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KRZYSZTOF FALKOWSKI*

Competitiveness of the Baltic States in International High-Technology Goods Trade

Abstract

The aim of the article is to assess the international competitiveness of the Baltic States (Estonia, Latvia, Lithuania) in high-technology goods trade. To this end, Balassa's method of analysing revealed comparative advantages (RCA) was applied. An in-depth analysis of the dynamics of RCAs in the Baltic States' exports between 1997 and 2014 has shown that their international competitiveness in this regard is relatively low, the direct consequence of which is the growing negative trade balance in high-technology goods. Also, during the analysed period Lithuania possessed no RCAs in trading high-technology goods, while the number of advantages for Estonia and Latvia was relatively small. Still, among the three Baltic States, Estonia was found to be most competitive in this regard, although in Latvia some progress was observed. In contrast, Lithuania not only had the lowest values of RCA, but also it did not record any improvement in the analysed period.

Keywords: *International Competitiveness, Revealed Comparative Advantages (RCA), High-Technology Goods, Baltic States, Estonia, Latvia, Lithuania*

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* Ph.D., Assistant Professor at the Warsaw School of Economics, World Economy Research Institute, Collegium of World Economy, e-mail: kfalkow@sgh.waw.pl

1. Introduction

In today's increasingly globalized world economy, characterized by the growing internationalization of business activities and international co-operation, the rising importance of transnational corporations and the enormous acceleration of the ICT revolution, additionally accompanied by far-reaching liberalization of economic relations, has had the effect of making international competitiveness of economies also subject to certain changes (Hämäläinen 2003). These changes concern not only the general nature of international competitiveness, but also the role and significance of different factors determining it (Falkowski 2017b). Namely, nowadays various factors whose importance was much lower or even underrated a few decades ago have become much more important, such as the quality of human capital, the level of development, and the quality of infrastructure, especially the soft one, which is responsible for the creation and diffusion of knowledge, the innovativeness of the economy and the efficiency and effectiveness of institutions as broadly understood (Miozzo & Walsh 2010). Moreover, due to changes in the structure of global demand, we can also observe the growing importance of goods and services which are more technologically advanced (Weresa 2014).

Undisputedly, from the point of view of competition in contemporary international trade and at the same time of a country's competitive position in the global economy, it is especially desirable for a country to possess comparative advantages in high-technology goods created in industries that are intensively employing modern production factors and are characterized by a high level of innovation (Wu et al. 2017). Moreover, as Dollar and Wolff (1993) stress, there is a strong correlation between a country's competitiveness in the area of high-technology goods and its ability to maintain high incomes and high wages. This is especially important for small, open economies with relatively small growth potential due to the limited nature of their natural, capital and human resources, such as the economies of the countries analysed in this article (Estonia, Latvia and Lithuania).

Still, relatively recently, i.e. in the 2000s, these three small economies were dubbed by economists the "Baltic tigers", owing to their very dynamic economic growth recorded at this time (Åslund 2015; Kuokštis 2015; Korhonen 2013; Hübner 2011). In view of the above, the question of international competitiveness of the economies of the three Baltic States (Estonia, Latvia and Lithuania) in terms of high-technology goods seems very relevant. It is an interesting and important research issue also because having comparative advantages in the modern world economy in this respect can be an important factor for the development of the entire economy, the best examples being Singapore or South Korea. Therefore, the purpose of this article is to conduct an in-depth analysis of the dynamics of the revealed comparative advantages in Estonian, Latvian and Lithuanian high-technology goods exports. For this analysis, which covers the years 1997–2014, I used

the methodology of measuring the competitiveness of the economy in international trade developed by B. Balassa (the RCA indicator).

In the international literature, there are studies on the competitiveness of the Baltic States' economies, but there is a noticeable lack of in-depth, comparative research into their international competitiveness in high-technology goods. It is the intention of this article to fill in the gap in this area.

This article puts forth the thesis that the competitiveness of the Baltic States in contemporary international trade in high-technology goods is low. This is evidenced by the absolute lack of any comparative advantages in high-technology goods trade in the case of Lithuania, and the relatively small number of comparative advantages possessed by Estonia and Latvia. In relative terms, out of all three Baltic States Estonia is the most competitive in this regard, although in Latvia some progress has been observed over the recent years.

2. Literature review

The Baltic States are quite a popular topic of economic research and analysis, especially in terms of their experience of systemic transformation after the collapse of the USSR, but also, amongst others, into the reasons for their dynamic economic growth in the 2000s (i.a. Åslund 2015; Hübner 2011), the effects of the global crisis of 2008 (i.a. Kattel & Raudla 2013), or their integration with the EU and the eurozone (i.a. Auers 2014).

