

ANNEX 1. Manufacturing complexity of exported products

In the period of the recovery of the economy exports were an important stimulus of economic growth. Most analysis of factors affecting export growth is focusing on foreign demand and the price and cost dynamics, while the analysis of exports structure is less extensive. To draw attention to its importance in the development of exports, the *Lithuanian Economic Review* published by the Bank of Lithuania in May 2013 presented an analysis of one of the structural indicators — exports concentration. It showed that the country's exports, excluding mineral products, are one of the most diversified of all the EU countries' exports. The sustainable increase in the volume of exports is attributed not only to diversification but also to the redirection of exports to higher value-added products, i.e. products that are produced using more educated labour and advanced technology. Therefore, in this *Lithuanian Economic Review* the country's exports structure is analysed according to the complexity of manufacture of exported products. The exported products are classified according to three criteria:

- By production factor intensity, applying the methodology described by Bahri Yilmaz (2003) which is based on the classical trade theory. In this regard, exports are divided into five major product groups: raw material intensive products, labour-intensive products, capital-intensive products, easily imitable research-oriented products and difficultly imitable research-oriented products; also an additional (residual) product group is formed.
- By educational intensity, applying the methodology of Michael Peneder (2007). In this regard, economic activities are broken down by knowledge and education requirements for the labour force. Six different product groups are distinguished according to the level of education required for the manufacture of products and services — from a product group with very low educational intensity to a product group with high educational intensity. This distinction is based on the assumption that there may be a positive relationship between the intensity of labour force education and the value added.
- By technological intensity, applying the methodology of Sanjaya Lall (2000). This approach divides exports into six product groups: primary products (raw materials), resource-based products, low-tech products, medium-tech products, high-tech products and special transactions. In principle, such export division connects the two previous breakdowns.

Studies, on which the analysis is relied on, were carried out using the older versions of classification of products and activities. In order for classifications to be compatible, assumptions made by other authors (for example, Orszaghova et al., 2013) and an expert assessment were taken into account. It is worth noting that, due to substantial aggregation in used classifications, products with very different characteristics can be assigned to a single group. For example, both smartphones and corded phones, produced using older technologies, are classified as telecommunication equipment. Also classifications cannot distinguish between quality differences within products, such as more expensive fashion clothing and cheaper mass-produced clothing.

To avoid extremely large fluctuations of the indexes, further analysis is made based on the export data excluding the exports of mineral fuels, lubricants and related materials. The removed products correspond to section 3 in the Standard International Trade Classification (SITC), Rev. 3. These materials are removed due to the effects of high price fluctuations on the value of exports. The obtained results of study are presented in Chart A.

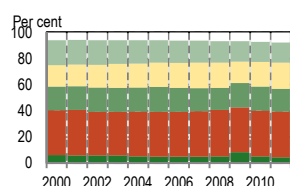
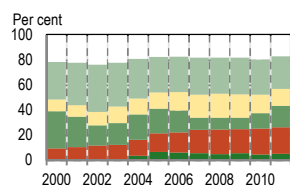
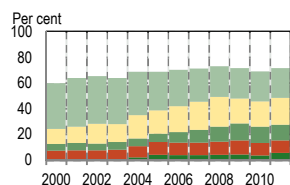
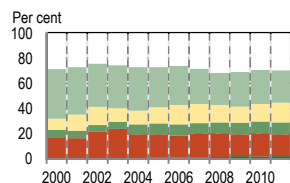
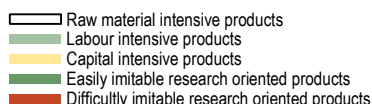
As shown in Chart A, the Lithuanian exports structure gradually changes: it is reoriented from simpler to more sophisticated product exports. The breakdown by production factor intensity shows that in 2000–2011 there was a significant change in the exports structure from labour-intensive products, in particular clothing and textiles, to other products. During the analysed period, the share of capital-intensive products, especially road vehicles⁹, in the exports structure increased the most. The share of research-oriented, especially easily imitable, products was growing as well, however at a more moderate pace. It should be added that most of the country's research-oriented exports consists of difficultly imitable products, the manufacture of which generally require a higher-skilled labour force.

In the period in question reorientation to exports of products, the manufacture of which requires a better skilled labour force, was observed as well. This is seen in the analysis of exports breakdown by educational intensity. During the analysed period, the share of products requiring very low educational intensity in the country's exports declined the most. Meanwhile, the share of products requiring slightly higher educational intensity (low, low-medium, medium) in exports grew.

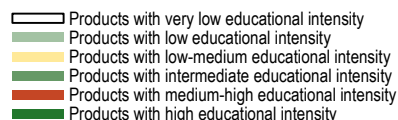
⁹ Cars, other motor vehicles and their parts and accessories, motorcycles and bicycles, trailers and semi-trailers, other vehicles.

