

ESTONIAN FOREIGN TRADE: TRADE PATTERNS, REVEALED COMPARATIVE ADVANTAGE AND INTRA- INDUSTRY TRADE

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Abstract

In this paper, we investigated the development of Estonian foreign trade flows. The objective was to analyse the nature and aspects of structural changes that occurred in trade in 1995 – 2006 and to determine the factors behind these changes including comparative advantage and intra-industry trade. We based our work on statistical analysis of the data available on trade flows. The objective of the followed econometric analysis was to study the impact of a comparative advantage and intra-industry trade level of commodity groups on their export share. The panel-data model was specified at HS 2-digit level. An estimation result suggested that both factors significantly determined the share of export in respective commodity group.

1. Introduction

For extremely open Estonian economy export development is a main engine of economic growth. Foreign trade is also one of important factors of Estonian economic convergence with the European economies. Until the EU accession Estonian trade policy was very liberal, so a development of foreign trade since the trade liberalisation was more rapid than GDP growth (especially in the beginning of the transition process). As can be seen from the Table 1 exports and imports have increased since 1994 more than 8 times. The structure of foreign trade compared to both the structure of domestic demand and that of industrial manufacturing also changed more rapidly. It can be explained by greater dependence on the demand of trade partners and by remarkable share of re-exports that are more vulnerable to the economic shocks. Estonian foreign trade balance remains in deficit since 1994 and the deficit has grown more than 11 times. The main reason of such a deficit is a rapid growth of import which has been generated by strong domestic demand for investment and consumption goods. Understanding the main factors behind the structural development of Estonian trade is an important condition for effective macroeconomic and industrial policy.

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In this paper, we investigate the development of Estonian foreign trade flows. The objective is to analyse the nature and aspects of structural changes that occurred in trade with in 1995 – 2007 and to determine the factors behind these changes, including comparative advantage and intra-industry trade. We base our work on statistical and econometric analysis of the data available on trade flows.

The rest of the paper is structured as follows. In second section, we analyse the data. Next, we investigate the composition of Estonian trade and analyse its structural dynamics. Forth and fifth sections are devoted to the study of Estonian comparative advantage and intra-industry trade, wherein their main determinants and dynamics are investigated. In the sixth section, we conduct a panel-data analysis to evaluate the impact of comparative advantage and intra-industry trade on a structural development of exports. Conclusions are presented in the last section.

Table 1. Indicators of Estonian foreign trade

	1996	1998	2000	2002	2004	2005	2006	2007
exports (EEK mln)	21246	37545	55836	56990	74614	96747	119519	125553
imports (EEK mln)	34666	55215	72217	79471	104877	128365	165298	176669
Balance (EEK mln)	-13419	-17670	-16380	-22481	-30262	-31618	-45788	-51115
export/GDP (%)	37,5	47,9	58,5	47,0	49,8	55,2	57,7	51,6
import/GDP (%)	61,1	70,4	75,6	65,5	70,0	73,2	79,8	72,6

Source: database of Foreign Trade Division of the Statistical Office of Estonia, own calculations.

2. The Data

The statistics of foreign trade in Estonia are based upon the data of custom statistics. Primarily disaggregated data was accessible only in a General Trade System format that includes re-export. However, since 1995, the codes of custom procedures have been added to a declaration form, and the data is accessible in the Special Trade System without re-export. Since 2004 trade with EU countries is registered through Intrastat survey which cannot exclude all re-export flows.

The main sources of information were the database of Foreign Trade Division of the Statistical Office of Estonia. All commodities are classified according to the "Estonian Goods Nomenclature" issued in 1993. The first six digits equal the "Harmonized System"(HS) used in international trade. The nomenclature divides the commodities into 21 sections and 97 chapters. In this work commodity flows are analysed on the level of commodity chapters that are equivalent to two digits of the "Harmonized System". In some cases, the analysis was conducted at the more disaggregated level.

