

## QUALITY COMPETITIVENESS OF LATVIA'S WOOD INDUSTRY

**Janis Priede, Roberts Skapars**

*University of Latvia, Faculty of Economics and Management*

### **Abstract**

**Quality is a complex phenomenon and there exist no general accepted definition, which fits every purpose and all the complexities in teal economics.**

**While competitiveness of enterprises has been studied by many scholars around the world, competitiveness of nations is a relatively new discipline.**

**Studies of export competitiveness in the world markets are not new. Several attempts to evaluate export competitiveness have been made in the past, primarily in Eastern Europe. In Czechoslovakia, for example, a detailed and comprehensive analysis of the study was undertaken already in the 1960's. Similar approach was used by World Bank studies of the price and quality competitiveness of exports by other authors in the late 1980's.**

**Quality competitiveness topic is still important and research in this field continuous. Researchers are using different methods to look at the quality of exports and its competitiveness. Researchers are developing different methods and indicators to measure quality competitiveness of exports, product differentiation and quality link to changes in exports, product-quality view, exporters behavior under quality constrains and other issues.**

**Authors in this paper will examine quality competitiveness of Latvia's wood industry on example of main trade partners of wood and articles of wood.**

**Keywords:** competitiveness, quality, export, wood.

### **Introduction**

Main problem authors are facing in this article is measuring quality competitiveness of countries and industries. Until now there are several approaches in the literature how to measure quality competitiveness of countries or industries or product groups and each one of them has their advantages and disadvantages. Approach is still discussable due to the nature of measuring quality itself and measuring quality competitiveness of country is still quite new and undeveloped field.

The aim of this paper is to analyze quality competitiveness of wood industry on example of main trade partner countries of Latvia.

Research methods used in this paper include monographic approach (studying of scientific literature on quality competitiveness), statistical methods (structural analysis), calculations and graphic method.

### **Quality competitiveness of country and industry**

Theoretical and empirical research increasingly point to the importance of product quality in international trade and economic development (Hallak, Schott, 2008).

Studies of export competitiveness in the world markets are not new. Several attempts to evaluate export competitiveness have been made in the past, primarily in Eastern Europe. In Czechoslovakia, for example, a detailed and comprehensive analysis of the study was undertaken already in the 1960's (see, for example, Klacek and Pleva, 1967). Unfortunately, their study covered only the price competitiveness of Czechoslovak exports in the EEC market and the period 1955–64 and selected manufacturing exports. They estimated export prices realized by Czechoslovak exporters in the EEC market and compared them with export prices of countries for the same products of countries of the European Free Trade Association (EFTA).

Similar approach was used by World Bank studies of the price and quality competitiveness of exports by other authors (Drabek, Olechowski, 1989).

Quality competitiveness topic is still important and research in this field continuous. Researchers are using different methods to look at the quality of exports and its competitiveness. Researchers are developing different methods and indicators to measure quality competitiveness of export (Aiginger, 2001; Davidsons, Kanepajs, 2008), product differentiation and quality link to changes in exports (Kandogan, 2003, 2004), product-quality view (Hallak, 2006), exporters behavior under quality constrains (Hallak, Sivadasan, 2009) and other issues.

Different studies have used different proxies for product quality. Since product quality is not directly observed in trade data, most of these proxies are based on the assumption that price variations contain sufficient information about quality variations. Some of these proxies use crosscountry variation in export prices (unit values), while others rely on both export and import unit prices. Some of these indices are calculated at the product level, while other indices are constructed at the sectoral level. Hallak (2005) even goes one step further and creates a separate quality index for each country. The following discussion will elaborate on the definition and construction of some of these quality indices. The Abd-el-Rahman (1991) unit value ratio expresses the export unit value of a given product relative to the import unit value of the same product. Import unit values are used since domestic flows are largely unobservable. The closer is this ratio to 1, the more similar are the home country's exports and imports in terms of quality. Such exchanges are considered "horizontal." Products in such sectors may have different proportion of some characteristics, but none has a bigger amount of every characteristic. These products are not expected to show huge price differences. If this ratio is sufficiently far away from 1 (such that it exceeds

