the factors that are relatively abundant and cheap in that country and import those goods whose output uses intensively relatively scarce and expensive factors.

To carry out this investigation we divide trade into five categories according to factor intensity of traded goods' production. In this, we follow the methodology and classification proposed by Neven (1995) in his study on eastern enlargement. Traded goods fall into different categories, on the one hand, according to capital intensity (high, intermediate and low) and, on the other hand, according to labour intensity (skilled and unskilled).

2. Baltic Sea Region as a Trading Area

In the following, we characterise geographical trading patterns within the BSR and assess the importance of the region to the area's countries. Figure 1 shows the percentages of exports to the BSR in region's countries exports to the EU25 plus Norway and Russia (henceforth EU25+) in 1999 and 2004. The figure, thus, illustrates the relative importance of the BSR to the region's countries in EU25+ markets. The figure clearly and expectedly shows that the only big country Germany is relatively much less oriented towards the BSR in its exports than the rest of the region's countries. The second group is formed by Russia and Norway that are not EU member states. This is partly due to varying trade policy regimes but also due to specialisation patterns (see section 3). The rest of the BSR-countries have considerably higher shares. It is worth noting that the percentages of the BSR in EU25+ trade have significantly increased in Sweden, Denmark and Finland between 1999 and 2004.

Figure 1. The share of BSR in region's countries exports to EU25+ in 1999 and 2004



Source: Eurostat and author's calculations.

The average share of intra-BSR trade was 28 per cent in 1999 and 32 per cent in 2004. In terms of output, the BSR+ accounts approximately for 30 per cent of EU25+ output. Germany's share of the BSR output is more than 80 per cent, which explains why the average is so much lower than the highest shares in Estonia and Lithuania.

Table 1 presents the ratios of the BSR's actual and potential export shares of BSR-countries exports to EU25+. Export potentials have been calculated using the gravity model that is estimated and applied in Baldwin (1994). The gravity model explains bilateral long-term trade flows by the distance between the two countries, their incomes per capita and their sizes (usually total output). In addition, dummy variables describing regional trading blocs, cultural or economic proximity and others are added. The gravity model estimates assume an income catch-up roughly to the income level of the poorest EU15-countries (for details see Baldwin 1994, 96-98). In reality, the income levels of the Baltic States, Poland and Russia are still far below the lowest-income level countries of the EU15. The ratios, thus, indicate how well the BSR-countries have exploited the long-run trade potential.

In most, cases the ratios in table 1 show an upward trend between 1999 and 2004. The clearest exceptions are Russia and Latvia. The average ratio reaches unity in 2004, which means that the actual intra-BSR trade is at its potential long-term level. Note that the model estimates take the current trade arrangements and other relevant factors into account. The ratios on the last row of the table suggest that intra-BSR trade has been intensified during the past five years and has in relative terms reached its long-run equilibrium. This is a clear indication of deepening real integration in the region but the results also suggest that in the cases of Russia and Latvia there is a dis-integration tendency and that these countries together with Norway

do not trade in BSR as much as trade potentials suggest. Notably, the share of the BSR has almost reached its potential level also in Germany's intra EU25+ trade.

Table 1. Ratios of the BSR's actual and potential trade shares in EU25+ trade in 1999-2004

Country	*1999*	*2001*	*2004*
Germany	0.87	0.96	0.98
Denmark	1.15	1.48	1.36
Estonia	1.13	1.07	1.09
Finland	0.85	1.00	1.10
Lithuania	1.06	1.19	1.26
Latvia	0.93	0.81	0.77
Norway	0.68	0.82	0.74
Poland	1.20	1.30	1.34
Russia	0.91	0.86	0.82
Sweden	0.87	1.00	1.06
BSR	0.88	0.99	1.00

Source: Baldwin(1994), Eurostat and author's calculations.

Figure 1 further illustrates BSR's role as a trading area. It shows the countries that trade more than potentially within the BSR in grey color. One difference between the two groups is that their actual intra-BSR trade exceeds the potential less in the northern group than in more southern group. In terms of their mutual trade integration Finland, Sweden and Estonia form, however, a more united group than Lithuania, Poland and Denmark.

Table 2 gives a more detailed picture on intra-BSR trade patterns. It shows the ratios of actual and potential bilateral export shares in intra-region exports. The rows sum up to 100 per cent and hence the shares in each cell in one row give the relative share of an export partner in a country's exports to the BSR. Appendix 1 gives the actual and potential figures separately. The ratios that exceed one are bolded.

Figure 2. Countries whose intra-BSR trade share excess the potential intra-BSR trade share

Table 2 reveals several interesting phenomena in intra-BSR trade flows. First, only with an exception of Denmark, Germany's share in BSR-countries actual exports exceeds the potential share. Similar phenomenon can be observed in BSR-countries exports to the region's other high-income countries Sweden, Finland, Norway and Denmark as well. Second, the Baltic countries seem to trade intensively: with an exception of Estonia's exports to Lithuania, actual export shares exceed the potential ones. Finally, the ratios of Poland and Russia fall below one indicating that there is unexploited export potential to these countries from the fellow BSR-countries. Table 2 also suggests that despite the average equality of actual and potential intra-BSR trade there is substantial variation in bilateral trade intensities within the region. In general, low-income countries tend to export more than potentially to the whole region and high-income countries tend to import more than potentially from almost the whole region. Russia and Poland are exceptions.

Table 2. The ratios of actual and potential export flows in intra-BSR trade in 2004

	Importer									
Exporter	*Germany*	*Denmark*	*Estonia*	*Finland*	*Lithuania*	*Latvia*	*Norway*	*Poland*	*Russia*	*Sweden*
Germany		**1.320**	0.437	**2.388**	0.475	0.401	**1.495**	0.857	0.516	**2.331**
Denmark	0.984		0.391	**2.151**	0.371	0.250	**2.637**	0.284	0.170	**3.340**
Estonia	**1.428**	**3.658**		**4.582**	0.797	**1.012**	**3.382**	0.074	0.074	**4.651**
Finland	**2.114**	**2.152**	0.588		0.383	0.397	**2.510**	0.527	0.421	**1.782**
Lithuania	**3.435**	**6.777**	**2.233**	**1.662**		**2.331**	**3.073**	0.333	0.412	**3.064**
Latvia	**3.887**	**6.755**	**1.750**	**1.444**	**1.212**		**2.317**	0.186	0.212	**4.577**
Norway	**2.215**	**2.715**	0.046	**1.523**	0.047	0.033		0.123	0.098	**2.066**
Poland	**3.418**	**2.034**	0.220	0.865	0.318	0.225	**1.612**		0.132	**1.612**
Russia	**2.572**	0.496	0.216	**1.859**	0.604	0.128	0.267	0.600		0.468
Sweden	**1.247**	**2.820**	0.524	**1.532**	0.187	0.202	**3.176**	0.367	0.123	

Source: Baldwin(1994), Eurostat and author's calculations.

In sum, the message of table 2 is the following. Assuming that the ratio of actual to long-run potential trade serves as a proxy to the intensity of trade integration we can find two sub-regions from the BSR where actual trade shares exceed the potential in exports and imports. These are, on the one hand, the Baltic States and, on the other hand, the Nordic countries in the region. The Baltic States export shares to the Nordic countries exceed the potential shares but the potential trade figures suggest that they should gain importance in Nordic countries' intra BSR exports. It is worth noting that both Poland and Russia should gain importance in other countries intra-BSR exports too.

A closer look at tables A1.1 and A1.2 in appendix 1 reveals that one can expect quite substantial structural changes in intra-BSR trade. Table 3 shows the actual and potential BSR-countries' three most important export partners in the region. The most striking observation is that currently Russia belongs to top-3 export partners only in three cases (Finland, Lithuania and Poland) and Poland in two cases (Germany and Russia) whereas the potential numbers of cases are nine and eight respectively. This means that potentially Russia belongs to top-3 export targets in every BSR-country and, moreover, only with an exception of Norway and Denmark, it is potentially the most important export partner in the BSR.

Currently, Germany holds the leading position as BSR-countries export partner. It belongs to top-3 throughout the region. Trade potentials suggest, hovever, that Germany's role as an export partner will potentially diminish especially in the Baltic States. Even more striking is the diminishing role of Sweden as a top-3 export partner. Currently it belongs to top-3 in seven cases whereas, in the right hand column, Sweden does not appear as a top-3 export partner at all. In sum, this result suggests that deeper integration and low-income countries income catch-up shifts the centre of gravity in the BSR from Stockholm-Hamburg axis towards East.