As far as the body of research on the competitiveness of the Baltic States in international trade published in international literature is concerned, the results of Bernatonyte and Normantiene (2009) are worth mentioning. They stress that differences in the trade structure and comparative advantages of the Baltic States are mostly caused by these countries' different manufacturing bases, but also by different administrative reforms implemented and different political frameworks put in place. At the same time, the Baltic States compete with each other in exports of similar categories of goods. The specialization of all three Baltic States in international trade in low-technology goods has been pointed out by Landesmann et al. (2015) and Pilinkiene (2015). This conclusion finds confirmation in Misztal (2009), who, based on an analysis of data for 1996–2006 (by SITC section), identified the main competitive advantages of all three Baltic States in international trade as being in Crude materials inedible except fuels and Miscellaneous manufactured articles, and also in Manufacture goods classified chiefly by material (Estonia and Latvia) and Food and live animals (Lithuania). Such similarities in Estonia's and Latvia's competitive advantages were also observed by Remeikienė et al. (2015), according to whom Latvia and Estonia possess a strong and medium competitive

position, respectively, in raw materials, while Lithuania enjoys a comparative advantage in mineral fuels, lubricants and related materials. In turn, Pilinkiene (2014) proves that there is a strong similarity between the competitive profiles of Latvia and Lithuania as in both Latvia and Lithuania there is a strong dominance of textiles and clothing industries, whereas no noticeable competitive advantages can be recorded among Estonian industries.

What's more, insofar as the competitive profiles of the Baltic States are concerned, in the case of Estonia Laaser et al. (2015) observe that the country records positive RCA values for labour-intensive and material-intensive goods, which still account for 65 per cent of Estonian exports. As for research-intensive as well as capital-intensive goods, on the other hand, Estonia does not possess any such advantages (RCA <0, in 1999–2012), with RCA values for research-intensive goods being much more negative than for capital-intensive goods. Significantly, as Kilvits (2014) points out, since the 2008 global crisis it has been all the more desirable in Estonia to accelerate structural changes in the manufacturing sector in order to increase its productivity (significantly reduced after the crisis, as argued by Andrews and de Serres (2016)) as well as the technological advancement of the manufactured goods so that they can effectively compete in international markets, not only in the field of wood and wooden products (Eesti Pank 2016).

Secondly, with respect to research on the international competitiveness of Latvia's economy, Davidsons (2005) stressed that the most important export items in this country were little-processed or unprocessed goods, as well as resource-intensive goods and the least human-capital-intensive goods. Similar conclusions were reached by Benkovskis (2012) and Sauka (2014). Interestingly though, Latvia's competitiveness differs between markets, which means that its human-capital-intensive goods are competitively only in the CIS market, whereas in the EU market Latvia's advantages are only recorded in exports of resources-intensive and labour-intensive goods. Unfortunately, the falling productivity in export industries observed in recent years means that the international competitiveness of the Latvian economy is gradually decreasing too (Skribane & Jekabsone 2013). Therefore, as stressed by Strašun (2015), what needs to be done by the authorities to boost growth in the existing industries and companies which are higher up on the value chain is to implement structural changes, as well as those which would support the creation and development of new industries and high-technology companies. There are a number of ways this can be achieved, from educational reforms (e.g. commercialisation of ideas, bringing academia closer to business, and promotion of innovations) to changing the tax system (e.g. reducing the grey economy, thus securing financing for companies). Fedotovs (2010) also came to similar conclusions in this respect.

And thirdly, with regard to the international competitiveness of the Lithuanian economy, interesting research was carried out by Startiene & Remeikiene (2014), who clearly demonstrated that the country's strongest competitive position in in-

ternational markets is in the areas of food, chemicals, and wood and textiles, i.e. goods with low technological advancement. Similar conclusions were reached by, inter alia, Laskiene et al. (2017), Kalendiene & Miliauskas (2011) as well as Travkina & Tvaronavieiene (2010). In turn, Saboniene et al. (2013), based on their research on the export specialization of the Lithuanian manufacturing industry, emphasized the particular importance of low-technology manufacturing industries, which generally prevail in the Lithuanian trade structure, for the country's economy. Moreover, they observed that Lithuania's low-technology and medium-low-technology exports are vital for the country's economic growth and exports, therefore it would be advisable to replace the cost-based comparative advantages in these industries with non-price factors based on research and innovation. On one hand, this confirms the still very low importance of high-technology goods both in the national income creation and in Lithuanian exports, which depend heavily on traditional industries (Laskiene & Venckuviene 2014; Saboniene 2009). On the other hand, its also highlights the need to strengthen the innovativeness of the Lithuanian economy if the country wishes in the future to not only to increase the importance of these goods in the economy, but also to possess competitive advantages in the international trade in this category of goods. Nevertheless, as stressed by Saboniene et al. (2013), what remains the greatest challenge is to change Lithuania's exports structure to include more high-value-added knowledge-intensive, high-skill-labour-intensive and technology-intensive goods. This will prove especially difficult since, as observed by Pridotkiene et al. (2013), R & D expenditures in all sectors of the Lithuanian manufacturing industry are very low, and as a matter of fact even the high-technology sector does not meet the OECD criteria for high-technology industries.