the limits of the interval  $[1-\varepsilon, 1+\varepsilon]$ , where  $\varepsilon$  is an arbitrary cutoff point), these exchanges are “vertical.” These products have a different amount of every characteristic compared to other products. The quality of these products may be ‘better’ or ‘worse’ than those of other products, depending on whether they have a bigger or a lower amount of these characteristics. These products represent a different positioning on the quality spectrum and are less sensitive to price competition. The Abdel-Rahman index has been extensively used in the literature, most notably by Chiarlone (2000), Martin and Orts (2001), Mora (2002), Reganati and Pittiglio (2005), etc. Schott (2004) also uses product level unit values to measure quality. In essence, he estimates quality by calculating unit values of all US imports (equivalently, exports of all other countries) at the product level. The unit values provide substantial variation at a very disaggregate level, and may not be perfect indicators of quality due to underlying product heterogeneity and classification error involving inaccurate recording of units and misclassification of goods. Hallak (2005) uses a more aggregate price index to estimate quality. More specifically, he uses the Fisher price index, which is the geometric mean of the Laspeyres index and the Paasche price index. The Laspeyres index itself weights the price in each period by the quantities in the base period, while the Paasche price index uses the current period quantities to weight the prices. Hummels and Klenow (2005) also use a variant of the Fisher Price Index to infer the quality margin. They decompose each country’s exports to a given market category into its price and quantity components and compare them across exporters (Faruq, 2006).

A number of studies do not construct any specific quality (or price) indices, but use other ways to estimate quality differences across countries. For example, Hummels and Skiba (2004) estimate quality differences by calculating price variation across all country pairs for products in a given category. This removes certain commodity-specific variation in prices (e.g. a low quality car might be much more expensive than a high quality stereo system). They also hold the supply side of the model constant so that price variations across importers arise purely due to changes in the quality mix.

Several studies also explore the horizontal dimensions of product differentiation. Instead of equating quality with a price index (under the assumption that all price dispersions occur due to vertical quality differentiation), they allow cross-country variation in prices to be caused by factors other than quality, such as comparative advantage. For example, Hallak and Schott (2005) develop a decomposition methodology that separates observed export prices into quality versus quality-adjusted prices. However, despite allowing for horizontal differentiation, they find that for many countries, there is not much difference between a country’s quality index and its price index (notable exceptions include China and Ireland). Khandelwal (2005) also allows for horizontal differentiation by applying the discrete choice methodology in Berry, Levinsohn, and Pakes (1995). He infers countries’ unobserved product quality by allowing market shares to influence quality estimates, so that products with larger market shares have higher quality (conditional on price) and vice-versa. This methodology, while useful at a disaggregate level, is computationally intensive and difficult to implement at the country level (Faruq, 2006).

Since product quality is not directly observable from trade data, there is a lack of consensus on an appropriate measure of quality. Researchers have traditionally used various price indices to proxy for quality, but this approach ignores the horizontal aspects of product differentiation. On the other hand, efforts to incorporate horizontal differentiation have been relatively scarce and are somewhat difficult to implement at a more aggregate level.

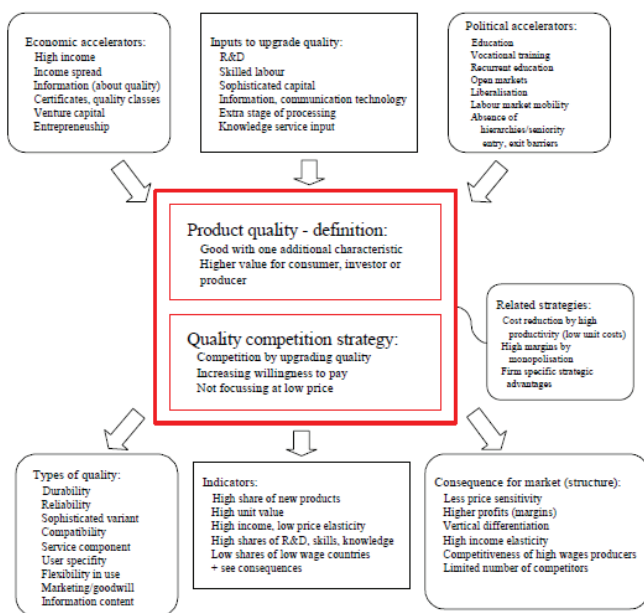
In this paper authors decided to pay more attention to Aiginger’s ideas in order to better understand the theoretical framework of quality competitiveness.

