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Quality mode of Lithuanian Manufacturing Industry's Exports

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The analysis of exports structure by the quality mode lays the foundations to judge about the actual performance of the manufacturing industry and foresee the main trends of exports development in the global market. Moving towards the competition on quality, the knowledge and technology are increasingly becoming the drivers for competitiveness and sustainable growth while the competition on lower costs is facing difficulties due to the rising costs of labour and other resources. The research study examines the structure of Lithuanian origin exports by the quality elasticity, factor inputs and labour skills modes, which characterise the quality peculiarities of exports. The competitiveness of Lithuanian exports is based on employing lower costs rather than on creating quality advantages. Thus, the analysis of the structure of Lithuanian origin exports by commodities sensitivity to price versus sensitivity to quality is a significant research problem facing the tendencies of rising resource and labour costs and losing lower costs advantages. Policy makers monitoring the industrial structure have to focus on the structural upgrading within sectors on the basis of exports quality. The core aim of the research study is to reveal the exports structure by Revealed Quality Elasticity (RQE), Factor inputs and Labour skills of Lithuanian manufacturing industries. The study is intended to analyse the main changes in exports structure aiming to answer the question what shifts have occurred in the long run and how the exports have been affected by economic integration and globalization processes. The relevance of the empirical study is denoted by the lack of the detailed research on the quality of Lithuanian exports as well as the changes in exports quality by different modes. The main scientific problem raised in this empirical study is the disclosure of what shifts have occurred in the exports quality during the period of 2003–2012 and how these shifts will affect the future exports development. From an individual country's perspective, it is important to identify the internal and external factors which affect the upgrading quality of exports. This empirical study employs the RQE, Factor inputs and Labour skills taxonomies to classify the Lithuanian exports by different dimensions, and illustrates the solutions of the raised research problem. Altogether, the taxonomies make a profile of Lithuanian origin exports structure regarding the quality dimension and serve as a measure to forecast the long-term trend of export development. The results of the empirical study have revealed that Lithuanian origin exports share taken by high RQE industries declined during the period of 2003–2012, and was twice as low as the average of EU-27, where High RQE accounts for nearly a half of the total exports. The largest exports share was made by Medium RQE industries, and this confirms the fact that a certain share of Lithuanian exports remains price-sensitive and competes on the basis of lower costs. The analysis of Lithuanian exports by Factor inputs taxonomy revealed the low share of technology driven and marketing driven industries. Nevertheless, by improving the quality of exports, Lithuanian producers can expand their trade markets in high-income countries, which tend to import more high quality commodities, establish long term relations with purchasers and attract knowledge-intensive foreign direct investment.

Keywords: *Exports, Manufacturing Industry, Revealed Quality Elasticity (RQE), Factor inputs, Labour Skills.*

Introduction

The issues of export competitiveness have attracted a lot of scientific attention considering the growth of Lithuanian economy. Export plays a significant role in sustainable development of Lithuanian economy which is characterised as small and vulnerable. Export competitiveness is also closely related to the future development of manufacturing industry. Therefore, it earns policy makers' attention while implementing export promotion instruments (Razavi *et al.*, 2012). Exports allow Lithuanian manufacturing companies to achieve economies of scale, which otherwise would not have been possible due to the relatively small domestic market. The issue of export competitiveness is related to the factors that influence the attractiveness and demand of the produced commodities. The main factors of export competitiveness may be characterised either by lower production costs or quality dimensions. Aiginger (2000) pointed out that a position on higher rungs of the quality ladder is a necessary precondition to remain competitive in foreign markets, especially for high-costs producers. Lithuania can still be defined as a lower income country in comparison with the EU old-timers, and still keeps lower costs advantages in manufacturing sectors. Lower costs still make the produced commodities attractive for the global market. The intense competition in international markets, however, causes the necessity of quality and efficiency improvement. Thus, the issue of quality upgrading is becoming exceptionally relevant.