3. Research methodology and data

There is no universally accepted definition of international competitiveness in the economic literature, which best illustrates the complexity and multifaceted nature of this concept. This is due to, among other things, different approaches to the subjective scope of competition as such, differences in the approaches to its sources, as well as different systems of values professed by economists who define it (Bhawsar & Chattopadhyay 2015; Delgado et al. 2012; Fagerberg 1996; Pace & Stephan 1996). A synthetic overview of them can be found in, e.g., Bhawsar & Chattopadhyay (2015), Misala (2014), Balkyte & Tvaronavičiene (2010), as well as Banwet et al. (2002).

However, as it pertains to the issue presented in this article, it is necessary to explain how the concept of competitiveness of an economy in international trade is de-

fined in the literature. In this respect, there is also a wide range of definitions in use. According to the OECD (2005), competitiveness should be understood as an economy's ability to compete fairly and successfully in the international goods and services markets, which, as a result, leads to improved living standards of the citizens of a given country. A very similar definition is provided by Barker & Köhler (1998). In turn, according to Scott & Lodge (1985), a competitive economy is able to create, produce, distribute, and/or service products in international trade while earning rising returns on its resources. Similarly, Carbaugh (2017) states that international competitiveness boils down to the ability to develop, produce and sell goods and services which are more attractive because of their price and/or quality than the export offer of other countries, as evidenced by the growing share of a given country in international trade with respect to the sale of such goods as compared to other countries (Fagerberg 1988). It is also worth mentioning the definition used by Weresa (2014), who stresses the dynamic character of competitiveness, stating that it is the ability to derive faster (than other countries) and greater benefits from one's own and foreign production factors, which translates into a more dynamic growth of the overall welfare.

A number of different statistical-econometric methods are used by economists to assess the competitiveness of selected economies (Startiene & Remeikiene 2014). In this article, Balassa's method of analysing revealed comparative advantages (RCA) (1965, 1989) was applied to evaluate the real competitiveness of the Baltic States in contemporary trade in high-technology goods. In particular, Balassa's original logarithmical RCA formula was used, as follows:

$$RCA_i = \ln\left(\frac{X_{ij}}{X_j} \div \frac{X_i}{X}\right) \tag{1}$$

where:
RCA_i – the revealed comparative advantages index of a given country in the i goods category
X_{ij} – exports of the i goods category from the given country to the j country or category of j countries
X_j – total exports from the given country to the j country or category of j countries
X_i – global total exports of the i goods category
X – global total exports

The above form of Balassa's formula allows for the symmetry of both positive and negative RCAi values in the range around 0 to be maintained, thereby facilitating their interpretation (Falkowski 2017a). One can only speak of the presence of a relative trade advantage for a given goods category when the value of this index for it is greater than zero (RCAi > 0).

In addition, in order to further analyze the international competitiveness of Estonia, Latvia and Lithuania in the field of high-technology goods, the OECD clas-

sification of basic goods categories based on their technological advancement was used (OECD 2011; Hatzichronoglou 1997). Under this classification, OECD has distinguished four basic categories of goods, i.e. high-technology, medium-high-technology, medium-low-technology and low-technology goods. Furthermore, within the category of high-technology goods, which is crucial for this article, the OECD has included the following subcategories: aircraft and spacecraft; medical, precision and optical instruments; office, accounting and computing machinery; pharmaceuticals; radio, TV and communications equipment. In the empirical part of this article, using the relevant RCA values as calculated, the competitiveness of the three Baltic countries is present with respect to both the high-technology goods categories against the background of the other goods categories under the OECD classification, as well as the different subcategories of goods from the high-technology goods category.

All necessary statistical data used to analyze the subject matter comes from the United Nations Commodity Trade Statistics Database.

4. Empirical research results

When analysing the competitiveness of individual Baltic countries in international trade in high-technology goods, it is worthwhile to first look at the export structure of Estonia, Lithuania and Latvia in terms of individual categories of goods, according to the OECD classification based on their technological advancement (Table 1).

Exports from all the Baltic States are dominated by low-technology goods, which in 2014 accounted for 36.18% (Latvia), 29.13% (Lithuania), and 26.29% (Estonia) of their total exports. At the same time however, the value of low-technology goods in the export value of each of the Baltic countries markedly decreased over the analyzed period of 1997–2014. The biggest drop was recorded by Latvia (–30.89 pp; from 67.07% in 1997 to 36.18% in 2014), followed by Estonia (–16.61 pp; from 42.90% in 1997 to 26.29% in 2014), and then by Lithuania (–11.21 pp; from 40.34% in 1997 to 29.13% in 2014).

On the other hand, when we look at the importance of exports of hi-technology goods, comprising both the high-technology and medium-high-technology categories under the OECD classification, Estonia turns out to be the leader in this respect, with exports of high-technology goods accounting for 15.66% and medium-high-technology goods – for 24.97% of the total export value in 2014 (in total, 40.63% of Estonian exports). The relatively high importance of high-technology and medium-high-technology goods in Lithuania's export structure, albeit significantly lower than in Estonia, can also be noted (in total, 33.52% in 2014), as well

as in Latvia (28.81% in 2014). However, as far as the share of high-technology goods only in total exports in the Baltic countries is concerned, in 2014 it was very similar for Estonia and Latvia (15.66% and 14.18%, respectively) while for Lithuania it was much lower, amounting to just 7.54%.