The time period for the current analysis is limited to thirteen years from 1995 to 2007. The analysis of trade flows since the beginning of monetary reform in 1992 to 1995 was presented in Fainshtein (1998). The base year in current work is 1995 as the first year of industrial growth. By that year, the basic structural changes caused by transitional shocks in Estonian economy had already occurred.

3. Commodity composition of Estonian foreign trade

The structural development of foreign trade reflects further economic integration of Estonia into the EU. General developments in trade flows can be described by the correlation of export and import structures. Its analysis shows that during the period in question trade structures has changed significantly. The correlation coefficients for export and import structures in 1995 to 2007 by HS2 digit are accordingly 0.787 and 0.917. As can be seen structure of imports has been more stable than that of exports. The most important factors of structural changes were further re-orientation of trade flows from the Eastern market to the EU market in reaction to the financial crisis in Russia. Other reason is the influence of FDI that generated strong demand for investment imports (Hansson, 1995; UNCTAD, 2005).

Table 2. Commodity concentration of Estonian foreign trade (Hirshman coefficient) in 1995-2007

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Exports	0,219	0,218	0,254	0,283	0,302	0,381	0,346	0,294	0,293	0,295	0,298	0,295	0,258
Imports	0,223	0,218	0,236	0,255	0,262	0,331	0,289	0,257	0,250	0,259	0,281	0,282	0,262

Source: database of Foreign Trade Division of the Statistical Office of Estonia, own calculations.

An important indicator describing foreign trade flows is the level of commodity concentration. A high level of commodity concentration shows on

the one hand high level of specialisation, and on the other high dependence on demand, especially for commodities with high price elasticity of demand. The most common measure of it is Hirschman's concentration coefficient for exports and imports (Hirschman, 1945):

$$HX = \sqrt{\sum_i (S_i^2)} \quad (1)$$

where S_i - export (import) share of commodity group i

The development of commodity concentration of trade is shown in the Table 2.

The level of commodity concentration of both imports and exports has increased in general. In relation to exports this indicates an increasing specialisation. The increase in commodity concentration of imports is a recent tendency, as in the beginning of the transition period the commodity concentration was decreasing. Generally imports are less concentrated than exports. In 2007 the top 20 HS2 commodities of exports and imports accounts for 83,9 % and 80% of total exports and imports accordingly.

Analysis of the shares of exports and imports provides more detailed view of trade structure dynamics. The shares are calculated as follows:

$$S_i^t = E_i^t / \sum_i E_i^t \quad (2)$$

where S_i^t - export(import) share of commodity i in year t

E_i^t - export(import) of commodity i in year t

Table 3 represents the HS commodity sections of exports. The first four of them – machinery, mineral products, wood and articles of wood and base metals and articles accounted for more than 50% of Estonian Export in 2007. The highest annual growth rates of exports have occurred in commodity sections pulp of wood, vehicles and equipment, mineral products and base metals and articles.

In the more disaggregated HS2 level also can be seen high concentration of exports. First five items accounted for more than 50% of exports. The highest increase in exports share have occurred in trade groups pulp of wood (47), electrical machinery and equipment (85), beverages, spirits (22), Iron and steel (72), mineral fuels (27) furniture; bedding; mattresses. (94), vehicles other than railway or tramway rolling-stock (87). The biggest decrease in export share has occurred in groups articles of apparel and clothing accessories (61,62), tanning or dyeing extracts (32), fish and crustaceans (03), other made-up textile articles (63). In general, the analysis of export commodity structure indicates increase in shares of manufacturing and resource-intensive commodities and decrease in

shares of labour-intensive commodities. The main factors behind that could be fast growth of labour cost and prices for natural resources and also considerable investments in manufacturing.