Another reason for quality upgrading is related to the tendency of rising wages in the EU new member-countries including Lithuania. Considering the growth of welfare of an individual economy, increased wages cause the costs of the social, educational and health care systems to rise. Thus,

they have indirect impact on higher labour productivity. Rising wages may also serve as an indicator for upgrading labour qualification and skills. The research problem analysed in this paper is directed towards the evaluation on how Lithuanian exports from manufacturing industries are distributed by commodity's sensitivity to quality versus its sensitivity to price. The topicality of the problem is based on the fact that the exports of low-costs commodities are getting complicated when labour costs rise. Although production costs can be lowered by investing in process and technology innovations, this target is relatively complicated in a short term. Competition based on lower costs is also more sensitive to market volatility. On the contrary, quality-based competition may decrease the vulnerability resulting from the rivalry among the low costs countries. Moreover, when the trade is open, a higher price paid by an importer from a high-income country may reflect product's higher quality.

Foreign scholars (Aiginger, 2000; Fabrizio *et al.*, 2007; Chioveanu, 2010; Racine, 2011; Baldwin & Ito, 2011; Dulleck *et al*., 2004; Nguyeny, 2009; Crozet *et al*., 2011) analysed the evidences and the role of quality upgrading as the source of export competitiveness on both theoretical and practical bases. Aiginger (2000) states that "*a quality strategy redirects efforts towards research, the upgrading of skills, the use of information and communication technologies and of knowledge-based service inputs*". Corbett (2006) as well as Albuquerque *et al*., (2007) argue that exports also have positive effects on quality upgrading and influence the adaption of higher quality standards when trade partners demand for higher quality products. Considering the case of Lithuania, the opinion expressed by Hausmann *et al*., (2007) that "*an economy is better off when it produces goods that it can export to richer countries*" is relevant. This confirms the presumption that the improvement of exports quality creates opportunities for Lithuanian producers to expand their trade markets in high-income countries which tend to import more high quality commodities. According to (Hausmann *et al.,* 2007), quality-based competition enables both the establishment of long term relations with purchasers and attraction of knowledge-intensive foreign direct investment. Racine (2011) pointed out that *"understanding the structure of a country's production and exports through the lens of quality competition may bear useful policy lessons in the short and medium term"*. Facing the rivalry from low-income countries, Lithuanian producers may compete on the basis of the relevant quality/price ratio. This suggests a combination of both price competition and quality competition strategies. The studies carried out by Chioveanu (2010) proved that application of the mixed strategy can be profitable for an enterprise across multiple markets. Lederman and Maloney (2010) noted that export development depends on the composition of the export basket and the peculiarities of the state's manufacturing industry performance. It is important to note that, despite different export intensity ratios of particular industries, the relation between the state's export structure and industry structure is evident. The empirical study performed by (Kraftova *et al.*, 2011) confirms the significance of the industry structure to economy as a factor affecting the intensity of economic growth.

Nevertheless, the analysis of the scientific literature has revealed that the structure of Lithuanian exports regarding the division of manufacturing industries by different types of quality modes (RQE, Factor inputs and Labour skills) has not been analysed in detail, and the structural changes have not been duly substantiated. Our early empirical studies were directed towards the evaluation of exports specialisation by the technological classification of the produced commodities and, differently from this empirical study, the comparative advantage approach was employed to examine the export specialization pattern (Saboniene *et al*., 2013). The empirical study carried out by Racine (2011) employed the RQE classification to analyse the export structure in Eastern Europe and Central Asia with a view to comparing it with the one in the West and South Europe. The provided analysis revealed that Lithuania made a small exports share of High RQE industries in 2006, but it did not disclose the shifts of exports structure during short or long term. The lack of the detailed research on the quality of Lithuanian exports and the changes of exports structure through the lens of quality lays the foundations to substantiate the relevance and novelty of the raised research problem. The core aim of the research paper is to present the evaluation of Lithuanian manufacturing industry exports quality by quality mode and to reveal the main changes in exports structure during period of 2003–2012. The paper analyses Lithuanian exports structure by Revealed Quality Elasticity (RQE), Factor inputs and Labour skills taxonomies. The object of scientific research is Lithuanian origin exports of manufacturing industry.

The paper is organized as follows: the first part outlines the theoretical basis and the main features of the employed taxonomies. The second part provides the overview of the evaluation of Lithuanian exports structure. The paper presents the findings of the conducted analysis and concludes with the summary of the results.