What's more, and what needs to be stressed in this context, is that the share of high-technology goods in Latvian exports in the analyzed period has significantly increased. While in 1997 it stood at just 4.98%, in 2014 it reached as much as 14.18% (a nearly threefold rise). Unlike for Latvia, the shares of high-technology and medium-high-technology goods for Estonia and Lithuania, despite some fluctuations, remained relatively stable over the entire analysed period.

Table 1. Share of high-technology goods category in Estonian, Latvian and Lithuanian exports against other categories of goods according to the OECD classification in selected years between 1997–2014

Category of goods	Share in total exports (%)				
	1997	2002	2006	2010	2014
Estonia					
High-technology	**13.41**	**15.56**	**14.74**	**10.20**	**15.66**
Medium-high-technology	21.24	19.09	21.15	23.93	24.97
Medium-low-technology	13.50	16.30	26.50	26.43	20.79
Low-technology	42.90	41.99	26.98	27.44	26.29
Other	8.96	7.07	10.63	12.00	12.28
Latvia					
High-technology	**4.98**	**4.79**	**7.01**	**11.17**	**14.18**
Medium-high-technology	14.37	10.12	15.93	15.86	14.63
Medium-low-technology	9.84	16.12	21.38	19.15	18.04
Low-technology	67.07	63.97	44.97	37.77	36.18
Other	3.74	5.01	10.71	16.05	16.98
Lithuania					
High-technology	**8.13**	**7.25**	**6.85**	**5.88**	**7.54**
Medium-high-technology	23.16	19.38	23.50	24.53	25.98
Medium-low-technology	20.08	31.15	32.98	31.30	26.13
Low-technology	40.34	35.90	29.59	27.77	29.13
Other	8.29	6.32	7.09	10.53	11.21

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

However, looking at the net trade in high-technology goods in the Baltic countries in the years 1997–2014, one can see that for all three of them the balance was negative in this regard (Figure 1). Thus, despite the above-mentioned growing share of high-technology goods in total exports in Latvia and Estonia, the value of imports of these goods year-on-year in all Baltic States was significantly higher than

the value of relevant exports. A particularly negative tendency of a rapidly rising negative balance in this regard occurred in 2001–2007, which was mainly connected with the liberalization of trade rules in the Baltic States due to their accession to the World Trade Organization (Estonia and Latvia joined in 1999, and Lithuania in 2001), their forthcoming accession to the European Union (2004) and their dynamic economic development observed in the early 2000s in all of them. By far the worst in this respect were the years 2007 and 2008, when the negative imbalance in foreign trade in high-technology goods was the largest in all three countries over the analysed period. However, when these three countries are compared among themselves in this regard, it is noticeable that Estonia's trade deficit in high-technology goods was the smallest, while Lithuania's was the largest (Figure 1).

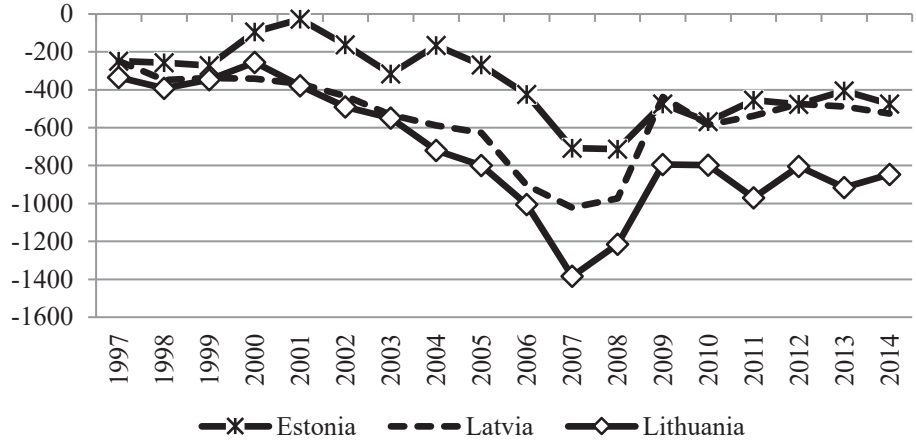

Figure 1. Net balance of trade in high-technology goods (Export minus Import) for Estonia, Latvia and Lithuania in 1997–2014 (USD million)

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

Furthermore, analysis of the data concerning long-term comparative advantages in exports of the Baltic States in 1997–2014, according to the OECD classification of goods categories based on their technological advancement (Figures 2–4), clearly shows that all three Baltic States have a very similar competitive profile. They all enjoy competitive advantages in the same two of the four goods categories, i.e. in the low-technology and medium-low-technology goods. Also, in exports to international markets all of these countries are the most competitive in the low-technology goods category in general (the most competitive goods subcategory traditionally being *Wood, pulp, paper, paper products, printing and publishing* (Estonia and Latvia) and *Food products, beverages and tobacco* (Lithuania)). However, it is also worth pointing out that only in the case of Lithuania,

in the selected years of the analyzed period, that is between 2001–2006, in 2008, and between 2010–2012, the highest competitiveness in foreign trade was recorded in the category of medium-low-technology goods, mainly due to its high competitiveness in the *Coke, refined petroleum products and nuclear fuel* subcategory.