Chart A. Breakdown of exports by product complexity

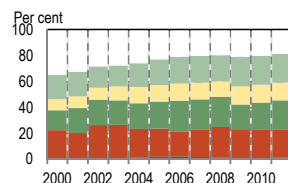
Breakdown by production factors intensity



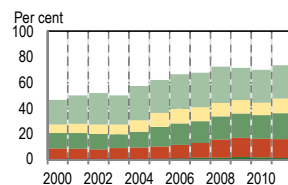
Breakdown by labour educational intensity



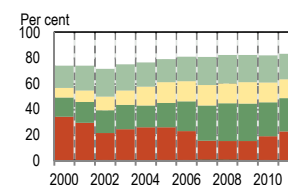
Lithuania



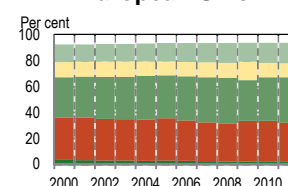
Latvia



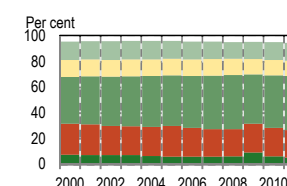
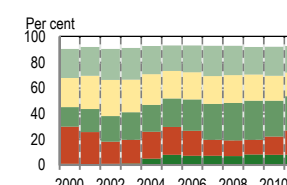
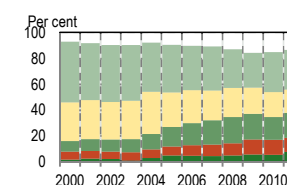
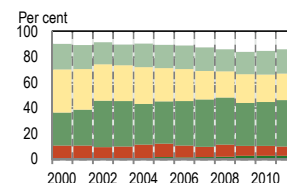
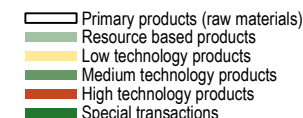
Estonia



European Union



Breakdown by technological intensity



Sources: Comtrade (UN) and Bank of Lithuania calculations.

The changes that took place in the structure of exports by production factor and educational intensities can also be seen breaking down the exports by technological intensity. During the analysed period, the exports share of low-tech products, mainly clothing and textile, significantly decreased and the share of medium-tech products, mainly vehicles and chemical products, increased. These changes indicate a shift from the exports of lower skilled labour products to the exports of higher skilled labour-intensive and capital-intensive products. However, the share of high-tech products in the structure of exports declined slightly over the period. This is mainly due to a decline in electronics and electrical equipment exports. This is likely to relate to the world's trend of transferring the final processes of the assembly of such products to the extremely cheap labour countries (Lall, 2000). The share of other high-tech products in total exports remained essentially unchanged. It should be noted that over the analysed period the exports of primary products (raw materials) increased, which in Lithuania consists mainly of agricultural products. Its increase is explained by the extensive and intensive development in the agricultural sector, and faster rise of prices compared to other products.

Other Baltic countries also experienced the reorientation of exports from low skilled labour-intensive products to higher skilled labour-intensive and capital-intensive products. However, the exports structure and its change in the Baltic countries were different. For example, in terms of exports structure by production factor intensity, one can see that the most intense reorientation process was taking place in Latvia. Raw material and labour-intensive products, mainly timber and textiles, were replaced with capital-intensive and research-oriented (although, easily imitable) products, mainly beverages, road vehicles and telecommunications equipment. Estonia's exports were distinguished by a significant decline not only in the share of labour-intensive products, but also by easily imitable research-oriented products. It was replaced by capital-intensive products, mainly beverages, rubber products, as well as difficultly imitable research-oriented products. In terms of the exports according to educational intensity it can be seen that all the Baltic countries began to export products with relatively higher educational intensity. In this respect, Estonia was a little different as well: unlike the other Baltic states, in Estonia the share of products with medium-high educational intensity, in particular telecommunications equipment, declined in the exports structure, and the greatest growth was seen in the export of products with intermediate educational intensity, mainly industrial and electrical machinery, apparatuses and appliances. In terms of technological intensity, it can be said that the changes of the Latvian exports structure were similar to those of Lithuania

(the change has been fairly consistent and has been shifting towards higher-tech products), while in Estonia the evolution of the exports structure was not so uniform.

The analysis shows that the exports structure in the Baltic countries becomes more similar to the exports structure of economically more developed EU countries, which changes relatively little. In terms of production factor intensity, the share of labour-intensive products became slightly smaller in the exports structure, mostly due to textiles and products from non-metallic minerals, while the share of raw material intensive products, especially metalliferous ores and metal scrap, and capital-intensive products, especially road vehicles, grew. Exports structure by educational intensity changed even less, while in the exports structure by technological intensity the share of high-tech products, especially electronics and electrical appliances, decreased and was replaced by medium-tech products, especially by the aforementioned road vehicles. The comparative analysis of the exports structure of the EU and the Baltic countries shows that at the end of the period the Baltic States exported less complex products. Exports structure by production factor intensity shows that three quarters of EU exports are capital-intensive and research-oriented products and in the Baltic region only in Estonia the share of these products exceeded 50 per cent; the corresponding shares of Lithuania and Latvia were even smaller — a little more than 40 per cent. The same differences are seen in the exports structure by educational intensity. The exports of products with medium and high educational intensity in the EU accounted for nearly 70 per cent, while in Estonia and Lithuania the exports of these products have been about 50 per cent and in Latvia — about 40 per cent. The major part (60%) of EU exports accounted for medium and high-tech products, and these exports shares in the Baltic States were at least a quarter smaller (in Estonia — 46%, Lithuania — 43%, Latvia — 30%).

References

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