Higher quality is a necessary precondition for high cost producers to stay competitive. Producing the same quality at a higher price or at lower margins is not feasible in the long run. Many European countries have higher wages than the USA and Japan; this cost advantage is even larger if compared to accession countries and to many new competitors in the globalizing world. It is possible to cope with higher wages by increasing productivity, but since technology and managerial skills are also spreading by the investment of multinational firms, this strategy is not always feasible. Producing a higher quality is an alternative as well as a complement to higher productivity. This strategy is however easier in those industries in which buyers differentiate between quality types, while there are other markets in which price competition is the most important competitive mode. “Quality competition” is competitive environment, in which upgrading quality, and increasing the willingness to pay is important relative to competing at low prices (Aiginger).

Activities that upgrade quality are more or better skilled labor, machines, more sophisticated material inputs, but also superior organization on the plant or firm level. Research and development, as well as imitation of the best techniques and processes, may be sources of quality upgrading. Marketing may increase the willingness to pay by providing information about the capabilities of the product or by changing the tastes of consumers. In most, but not all cases, the quality of output is related to the quality of input. Submitting to certifications, setting standards, and benchmarking are other techniques of upgrading the quality of processes, as well as the quality of products, and also market functions. The inputs that help to upgrade quality, economic and political accelerators, are summarized in Figure 1. It also reports on the indicators that signal quality and consequences for market structure.

Quality differs from productivity, as the latter is defined usually in technical (quantitative) terms, like tons per one unit of labor input. If, however, value added is used as a numerator, then the prices and quality of output are taken into account. And if we distinguish between several qualifications for labor, the quality of inputs can be incorporated into the denominator of productivity. Nevertheless, productivity studies focus on the quantity of output with respect to the quantity of inputs, trying to do so for indicators which are as homogenous as possible, while quality explicitly addresses the heterogeneity of outputs produced usually with respect to heterogeneous inputs.

Innovations refer to changes in processes and products. New products are usually products of higher quality.



**Figure 1. Quality competition: preconditions, types and consequences (Aiginger, 2001)**

However, they can be relatively cheaper when better materials or superior production processes are used. Tension between higher quality and lower costs may arise.

Adding a further stage of processing usually increases the quality of the product. The additional stage can make the product more durable, more convenient, more specifically suitable and useful for the consumer, investor or producer. A further stage of processing can be to combine hardware with a software; a tangible product with a service or information. There are some cases, where a further stage of processing decreases the user value by decreasing flexibility or compatibility for some purposes (Aiginger).

Quality and profitability are closely related, insofar as the quality of products will usually raise profitability, both by decreasing the competitive pressure as well as by increasing the willingness to pay. However, quality is mainly a characteristic of the product and profitability a result of the production process and the strategy and organization of firms. There can be a conflict between the quality of the product as measured in objective terms and profitability, if quality raises costs more than it raises the willingness to pay. The economic solution is to find the quality that maximizes profits. The resulting “optimal” quality provided may be below that assessed as desirable or feasible by technicians or consumer organizations.

The quality of products should be reflected in the profits and specifically in the persistence of supernormal profits. If the market is not regulated or characterized by entry barriers, each advantage of a specific firm will be contested rapidly by other firms. Only firms which can consistently upgrade quality or which – to use a term taken from strategic management literature – possess a specific nonimitable advantage can accrue higher profits in the long run.

Aiginger also developed three main indicators to assess quality: the unit value of exports (UV), the share of exports in quality sensitive industries, and the share of exports in the high price (quality) segments. The main indicators (Aiginger):