Method

In order to evaluate the exports structure by different modes and assess the changes, it is necessary to characterise the taxonomies which were employed for this empirical study. The analysis was performed aiming to describe the direction of the structural changes of Lithuanian export over the period of 2003–2012 and to make insights in exports development considering the aspects of exports quality.

The taxonomy, created by Aiginger (2000), enables to distinguish quality-sensitive and price-sensitive industries and to evaluate the exports structure by quality mode. Following this classification, exports are divided by the Revealed Quality Elasticity (RQE) of industries where each industry falls into one of three categories – High RQE, Medium RQE and Low RQE. In more detail, High RQE industries compete on the basis of quality whereas the industries with Low RQE compete on the basis of price (lower costs). The RQE taxonomy allows to characterize the "quality specialisation" of exports. According to Aiginger (2000), if the rise of commodity prices decreases the quantities sold, the main competitive factor is price, and on the contrary, if industries determine high prices and are able to export high quantities, this fact implies that commodities are demanded on the basis of quality parameters which

create customers' willingness to pay higher prices. Gardiner (1998) also measured price responsiveness employing time series data on quantities and prices, concluding that sectors in which demand is less responsive to prices depend on quality and technology. Thus, the RQE classification was created on the basis of the data about the relative role of quality or prices in each industry. The latter data was received by estimating association of unit values with quantities. Following this taxonomy, one third of the industries fall in a High RQE category (quality elastic group), one third fall in a middle category (Medium RQE) and the rest part of industries fall into Low RQE category (price elastic group). The RQE taxonomy classifies each manufacturing sector into categories, for example, manufacture of electrical machinery and apparatus is classified as follows: isolated wires and cables – Low RQE, lighting equipment, electric lamps – Medium RQE, electricity distribution and control apparatuses – High RQE (for more details see Aiginger, 2000). The scholar noticed that the taxonomy has limits because in some industries (as in the example of textile-related industries) higher prices and large quantities reflect higher processing rather than higher quality, when a high-wage country exports inputs to a low-wage country for processing in order to employ lower labour costs and re-import final commodities after processing with increased value. Despite these limits, the suggested classification provides a deeper insight in exports structure through the lens of quality.

The evaluation of exports structure may also be performed employing typologies which provide the information on how manufacturing industries produce. The typologies incorporate the Factor inputs and Labour skills modes into outputs indicators. The two classifications of manufacturing sectors including their typical combinations of factor inputs and taking into account the employment of skilled labour are based on the taxonomies suggested by Peneder (1999). Factor inputs taxonomy provides the information about the main factors that create competitive advantage in different industries. This taxonomy is directed towards the distinction between exogenously given competitive advantages, based on factor endowments, and endogenously created advantages, based on investment in intangible assets, such as innovation, etc. Applying Peneder's (1999) typology, manufacturing industries are assigned to the following Factor inputs categories: Labour intensive industries, Capital intensive industries, Marketing driven industries and Technology driven industries. The industries which have no particularly pronounced reliance on any of the input variables are placed in a fifth category – Mainstream, which represents the input combination in a typical manufacturing industry. This taxonomy distinguishes industries between the traditional inputs, such as labour and capital, and the inputs which create strategic advantages, such as research, innovation and marketing.

Finally, in our empirical study, we used the criterion of human resource which is captured within the taxonomy of Labour skills. The Labour skills taxonomy classifies industries into the skill classes, and serves for indirect assessment of export quality taking into account the importance of labour quality to production. Cotis *et al.*, (2010) pointed out, that the accumulation of skills and competences is generally considered to be fundamental for growth since it facilitates the creation and diffusion of new technologies. Scholars also stress the significance of well-performing and broadly accessible education system which enables to enhance the adoption and wide-spread diffusion of innovation while empowering the highly trained labour with the skills in science and technology. According to Oguz, Knight (2010), workers' skills influence productivity as the scientists define the capabilities that the labour force can apply in the production process. Therefore, qualifications can be used as proxy indicators by examining how labour skills were changing over time and what impact on productivity they had. Considering the issue of skills and competences of an employee, Ortiz *et al*., (2012) analyzed the impact of management's experience-based knowledge on exports initiation and consolidation. Positive and significant links between human capital, productivity, competitiveness and income level have been proved by some recent studies (Cohen & Soto, 2007; Bassanini & Scarpetta, 2001; Ramirez & Morales, 2011). The classification of Labour skills was used to provide further details of the industries regarding their skilled labour and to divide them into High skill industries, Medium-skill/white collar workers, Medium-skill/blue collar workers, and Low skill industries (for more details see Peneder, 1999).