Table 3. BSR-countries' three most important actual and potential export partners in the region

	Three most important export partners	*Three potentially most important export partners*
Germany	Poland,Sweden,Denmark	Russia,Poland,Denmark
Denmark	Germany,Sweden,Norway	Germany,Russia,Poland
Estonia	Finland,Sweden,Germany	Russia,Poland,Finland
Finland	Germany,Sweden,Russia	Russia,Germany,Estonia
Lithuania	Germany,Latvia,Russia	Russia,Poland,Latvia
Latvia	Germany,Sweden,Lithuania	Russia,Poland,Lithuania
Norway	Germany,Sweden,Denmark	GermanyPoland,Russia
Poland	Germany,Russia,Sweden	Russia,Germany,Lithuania
Russia	Germany,Poland,Finland	Poland,Germany,Lithuania
Sweden	Germany,Norway,Denmark	Russia,Germany,Poland

3. Evaluating specialisation patterns

3.1 The Balassa index of revealed comparative advantage

In the analysis below, we use two different ways to measure comparative advantage. The idea behind the first is that the direction of trade flows reveals countries' specialization patterns and hence comparative advantage of nations. From this we cannot explain what is behind the comparative advantage though. We calculate the measure of revealed comparative advantage, the Balassa-index (BI), as the ratio between the shares of a given product in a country's exports to the OECD area in total OECD exports. Formally, the BI for country i in its exports of good k to the OECD can be written

$$BI = \frac{x_{ij}^{k} / X_{ij}}{x^{k} / X}$$

where x_{ij}^{k} is exports of product k from country i to country/region j where j can refer to the whole world or some reference group like OECD, X_{ij} is aggregate exports from country i to the reference group, x^{k} is reference group's exports of good k, X is reference group's total exports. If the index is greater than one for product k, the country is said to have revealed comparative advantage in exports of that commodity.

In the analysis, HS 4-digit classification of exports is used which contains 1367 goods and Eurostat data. After having calculated the Balassa-indices for all countries and all commodities in given years, we disregard the exports of those goods in which the countries did not have a comparative advantage. We are thus left with only the goods in which the value of the Balassa-index exceeds unity. Then, we divide these, following Neven (1995), into categories as described in the following sub-section.

3.2 Neven (1995) classification of manufacturing industries

The factor intensity of the RCA of the EU and selected countries is analysed by using Neven's (1995) classification. He classified manufacturing industries into five categories at the NACE CLIO 3-digit level (some at 4-digit) according to their relative capital and skill intensity (see Figure 1). In determining capital and skill intensities he used the following four criteria

- share of white collar workers in total industry labour force
- medium wage in an industry
- industries' ratio of labour costs to value added
- industries' ratio of fixed investment to value added.

Western European data from the late 1980s form the base to determine the classification of industries. Although the data used to determine the categories for manufacturing industries is old, this is unlikely to constitute a problem here because the characteristics of different industries are relatively constant.

Figure 1 gives a graphical illustration of the classification. Category 1 is characterised by a high percentage of wages in value added, very high wages, and a very high proportion of white-collar workers. These are high-tech industries intensive in human capital. Category 2 is intensive in human capital, but uses only little physical capital. It has a relatively low level of investment relative to value added, high wages, and a high level of wages in value added. Manufactures of electrical machinery and equipment serve as an example from this category. Category 3 is intensive in labour and uses relatively little capital. Average wages are low, and there is a low level of investment and a high level of wages in value added. An example from this category is textiles and clothing industry. Category 4 includes industries that are intensive in labour and capital. There is a high level of investment, relatively low wages, a low proportion of white-collar workers, and an intermediate proportion of wages in value added. Car industry for instance belongs to this group. Category 5 is dominated by forest and food-processing industries that are intensive in both physical and human capital. Also paper industry belongs to this category. Table 4 summarises the characterisation of the five categories.

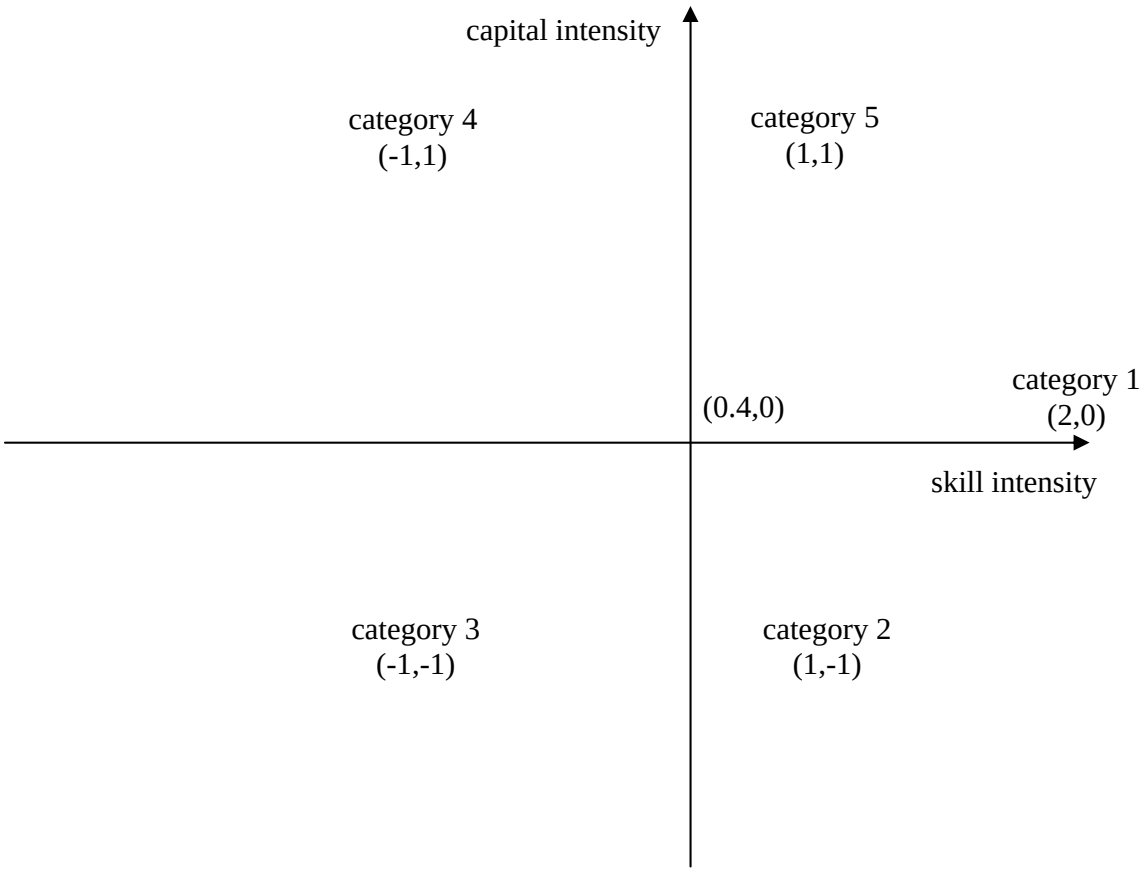
Table 4. A summary of the properties of the five categories

Intensity Cat	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

To quantify the results, we have added coordinates on two-dimensional space for each category. The x-coordinate proxies skill-intensity and the y-coordinate capital intensity. The coordinates are assumed to be (2,0) for category 1, (1,-1) for category 2, (-1,-1) for category 3, (-1,1) for category 4 and (1,1) for category 5. We use these to define countries' average position in capital-skill-intensity space. If a country's RCA is equally distributed to all

categories it would be located at (0.4,0). Countries' that have RCA in relatively skill intensive sectors have x-coordinate larger than 0.4 and those having RCA in capital intensive industries y-coordinate greater than 0. The coordinate values are, of course, somewhat arbitrary but when used for the analysis of changes in factor content of countries' RCA they summarise the classification pretty well.

Figure 3. A quantification of Neven's categories



Source: Neven (1995) and author's assumptions.

4. Specialisation patterns in the Baltic Sea Region

4.1 Some recent related findings

Specialisation patterns in intra-EU15 trade and the impact of eastern enlargement and enlarged EU's external trade relations have been recently studied quite extensively. In terms of methodology used, the closest to ours is Kaitila (2004), which studies the factor content of EU15 and CEE8 countries' comparative advantage[2] in the Internal Market using somewhat modified Neven (1995) methodology described above. In contrast to Neven study, Kaitila (2004) uses the standard Balassa index in evaluating RCA and, more importantly, makes an

[2] See also Kaitila (2001) for an earlier study on the same topic.

effort in trying to place the countries' revealed comparative advantage in the two-dimensional space as is our intension here too.[3]

The study finds, as might be expected, that in 2002 EU15 countries' specialization patterns and hence comparative advantage are generally more based on skill intensity than that of the exports of CEE countries. In figure 3 above they are on average positioned further right than the CEE8 countries. In terms of how much the skill-intensive sectors (category 1) account for countries' comparative advantage, Kaitila (2004) study demonstrates the most skill intensive EU15-countries are Ireland and the UK, the Netherlands, Finland and Belgium. Among the new member states they are quite closely followed by Hungary and Estonia. The CEE countries having the highest skill-intensity in their specialization all follow the same pattern: the share of sectors having intensive use of low-skilled labour has diminished roughly at the same magnitude as the share of sectors with an intensive use high-skilled labour has increased. The specialization of the EU15 countries is on average only slightly more based on intensive use of physical capital than the specialization of the CEE countries, Rumania being the biggest exception to low capital intensity direction In this respect, the change during the latter half of the 1990s and early 2000 is also rather mixed in the new member states.