- The unit value (UV) of exports: this indicator is defined as nominal exports divided into tons. Higher unit values reflect higher willingness to pay for a given product, one reason for this is the higher quality in a market with vertically differentiated products. The unit value for an aggregate is higher if a country focus on more sophisticated or higher processed goods. We can call this indicator “indicator on overall quality” since it comprises many different aspects of product quality.
  - The share of exports in quality sensitive industries: A method is developed to reveal in which industries exports are dependent on quality and not only on prices. The indicator reveals the importance of quality is called RQE (Revealed Quality Elasticity). This indicator defines quality competition as an intrinsic characteristic of an industry (not changing over time or across countries). Countries with a large share in high-RQE industries have managed to abandon industries in which low prices define the competitive edge and shifted exports into quality elastic industries. It could be called “indicator on inter industry quality upgrading”.
  - The share of exports in the high price segment: A method is developed to divide each industry in a high, medium and low quality segment. The indicator PPS (Position in Price Segments) reveals the position of countries in the individual price segment. This is an “indicator on intra industry quality upgrading”. Countries with a high PPS have managed to shift into high price segments in their main export industries.
- Summing up we see that the second indicator focus on industries (as quality or price elastic), the third on position within industries (high or low segment), and the first indicator comprises elements of both. Though the three main indicators already look at quality from different angles, there exist more aspects of quality than those captured by these three indicators. Aiginger have developed set of indicators to monitor the quality position (competitiveness) (Aiginger):
1. Share of quality intensive industries in value added (net RQE production).
  2. Share of quality intensive industries in exports (net RQE exports).
  3. Share of exports in high quality sectors of industries (PPS, net).
  4. Export unit value (export UV).
  5. Import unit value (import UV).
  6. Relative unit value (export UV/Import UV).
  7. Share of value added in sunk cost industries (technology + marketing driven).
  8. Share of exports in sunk cost industries (technology + marketing driven).
  9. Share of value added in skill intensive industries.
  10. Share of exports in skill intensive industries.
  11. Share of value added in industries with high contents of knowledge-based services.
  12. Share of exports in industries with high contents of knowledge-based services.
  13. Share of value added in industries with high product differentiation (PD).
  14. Share of exports in industries with high product differentiation (PD).

15. Share of value added in globalised industries (Openness).

16. Share of exports in globalised industries (Openness).

These indicators highlight different aspects of quality. Authors in this paper will use unit values of export and import and relative unit value as well.

### Measuring quality competitiveness

The most comprehensive measure of quality available for empirical research is the “unit value”. Its usefulness in evaluating quality comes from the fact that all of the following activities tend to increase sales relative to physical weight (Aiginger):

- Increasing durability, reliability, compatibility, flexibility
- Using superior material inputs or higher skills
- Making a product more specific to demand
- Refining or further processing a product
- Adding new functions, service or maintenance contracts
- Better design, advertising.

Unit values as indicators of quality have been used in industry studies for assessing qualitative competitiveness and for discriminating between different components of intra-industry trade.

The unit value is defined as nominal value divided into physical volume. In Aiginger’s reports it is the gross value of exports or imports in ECU (euro) divided by kilogram. The unit value in general depends on demand and prices, but specifically it reflects changes in quality, shifts to higher product segments and to other value enhancing features (service component, design and advertising). Therefore, unit value is often applied as an indicator in attempts to measure quality and vertical product differentiation. Like any comprehensive indicator, it has advantages and disadvantages. Among the advantages is its availability at nearly every level of disaggregation (6 digit industries or even 9 digit industries), for any country, and even for bilateral country to country trade flows. It is not available for production. For some industries, some information is missing (differing from country to country), implying careful programming techniques for the correct treatment of nominators and denominators.

As far as the interpretation of the unit value is concerned, it is fascinating that most of the components which add value are included. Industries intensively using physical capital exhibit rather low unit values, since capital is used for example in basic steel industries or in basic chemicals for large-scale production. So capital intensive industries rank lower and skill intensive higher in unit values as compared to productivity or value added per employee. This can also be seen as an advantage when we understand that developed countries rely mostly on skills in their efforts to achieve the competitive edge. On the other hand, some industries have intrinsically higher unit values, while they are neither high tech, nor do they use skilled labour, nor is physical capital involved. For example, this holds for textile and apparel industries, in which the unit values are high, since the weight in tons is low. Here, reprocessing also poses a problem. Goods are shipped into low wage countries and return at a somewhat higher unit value, indicating that the high wage country exports the lower quality product (as compared to the

re-imported good). Reservations about the use of unit value also hold for precious metals, where supply is scarce relative to demand. Therefore, jewellery, leather, furs, footwear and apparel are among the top industries, as far as absolute unit value is concerned, without for example any indication of the use of skilled labour or research. However in general, high tech or high skill industries - like aircraft and spacecraft, watches and clocks, TV and radio transmitters and instruments - are also among the industries with the highest export unit values (Aiginger).

