Development of Estonian Foreign Trade with the EU in transition period (Развитие внешней торговли Эстонии с Европейским союзом в переходный период)*

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Развитие торговли с Европейским союзом стало приоритетным для Эстонии с начала 1990-х гг. В статье рассматривается развитие торговых потоков между Эстонией и европейским рынком в 1991-2007 гг. Анализируются три основных аспекта: развитие товарной структуры экспорта и импорта, развитие сравнительного преимущества Эстонии на европейских рынках, внутриотраслевая торговля и ее наиболее существенные компоненты.

Ключевые слова: Эстония, сравнительное преимущество, вертикальная/горизонтальная внутриотраслевая торговля.

1. Introduction

One of the main factors of Estonian economic convergence with the European economies is a development of trade with the EU countries. These trade relations assume an inflow of high-technology goods, economic integration at a micro-level and increase in competitiveness of Estonian exports.

After re-establishing independence in the 1991Estonian trade policy was extremely liberal, so a development of foreign trade was more rapid than GDP growth (especially in the beginning of the transition process). The structure of foreign trade compared to both the structure of domestic demand and that of industrial manufacturing also changed more rapidly.

For extremely open Estonian economy foreign trade is the main engine of economic growth. Estonian foreign trade balance remains in deficit since 1994 and the deficit has grown more than 11 times. The main reason for that 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.

In this paper we focus on the development of foreign trade flows between Estonia and the EU. The objective is to analyse the nature and aspects of structural changes that occurred in trade since the beginning of 90-s to 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 paper is structured as follows. At first we analyse dynamics of trade flows between Estonia and the EU. Next sections are devoted to Estonian comparative advantage and intra-industry trade. Theoretical framework and empirical analysis are presented in both sections. Conclusions follow in the final section of the paper.

2. Dynamics of Trade Flows between Estonia and the EU

An important factor in Estonian economic openness was the competitive advantage of its geographical location and remarkably liberal trade regime. The geographical location of Estonia enables it to have very close trade relations with Western European, Scandinavian and CIS countries offering transit services for commodity flows.

Estonian foreign trade policy in the 90-s was based on liberal principles. The ratification of bilateral free trade agreements formed a legislative basis for the development of trade with both EU members and at that time potential members. Since 1995 free trade area has been created between Estonia and the European Union where all trade barriers to industrial products were abolished. Since 1999 Estonia is a member of the WTO and since 2004 of the EU.

In the beginning of transition a rapid re-orientation of Estonian foreign trade from the markets of CIS countries to Western markets took place. As

* Журнал открывает этой статьей серию материалов зарубежных авторов на английском языке.

in case with any small open economy the main engine of liberalization has been the need to gain a competitive advantage by expanding the tiny domestic market through exploiting economies of scale. Domestic consumer demand has also been oriented mostly towards imported goods.

Among the reasons for trade re-orientation in the beginning of the transition were the deterioration of the terms of trade with Russia since 1992 caused by high inflation in Russia, collapse of the system of payments, introduction of import tariffs, rise in prices of raw materials and unstable overall economic climate.

Table 1 presents the shares of export and import trade flows between Estonia and the EU and Estonia and rest of the world (ROW). Straightforward conclusion is that reorientation in trade flows from former Soviet to European partners took place in the early 90-s and very quickly. Already in 1993 the share of European export and import has reached 64,1 % and 68,4 % respectively. Since 1995 the share of European export and import in the Estonian trade structure is more or less stable at around 75-80 %.

If the shares of European export and import are quite stable, then the volume of trade has exploded. In 1995 European import amounted to 21,5 billions of kroons and in 2007 it reached 140,5 billions. Estonian export to European partners amounted to 13,4 billions of kroons in 1995, though reaching 87,9 billions of kroons in 2007.

Tabel 1. **Distribution of Estonian export and import between EU and ROW, %**

Flow	Partner	1991	1993	1995	1997	1999	2001	2003	2005	2007
Export	EU	15,3	64,1	70,38	77,63	85,66	80,83	82,43	77,79	69,93
	ROW	84,7	35,9	29,62	22,37	14,34	19,17	17,57	22,21	30,07
Import	EU	19,4	68,4	78,54	83,49	84,67	81,79	76,56	76,30	78,60
	ROW	80,6	31,6	21,46	16,51	15,33	18,21	23,44	23,70	21,40

Source. Statistics Estonia, authors' calculations.