Using OECD data, Widgrén (2004) applies similar methodology to a small sample of old (Finland and Sweden) and new EU countries (Hungary, Poland and Czech Republic) and Asian countries (China, Korea and Japan). He uses the above mentioned coordinate values when pinpointing countries in two-dimensional skill-capital intensity scale. The study applied OECD data on countries' total exports at HS 4-digit level, which is then transformed into NACE CLIO 3-digit level as in Kaitila (2001, 2004).

As a more general conclusion Widgrén (2004) finds some convergence towards more skill-intensive RCA Sweden and Japan being at the extreme right in this dimension (see figure 2 above), Finland and Korea clearly converging and the rest of the countries having the same direction but lacking behind. The biggest individual shift in skill-intensity dimension is observed for China. The analysis covered the shifts between 1996 and 2001.

Widgrén (2005) studies the development of RCA of EU15 and compares that to a sample of the most important countries in the World economy outside the EU. His analysis demonstrates that, among the sample of countries, the U.S. is an exception. Its comparative advantage is based on intensive use of highly skilled labour 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.

According to Widgrén's results 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

[3] Kaitila (2004) uses different coordinate values. They are (4, 2) for Category 1, (2, 1) for Category 2, (–2, 1) for Category 3, (–2, 3) for Category 4, and (2, 3) for Category 5.

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.

4.2 Baltic Sea Region's revealed comparative advantage

In the following, we evaluate the differences and similarities of RCA in the Baltic Sea Region countries trade. We also evaluate the specialisation patterns of the region aggregate and split the region into two sub-groups: Northern BSR, which contains Finland, Sweden, Estonia and Latvia and Southern part consisting of Germany, Denmark, Poland and Lithuania. Norway has been excluded from this division.

It is worth noting that Neven's five categories do not cover the whole HS 4-digit classification. Table 5 reports the shares of trade that are covered by the division. That may cause some bias to the results. In our sample, division into the five categories covers on average 69 per cent of the Baltic Sea Region's exports. The higher the share, the more reliable the results are. The lowest shares are in Russia, Norway and Latvia. Only one fifth of Russia's, one third of Norway's and a half of Latvia's exports fall into the five categories. That can be explained by the fact that the biggest commodity groups that are left outside the categorisation are petroleum oils and coal and briquettes that have a substantial share in these countries' exports. Thus, the conclusions concerning these countries RCA should be made with caution. The highest shares of commodity groups that can be divided into the five categories are in exports of Germany, and Finland but also the rest of the region's countries have shares more than 70 per cent.

Table 5. The percentage of exports that falls into five Neven's gategories in the sample countries in 2002

Country	*%*
Germany	83
Denmark	76
Finland	81
Norway	34
Poland	74
Sweden	77
Estonia	72
Lithuania	82
Latvia	50
Russia	20
BSRtotal	69
BSRNorth	61
BSRSouth	82

Source: Author's calculations

Table 6 reports the shares of the above described categories in 2002 and the changes in percentages from 1996 till 2002. The table also reports three aggregates: categories 3 and 4 that represent commodities whose production is intensive in low-skilled labour, categories 1, 2 and 5 that are intensive in relatively high-skilled labour and capital-intensive categories 4 and 5. The results demonstrate that at the aggregate level the intensive use of low-skilled labour forms the major base in revealed comparative advantage in the BSR. In this respect, the countries within the region vary substantially. The lowest shares of RCA in sectors that are using intensively low-skilled labour (categories 3 and 4) are in Finland and Sweden whereas they are the highest in Latvia and Lithuania. Estonia clearly differs from the other Baltic countries although still having rather high percentage of its RCA is in sectors that are using intensively low-skilled labour. The main difference is the development in Estonia, which clearly demonstrates a shift in its RCA from sectors that are using intensively low-skilled labour towards sectors that are using intensively high-skilled labour. The development of the specialisation patters in Estonia is almost identical to the development in Finland, which shows the close linkage between the countries in electronics and mobile phones industry. The share of capital-intensive sectors has also diminished considerably in both countries.

Table 6. The shares of the BSR countries' RCA sectors in skill-capital-intensity classes in 2002 and the change in shares from 1996 till 2002

	1	*2*	*3*	*4*	*5*	*3+4*	*1+2+5*	*4+5*
BSRTot	22.22	27.73	7.61	38.95	3.49	46.56	53.44	42.44
BSRNorth	26.31	23.86	7.93	34.38	7.52	42.31	57.69	41.90
BSRSouth	21.35	28.35	7.14	40.43	2.73	47.57	52.43	43.16
Denmark	24.29	24.73	14.88	27.74	8.36	42.62	57.38	36.10
Estonia	26.35	10.74	21.71	38.62	2.58	60.33	39.67	41.20
Finland	36.19	18.46	7.19	28.50	9.65	35.69	64.31	38.15
Germany	15.09	33.52	3.91	45.89	1.58	49.80	50.20	47.48
Latvia	2.24	2.25	23.33	71.22	0.97	94.55	5.45	72.19
Lithuania	12.54	8.03	40.95	33.39	5.08	74.34	25.66	38.47
Norway	21.34	24.16	7.46	42.65	4.39	50.11	49.89	47.04
Poland	11.89	25.76	18.38	37.70	6.27	56.08	43.92	43.98
Russia	6.81	5.03	0.12	83.69	4.38	83.81	16.22	88.07
Sweden	26.02	29.30	7.31	27.59	9.78	34.89	65.11	37.37

	1	*2*	*3*	*4*	*5*	*3+4*	*1+2+5*	*4+5*
BSRTot	3.11	-0.25	-0.38	-1.24	-1.25	-1.62	1.62	-2.49
BSRNorth	6.87	0.29	0.87	-4.01	-4.01	-3.15	3.15	-8.03
BSRSouth	2.18	-0.32	-0.49	-0.59	-0.77	-1.08	1.08	-1.36
Denmark	9.17	-3.40	1.53	-6.12	-1.18	-4.59	4.59	-7.30
Estonia	14.57	5.13	-6.74	-11.16	-1.80	-17.90	17.90	-12.97
Finland	19.32	2.81	-0.84	-12.76	-8.53	-13.60	13.60	-21.29
Germany	0.53	0.01	-0.41	0.53	-0.66	0.12	-0.12	-0.13
Latvia	-1.88	1.00	1.23	0.66	-1.01	1.89	-1.89	-0.36
Lithuania	-7.59	2.62	12.37	-5.77	-1.62	6.60	-6.60	-7.40
Norway	4.65	1.91	-3.04	0.83	-4.35	-2.21	2.21	-3.52
Poland	0.83	16.09	-7.42	-6.60	-2.90	-14.02	14.02	-9.50
Russia	-0.61	0.79	-0.43	-0.33	0.39	-0.60	0.59	0.72
Sweden	4.02	0.48	1.68	-3.09	-3.10	-1.41	1.41	-6.18

Table 6 clearly demonstrates that BSR-countries' RCA vary substantially. A common feature is the diminishing share of capital-intensive sectors in their RCA. In terms of different categories' shares of RCA, the specialisation patterns of Germany, Latvia, Sweden and Norway have remained almost unchanged during our sample period. The specialisation patterns of the BSR are also relatively stable but the development of the Northern and Southern part are different. In the former, RCA shifts towards sectors that are using intensively high-skilled labour whereas in the latter there is a tendency towards sectors with intensive use of low-skilled labour. The most significant shifts have taken place in Estonia, Finland and Poland in all cases from sectors that are using intensively low-skilled labour and capital towards sectors with intensive use of high-skilled labour. In Poland, the shift is towards category 2, in Finland and Estonia towards high-tech industries in category 1.

As a general conclusion, the upper panel of table 6 suggests that the development of specialisation patterns in the Baltic Sea Region have two distinct directions. In the BSRNorth, with an exception of Latvia, category 1 and high-tech industries tends to dominate the recent development whereas in the BSRSouth labour intensive categories 2 and 3 have increased their share. In BSRSouth, the development is not as parallel as in BSRNorth and there are substantial differences between countries. A common feature for the whole region is the shift in RCA from sectors with intensive use of physical capital towards labour and human capital intensive sectors.

Table 7 gives the Balassa indices in the five categories in 2002 and their change between 1996 and 2002. The figures have been computed as it has been explained in section 2.1 but this time not for each single commodity but rather to the export shares of the five categories. As above, the values exceed one when the export share of a category in a country or a region is greater than in the reference group (OECD-countries). The numbers can be, thus, interpreted as weighted average Balassa indices within the groups. If the number in category 1, say, exceeds one, we can conclude that a country has RCA in industries that use intensively skilled labour. The lower panel of table 7 gives the changes in the Balassa indices between 1996. Here the positive values tell that the export share of a category has either increased or decreased in country under consideration and the reference group. Negative values indicate that the exports shares have developed in opposite directions.

The ease the interpretation of the figures in table 7, the last row gives the direction where the export share has developed in the OECD countries. If the OECD row has a positive sign positive values less than one indicate that export shares in a country and the reference group have developed in parallel but a country under consideration has lost comparative advantage and values exceeding unity indicate that it has gained comparative advantage. The lowest panel of table 7 gives a more qualitative picture about the potential changes in RCA. In each cell a minus sign indicates that a country has revealed comparative disadvantage and positive signs indicate revealed comparative advantage. The first signs in each cell are for 1996 and the second ones for 2002. The cases where the Balassa-index gets a value between 0.95 and 1.05 are marked with zeros.