Table 3. HS Commodities sections with highest share in Estonian exports in 2007, %

HP Commodities sections	96	98	00	02	04	06	07	Annual growth 96-07
XVI Machinery and mechanical appliances; electrical equipment;	14	23	37	24	26	24	20	1,21
V Mineral products	5,8	2,8	2,4	2,7	4,6	16	12	1,24
IX Wood and articles of wood;	12	16	13	15	12	9,2	10	1,15
XV Base metals and articles	6,5	7,8	7,1	7,8	8,6	9,2	10	1,21
XVII Vehicles, aircraft, vessels and associated transport equipment	4,1	3,4	2,6	4,1	6,1	6,7	8,5	1,23
XX Miscellaneous manufactured articles	6,8	6,7	6,6	9,6	9,4	7,3	7,9	1,19
XI Textiles and textile articles	16	14	11	12	9,0	5,2	5,0	1,07
VI Products of the chemical or allied industries	8,1	5,0	3,7	4,5	4,7	4,1	4,5	1,12
IV Prepared foodstuffs; beverages, spirits and vinegar	6,9	3,9	1,6	3,1	3,2	3,0	4,2	1,12
VII Plastics and articles thereof; rubber and articles thereof	2,0	2,1	1,8	2,6	2,7	2,9	3,2	1,20
X Pulp of wood or of other fibrous cellulose material;	1,9	2,0	1,8	2,3	2,1	2,4	3,0	1,26
I Live animals; animal products	6,9	5,0	3,7	4,2	3,4	2,7	2,9	1,08
XIII Articles of stone, plaster, cement, asbestos	1,7	1,4	1,2	1,4	1,5	1,5	1,7	1,17
XVIII Optical, photographic, cinematographic, measuring, ...	1,8	2,2	2,0	1,8	2,0	1,6	1,6	1,19

Source: database of Foreign Trade Division of the Statistical Office of Estonia, own calculations.

Table 4 represents the HS commodity sections of imports. The first five of them – machinery, mineral products, vehicles, base metals and articles from base metals, account for more than half of Estonian imports. The highest annual growth rates of import have occurred in sections transport equipment, mineral products, base metals, wood and articles of wood, plastics and articles thereof.

Table 4. HS Commodities sections with highest share in Estonian exports in 2007, %

	96	98	00	02	04	06	07	Annual growth 96-07
Commodities total								
XVI Machinery and mechanical appliances; electrical equipment;	22	29	38	29	28	25	21	1,16
V Mineral products	9,2	5,8	6,1	6,1	6,9	16	14	1,20
XVII Vehicles, aircraft, vessels and associated transport equipment	7,3	9,6	6,9	10	11	12	13	1,24
XV Base metals and articles of base metal	8,1	9,3	8,1	9,0	11	9,5	10	1,20
VI Products of the chemical or allied industries	8,5	7,2	6,6	7,3	7,1	6,4	6,7	1,15
IV Prepared foodstuffs; beverages, spirits and vinegar; tobacco ...	7,3	5,5	4,2	4,7	4,9	4,0	5,6	1,14
XI Textiles and textile articles	10	8,8	7,5	8,2	6,9	5,1	5,2	1,10
VII Plastics and articles thereof; rubber and articles thereof	4,6	4,4	4,5	5,1	4,9	4,7	5,0	1,18
IX Wood and articles of wood;	1,5	1,8	1,8	2,4	3,3	3,1	3,8	1,26
XX Miscellaneous manufactured articles	2,9	2,6	2,3	2,5	2,4	2,3	2,5	1,15
XIII Articles of stone, plaster, cement, asbestos, mica ...	2,2	2,0	1,6	1,9	1,7	1,9	2,1	1,16
X Pulp of wood or of other fibrous cellulose material; waste and scrap	3,4	3,2	3,0	2,7	2,3	1,9	2,0	1,12
II Vegetable products	3,4	2,7	2,4	2,4	2,3	1,7	1,9	1,12
XVIII Optical, photographic, cinematographic, measuring,...	2,6	2,2	2,2	2,0	2,2	1,8	1,7	1,13

Source: database of Foreign Trade Division of the Statistical Office of Estonia, own calculations.