Unfortunately, what is particularly important from the point of view of this article, the Baltic States do not have any comparative advantages in the high-technology goods trade. The RCA values for this category of goods, with the exception of 2000–2001 for Estonia, remained below zero during the entire analyzed period. It should be noted, however, that in this regard Estonia fared relatively the best, that is during the entire period its RCA values, although negative, were significantly better than those of Latvia and Lithuania (except for 2009). Also a clear improvement of RCAs for high-technology goods in Latvia should be emphasised (a very significant reduction in their negative values over the years 1997–2014), which most clearly demonstrates the gradual improvement of the country's competitiveness in this category of goods. And secondly, Lithuania is a kind of outsider among the Baltic States in terms of competitiveness (or, in fact, the total lack thereof) in the area of trade in high-technology goods. Not only did the country have the lowest RCA values in this area among all Baltic States starting from 2006, but also there was virtually no real improvement in this respect over that time.

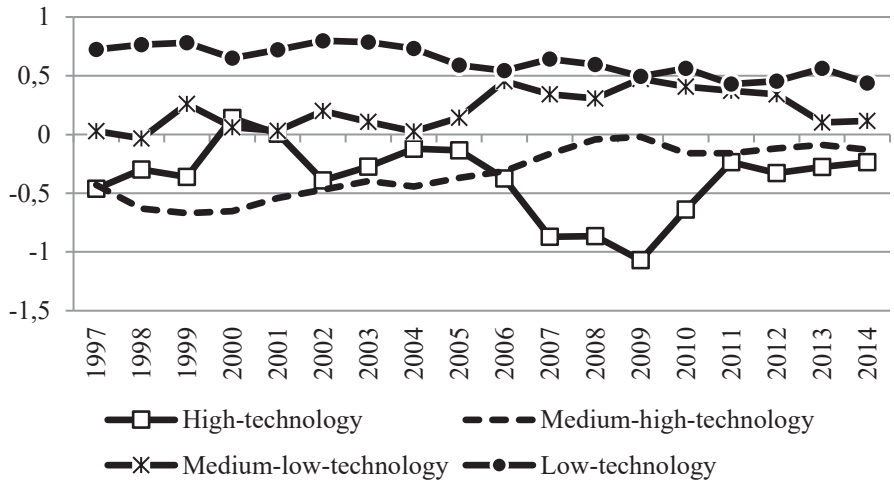

Figure 2. Revealed comparative advantages (RCA) in Estonia's exports within the basic categories of goods according to the OECD classification in 1997–2014

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

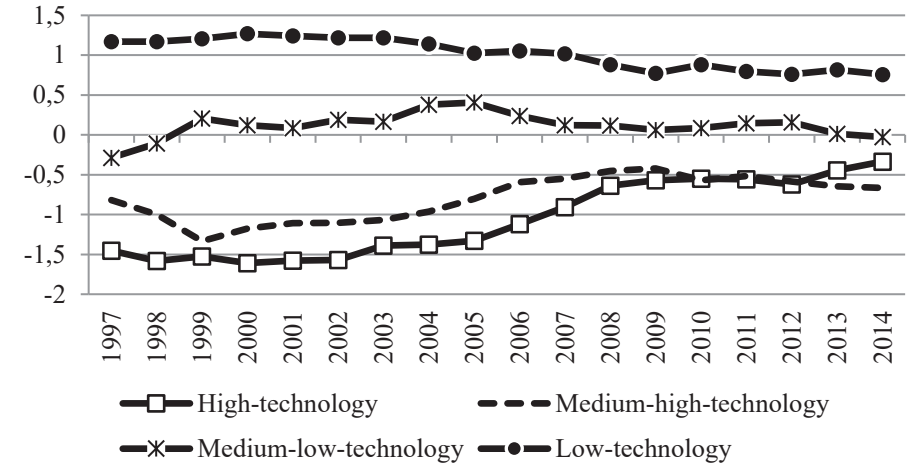

Figure 3. Revealed comparative advantages (RCA) in Latvia's exports within the basic categories of goods according to the OECD classification in 1997–2014