The Balassa-indices in the upper panel of table 7 nicely demonstrate the differences in specialisation patterns within the region. In sectors representing intensive use of relatively skilled labour and not that much physical capital, BSRNorth has gained RCA in high-tech industries (category 1) whereas BSRSouth has RCA in category 2 that represents intensive use of relatively skilled labour and non-intensive use of physical capital. In capital intensive sectors, BSRNorth has comparative advantage in those using intensively skilled labour whereas BSRSouth in those using intensively unskilled labour.

Table 7. BSR-countries' RCA in different categories (upper panel) and their change compared to the reference group between 1996 and 2002 (middle and lower panel)

	1	*2*	*3*	*4*	*5*	*3+4*	*1+2+5*	*4+5*
BSRTot	0.88	1.07	0.80	1.09	0.96	1.03	0.98	1.08
BSRNorth	1.04	0.92	0.83	0.96	2.07	0.94	1.05	1.07
BSRSouth	0.85	1.09	0.75	1.13	0.75	1.05	0.96	1.10
Denmark	0.94	1.05	1.35	0.82	1.94	0.93	1.06	0.92
Estonia	1.00	0.46	2.34	1.06	0.69	1.33	0.72	1.03
Finland	1.30	0.78	0.77	0.88	2.20	0.86	1.12	1.00
Germany	0.87	1.11	0.66	1.14	0.70	1.04	0.97	1.10
Latvia	0.14	0.13	2.44	1.93	0.31	2.04	0.14	1.78
Lithuania	0.51	0.35	4.15	0.94	1.36	1.62	0.49	0.98
Norway	0.84	1.13	0.76	1.08	1.03	1.02	0.99	1.08
Poland	0.51	0.95	1.82	1.11	1.48	1.26	0.79	1.14
Russia								
Sweden	0.93	1.02	0.77	0.98	2.09	0.94	1.05	1.08

	1	*2*	*3*	*4*	*5*	*3+4*	*1+2+5*	*4+5*
BSRTot	0.78	-0.44	0.36	0.59	0.91	0.51	0.51	0.71
BSRNorth	1.73	0.53	-0.84	1.89	2.92	1.00	1.00	2.30
BSRSouth	0.55	-0.58	0.48	0.28	0.56	0.34	0.34	0.39
Denmark	1.71	-4.33	0.16	1.51	0.77	1.07	1.07	1.22
Estonia	3.46	8.41	6.06	4.92	1.26	5.29	5.29	3.48
Finland	3.47	3.94	0.77	4.01	4.87	2.95	2.95	4.35
Germany	0.61	-1.25	0.58	0.19	0.55	0.32	0.32	0.33
Latvia	-0.38	2.20	-0.47	-0.41	0.78	-0.43	-0.43	0.05
Lithuania	-1.70	5.58	-10.79	2.81	1.13	-1.66	-1.66	2.15
Norway	1.10	3.62	2.35	0.27	2.45	0.95	0.95	1.13
Poland	0.12	17.98	4.07	1.87	1.64	2.59	2.59	1.78
Russia	0.24	0.26	0.01	2.17	0.94			
Sweden	0.93	-0.44	-1.21	1.05	1.80	0.31	0.31	1.35
OECD	+	+	-	-	-	-	+	+

	1	*2*	*3*	*4*	*5*	*3+4*	*1+2+5*	*4+5*
BSRTot	-,-	+,+	-,-	+,+	0,0	0,0	0,0	+,0
BSRNorth	-,0	-,-	-,-	0,0	+,+	0,0	0,+	+,+
BSRSouth	-,-	+,+	-,-	+,+	-,-	0,0	0,0	+,0
Denmark	-,-	+,+	+,+	-,-	+,+	-,-	+,+	-,0
Estonia	-,0	-,-	+,+	+,+	-,-	+,+	-,-	0,0
Finland	-,+	-,-	-,-	+,-	+,+	0,-	+,+	0,0
Germany	-,-	+,+	-,-	+,+	-,-	0,0	0,0	+,+
Latvia	-,-	-,-	+,+	+,+	-,-	+,+	-,-	+,+
Lithuania	-,-	-,-	+,+	+,-	+,+	+,+	-,-	+,-
Norway	-,-	+,+	-,-	+,+	+,+	+,+	-,-	+,+
Poland	-,-	-,0	+,+	+,+	+,+	+,+	-,-	+,+
Russia								
Sweden	-,-	+,0	-,-	0,0	+,+	-,-	+,0	+,+

Source: Author's calculations

Revealed comparative advantage in BSRNorth is more based on human capital than in BSRSouth. The region does not have RCA is sectors representing intensive use of low-skilled labour (category 3). In this respect, there is, however, a distinction between the old and the new EU countries. The Baltic States and Poland have RCA category 3 commodities whose production uses intensively low-skilled labour. In Estonia and Poland the development goes, however, towards more skilled labour as the determinant of RCA while this does not hold in Latvia and Lithuania.

The export share of our reference group has increased in categories 1 and 2 and decreased in other categories. The development within the BSR has been mostly parallel. The relative importance of high-tech industries (category 1) has diminished only in Latvia. In Denmark, Estonia, Finland and Norway the export share of category 1 has increased faster than in OECD countries on average. In category 2, the export shares have increased more than in OECD in Finland, the Baltic States, Norway and especially in Poland. Germany and Sweden who traditionally belong to the big exporters of category 2 goods in the BSR have experienced diminishing export shares during 1996-2002. This is sufficient to reduce the export share of category 2 in the BRS as a whole.

In category 3, representing intensive use of low-skilled labour the export share has increased in Latvia, Lithuania and, surprisingly, also in Sweden. This is sufficient to increase the export share of category 3 in BSRNorth as well. In category 4, the shift in exports shares in BSR is parallel to OECD with an exception of Latvia and in category 5 there are no exceptions.

The lower panel of table 7 compares revealed comparative advantage and disadvantage in 1996 and 2002. In general, there are very few changes. In categories 3 and 5, the coutries or regions that had RCA in 1996 had RCA also in 2002. Finland has gained RCA in industries that represent intensive use of high-skilled labour and also Estonia and BSRNorth have Balassa-index values greater than or equal to one. In the case of Finland, there is a clear shift from capital intensive category 4 to high-tech. In sectors that represent intensive use of relatively skilled labour and not physical capital, Poland has considerably increased its export share but its Balassa-index value is slightly below one. In Sweden the development has been opposite.

4.3 Weighted average RCA in the two-dimensional space

In the following, we make an attempt to summarise the BSR-countries' RCA in the five above-described categories. We do that by computing a weighted average of countries' category-wise Balassa-indices shown in table 5 above using the distribution of countries' exports in RCA sectors over the categories shown in table 4 as the weight. Each category is assumed to get a two-dimensional vector value as described in section 2.2 above. It is worth noting that the coordinate values that describe different categories are rather arbitrary (see figure 3 above).[4] For instance if one country's weighted average on horizontal skill-intensity dimension is 1 and the other country's position in the same dimension is 0.5 it does not mean that the former country has RCA that is using twice as skill-intensive labour than the latter country.

[4] For an alternative choice, see Kaitila (2004).

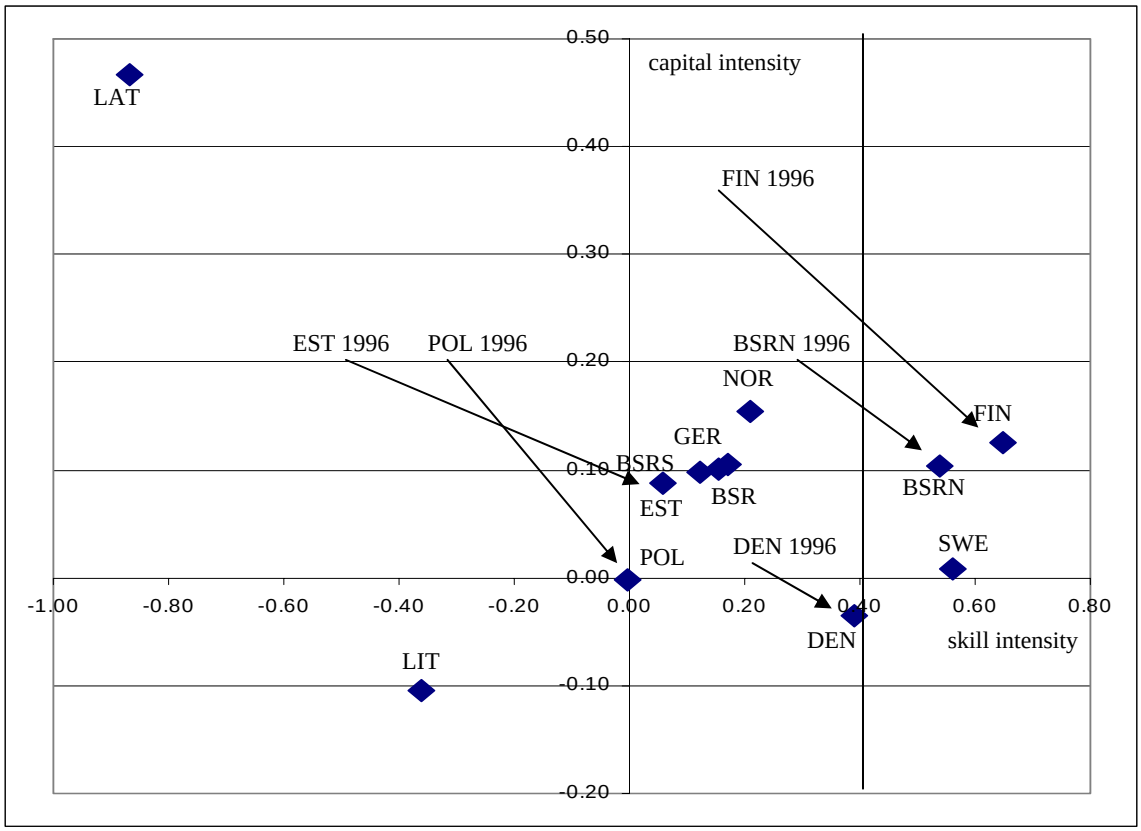
Table 8 compares BSR to some other countries and economic areas. The table gives the coordinate-values in skill-capital intensity dimensions. The figures clearly show that RCA of BSRNorth is in terms of intensive use of high-skilled labour is further right than the EU15. Only the Northern American countries are even further right. As a region BSR and BSRSouth are lacking somewhat behind being positioned at the same area as Germany or France. This is not surprising knowing the dominant role of Germany as an exporter in the region.