Altogether, the taxonomies introduced above make a profile of exports structure regarding the quality dimension and reveal long term export tendencies. The empirical study, intended to examine Lithuanian origin exports structure, covers the period of 2003–2012 with a view to comparing the structural changes affected by the processes of economic integration and globalisation.

The other methods of the scientific research employed in this study include scientific analysis and summarizing of the literature, mathematic calculations and the comparative analysis of the statistical data.

Results

The structure of exports naturally depends on the industries prevailing in the state as well as on the other factors such as market structure, nature of raw material, geographical factors, applied technologies and consumer preferences. Considering the fact that the country's industrial development is usually based on the structure of its manufacturing industry with the particular emphasis on high-tech industries, it should be noted that Lithuanian high-tech and medium-high-tech sectors hold a comparatively small share in the manufacturing industry. Taking into account the prevalence of low-tech and medium-low-tech industries, the evaluation of exports structure by the quality dimension allows to develop a deeper understanding of exports performance.

Before the evaluation of Lithuanian exports structure by taxonomies discussed above, we will explore some indices, presented by the United Nations Industrial Development Organization (UNIDO), which characterize the export quality on the basis of the share manufacturing exports take in total exports (Fig. 1) and the share medium and high-tech products take in manufacturing exports (Figure 2).

The share of manufactures in total exports captures the importance of manufacturing in export activity as well as

the ability to produce more advanced products. While the share of manufacturing exports in Lithuanian total exports made 85,6 % in 2010 (Figure 1), and closely followed Germany (86,8 %) and Estonia (86,2 %), the share of medium-high-tech and high-tech products in Lithuanian manufacturing exports made 37,8 % in 2010, and it was almost twice as low as the share of the same kinds of products in German manufacturing exports.

The results demonstrate the prevalence of medium-low-tech and low-tech industries in export structure and denote existing industrial maturity in Lithuania. However, the scholars maintain that medium-low-tech and low-tech industries mostly comprise from mature industries and play a significant role in every economy including high income countries (Hirsch Kreinsen *et al.*, 2006; Bender, 2006; Hirsch Kreinsen, 2006). Figure 3 presents the index of manufacturing export per capita and reveals not high, but constantly increasing ratio from 0,05 in 2000 to 0,15 in 2010 in Lithuania.

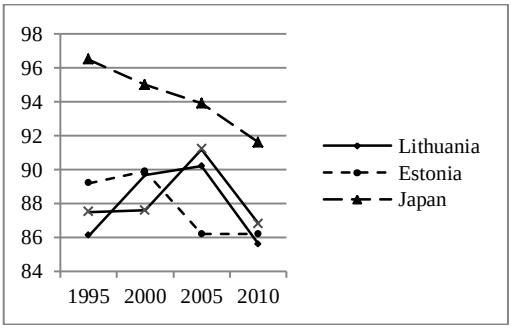

Figure 1. Share of manufacturing exports in total exports, per cent, 1995–2010
Source: UNIDO, http://www.unido.org/

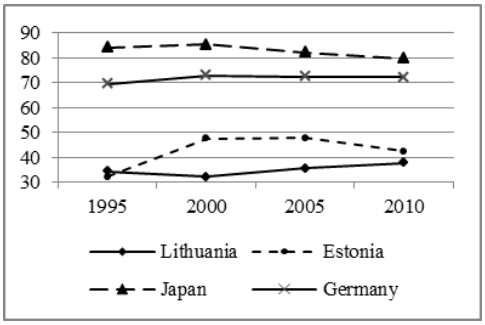

Figure 2. Share of medium-high-tech and high-tech products in manufacturing exports, per cent, 1995–2010
Source: UNIDO, http://www.unido.org/