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

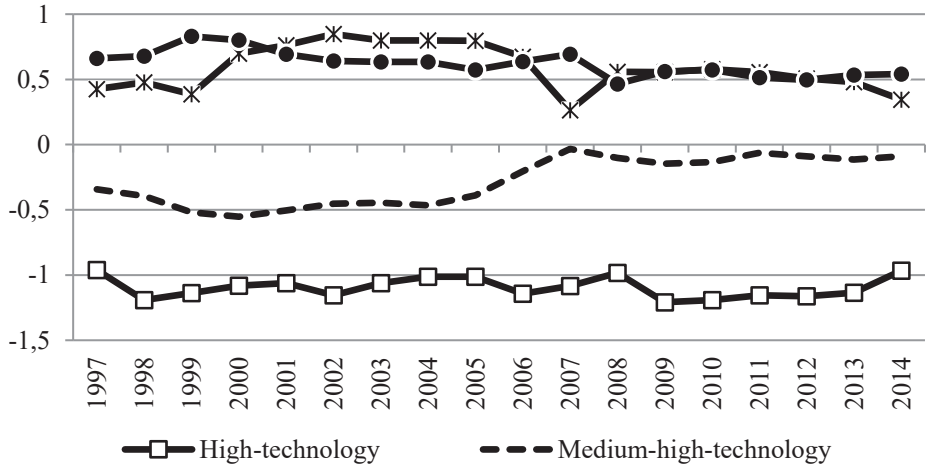

Figure 4. Revealed comparative advantages in Lithuania's exports within the basic categories of goods according to the OECD classification in 1997–2014

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

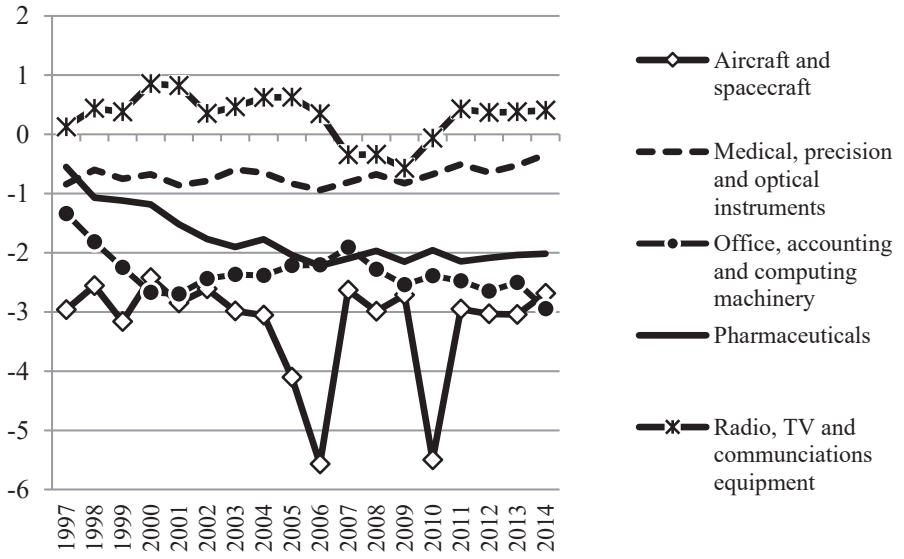

Figure 5. Revealed comparative advantages in Estonia's exports within high-technology goods according to the OECD classification in 1997–2014

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

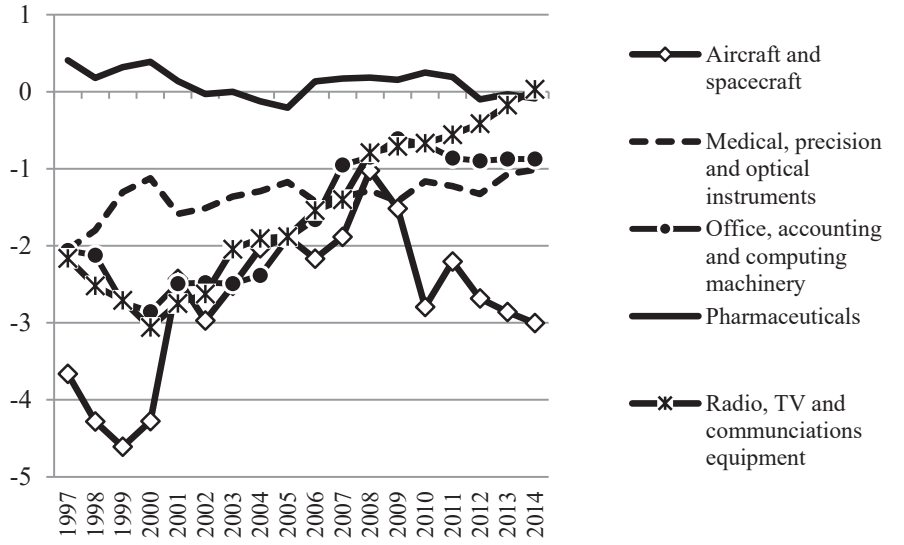

Figure 6. Revealed comparative advantages in Latvia's exports within high-technology goods according to the OECD classification in 1997–2014