The weighted average RCAs have been plotted in figures 4 and 5. The former shows the averages for 2002 and the latter for 1996.. 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 at the North-East quadrant relative to (0.4,0.0) its has a comparative advantage in sectors that are using intensively both physical and human capital. As figure 4 shows, nearly all BSR-countries lie in that region.

Table 8. Different countries' and regions' positions (weighted average RCAs) in skill-capital intensity diagram

	Skill intensity	*Capital intensity*
EU15	0.41	0.14
Brasil	0.13	0.37
China	-0.03	0.01
India	-0.52	0.02
Korea	0.49	0.02
Mexico	0.85	0.07
Russia	-0.61	0.83
Thailand	0.22	0.10
Turkey	-0.61	-0.12
U.S.	1.30	-0.22
Canada	0.66	0.25
Indonesia	-0.09	-0.20
Japan	0.39	0.19
BSRTot	0.17	0.10
BSRNorth	0.54	0.10
BSRSouth	0.12	0.10

Figure 4. Weighted average RCA in the BSR in 2002 and the most significant shifts from 1996 (shown by arrows, 1996 position at the starting point)

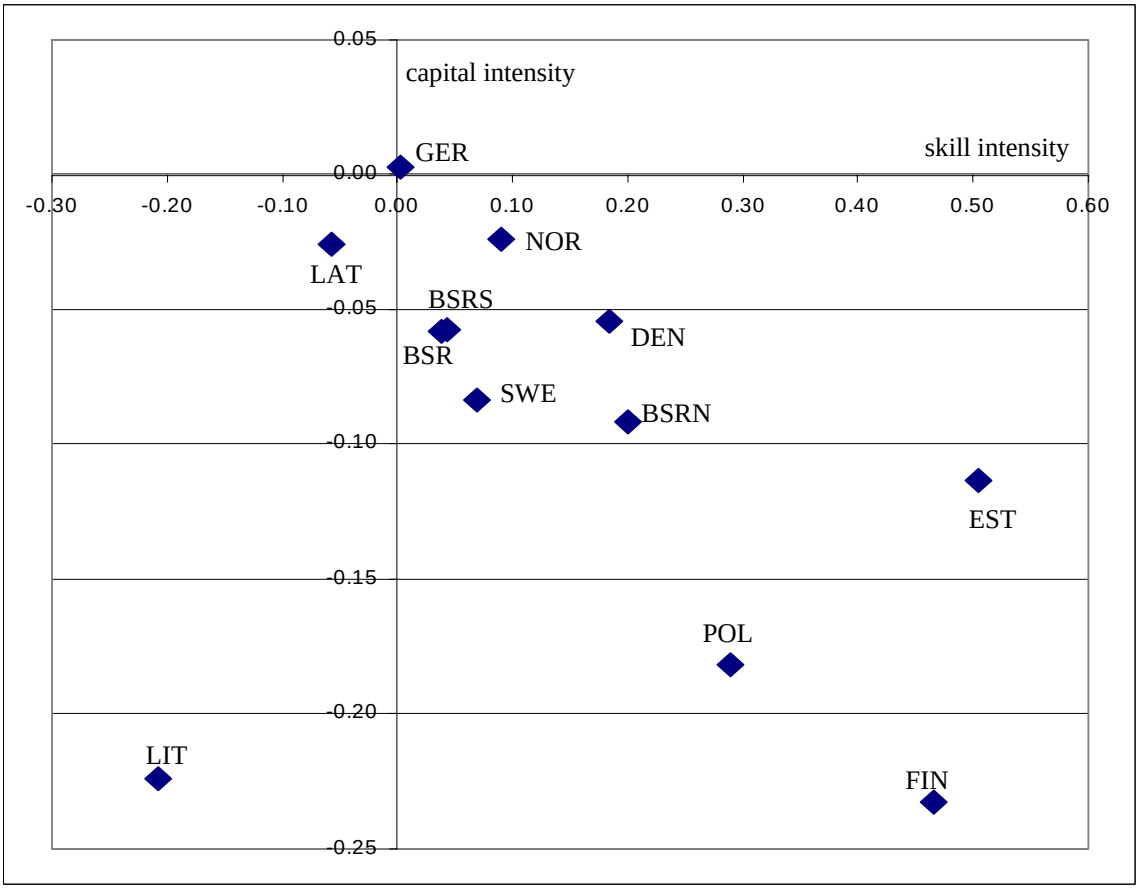


Source: Author's calculations.

The figure shows a clear tendency towards a more skill-intensive direction in BSR-countries' revealed comparative advantage. The only countries that have moved leftwards in x-axis are Latvia and Lithuania. Germany's position is as in 1996. Another general trend is the move downwards in y-axis. WARCA is based less or at most at the same magnitude on intensive use of capital in all BSR-countries in 2002 compared to 1996.

Figure 5 confirms the trend. It clearly demonstrates that the shift in revealed comparative advantage in the BSR goes towards industries that represent intensive use of high-skilled labour and less intensive use of physical capital. Finland Estonia and Poland have experienced the most substantial shift in their WARCA during the latter half of the 1990s and early 2000.

Figure 5. The changes in weighted average RCA in the BSR in skill-capital intensity coordinate between 1996 and 2002



Source: Author's calculations

5. Intra-industry trade

When a country specializes in exports and imports of a commodity simultaneously its trade follows intra-indutry pattern. The intensity of intra-industry trade can be evaluated e.g. by (average) *Grubel-Lloyd index* that can be written as follows

$$GL_{ij}^{\ k} = 100 * \left[1 - \frac{\sum_k \left| x_{ij}^k - m_{ij}^k \right|}{X_{ij} + M_{ij}} \right]$$

where X_{ij} and M_{ij} denote the total exports and imports between countries i and j respectively. The idea of the index is that the more there are net trade (the nominator within the brackets) relative two countries or regions total trade (the denominator) the less there is trade within the industry under consideration. Without aggregation over all industries the idea of the Grubel-Lloyd index can be used for single industries or groups of industries. The average index has sometimes been used to proxy how integrated a country is with its trading partners.

Figure 6 shows the average shares of intra-industry trade in Baltic Sea Region's trade within the Internal Market. The figure clearly demonstrates that, in this respect, BSR-countries differ quite a lot Germany and to some extent Denmark, Sweden and Poland being more integrated with the Internal Market and hence having higher percentage of intra-industry trade with the Internal Market than the North-Eastern members of the region (see Widgrén 2000 for similar argument).

Table 9 takes a closer look at intra-industry trade within the region. The matrix gives pair-wise intra-industry trade shares between the countries in the region. The shares are generally somewhat lower than in countries' aggregate trade. On the one hand, this is since trade flows are geographically restricted and, on the other hand, because intra-industry trade of Germany, Denmark, Sweden and Poland is dominated by the central part of the Internal Market.

A usual wisdom is, however, that proximity contributes positively on intra-industry trade. In the table intra-industry trade shares in trade between Finland and Sweden, Finland and Estonia and Sweden and Denmark confirm that. On the other hand, similarity of income levels contributes to intra-industry trade as well. There are considerable income differences between the countries of the Baltic Sea Region. This reduces intra-industry trade within the region. Moreover, Germany's and Denmark's geographical location is closer to the core of the Internal Market – most of their intra-industry trade takes place there.

Figure 6. The share of BSR-countries intra-industry trade in the Internal Market in 2003.