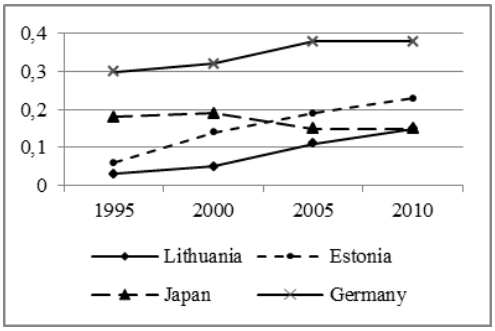

Figure 3. The index of manufacturing export per capita, 1995–2010
Source: UNIDO, http://www.unido.org/

The evaluation of the exports structure on the basis of RQE taxonomy has revealed that Lithuania has a relatively low exports share in High RQE industries where quality plays a key role while competing in international markets (Figure 4). The High RQE made 16,9 % in 2012, and decreased below its highest level of 21 % in 2003. The share of High RQE industries was formed mainly by the manufacture of dairy products, knitted and crocheted fabrics and other wearing apparel which are not high-tech or knowledge based, but they are identified as High RQE industries because of quality differentiation. The empirical studies carried out by (Janger *et al.*, 2011) provided the results of 2010 for EU-27. These results allow to compare the structure of Lithuanian export with the one of EU-27. The exports structure of EU-27 consists of 46,5 % of High RQE, 26,8 % of Medium RQE and 26,7 % of Low RQE industries. Thus, Lithuanian exports share of High RQE industries was more than twice lower. The estimation demonstrated the growing exports share in Medium RQE industries and disclosed the domination of medium quality-sensitive industries in Lithuania. The exports share in Medium RQE slightly moved up to 60,8 % during the period of 2003–2012, when it was high mainly due to the growing exports of furniture, food products, knitted and crocheted articles and refined petroleum.

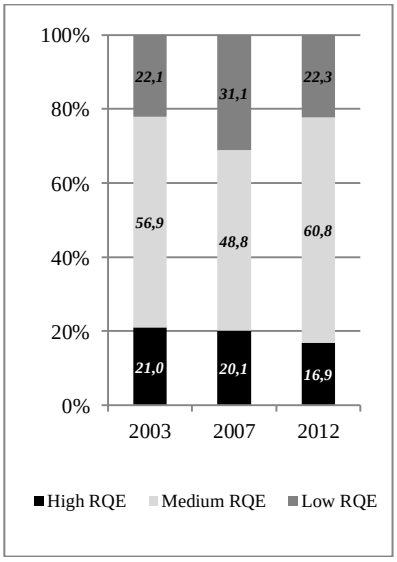

Figure 4. Structure of Lithuanian origin exports by Revealed Quality Elasticity, per cent, 2003–2012
Source: author's estimates based on the data of The Department of Statistics to the Government of the Republic of Lithuania.

The Lithuanian exports share in Low RQE industries remained at the similar scope and made 22,3 % in 2012. It must be noted that exports share in Low RQE industries was larger than that in High RQE, and this confirms the fact that a certain part of exports remains price-sensitive and competes on the basis of lower costs.

The analysis of Lithuanian exports, classified on the basis of Factor inputs taxonomy, showed the dominance of Capital intensive industries with gradually increasing shares from 32,9 % in 2003 to 52,5 % in 2012 (Figure 5). On the contrary, exports share of Labour intensive industries declined threefold from 39,3 % to 13,5 % during the period of 2003–2012. This demonstrates the structural changes in Labour intensive and Capital intensive industries while both

sectors can be characterised as based on factor endowments with natural comparative advantages. Technology driven industries are the focus of the research due to their significance to the economy. However, Lithuanian exports share taken by Technology driven industries declined from 6,3 % in 2003 to 3,4 % in 2012. Thus, the empirical study confirmed that Technology driven sector remains slim. On the contrary, exports share taken by Marketing driven industries increased from 11,4 to 16,6 % in 2003–2012.