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

To assess the competitiveness of the individual Baltic States in the international trade in high-technology goods, one should undoubtedly look closer at the structure and dynamics of the RCA values for specific subcategories of goods from the high-technology goods category, based on the OECD classification. It is clear from the above analysis that, although Estonia and Latvia do not have any comparative advantages in international trade in the most technologically advanced goods category in general, they do possess some comparative advantages in several subcategories of goods from this category (Figures 5–6). In the case of Estonia, comparative advantages were recorded in the *Radio, TV and communications equipment* subcategory (in 2011–2014, the value of Estonian exports of this subcategory exceeded USD 2 billion, which was the best result of all subcategories of foreign trade in that country according to the OECD classification), and in the case of Latvia comparative advantages were recorded in the *Pharmaceuticals* subcategory. It is worth noting that in 2014, for the first time in the analyzed period, Latvia also possessed comparative advantages in the *Radio, TV and communication equipment* subcategory (RCA value = 0.034), while the export value of those goods reached $ 1.16 billion, almost treble the value of Latvian exports of pharmaceuticals.

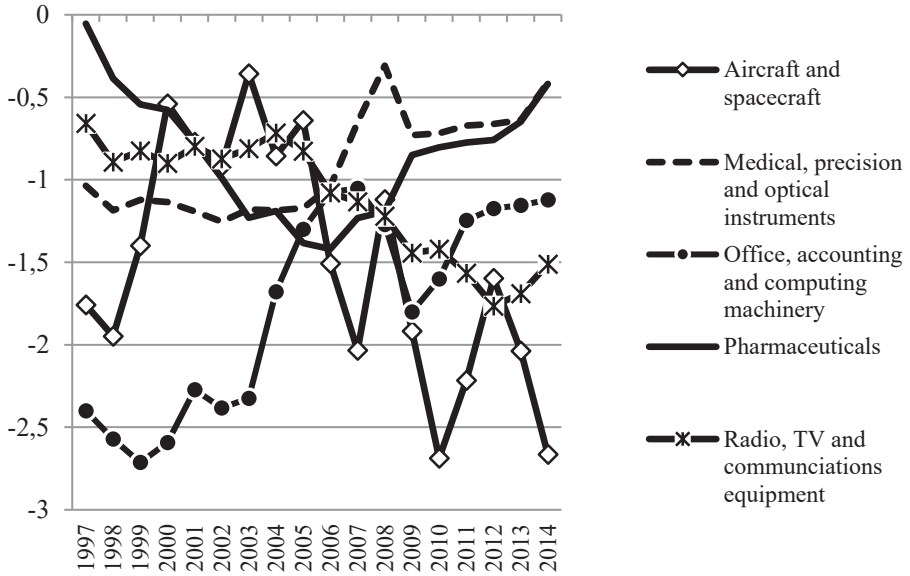

Figure 7. Revealed comparative advantages in Lithuania's exports within high-technology goods according to the OECD classification in 1997–2014

Source: Own elaboration based on data from the United Nations Commodity Trade Statistics Database.

On the other hand, with respect to Lithuania it should be emphasized that during the entire analyzed period the country did not have any comparative advantages in foreign trade in any of the five subcategories of goods from the high-technology goods category according to the OECD classification (Figure 7). Relatively the best (but still negative) RCA values for these goods subcategories were recorded by Lithuania in the subcategories of *Medical, precision and optical instruments* (in 2014, RCA = –0.41) and *Pharmaceuticals* (in 2014, RCA = –0.42).

If we look at the most competitive goods in the high-technology goods category in the foreign trade of the Baltic States in 2014, i.e. those with the highest RCA values and with the highest share in total exports, the number of them turns out to be the largest for Estonia and the smallest for Lithuania. The most competitive high-technology goods in the case of Estonia are – *Apparatus for carrier-cu* (RCA = 3.95; export share 3.16%; export value 554.5 million USD); *Elect apparatus for line* (2.03, 4.91%, 861.8 million USD, respectively); *Parts of line telephone / telegraph equipment, nes* (1.30, 2.55%, 448.3 million USD, respectively); *Transmit-receive apparatus for radio, TV, etc.* (0.92, 0.56%, 98.5 million USD, respectively). What is noteworthy is that all of them are from the the *Radio, TV and communcation equipment* subcategory.

In the case of Latvia, the most competitive goods (commodities) in the high-technology goods category in 2014 were: *Colour Television Receivers* (RCA = 1.56; exports share 1.88%; exports value 255.9 million USD), *Transmit-receive apparatus for radio Electrodes for line* (0.64, 1.23%, 167.3 million USD, respectively), and *Medicaments nes, in dosage* (0.44, 2.34%, 318.5 million USD, respectively).

As for Lithuania, although the country does not possess any comparative advantages either in the high-technology goods category in general or in individual subcategories within this goods category, it did have, albeit small, advantages at the level of specific goods (commodities) in 2014. There were: *Instruments, appliances for medical, science, nes* (RCA = 0.97; export share 0.69%; export value 222.8 million USD), *Step and repeat aligners* (0.81, 0.31%, 100.1 million USD, respectively); and *Colour television receivers* (respectively: 0.02, 0.4%, 130.9 million USD).