The highest increase in import share in the more disaggregated HS2 level have occurred in trade groups wood and articles of wood (44), vehicles other than railway or tramway rolling-stock (87), iron and steel (72), machinery (44),

miscellaneous chemical products (38). The biggest decrease in export share has occurred in articles of machinery and mechanical appliances (84), paper and paperboard (48), optical, photographic (90) and articles of apparel and clothing accessories (62). The structural changes in import was mainly determined by domestic demand development and also by world relative prices changes.

For analysis of the factor intensity of Estonian trade flows we used approach developed in (UNCTAD, 2002). According to this approach commodities were grouped into five categories: primary commodities, labour-intensive and resource based manufactures, manufacturing with low skill and technology intensity, manufacturing with medium skill and technology intensity, manufacturing with high skill and technology intensity and unclassified products. The result of this aggregation is presented in Table 5. The general tendency is the decrease of labour-intensive and resource based commodities share and increase in the share of manufacturing with low and medium skill and technology intensity. The share of high skill and technology goods are still low.

Table 5. Factor intensity of Estonian exports

	1996	1998	2000	2002	2004	2006	2007
Primary commodities	20,9	12,5	8,41	11,0	12,1	23,4	22,0
Labour-intensive and resource based manufactures	42,0	43,0	36,5	42,6	35,8	26,0	27,3
Manufacturing with low skill and technology intensity	7,15	8,02	7,33	8,07	9,06	9,57	10,6
Manufacturing with medium skill and technology intensity	17,8	26,8	39,9	28,8	32,8	31,4	29,3
Manufacturing with high skill and technology intensity	11,6	9,07	7,22	8,63	8,99	8,04	8,90

Source: database of Foreign Trade Division of the Statistical Office of Estonia, own calculations.

4. Revealed Comparative Advantage

The most common measure of countries' comparative advantage is Balassa index of revealed comparative advantage (Balassa, 1965). According to this approach trade flows reveal the comparative advantage of nations. The index is calculated as follows:

$$RSA_{jk} = \frac{x_{jk} / X_j}{\sum_j x_{ji} / \sum_j X_j} \quad (3)$$

Where x_{jk} represents the export of product k by country j,

X_j is total export of country j.

We analysed comparative advantage of Estonian exports in EU market. Table 6 provide calculation of revealed comparative advantage index for HS2 commodity groups for commodities which possess comparative advantage in this market (RSA>1).

Table 6. Commodity groups with the highest Grubel-Lloyd indices, ranked by index values in 2007

RCA	1996	1998	2000	2002	2004	2006	2007
..44 Wood and articles of wood	20,2	23,1	17,1	20,1	18,1	16,4	16,7
..14 Vegetable plaiting materials	16,8	8,6	7,7	6,6	12,2	16,6	16,0
..78 Lead and articles thereof	4,6	0,4	0,3	0,4	3,5	5,7	9,0
..94 Furniture; bedding; mattresses,	5,2	4,7	4,4	7,1	7,7	7,9	7,4
..53 Other vegetable fibres;	5,3	11,2	16,1	26,1	13,5	8,4	6,5
..63 Other made-up textile articles;	10,0	9,9	9,1	9,6	10,7	7,6	6,2
..47 Pulp of wood or of other fibrous cellulose material	0,2	0,0	0,0	0,1	0,1	1,3	4,7
..31 Fertilizers	6,3	2,1	3,6	3,9	5,0	3,5	4,7
..65 Headgear and parts thereof	7,1	5,3	4,0	4,8	4,2	3,6	4,0
..62 Articles of apparel and clothing accessories, not knitted or crocheted	6,8	5,8	4,7	5,2	4,0	3,1	2,7
..36 Explosives; pyrotechnic products;	0,5	0,6	0,8	2,2	2,8	2,7	2,7
..04 Dairy products; bird's eggs; natural honey; edible products of animal origin, ...	2,6	0,9	1,5	2,2	2,6	2,1	2,6
..85 Electrical machinery and equipment and parts thereof...	1,0	2,4	3,4	2,4	2,7	2,5	2,3
..81 Other base metals; cermets; articles thereof...	5,2	1,8	0,6	4,0	2,6	2,1	2,2
..03 Fish and crustaceans, molluscs and other aquatic invertebrates	3,1	3,9	2,6	2,6	2,7	2,2	2,0
..12 Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; ...	1,1	0,8	0,4	0,7	0,6	1,9	2,0
..73 Articles of iron or steel	1,7	1,7	1,6	2,2	1,6	1,6	2,0
..52 Cotton and articles thereof	9,8	6,7	4,6	4,3	4,1	2,6	1,9
..57 Carpets and other textile floor coverings	0,5	0,7	1,2	1,9	2,5	1,9	1,8
..70 Glass and glassware	1,1	1,0	0,8	1,2	1,5	2,0	1,8