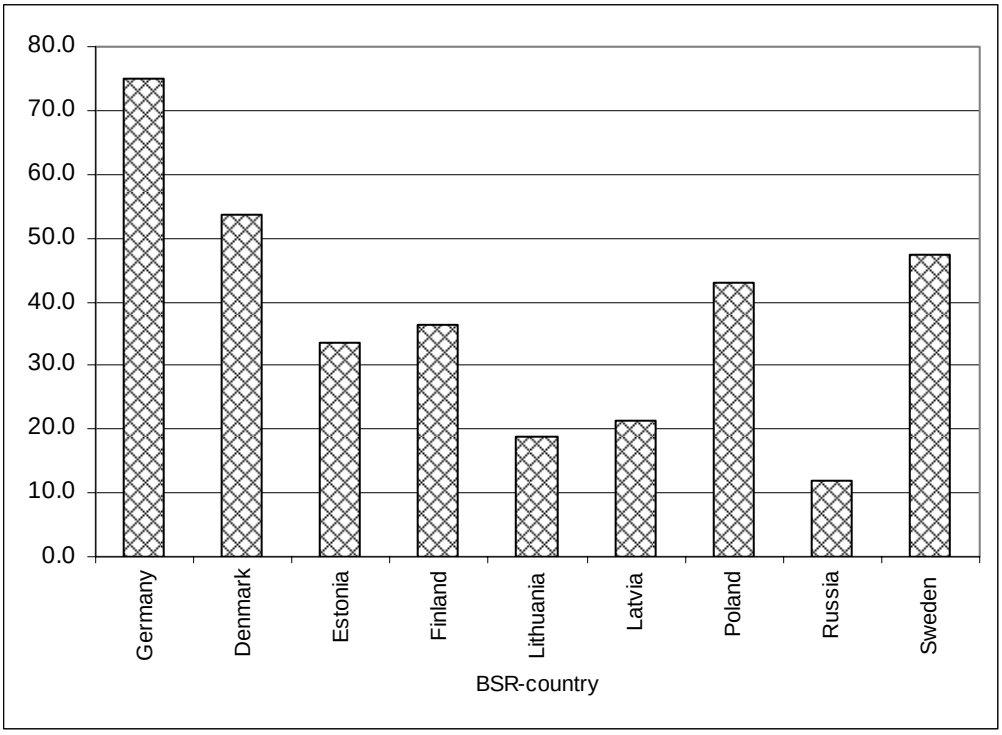


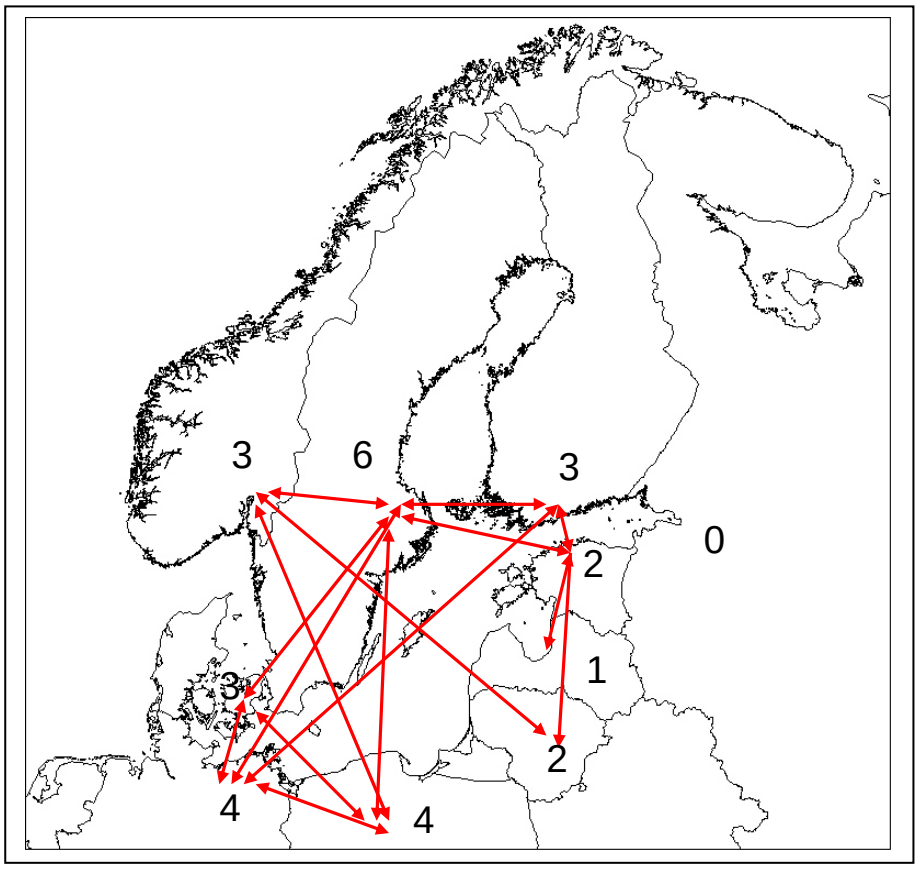
Table 9 also confirms the above mentioned distinction between the Northern and Southern part of the Baltic Sea Region. The shares above 30 per cent are bolded. Clearly, one can see the highest shares of intra-industry trade, on the one hand, between Germany, Denmark and Poland and, on the other hand, between Sweden, Finland and Estonia. Interestingly, Sweden belongs to both groups having relatively high intra-industry trade shares with Denmark and Germany. Latvia and Lithuania remain to some extent in the middle. The similarity of the Baltic economies has, however, increased their mutual intra-industry trade during the recent years.

Table 9. Intra-industry trade shares' matrix between the BSR-countries in 2003, % of total trade

	Germany	*Denmark*	*Estonia*	*Finland*	*Lithuania*	*Latvia*	*Poland*	*Sweden*	*Norway*	*Russia*
Germany	100.0	**45.1**	19.1	**32.9**	12.8	12.2	**44.0**	**42.2**	12.6	6.1
Denmark		100.0	18.7	24.7	18.4	19.6	**34.0**	**50.9**	29.0	3.6
Estonia			100.0	**38.6**	26.4	**36.2**	9.8	**38.4**	12.4	8.5
Finland				100.0	7.5	12.8	17.1	**48.3**	21.9	5.8
Lithuania					100.0	29.3	10.1	16.8	**44.8**	5.9
Latvia						100.0	8.1	15.7	28.2	10.6
Poland							100.0	**31.7**	**65.3**	2.9
Sweden								100.0	**34.5**	2.4
Norway									100.0	n.a.
Russia										100.0

Source: Eurostat and author's calculations.

Figure 7. Bilateral intra-BSR trade flows having more than 30 per cent of intra-industry trade



In terms of intra-industry trade, the most notable exception among the BSR-countries is Finland. Its average share of intra-industry trade in the Internal Market is 36 per cent. Among the EU25 Finland has the highest shares of intra-industry trade with Sweden and Estonia the former being a traditional intra-industry trade partner of Finland.[6] In the case of Sweden, proximity and similar economic structures explain a great deal of countries' mutual intra-industry trade. In the case of Estonia, the Nokia-phenomenon is by far the most important

[6] Note that still in the late 1990s the second was Germany. It is now the third.

explanation. Intra-industry trade between Finland and Estonia is to great extent based on trade in mobile phone and other electrical equipment components.

Intra-industry trade relations within the BSR are summarised in figure 7. It shows bilateral intra-BSR trade flows having a higher than 30 per cent share of intra-industry trade. The numbers in the map show the numbers of trade partners in the BSR with whom intra-industry trade share exceeds 30 per cent.

The map in figure 7 shows that there are no groups of four or more where intra-industry trade exceeds 30 per cent in all pair-wise trade flows.[7] One can, however, find several groups of three where this holds. They are (Finland, Sweden, Estonia); (Finland, Sweden, Germany); (Sweden, Germany, Poland); (Sweden, Norway, Poland); (Sweden, Denmark, Germany) and (Sweden, Poland, Denmark). In sum, this suggests that the southern core of the BSR, i.e. Germany, Denmark and Poland, is linked to the northern core, i.e. Sweden, Finland and Estonia, via Sweden. In terms of their intra-industry trade activity within the BSR Latvia and Lithuania are somewhat on the side and Russia seems to be in isolation.

6. Conclusions

This paper has investigated the specialisation patterns of the Baltic Sea Region in the World economy and trade potential within the region. In the former, we carried out the analysis for each single country in the region, the whole region and its two sub-regions. The analysis was based on the Balassa-index of revealed comparative advantage and Neven's (1995) classification of industries according to their factor intensities. Trade potential investigation was based on earlier gravity model estimates that we then compared to actual trade flows.

The analysis shows that the BSR is not homogeneous area. The RCA figures show that in the Northern part of the Baltic Sea comparative advantage is more based on intensive use of high-skilled labour than in the Southern part. In this respect the most substantial shift has materialised in Estonia and Finland and also Poland. It is common for all these three countries that this development has taken place at the cost of sectors that represent intensive use of physical capital. This trend is common for all BSR-countries with an exception of Russia, Latvia and Lithuania.