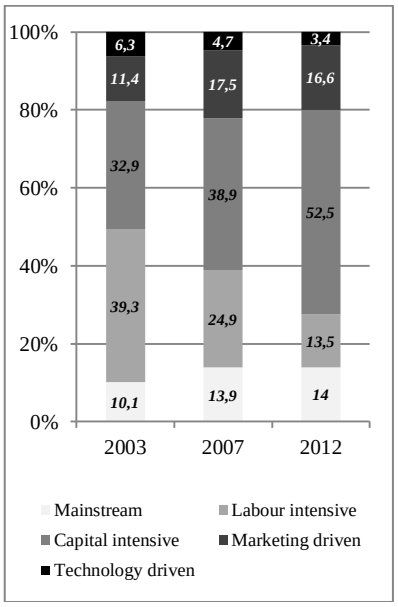

Figure 5. Structure of Lithuanian origin exports by Factor inputs, per cent, 2003–2012
Source: author's estimates based on the data of The Department of Statistics to the Government of the Republic of Lithuania.

The taxonomy of Labour skills enables to describe the industries regarding their employment of skilled labour and indirectly analyse exports quality dimension by labour quality. According to Peneder (1999), "*the employment of certain labour skills discloses corresponding technological constraints and market opportunities*".

The empirical estimations showed that the largest exports share in Lithuania was made by Medium skill/white collar workers industries, and the growth from 40,9 % to 57,5 % was evident over the period of 2003–2012 (Figure 6). On the other hand, the exports share of High skill industries remained very low, and made only 2,2 % in 2012. It is interesting to note that both Low skill and Medium skill/blue workers industries' share in exports structure have declined. Nevertheless, their exports shares remained relatively high. The exports share of Low skill industries made 25,6 %, and the share of Medium skill/blue workers made 14,7 % in 2012.

It is purposeful to explore how the exports of different industries are distributed by the quality dimension taking into account the sectors which are the largest exporters in Lithuania, i.e. Capital intensive and Labour intensive sectors, and analyse the advantages created by Technology driven and Marketing driven sectors. Figure 7 illustrates the division of the industries by both RQE and Factor inputs taxonomies. The changes provide interesting insights in the industries' actual performance as well as the future trends.

The analysis revealed the RQE changes in Technology driven sector, where the exports share of Medium RQE industries were replaced with the High RQE industries. The overall exports share taken by Technology driven industries decreased to 3,4 % in 2012; the main share in the group was made by High RQE industries, i.e. 3,1 %. The growth of exports share in Marketing driven sector was due to the rise: for High RQE industries - from 4,8 to 8,0 %, and for Medium RQE industries – from 5,4 to 7,6 % over the period of 2003–2012.

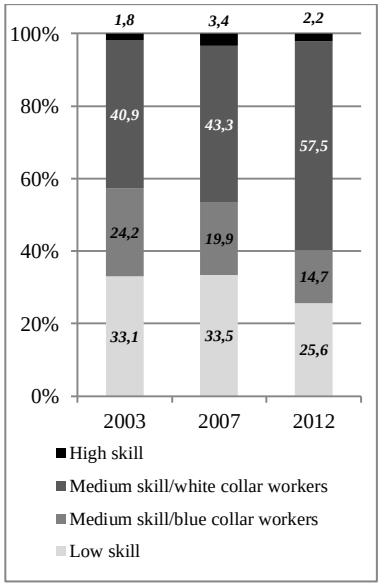

Figure 6. Structure of Lithuanian origin exports by Labour skills, per cent, 2003–2012
Source: author's estimates based on the data of The Department of Statistics to the Government of the Republic of Lithuania.

The Capital intensive sector holds the largest share of Lithuanian origin exports. The main share of exports in this sector was made by Medium RQE industries growing from 24,2 % in 2003 to 38,7 % in 2012. Low RQE industries also made a relatively high exports share of Capital intensive sector (13,4 % in 2012) while the share taken by High RQE industries remained only 0,3 % in 2012. The Medium RQE industries hold the main share of exports in Labour intensive sector which contributed to 9,5 % in 2012. Labour intensive sector experienced the evident decline in exports share of High RQE industries from 12,8 to 1,2 % over the period of 2003–2012. Exports share of Low RQE industries also decreased from 7,0 to 2,3 % (see Figure 7). Figure 8 demonstrates the exports shares in different Labour skills industries by the revealed quality elasticity and enables to compare the estimated exports shares in 2012 with these in 2003. High skill industries made a slim share of industrial exports, and the estimations showed that the major part was made by High RQE sector - its share grew slightly from 1,4 % in 2003 to 2,1 % in 2012. The exports of medium skill/white collar workers industries prevailed in the exports structure and were distributed as follows: 3 % of High RQE sector, 38,3 % of Medium RQE, and 16,2 % of Low RQE in 2012. Thus, this sector increased its High, Medium and Low RQE shares in contrast to 2003.