A problem in using unit values was that high values could indicate high quality or high costs. A technique proposed by Aiginger (Aiginger, 1997) enables us to disentangle costs and quality at least partially. If unit values reflect costs, the quantity exported must be low for the high cost country. If it reflects quality, then exports are predicted to be high for the country with the higher unit value. Another objection to the use of unit value is that unit values may include the higher margins created by market power. The greatest market power is primarily expected on domestic markets. If unit values on the international market contain market power, this will be based on a major innovation. And if some firms succeed in becoming world monopolists and are not challenged over a long period of time, they will produce in various countries. Unit values of exports and imports are not fully comparable, since both are measured at the border. Imports include trade costs from the point of origin to the border, exports from the mill to the border. The reporting mode has shifted in the last years from customs agencies to firms. A lot of noise and inconsistency on the product level have arisen from these features, but the rich data set enables us to cope with many outliers and errors. But in the most cases, a careful second look at the data, or the exploitation of the very rich data can eliminate distortions or enable an evaluation of their quantitative impact. In general we use total exports if we focus on the comparison of European countries.

### Trade structure of Latvia

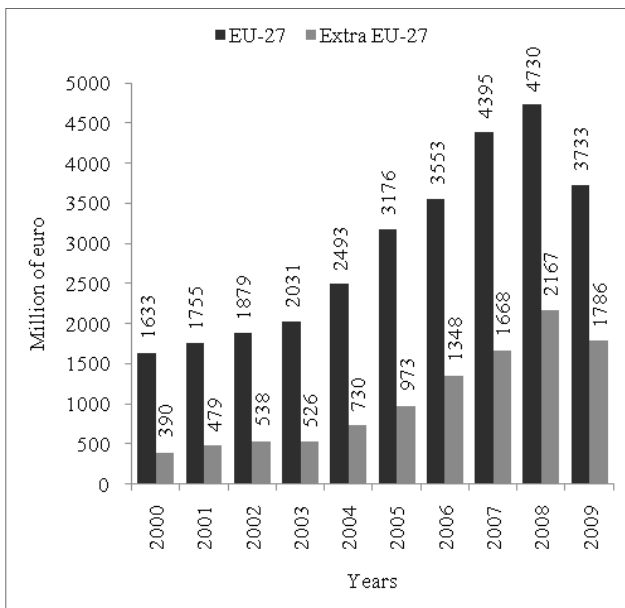
Authors of this paper will divide analysis of Latvia’s export structure in two parts: export structure to EU 27 countries and outside EU 27 countries (extra EU-27).

Figure 2 shows Latvia’s export to EU 27 countries and outside EU 27 countries in millions of euro.

As we can see in Figure 2, amounts of Latvia’s export to EU 27 countries and outside EU 27 countries is similar – from year 2000 it increased every year until year 2008 and in year 2009 it significantly decreased, which can be explained with economic crisis in the world.

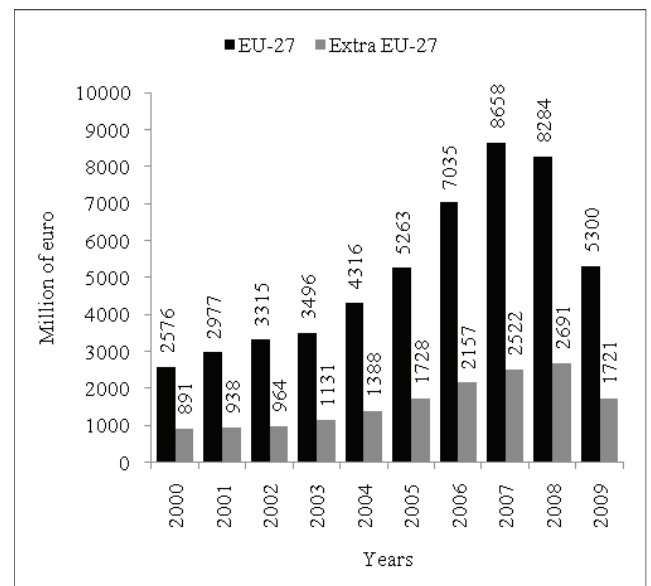
If we take a look at the structure of Latvia’s export in year 2009, we can see the main product groups exported.