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..49 Printed books, newspapers, pictures and other products of the printing industry; ...	0,2	0,3	0,3	0,5	0,8	1,6	1,8
..96 Miscellaneous manufactured articles	0,2	0,4	0,8	1,7	1,9	1,7	1,6
..61 Articles of apparel and clothing accessories; knitted or crocheted	3,5	2,8	1,9	2,2	2,0	1,4	1,3
..86 Railway and tramway locomotives, rolling-stock and parts thereof; ...	0,6	0,6	0,8	0,8	0,9	1,2	1,3

Source: database of Foreign Trade Division of the Statistical Office of Estonia, own calculations.

The biggest commodity groups with the comparative advantage in the EU market are wood and articles of wood (44), furniture; bedding; mattresses, etc. (94), electrical machinery (85), dairy products (04), other made-up textile articles (63), cotton and articles thereof (52), articles of iron or steel (73), articles of apparel and clothing accessories etc. (62), electrical machinery and equipment (85), fish and crustaceans (03).

In 1995-2007 the comparative advantage in the EU market for most of commodity groups decrease. RSA increased for groups oil seeds and oleaginous fruits (12), explosives; pyrotechnic products (36), pulp of wood (47), printed books (49), carpets and other textile floor coverings (57), glass and glassware (70), lead and articles thereof (78), furniture (94).

Another indicator of countries' comparative advantage is the trade coverage ratio (TC). It is defined as a ratio of countries' exports of a given commodity group to the countries' imports of the same commodity group:

$$TC_i = X_i / M_i \quad (4)$$

where $M(i)$ - countries' imports of commodity i , $X(i)$ - countries' exports of commodity i .

If it is greater, then one, the countries specialises in the given sector assuming that the country has a comparative advantage in this sector. Because the trade coverage ratio reflects the proportion of exports to imports of the same country it describes "internal" comparative advantage versus "external" comparative advantage on the export markets.

Comparing the TC and SI values in different sectors can draw interesting conclusions. By definition, the partial similarity exists between these indices. At the very general level, the values of both indices should be greater than unit for export-oriented commodity groups, and smaller than unit for import-oriented commodity groups. However, there are groups that do not fit into this scheme. First, if TC value of a group is smaller than unit and its SI value is greater than unit that means an economy has a strong position on the European market for these goods even if it does not have the internal comparative advantage (imports exceed the exports). Second, if TC value is higher than unit and SI is smaller

than unit, the economy does not have the strong position on the European market even if it gained the comparative advantage in the given group, as the share of exports in this group is smaller than the respective share of imports to the EU from the rest of the world.

If the absence of discrimination in Estonian trade with the EU is assumed (which is a rational assumption given the presence of only non-tariff barriers, those to be reduced during the integration process), then a number of analytical conclusions can be drawn. In the first case, perspectives for development of exports in the group in question are rather narrow, as there is no internal comparative advantage. Given the lack of investments, the share of these groups in imports from the EU can decline. The second alternative provides rewarding analytical results. In this case, there is a potential for a commodity group to increase its share of exports to the EU market, as the group's share in the EU imports is small compared to the existing internal comparative advantage.