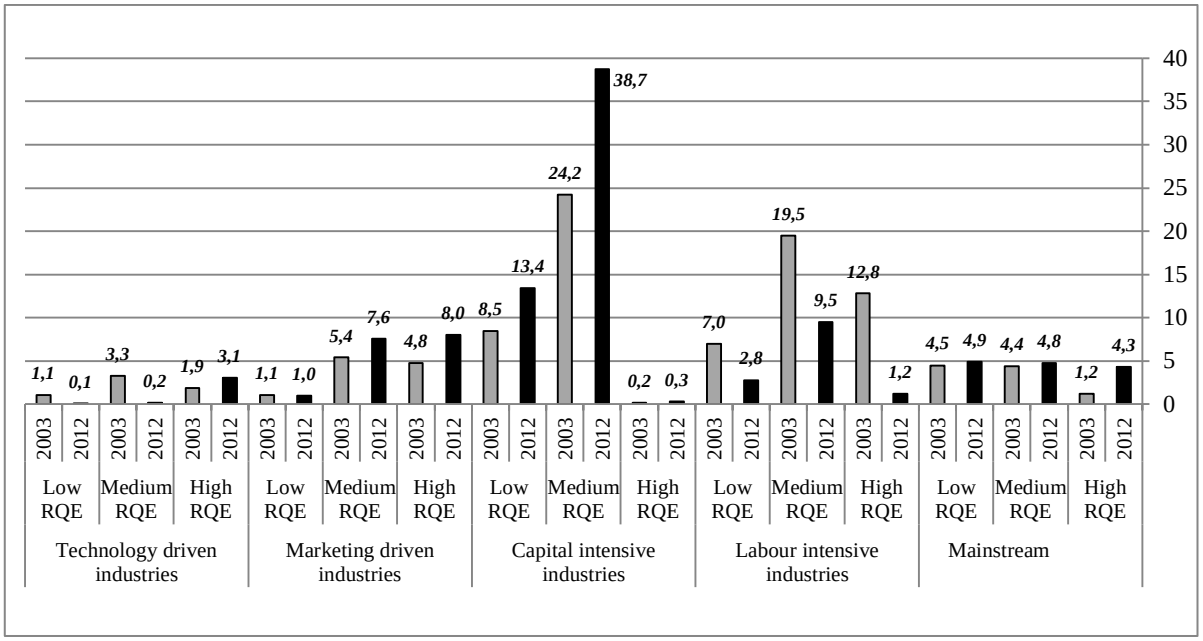

Figure 7. Structure of Lithuanian origin exports by Factor inputs and Quality modes, per cent, 2003–2012
Source: author's estimates based on the data of The Department of Statistics to the Government of the Republic of Lithuania.