As shown in Figure 3, the greatest share of Latvia’s export in year 2009 was agriculture and food products – 18,6% from all export. The next was wood and wood products – 16,5% and this group will be analyzed in this paper in more detail. There was three more big groups of export in year 2009: machinery products (14,1%), metal and metal articles (12,4%) and products of chemical industry (11,4%).

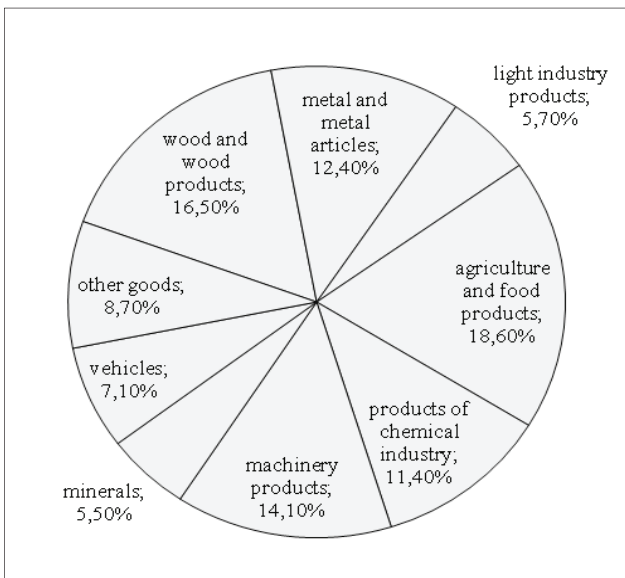


**Figure 2. Latvia's export to EU 27 countries and outside EU 27 countries, million euro (Authors, Eurostat)**

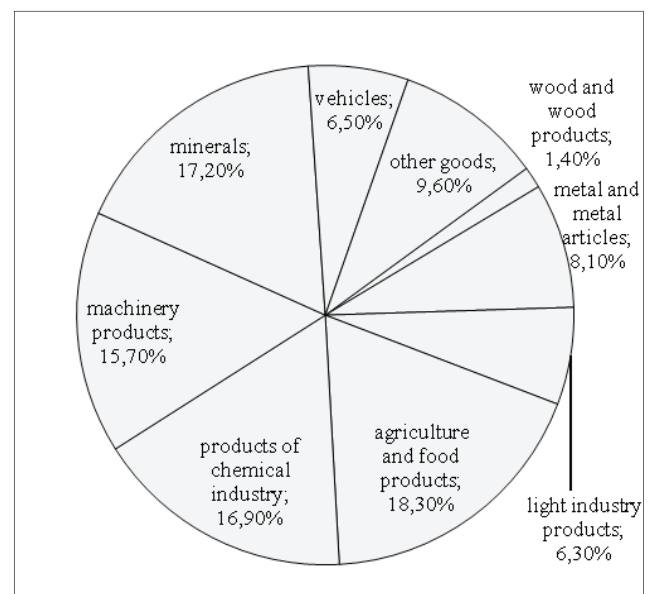
industry products (6,3%), wood and wood products (1,4%) and other goods (9,6%).



**Figure 4. Latvia's import from EU 27 countries and outside EU 27 countries, million euro (Authors, Eurostat)**



**Figure 3. Latvia's export structure in year 2009, percent (Authors, Eurostat)**



**Figure 5. Latvia's import structure in year 2009, percent (Authors, Eurostat)**

There was also vehicles (7,1%), light industry products (5,7%), minerals (5,5%) and other goods (8,7%).

Figure 4 shows Latvia's import from EU 27 countries and outside EU 27 countries.

As we can see in Figure 4, the situation from year 2000 until year 2009 is very similar as it was with export during the years. But import increased only until year 2007 and the next year it already decreased and in year 2009 it decreased significantly. Decrease in import reacted fast because of economical situation in Latvia.