Despite the differences in the development of factor contents of BSR-countries' RCA there has been some convergence. Estonia, having close economic links to Finland, and Poland, having a linkage to Germany, has experienced a huge shift towards less physical capital and more human capital based RCA. These countries have almost reached Germany in this respect. A broader comparison to other countries and regions in the World economy shows that, in terms of skill-intensity based RCA, BSRNorth is ahead of EU15, Japan or Korea whereas BSRSouth is somewhat behind roughly at the same level as Hungary, Germany and France.

The actual trade flows analysis suggest that the BSR has reached its potential importance in intra-EU25+ (EU25, Norway and Russia) trade. In this respect the countries within BSR differ, however, considerably. BSR's share falls considerably below its potential share in

[7] In a group of four there are six pairs.

Russia's, Latvia's and Norway's European exports. The overall conclusion in trade potential analysis is that the centre of gravity within BSR is likely to move gradually from Stockholm-Hamburg –axis somewhat to the east.

References

Algieri, B. (2004): Trade Specialisation Patterns: The Case of Russia, BOFIT Discussion Papers 19/2004.

Alho, K. (2003): The Impact of Regionalism on Trade in Europe, The Research Institute of the Finnish Economy, Discussion Paper No. 843.

Balassa, B. (1965): Trade Liberalization and Revealed Comparative Advantage, The Manchester School of Economic and Social Studies 33, 99-123.

Baldwin, R. (1994): Towards an Integrated Europe, CEPR, London.

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 Europan Union, Manchester University Press.

Neven, D. (1995): Trade Liberalization with Eastern Nations: How Sensitive, in 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.

Widgrén, M. (2005) Revealed comparative advantage in the Single Market, The Research Institute of the Finnish Economy, Discussion Paper No. 989.

.

Appendix 1. Actual and potential export shares of the BS-region in BSR-countries exports to EU25+

Table A1.1. Potential intra-BSR export shares

	Germany	*Denmark*	*Estonia*	*Finland*	*Lithuania*	*Latvia*	*Norway*	*Poland*	*Russia*	*Sweden*
Germany	0.00	12.59	1.91	4.43	4.16	3.22	5.20	28.12	31.55	8.82
Denmark	46.62	0.00	1.39	3.17	2.78	2.39	4.47	13.16	18.07	7.94
Estonia	6.52	1.29	0.00	9.92	5.05	9.13	1.11	13.40	49.53	4.05
Finland	15.81	3.06	10.44	0.00	3.46	4.26	2.77	9.60	37.72	12.88
Lithuania	6.78	1.23	2.57	1.58	0.00	9.59	0.80	34.51	40.67	2.27
Latvia	7.48	1.49	5.72	2.76	11.69	0.00	1.06	17.99	48.17	3.64
Norway	22.96	5.33	5.18	3.44	6.06	6.83	0.00	20.55	16.99	12.67
Poland	21.13	2.67	2.76	2.02	13.87	5.93	1.47	0.00	46.62	3.55
Russia	21.02	3.25	6.86	7.05	10.98	10.66	2.56	31.32	0.00	6.30
Sweden	24.66	6.00	3.32	10.09	3.89	4.39	8.01	13.19	26.46	0.00

Table A1.2. Actual intra-BSR export shares

	Germany	*Denmark*	*Estonia*	*Finland*	*Lithuania*	*Latvia*	*Norway*	*Poland*	*Russia*	*Sweden*
Germany	0.00	16.61	0.84	10.59	1.98	1.29	7.77	24.09	16.27	20.56
Denmark	45.87	0.00	0.54	6.82	1.03	0.60	11.79	3.73	3.07	26.54
Estonia	9.31	4.72	0.00	45.46	4.02	9.25	3.76	0.99	3.68	18.82
Finland	33.42	6.58	6.14	0.00	1.33	1.69	6.96	5.06	15.88	22.95
Lithuania	23.27	8.33	5.74	2.63	0.00	22.34	2.46	11.51	16.77	6.96
Latvia	29.08	10.08	10.01	3.98	14.16	0.00	2.46	3.35	10.22	16.66
Norway	50.85	14.47	0.24	5.23	0.29	0.23	0.00	2.52	1.33	26.18
Poland	72.22	5.43	0.61	1.75	4.41	1.33	2.36	0.87	6.18	5.72
Russia	54.06	1.61	1.48	13.09	6.63	1.37	0.00	18.79	0.00	2.95
Sweden	30.75	16.91	1.74	15.46	0.73	0.89	25.45	4.84	3.25	0.00

Appendix 2. Classification of sectors (NACE CLIO) according to factor intensities by Neven (1995)

Category 1
2500 Chemical industry
2510 Manufacture of basic industrial chemicals
2550 Manufacture of paint, varnish and printing ink
2560 Manufacture of other chemical products, mainly for industrial and agricultural purposes
2570 Manufacture of pharmaceutical products
2580 Manufacture of soap, synthetic detergents, perfume and toilet preparations
2590 Manufacture of other chemical products, chiefly for household and office use
2601 Chemical and man-made fibres
3300 Manufacture of office machinery and data processing machinery
3440 Manufacture of telecommunications equipment, electrical and electronic measuring and recording equipment and electro-medical equipment
3450 Manufacture of radio and television receiving sets, sound reproducing and recording equipment and of electronic equipment and apparatus, manufacture of gramophone records and pre-recorded magnetic tapes
3640 Aerospace equipment manufacturing and repairing

Category 2
2430 Manufacture of concrete, cement of plaster products for constructional purposes
2460 Production of grindstones and other abrasive products
3200 Mechanical engineering
3220 Manufacture of machine tools for working metal, and of other tools and equipment for use with machines
3230 Manufacture of textile machinery and accessories; manufacture of sewing machines
3240 Manufacture of machinery for the food, chemical and related industries
3250 Manufacture of plants for mines, the iron and steel industry and foundries, civil engineering and the building trade; manufacture of mechanical handling equipment
3270 Manufacture of other machinery and equipment for use in specific branches of industry
3280 Manufacture of other machinery and equipment
3400 Electrical engineering
3420 Manufacture of electrical machinery
3460 Manufacture of domestic type electrical appliances
3480 Assembly and installation of electrical equipment
3600 Manufacture of other means of transport
3700 Instrument engineering
3710 Manufacture of measuring, checking and precision instruments and apparatus
3720 Manufacture of medical and surgical equipment and orthopaedic appliances
3730 Manufacture of optical instruments and photographic equipment
4110 Manufacture of vegetable and animal oils and fats
4150 Processing and preserving of fish and other seafood fit for human consumption
4170 Manufacture of spaghetti, macaroni etc.
4190 Manufacture of bread and flour confectionery
4290 Manufacture of tobacco products
4380 Manufacture of carpets, linoleum and other floor coverings, including leather cloth and similar supported synthetic sheeting
4930 Photographic and cinematographic laboratories

Category 3
2220 Manufacture of steel tubes
2480 Manufacture of ceramic goods
3110 Foundries
3140 Manufacture of structural metal products
3150 Boilermaking, manufacture of reservoirs, tanks and other sheet-metal containers
3210 Manufacture of agricultural machinery and tractors
3520 Manufacture of bodies for motor vehicles and of motor-drawn trailers and caravan
3610 Shipbuilding
3620 Manufacture of standard and narrow-gauge railway and tramway rolling stock
3740 Manufacture of clocks and watches and parts thereof
4350 Jute industry
4360 Knitting industry
4400 Leather and leather goods industry
4420 Manufacture of products from leather and leather substitutes
4500 Footwear and clothing industry
4510 Manufacture of mass-produced industry
4530 Manufacture of ready-made clothing and accessories

4560 Manufacture of furs and of fur goods
4630 Manufacture of carpentry and of joinery components and of parquet flooring
4670 Manufacture of wooden furniture
4920 Manufacture of musical instruments
5000 Building and civil engineering
5010 Construction of flats, office blocks, hospitals and other buildings, both residential and non-residential
5020 Civil engineering, construction of road, bridges, railway
5030 Installation
5040 Building completion work
5100 Building and civil engineering without specialisation

Category 4
2200 Production and preliminary processing of metals
2210 Iron and steel industry excluding integrated coke ovens
2230 Drawing, cold rolling and cold folding of steel
2240 Production and preliminary processing of non-ferrous metals
2400 Manufacture of non-metallic mineral products
2410 Manufacture of clay products for constructional purposes
2440 Manufacture of articles of asbestos
2450 Working of stone and of non-metallic mineral products
2470 Manufacture of glass and glassware
3100 Manufacture of metal articles (except for mechanical, electrical and instrument engineering and vehicles)
3120 Forging, closed-died forging, pressing and stamping
3130 Secondary transformation, treatment and coating of metals
3160 Manufacture of tools and finished metal goods, except electrical equipment
3190 Other mechanical workshops not elsewhere specified
3260 Manufacture of transmission equipment for motive power
3470 Manufacture of electric lamps and other electric lightning equipment
3500 Manufacture of motor vehicles and of motor vehicles parts and accessories
3510 Manufacture and assembly of motor vehicles, manufacture of motor vehicle engines
3530 Manufacture of parts and accessories for motor vehicles
3630 Manufacture of cycles and motorcycles and parts and accessories thereof
3650 Manufacture of transport equipment not elsewhere specified
4120 Slaughtering, preparing and preserving of meat
4210 Manufacture of cocoa, chocolate and sugar confection
4300 Textile industry
4320 Cotton industry
4330 Silk industry
4370 Textile finishing
4390 Miscellaneous textile industries
4410 Tanning and dressing of leather
4550 Manufacture of household textiles other make-up textile goods
4600 Timber and wooden furniture industries
4610 Sawing and processing of wood
4620 Manufacture of semi-finished wood products
4640 Manufacture of wooden containers
4650 Other wood manufacture
4660 Manufacture of articles of cork and articles of straw and other plant materials, manufacture of brushes and brooms
4720 Processing of paper and boards
4730 Printing and allied industries
4800 Processing of rubber and plastics
4810 Manufacture of rubber products
4830 Processing of plastics
4900 Other manufacturing industries
4910 Manufacture of articles of jewelry and goldsmiths' and silversmiths' wares
4940 Manufacture of toys and sports goods
4950 Miscellaneous manufacturing industries