3. Comparative advantage

Comparative advantage is the central concept in explaining the foreign trade pattern. Recent empirical works in this field are concentrated in measuring of comparative advantage (see Moenius 2006), analyzing of it's dynamic (see Young 1991, Ferto 2007) and factor endowments as a main determinant according to Heckscher-Ohlin model.

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:

$$RSA_{jk} = \frac{x_{jk} / X_j}{\sum_j x_{ji} / \sum_j X_j}, \qquad (1)$$

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. According to our calculations of revealed comparative advantage index the biggest commodity groups with the comparative advantage in the EU market are wood and articles of wood, furniture, 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.

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, explosives; pyrotechnic products, pulp of wood, printed books, carpets and other textile floor coverings, glass and glassware lead and articles thereof, furniture.

In recent empirical literature was developed several methods of trade pattern dynamic analysis. As concerns to comparative advantage the main focus was on the stability of its measure over time. Following Dalum et al (1998) and Ferto (2007) we analysed the stability of distribution of the Balassa index of

Table 2. **Stability of RSA between 1995 and 2007**

Variable	Coefficient
α	0,29 (1,47)
β	0,65*** (12,01)
Adjusted R-squared	0,6
F-statistic	144
Prob(F-statistic)	0,00
Included observations	97

revealed comparative advantage between two periods. Regression model have a form:

$$RSA^{2007}{}_k = \alpha + \beta RSA^{1995}{}_k + \varepsilon_k, \qquad (2)$$

where 1995 and 2007 superscripts describe the first and last year of analysis;
RSA is Balassa index of revealed comparative advantage of product k;
б and в are linear regression parameters; е is residual term. The value of в indicate the specialisation dynamic: 0< в<1 indicates despecialisation, в = 1 indicated unchanged pattern of specialisation, в > 1 indicated strengthen of specialisation in considered period.

Estimation results are represented in Table 2. The results show clear tendency to despecialisation in trade with the EU in the considered period.

4. Comparative advantage and factor intensity

The Heckscher-Ohlin model predicts that countries trade pattern depend on their relative factor endowments. According to this prediction essential change in trade specialisation imply change of relative factor endowments of country compare with their main trade partners.

For analysis of the factor intensity of Estonian trade flows with the EU we used approach developed in (UNCTAD, 2005). According to these approach commodities was 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 general tendency in Estonian export with the EU as a result of this aggregation 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.

To analyse the relation between comparative advantage and factor intensity we calculated the export shares of commodity groups with comparative advantage (RSA>1) in total export of considered category of factor intensity (table 3). As can be seen the specialisation located mainly in primary commodities and manufacturing with medium skill and technology intensity. In the considered period specialisation increased in primary commodities and decreased in manufacturing with medium skill and technology intensity which is not improved the trade pattern. This confirms our previous result about despecialisation in trade with the EU.

5. Intra-Industry Trade

Intra-industry trade (IIT) plays very important role in the trade patterns, especially in that of transition countries and is often considered as a measure of product integration between markets. The idea of IIT was firstly introduces in the 1960s. The simultaneous import and export within an industry was firstly observed by Verdoorn (1960). Recent data shows that 27-44 % of global trade, depending on the level of aggregation used in estimations, is intra-industry one (Brьhlart 2008). Grubel and Lloyd (1975) in their empirical study of trade flows showed that among major industrialized countries exist trade flows within the same industries. Later studies suggested that meaningful distinction could be drawn between horizontal and vertical components of IIT.

Horizontal IIT (HIIT) is the exchange of commodities differentiated by attributes other then quality. The models of horizontal IIT are considered to be of greater relevance to trade among the developed countries. The models of vertical IIT (VIIT) are considered to reflect trade flows between developed and developing countries. Models explaining horizontal IIT are very different from the Ricardian and Heckscher-Ohlin type models and are based on imperfectly competitive market structure. Vertical IIT occurs according to H-O model logic based on comparative advantages and depending on resource endowments and factor proportions. Thus different industry and country characteristics are important as the determinants of IIT in the two types of models.

In spite of clearly seen different nature empirical studies on IIT for a long time have not distinguished between vertical and horizontal components, rather used total share of IIT. After comprehensive methodology introduced in papers by Greenaway *et al* (1994, 1995) the situation has changed and authors

Table 3. **Share of export groups with RSA >1 according to factor intensity, %**

	1995	2007
Primary commodities	21,8	28,9
Labour-intensive and resource based manufactures	11,1	9,5
Manufacturing with low skill and technology intensity	11,0	13,1
Manufacturing with medium skill and technology intensity	51,8	45,6
Manufacturing with high skill and technology intensity	0,9	0,7
Unclassified products	3,4	2,2

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

use separated vertical and horizontal IIT components in their studies.