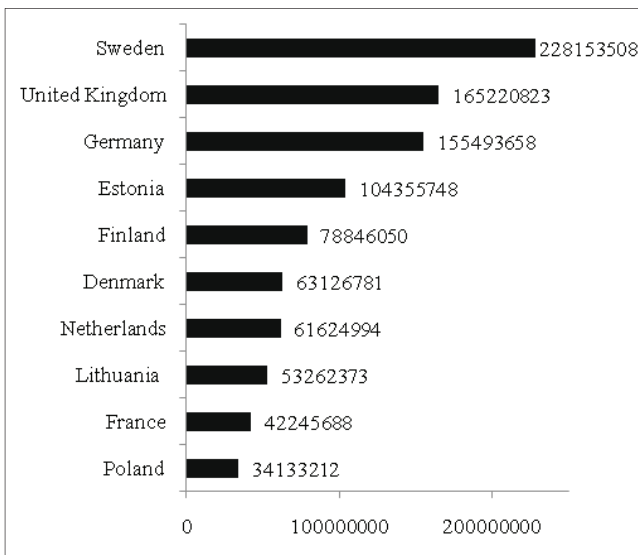
Structure of Latvia's export in year 2009 is shown in Figure 5. In year 2009 the greatest share of import was agriculture and food products (18,3%). The second largest import group is minerals (17,2%), than follow products of chemical industry (16,9%), machinery products (15,7%), metal and metal articles (8,1%), vehicles (6,5%), light

It is interesting that all export and import product groups are similar in structure except wood and wood products. If in export structure it makes 16,5% (Figure 3) than in import structure it makes only 1,4% from all goods.

**Quality competitiveness of Latvia's wood industry**

Authors in this section of article will analyze quality competitiveness of Latvia's wood industry by applying approaches described in previous sections.

Latvia's top 10 export partner countries of wood and articles of wood in year 2010 are shown in Figure 6.

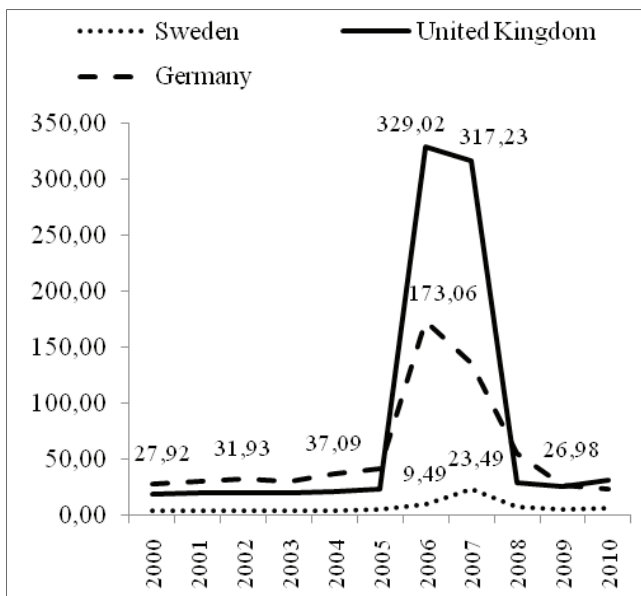


**Figure 6. Latvia's top 10 export partners of wood and articles of wood in year 2010, euro (Authors, Eurostat)**

Figure 6 shows that Latvia's top 10 export partners of wood and articles of wood in year 2010 was Sweden (228 million euro), United Kingdom (165 million euro), Germany (155 million euro), Estonia (104 million euro), Finland (78 million euro), Denmark (63 million euro), Netherlands (61 million euro), Lithuania (53 million euro), France (42 million euro) and Poland (34 million euro).

Authors in this paper will analyze in more detail top three export partner countries of Latvia's wood and articles of wood – Sweden, United Kingdom and Germany.

First, authors calculated Latvia's unit values of export to Sweden, United Kingdom and Germany (Figure 7)



**Figure 7. Latvia's unit value of export to Sweden, United Kingdom and Germany, euro/100 kg (Authors, Eurostat)**

As we can see in Figure 7, from three export partner countries the lowest export unit value is for the export to Sweden. In case of Sweden, unit value of export increased slowly from year 2000 (3,78 euro/100 kg) until year 2005

(4,97 euro/100 kg). Then it went up sharply and reach 23,49 euro/100 kg in year 2007. And then, considering changes in world economy, unit value decreased very sharply and reach value of 6,91 euro/100 kg in the following year. In year 2010 it was 6,31 euro/100 kg.