Category 5
2300 Extraction of minerals other than ferrous metals and energy-producing minerals; peat extraction
2420 Manufacture of cement, lime and plaster
4100 Food, drink and tobacco industry
4130 Manufacture of dairy products
4140 Processing and preserving of fruits and vegetables
4160 Grain milling
4180 Manufacture of starch and starch products
4200 Sugar manufacturing and refining
4220 Manufacture of animal and poultry food
4230 Manufacture of other food products
4240 Distilling of ethyl alcohol from fermented materials; spirit distilling and compounding

4250 Manufacture of wine of fresh grapes and of beverages based thereon
4270 Brewing and malting
4280 Manufacture of soft drinks, including the bottling of natural spa water
4700 Manufacture of paper and paper products; printing and publishing
4710 Manufacture of pulp, paper and board

Source: Kaitila (2004).

E L I N K E I N O E L Ä M Ä N T U T K I M U S L A I T O S (ETLA)
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
LÖNNROTINKATU 4 B, FIN-00120 HELSINKI

Puh./Tel. (09) 609 900 Telefax (09) 601753
Int. 358-9-609 900 Int. 358-9-601 753
http://www.etla.fi

KESKUSTELUAIHEITA - DISCUSSION PAPERS ISSN 0781-6847

Julkaisut ovat saatavissa elektronisessa muodossa internet-osoitteessa:
http://www.etla.fi/finnish/research/publications/searchengine

No 1000 JUKKA LASSILA – TARMO VALKONEN, The Finnish Pension Reform of 2005. 20.01.2006. 20 p.

No 1001 OLLI-PEKKA OKSANEN, Are Foreign Investments Replacing Domestic Investments? – Evidence from Finnish Manufacturing. 19.01.2006. 59 p.

No 1002 ARTO SEPPÄ, Open Source in Finnish Software Companies. 25.01.2006. 36 p.

No 1003 TERTTU LUUKKONEN, Venture Capital Industry in Finland – Country Report for the Venture Fun Project. 27.02.2006. 48 p.

No 1004 ELIAS OIKARINEN, Price Linkages Between Stock, Bond and Housing Markets – Evidence from Finnish Data. 15.02.2006. 36 p.

No 1005 JUHA ALHO – NIKU MÄÄTTÄNEN, Aggregate Mortality Risk and The Insurance Value of Annuities. 21.02.2006. 15 p.

No 1006 MORRIS TEUBAL – TERTTU LUUKKONEN, Venture Capital Industries and Policies: Some Cross-country Comparisons. 28.02.2006. 23 p.

No 1007 MIKA PAJARINEN – PEKKA YLÄ-ANTTILA, Omistajuus ja yritysten menestyminen: Analyysia suomalaisella aineistolla. 01.03.2006. 42 s.

No 1008 KARI E.O. ALHO, Labour Market Institutions and the Effectiveness of Tax and Benefit Policies in Enhancing Employment: A General Equilibrium Analysis. 29.03.2006. 43 p.

No 1010 FRANCESCO DAVERI – MIKA MALIRANTA, Age, Technology and Labour Costs. 24.03.2006. 48 p.

No 1011 MARKKU KOTILAINEN, Economic Shocks, Progressiveness of Taxation, and Indexation of Taxes and Public Expenditure in EMU. 03.04.2006. 29 p.

No 1012 HELI KOSKI – TOBIAS KRETSCHMER, Innovation and Dominant Design in Mobile Telephony. 03.04.2006. 31 p.

No 1013 HANNU HERNESNIEMI – MARTTI KULVIK, Helsingin seudun klusterit sekä erikoistuminen bioteknologiaan ja logistiikkaan. 11.04.2006. 44 s.

No 1014 LAURA VALKONEN, Deregulation as a Means to Increase Competition and Productivity. Some Finnish experiences. 25.04.2006. 84 p.

No 1015 VILLE KAITILA, Productivity, Hours Worked, and Tax/Benefit Systems in Europe and Beyond. 27.04.2006. 34 p.

No 1016 OLAVI RANTALA, Sosiaalietuuksien rahoituksen hinta- ja hyvinvointivaikutukset kotitalous-sektorissa. 05.05.2006. 21 s.

No 1017 MAARIT LINDSTRÖM – MIKA PAJARINEN, The Use of Design in Finnish Manufacturing Firms. 05.05.2006. 26 p.

No 1018 NIKU MÄÄTTÄNEN, Vapaaehtoiset eläkevakuutukset, verotus ja eläkkeelle siirtyminen. 05.05.2006. 25 s.

No 1019 ESA VIITAMO – HANNU HERNESNIEMI, Ympäristöliiketoiminnan määrittely ja tilastollinen seuranta – Ympäristöalalle lisää kilpailukykyä. 15.05.2006. 58 s.

No 1020 CHRISTOPHER PALMBERG – TUOMO NIKULAINEN, Industrial Renewal and Growth Through Nanotechnology? – An overview with focus on Finland. 17.05.2006. 45 p.

No 1021 ESA VIITAMO, Markkinoiden toimivuuden arvioiminen – Suuntaviivoja vertailevalle kilpailututkimukselle.

No 1022 OLLI MARTIKAINEN – JUSSI AUTERE – MARKKU NURMELA, Performance Improvement in Public Organizations – How to leverage ICT Investments. 30.05.2006. 38 p.

No 1023 ARI HYYTINEN – MIKA MALIRANTA, When do Employees Leave Their Job for Entrepreneurship: Evidence from Linked Employer-employee Data. 31.05.2006. 24 p.

No 1024 KARI E.O. ALHO, Climate Policies and Economic Growth. 31.05.2006. 23 p.

No 1025 JYRKI ALI-YRKKÖ, Technology Sourcing through Acquisitions – Do High Quality Patents Attract Acquirers? 14.06.2006. 16 p.

No 1026 DEREK C. JONES – PANU KALMI – MIKKO MÄKINEN, The Productivity Effects of Stock Option Schemes: Evidence from Finnish Panel Data. 15.06.2006. 36 p.

No 1027 MIKKO MÄKINEN – PANU KALMI, Henkilöstöjohtaminen, henkilöstönn osallistuminen ja organisaatiomuutokset teollisuusyrityksissä. Aineistokuvaus puhelinkyselyn tuloksista. 16.06.2006. 27 s.

No 1028 OLAVI RANTALA, T&K-panostusten kansantaloudelliset vaikutukset. 22.06.2006. 44 s.

No 1029 ARI HYYTINEN – OLLI-PEKKA RUUSKANEN, What Makes an Entrepreneur Independent? Evidence from Time Use Survey. 22.06.2006. 23 p.

No 1030 MARI MAUNULA, The Perceived Value-added of Venture Capital Investors. Evidence from Finnish Biotechnology Industry. 03.07.2006. 86 p.

No 1031 JYRKI ALI-YRKKÖ – MIKA MALIRANTA, Impact of R&D on Productivity – Firm-level Evidence from Finland. 07.08.2006. 20 p.

No 1032 TERTTU LUUKKONEN – MARI MAUNULA, ‘Coaching’ Small Biotech Companies into Success: The Value-adding Function of VC. 22.08.2006. 33 p.

No 1033 LAURA VALKONEN, Perhevapaiden vaikutukset naisten ura- ja palkkakehitykseen – Kirjallisuuskatsaus. 30.08.2006. 38 s.

No 1034 MIKA WIDGRÉN, Trade Potential, Intra-Industry Trade and Factor Content of Revealed Comparative Advantage in the Baltic Sea Region. 01.09.2006. 26 p.

Elinkeinoelämän Tutkimuslaitoksen julkaisemat "Keskusteluaiheet" ovat raportteja alustavista tutkimustuloksista ja väliraportteja tekeillä olevista tutkimuksista. Tässä sarjassa julkaistuja monisteita on mahdollista ostaa Taloustieto Oy:stä kopiointi- ja toimituskuluja vastaavaan hintaan.

Papers in this series are reports on preliminary research results and on studies in progress. They are sold by Taloustieto Oy for a nominal fee covering copying and postage costs.