Table 7 represents distribution of Estonian exports by TC and SI values in 2007. According to the present analysis, the following biggest commodity groups have both internal and external comparative advantage on the EU market: fish and crustaceans (03), dairy products (04), wood and articles of wood (44), articles of apparel and clothing accessories etc. (62), other made-up textile articles (63), other base metals; cermets; articles thereof (81), furniture; bedding; mattresses, etc. (94).

There is a strong export growth potential for sizeable groups: cereals (10), preparations of meat, of fish, or of crustaceans (16), tanning or dyeing extracts (32), ships, boats and floating structures (89).

Table 7. Distribution of Estonian exports by TC and SI values, 2007

TC>1, SI<1	TC>1, SI>1
1, 10, 16, 25, 32, 75, , 89, 97, 99	3, 4, 14, 31, 43, 44, 47, 49, 53, 57, 62, 63, 65, 78, 81, 86
TC<1, SI<1	TC<1, SI>1
2, 5, 6, 7, 8, 9, 11, 13, 15, 17, 18, 19, 20, 21, 22, 23, 24, 26, 28, 29, 30, 33, 34, 35, 37, 38, 39, 40, 41, 42, 45, 46, 48, 50, 51, 54, 55, 56, 58, 60, 66, 67, 68, 69, 71, 72, 74, 75, 76, 79, 80, 82, 83, 84, 87, 88, 90, 91, 92, 93.	12, 14, 36, 52, 59, 61, 64, 70, 73, 85, 95, 96.

Source: database of Foreign Trade Division of the Statistical Office of Estonia, COMEX database, own calculations

5. Intra-Industry Trade

Powerful though it is theory of comparative advantage cannot explain a significant part of the foreign trade flows. Obviously, it cannot be attributed to the mutual trade flows within one commodity group – a relation defined as intra-industry trade. Intra-industry trade is often considered as a measure of product integration between markets. Generally with the trade liberalisation the level of intra-industry trade increases (Shelburne, 2001).

In case of transition economies, a high level of intra-industry trade signifies that, for the given commodity groups, trade flows are determined primarily by the existing technological links. In case of developed economies, trade flows are mainly determined by demand for production factors and final goods. A level of intra-industry trade in a country is characterised by the factors of vertical specialisation (the location of different stages of production in different countries including subcontracts), and horizontal intra-industry trade involving finished products.

The common measure of the level of intra-industry trade is Grubel-Lloyd (GL) index (Grubel and Lloyd, 1975):

$$GL_i = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} \quad (5)$$

where $M(i)$ - countries' imports of commodity group i ,
 $X(i)$ - countries' exports of commodity group i .

Table 8. Grubel-Lloyd indices of intra-industry trade for Estonian foreign trade

	1996	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GL index	53,6	56,5	56,9	65,5	64,6	59,8	60,4	65,3	70,3	72,1	71,0

Table 8 shows GL index for Estonian trade in total. Obviously, the index has grown in the recent years, which may indicate an increasing level of international cooperation.

Table 9 represents the values of GL index for the commodity groups. The biggest export groups with high intra-industry trade are articles of apparel and clothing accessories etc. (62), glass and glassware (70), iron and steel (72), articles of iron or steel (73), electrical machinery and equipment (85), optical, photographic, cinematographic, measuring, checking, etc. (90). For the majority of commodity groups intra-industry trade index in considered period was increased.

Table 9. IIT for HP 2 biggest commodity groups (0,5% from export)