5. Conclusions

The subject-matter of this article has been an in-depth analysis of the competitiveness of the economies of the three Baltic States (Estonia, Latvia and Lithuania) in international high-technology goods trade.

It goes without saying that strong international competitiveness in high-technology goods is particularly important for small and open economies, as it not

only gives them the opportunity to improve their place in the international division of labour, and thus achieve faster economic growth, but it can also create an effective buffer against unpredictable external price shocks of labour- and capital-intensive goods. Perfect examples of such small economies which are particularly vulnerable to all cyclical fluctuations are Estonia, Latvia and Lithuania, as evidenced by how deeply they were affected by the economic crisis of 2009, which ultimately put an end to the then-dynamic economic development of these so-called 'Baltic tigers'. Unfortunately, none of the three Baltic States has so far joined the ranks of major exporters of high-technology goods in the world, which is partly because of their low international competitiveness in trade in these goods.

The analysis carried out in this paper clearly shows that all three Baltic States have a very similar competitive profile. On the one hand, all of them possess comparative advantages in exports in the low-technology and medium-low-technology goods categories (according to the OECD classification of goods categories based on their technological intensity). On the other, none of them has any comparative advantages in the high-technology goods category, as evidenced by the complete lack of such (in the case of Lithuania) or very small (Estonia and Latvia) comparative advantages in trade in individual goods within the high-technology goods category.

Out of the three Baltic States, Estonia was found to be the most competitive country in terms of international trade in high-technology goods. At the other end of the spectrum was Lithuania, whose RCA values in this category were not only the lowest, but what's more, no improvement in this regard could be observed in the analyzed period. Unlike Lithuania, Latvia has seen a boost in the value of RCA for high-technology goods. This testifies to the gradual improvement of the country's competitiveness in trade in international markets within this group of goods.

The improved innovativeness observed in recent years in the economies of the Baltic States (according to the most recent Global Innovation Index in 2016, Estonia ranks 24th, Latvia – 34th, and Lithuania – 36th worldwide (Dutta *et al.* 2016), up by 7, 16 and 11 places, respectively, as compared to the same report from 2007) gives hope for an improvement of their international competitiveness in high-technology trade, especially in the context of the policies they have consistently pursued in this area and the growing innovativeness of their private companies, especially from the small and medium-sized enterprises sector (EC 2016). Among the main recommendations for potentially strengthening the Baltic States' competitiveness in international high-technology goods trade are: (i) to support high-tech companies, including through the creation of favourable conditions for R & D investment; (ii) to increase the financing of high-tech start-ups from the state budget; (iii) to foster cooperation between technical universities and businesses to effectively implement new innovative solutions in the economy; (iv) to support and develop high esteem for science and engineering in their societies; (v) to make effective

use of the existing EU pro-innovation programs and instruments for the development of high-tech industries in the Member States.

However, while taking actions to improve the competitiveness of the Baltic States' economies in the area of high-technology goods trade is important, it is also very important to maintain their existing comparative advantages in the trade of medium-low-technology and low-technology goods.

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Streszczenie

KONKURENCYJNOŚĆ KRAJÓW BAŁTYCKICH W MIĘDZYNARODOWYM HANDLU TOWARAMI HIGH-TECH

Celem artykułu jest ocena poziomu międzynarodowej konkurencyjności krajów bałtyckich (Estonii, Łotwy, Litwy) w handlu towarami o wysokim stopniu zaawansowania technologicznego. W tym celu zastosowano metodę analizy ujawnionych przewag komparatywnych B. Balassy. Z dokonanej pogłębionej analizy kształtowania się ujawnionych przewag komparatywnych (RCA) w eksporcie poszczególnych krajów bałtyckich w latach 1997–2014, wynika, iż charakteryzuje je stosunkowo niski poziom międzynarodowej konkurencyjności w tym zakresie, czego bezpośrednią konsekwencją jest rosnący ujemny bilans handlowy w handlu towarami high-tech. Dowiedziono, iż w analizowanym okresie Litwa nie posiadała żadnych przewag komparatywnych w handlu towarami z grupy towarów high-tech, zaś liczba tych przewag w odniesieniu do Estonii oraz Łotwy była stosunkowo niewielka. Niemniej jednak spośród trzech krajów bałtyckich najwyższą konkurencyjnością w tym zakresie charakteryzuje się Estonia, aczkolwiek w przypadku Łotwy widoczny jest progres w tym zakresie w ostatnich latach. Swoistym outsiderem zaś jest Litwa, która nie dość, iż charakteryzuje się najniższymi wartościami wskaźnika RCA, to dodatkowo w analizowanym okresie nie odnotowała żadnej poprawy w tym zakresie.

Słowa kluczowe: *konkurencyjność międzynarodowa, ujawnione przewagi komparatywne (RCA), towary high-tech, kraje bałtyckie, Estonia, Litwa, Łotwa*