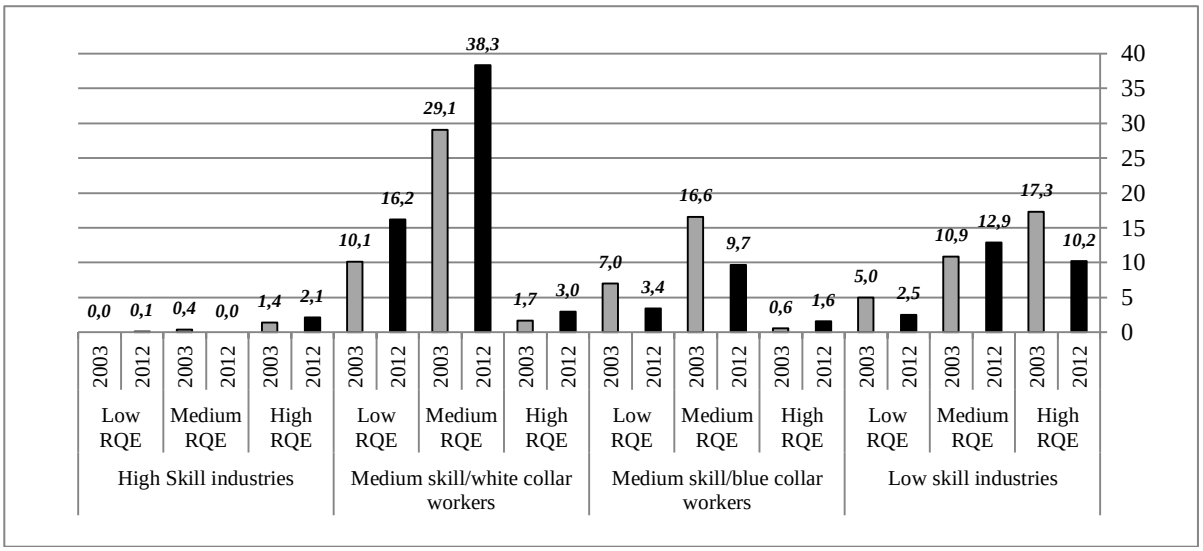

Figure 8. Structure of Lithuanian origin exports by Labour skills and Quality modes, per cent, 2003–2012
Source: author's estimates based on the data of The Department of Statistics to the Government of the Republic of Lithuania.

It is interesting to note that the share of High RQE in Low skill industries declined from 17,3 % in 2003 to 10.2 % in 2012 while the share of Medium RQE slightly moved up from 10,9 to 12,6 % during the same period. The exports shares taken by Medium skill/blue workers industries slightly increased in High RQE from 0,6 to 1,6 % during the period of 2003–2012 and declined in Medium RQE sectors from 16,6 to 9,7 %. Summarising the results, it must be pointed that the shares of high and medium labour skill sectors in High RQE industries slightly increased: this feature reflects the gradual process of upgrading quality in Lithuanian manufacturing industry.

Conclusions

Moving towards the competition on quality, the knowledge and technology are increasingly becoming the drivers for competitiveness and growth whereas the competition on price (lower costs) is becoming complicated due to the rise of the costs of labour and resources. The main research problem raised in this empirical study has been directed to answer the question what shifts have occurred in long run considering the quality of Lithuanian exports. The lack of the detailed studies on the quality of Lithuanian exports lays the foundations to justify the relevance of the raised research problem. The analysis of exports quality is based on the classification which compares the exports shares taken by quality-sensitive and price-sensitive industries. The results

of the provided empirical study are twofold. The share of High RQE of Lithuanian exports gradually declined and made only 16,9 % during the period of 2003–2012 while this share in EU-27 accounted for nearly a half of the total exports during the same period. Moreover, the share of Low RQE industries exceeded the one taken by High RQE, and made 22,3 % in 2012. The empirical study revealed the growing exports share in Medium RQE industries and disclosed the domination of medium quality-sensitive industries in Lithuania. The exports share taken by Medium RQE industries slightly moved up to 60,8 % in 2003–2012. This confirms the fact that a certain share of Lithuanian exports remains price-sensitive and competes on the basis of lower costs.

The exports share taken by Technology driven industries, which declined from 6,3 % to 3,4 % in 2003–2012, can be considered as a negative feature revealed by the comparative analysis. On the contrary, a positive feature is the exports share taken by Marketing driven industries that increased from 11,4 to 16,6 % in 2003–2012. On the other hand, the share of High RQE in Technology driven, Marketing driven and Capital intensive industries kept the moving up tendency. It is interesting to note that the exports share of Labour intensive industries declined threefold to 13,5 % while the share of Capital intensive industries made a half of the whole exports in 2012. With reference to Labour skills classification, the exports share of High skills industries remained very slim (2,2 % in 2012). Nevertheless, Medium skill/white collar workers industries made the largest share of Lithuanian exports. The positive features which have been revealed while overviewing the shifts in Lithuanian exports structure are the increased exports share taken by medium RQE industries, high skill and medium skill/white collar workers industries. Considering the tendencies of the exports structure development by different modes, it should be noted that the impact of external factors on quality upgrading promotes companies to intensify innovation and R&D activities in order to decrease exports vulnerability while competing on the basis of lower costs. Industrial policy implications that are related to the innovation development, R&D intensity, technological and labour quality upgrading are the significant contribution not only to the efficiency of the manufacturing industry but also to the business competitiveness in the domestic and foreign markets.

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