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

$$GL_{CD,i} = 1 - \frac{\left|X_{CD,i} - M_{CD,i}\right|}{\left(X_{CD,i} + M_{CD,i}\right)}. \quad (3)$$

$M_{CD,i}$ stands for country *C*'s imports of commodity group *i* from country *D*, and $X_{CD,i}$ is country *C*'s export of commodity group *i* to country *D* in the particular year. The index takes the values between 0 and 1. When there are exports and no imports or vice versa, the index takes the value 0. If there is no import neither export of a particular commodity, the index could not be calculated. The higher values represent the higher share of IIT.

The methodology to disentangle horizontal and vertical components was introduced by D.Greenaway, R. Hine and C.Milner (1994, 1995) and thus is known in the literature as *GHM* approach. It is based on the assumption that the gap between the unit value (UV) of imports and the UV of exports for each commodity reveals the type of trade, as relative prices reflect relative quality (Stiglitz, 1987).

Formally the horizontal (vertical) IIT is measured as:

$$GHM_{ik}^{p} = \frac{\sum\left(X_{lik}^{p} + M_{lik}^{p}\right) - \sum\left|X_{lik}^{p} - M_{lik}^{p}\right|}{\sum\left(X_{lik} + M_{lik}\right)}, \quad (4)$$

where *p* denotes whether horizontally or vertically product is differentiated, *i* is an industry, *l* is a product, *k* is a trading partner.

Bilateral trade of a horizontally differentiated product *j* occurs if the unit values of exports UV_j^X and imports UV_j^X for a dispersion factor a (e.g. 0.15, 0.25), satisfies the following inequality:

$$1 - \alpha \le \frac{UV_j^X}{UV_j^M} \le 1 + \alpha. \quad (5)$$

Bilateral vertical IIT occurs if:

$$\frac{UV_j^X}{UV_j^M} < 1 - \alpha \text{ , or } \frac{UV_j^X}{UV_j^M} > 1 + \alpha. \quad (6)$$

Greenaway *et al* (1994) test for dispersion factor a being between 0,15 and 0,35. In this paper we stick to a=0,25.

In this paper we use disaggregated at Harmonized System (HS) 8-digit level set of data on the trade flows between Estonia and EU-27 countries. It covers Estonian imports and exports from/to EU in the period 1999-2007. Data originates from Eurostat database. The *GL* indices are computed for the whole set of commodities using (1) further the indices are aggregated using (2). The highest level of aggregation is 21 sections of HS. In the figure and tables below we use the following notation: T - aggregated *GL* index computed using (1), i.e. share of IIT, V - share of VIIT in the total IIT, i.e. aggregated GHM^V index computed using (3), H - share of HIIT in the total IIT, i.e. aggregated GHM^H index computed using (3).

Intra-industry trade should shed more light on the level of integration into the EU, as it plays very important role in the trade patterns of transition countries. It is often considered as a measure of product integration between markets. Generally with the trade liberalization the level of intra-industry trade increases. Countries with different economic development are either engaged in vertical IIT of commodities or in the sub-contract works. Horizontal IIT involves finished products with similar quality.

Table 4. **Intra-industry Trade Development in Estonia in 1999-2007, EU-27 Trade Flows**

Year	V	H	T
1999	0,18	0,11	0,30
2000	0,18	0,11	0,28
2001	0,19	0,11	0,30
2002	0,19	0,11	0,30
2003	0,21	0,11	0,31
2004	0,24	0,12	0,35
2005	0,24	0,14	0,37
2006	0,21	0,15	0,36
2007	0,24	0,14	0,38

Source. Authors' calculations based on Eurostat HS data at 8-digit level.

Taking into account the structural reforms and the fact that Estonia is at a lower economic development level then the majority of main trading and FDI inflow partners, we expect IIT in general for Estonia to increase and VIIT to have higher share then HIIT in 1999-2007.