	1996	1998	2000	2002	2004	2006	2007
..28 Inorganic chemicals; ...	72,3	78,1	73,2	95,0	79,9	93,8	98,3
..31 Fertilizers	81,0	88,5	94,4	92,8	86,5	99,6	97,7
..03 Fish and crustaceans, molluscs and other aquatic invertebrates	77,1	68,3	51,5	70,4	80,0	88,3	95,8
..85 Electrical machinery and equipment and parts thereof; ...	56,3	80,6	92,3	91,4	93,4	93,6	92,1
..62 Articles of apparel and clothing accessories, not knitted or crocheted	63,6	60,8	53,5	50,2	60,2	82,9	91,9
..16 Preparations of meat, of fish, or of crustaceans	18,1	22,2	47,7	23,4	42,4	71,3	91,1
..73 Articles of iron or steel	77,5	86,3	95,5	94,9	76,6	79,4	90,4
..70 Glass and glassware	90,3	90,6	94,3	86,9	97,9	93,3	86,3
..90 Optical, photographic, cinematographic, measuring, checking,...	57,5	79,9	81,9	79,4	78,8	76,7	82,1
..89 Ships, boats and floating structures	30,4	91,0	71,4	65,7	89,9	78,4	81,4
..72 Iron and steel	53,0	64,1	70,3	63,9	70,4	90,2	81,3
..27 Mineral fuels, mineral oils and products of their distillation ..	49,8	38,7	40,5	45,5	62,8	83,5	76,7
..48 Paper and paperboard; articles of paper pulp, of paper or of paperboard	52,3	61,4	65,8	73,1	69,2	76,0	75,8
..61 Articles of apparel and clothing accessories; knitted or crocheted	85,0	80,3	76,2	85,6	97,4	80,7	75,6
..63 Other made-up textile articles; sets; worn clothing and worn textile articles;	59,3	40,4	37,1	51,7	52,8	67,2	74,0
..49 Printed books, newspapers, pictures and other products ...	32,0	31,0	42,2	84,9	90,0	61,7	69,7
..76 Aluminium and articles thereof	53,4	52,0	90,3	77,0	68,9	60,3	66,2
..84 Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	53,9	39,4	45,3	37,4	47,2	57,3	66,2
..39 Plastics and articles thereof	45,8	48,8	45,9	55,4	57,0	63,0	63,5
..68 Articles of stone, plaster, cement, asbestos, mica or similar materials	49,3	42,3	60,9	59,4	67,6	61,3	61,3
..87 Vehicles other than railway or tramway rolling-stock, and parts	44,0	34,8	38,6	42,3	51,5	55,2	57,8
..94 Furniture; bedding; mattresses...	69,9	63,1	49,2	41,8	41,6	48,9	51,7
..04 Dairy products; bird's eggs; natural honey; ...	52,6	74,1	50,6	51,5	46,6	38,4	42,0

It has already been noticed that high level of intra-industry trade can be explained by different reasons. In the developed industrial economies the biggest part of intra-industry trade is trade of the same quality commodities-substitutes (horizontal intra-industry trade). At the same time, countries with different economic development are either indulged in vertical intra-industry trade of commodities with different quality or in the sub-contract works. In both cases the industrial cooperation may take place.

To analyse the character of intra-industry trade it is assumed that the quality of a good is reflected in its price. As suggested by Greenaway (1994), intra-industry trade is horizontal if a commodity group's price shares of exports and imports do not differ more than 15%. Otherwise, intra-industry trade is vertical. As can be seen in our previous work (Fainstein, 1998) in Estonian trade flows vertical intra-industry trade dominates.

6. Econometric analysis

The objective of the following econometric analysis is to study the impact of a comparative advantage, and intra-industry trade level of commodity groups on their export share.

The panel-data model is specified as follows:

$$\log S_{i,t} = a_1 \log GL_{i,t} + a_2 \log RCA_{i,t} + a_3 YEAR1999_{i,t} + \varepsilon_{i,t} \quad (6)$$

Where S – export share

GL – GL index

RCA – Balassa index of revealed comparative advantage

YEAR2007- year dummy

$\varepsilon_{i,t}$ - error term

t – year

i-commodity group

The equation above was evaluated for the data at HS 2-digit level for years 1995 – 2007 (1261 observations in total). Year dummy for 2007 was introduced to the model to study the impact of recent deceleration of economic growth on Estonian exports. We estimated this equation as pooled least square and fixed effect models. In order to remove multicollinearity equation was estimated in the first differences. Results of the specified estimation are represented in Table 10. Estimation statistics indicate high level of confidence of the results. Statistics of repressors show high significance of both GL and SP (significant at 1% confidence level). It can be concluded that for 1995–2007 the level of intra-industry trade and RCA on the EU market determined export volume for a given commodity group.