Table 4 shows the trade-weighted average IIT, VIIT and HIIT for Estonia-EU trade within the analyzed period. Total IIT dynamics shows minor fluctuations in the years 1999-2003. However in the period 2004-2007 total IIT has increased. Vertical IIT shows similar dynamics as total IIT. In general it experiences period of growth but fall once in 2006. Horizontal IIT is around 0,1 before 2004 and after that stabilize at around 0,14. In general share of vertical IIT is significantly higher then the share of horizontal IIT. That is consistent with the findings of other contributors (c.f. Fertö 2005b, Fontagné *et al* 2006, Brühlart 2008). Vertical IIT experience greater growth (33,3 %) then horizontal IIT (27,7 %) if compared relevant shares in 1999 and 2007. Within the period the common year for increase in IIT to start is 2004. This is the year of accession to the EU.

6. Conclusions

In this paper we focus on the development of foreign trade flows between Estonia and the EU. As a result of economic reforms and foreign trade liberalization rapid reorientation of trade flows from former Soviet to Western markets took place. Already in 1993 the share of European export and import has reached 64,1 % and 68,4 % respectively. Since 1995 the share of European export and import in the Estonian trade structure is more or less stable at around 75-80 %. The volume of trade with the EU has exploded. In 1995 European import amounted to 21,5 billions of kroons and in 2007 it reached 140,5 billions. Estonian export to European partners amounted to 13,4 billions of kroons in 1995, reaching 87,9 billions of kroons in 2007.

The biggest commodity groups with the comparative advantage on the EU markets (as measured by Balassa 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. Econometric analysis shows clear tendency to despecialisation in trade with the EU in the considered period.

For the last years the general tendency for share of intra-industry trade in Estonia was to increase. To analyze IIT, HIIT and VIIT we used approach developed by Greenaway *et al*. Decomposition on VIIT and HIIT was made on the basis of unit values of import and export. Empirical evidence shows that share of IIT in Estonian-EU trade has significantly increased and formed 38% of trade flows in 2007. Vertical IIT plays dominant role in IIT flows. Shares of IIT, HIIT and VIIT started to rise remarkably in 2004, the year of accession to the EU. Dynamics of IIT development shows clearly convergence of Estonia towards European and world market.

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[1] *Brühlart M.* An Account of Global Intra-Industry Trade, 1962-2006. Research Paper Series. The Univesity of Nottingham. 2008.

[2] *Grubel H.G., Lloyd P.J.* Intra-Industry Trade. The Theory and Measurement of International Trade in Different Products. L., 1975.

[3] *Fertö I.* Vertically Differentiated Trade and Differences in Factor Endowment: The Case of Agri-Food Products between Hungary and the EU // J. of Agricultural Economics, 2005. □ 56 (1). P. 117-134.

[4] *Fontagné L., Freudenberg M., Gaulier G.* A systematic Decomposition of World Trade into Horizontal and Vertical IIT // Review of World Economics. 2006. □ 142 (3). P. 459-475.

[5] *Greenaway D., Hine R.C., Milner C.R.* Country-specific Factors and the Pattern of Horizontal and Vertical Intra-Industry Trade in the UK. Adelaide, 1994.

[6] *Greenaway D., Hine R.C., Milner C.R.* Vertical and Horizontal Intra-Industry Trade: A Cross-Industry Analysis for the United Kingdom // The Economic J. 1995. □ 105 (433). P. 1505-1518.

[7] *Stiglitz J.* The Causes and the Consequences of the Dependence of Quality on Price // J. of Economic Literature. 1987. □ 25 (1). P. 1-48.

[8] *Verdoorn P.J.* The Intra-bloc Trade of Benelux // Economic Consequences of the Size of Nations / E. Robinson (ed.). L., 1960. P. 291-329.

[9] *Viner J.* The Customs Union Issue. N.Y., 1950.

[10] *Moenius J.* Measuring Comparative Advantage:A Ricardian Approach, University of Redlands. 2006. URL: http://www.haveman.org/EITI07/moenius.pdf.

[11] *Young A.* Learning-by-doing and dynamic effect of international trade // Quarterly J. of Economics. 1991. □ 106 (2). P. 396-406.

[12] *Ferto I.* The Dynamics of Trade in Central and Eastern European Countries // Managing Global Transition. 2007. □ 5(1). P. 5-23.

[13] *Balassa B.* Trade Liberalization and 'Revealed' Comparative Advantage // Manchester School. 1965. □ 33. P. 99-123.

[14] *Dalum B., Laursen K., Villumsen G.* Structural Change in OECD Export Specialisation Patterns.De-specialisation and Stickiness // International Review of Applied Economics. 1998. □ 12 (2). P. 423-443.

[15] United Nations Conference on Trade and Development (UNCTAD) // World Investment Report. UN: N.Y.; Geneva, 2005.

Поступила в редакцию 06.01.2012 г.