Year dummy for 2007 is significant at 10% confidence level, that signify the impact of recent deceleration of economic growth on the structure of Estonian exports

Table 10. Summary of the regression statistics (the dependence of export shares on the levels of RCA and GL index)²

	Pooled Least Squares	Fixed Effect Model
Intercept	-2.904	
t-Statistic	-9.96	
RSA	0.421***	0.394***
t-Statistic	5.975	7.44
Intra-industry trade index (GL)	0.25***	0.356***
t-Statistic	2.67	6.2
Year2007	0.42	0.373*
t-Statistic	1.38	1.75
Adjusted R-squared	0.143	0.81
F-statistic	16.22	694
Prob(F-statistic)	0.00	0.00
Included observations	1261	1261

*, **, *** denote coefficient estimates significant at 1, 5 and 10 per cent confidence level

7. Conclusions

1. In 1995 – 2007, Estonian foreign trade with the EU has undergone a number of structural changing. Compared with imports, the structure of Estonian exports has changed more significantly. The most important factors behind this are instability of demand for Estonian exports on the Eastern market and voluminous investments that altered the structure of industrial manufacturing and exports.

2. In period considered, there is a clear tendency of commodity concentration to increase, whereas export concentration has increased more than import. Among the reasons is the higher specialisation of exports to the EU market and decrease of exports to Russia. Part of the former Eastern exports was re-oriented to the EU market.

3. In general, the changing of commodity structure of foreign trade can be explained by intensified international cooperation and sub-contract works in some branches of manufacturing, increase of exports of resource-intensive goods and decrease of exports of some labour-intensive goods due to the growth of wages and thus lower competitiveness of respective commodity groups on the export markets. The highest increase in exports share have occurred in trade

² fixed effects are not reported

groups electrical machinery and equipment , pulp of wood, beverages, spirits , iron and steel , mineral fuels furniture; bedding; mattresses, etc. , vehicles other than railway or tramway rolling-stock. The biggest decrease in export share has occurred in groups: articles of apparel and clothing accessories, tanning or dyeing extracts, fish and crustaceans, other made-up textile articles.

In commodity structure of imports increased the shares of wood and articles of wood, vehicles other than railway or tramway rolling-stock, iron and steel, machinery, miscellaneous chemical products. The biggest decrease in export share has occurred in articles of machinery and mechanical appliances, paper and paperboard, optical, photographic, etc., and Articles of apparel and clothing accessories. The structural changes in import was determined as by domestic demand development as by world relative prices changes.

4. The biggest commodity groups with the comparative advantage on the EU markets (as measured by RSA index) are wood and articles of wood , furniture; bedding; mattresses, electrical machinery, dairy products, other made-up textile articles, cotton and articles thereof , articles of iron or steel, articles of apparel and clothing accessories, electrical machinery and equipment , fish and crustaceans.

5. The comparative analysis of TC and SI for commodity groups differentiates the category of goods with stable comparative advantage, goods with unstable comparative advantage and the goods with allowable export potential. In last category are cereals, preparations of meat, of fish, or of crustaceans, tanning or dyeing extracts, ships, boats and floating structures.

6. The following export-oriented groups of commodities have a high level of intra-industry trade with the EU as measured by GL index: articles of apparel and clothing accessories, glass and glassware, iron and steel, articles of iron or steel, electrical machinery and equipment, optical, photographic, cinematographic, measuring, and checking.

7. The econometric analysis of dependence of the export share on the comparative advantage and intra-industry trade variables suggests that both factors significantly determined the share of exports respective commodity group. The recent deceleration of economic growth has the noticeable impact on the structure of Estonian exports

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