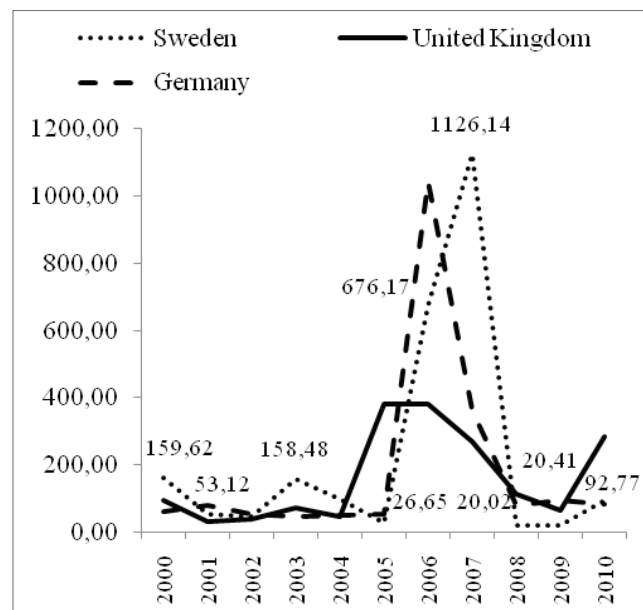
Changes in world economy left even more significant impact on unit values of export to Germany and United Kingdom.

Unit values of Latvia's export to Germany reached maximum level in year 2006 (173,06 euro/100 kg) and in year 2010 it was only 23,57 euro/100 kg (it is more than maximum for Sweden in year 2007).

And unit values of Latvia's export to United Kingdom reached maximum level also in year 2006 (329,02 euro/100 kg) and sharply decreased until year 2010 (31,72 euro/100 kg).

From the theory we can make a conclusions that overall Latvia are exporting higher quality goods to Germany and United Kingdom, then to Sweden. In this case it also could reflect just higher added value goods since product group of wood and wood articles contain products with very different added value.

Authors also calculated unit values of import from Sweden, United Kingdom and Germany (Figure 8).



**Figure 8. Latvia's unit value of import from Sweden, United Kingdom and Germany, euro/100 kg (Authors, Eurostat)**

As we can see in Figure 8, overall lowest unit value is for import from United Kingdom (lowest – 29,49 euro/100 kg in year 2001, highest – 382,49 euro/100 kg in year 2006).

Import unit value from Germany was very high during the year 2006 – 1045,12 euro/100 kg, and with the economic situation in the world it sharply decreased and was only 84,09 euro/100 kg in year 2010.

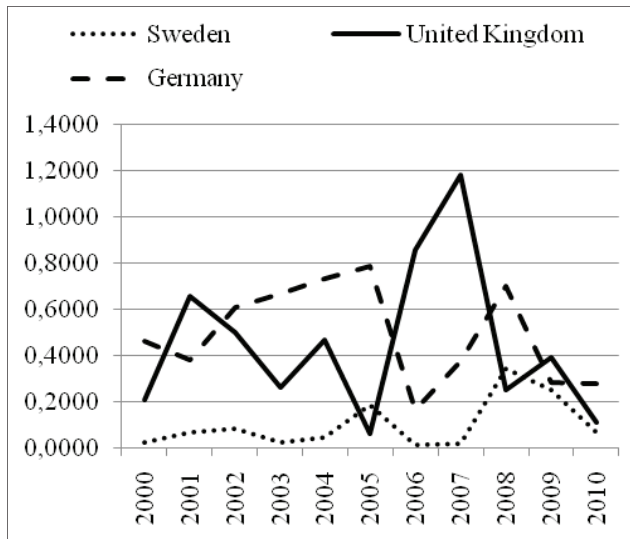
Interesting results are for Sweden. Latvia had lowest export value from three trade partners, but overall it has highest import unit value. And again we can see that during the years 2006 and 2007 there was sharp increase of unit value of export and it reached 1126,14 euro/100 kg in year 2007. After that unit value sharply decreased until 92,77 euro/100

kg in year 2010.

Overall we can see (Figures 7 and 8) that unit values of export and import increased very sharply during the years 2006 and 2007 and now they has returned to the level before these dramatic increases in value.

As authors mentioned before, relative unit of value will be used as well to characterize quality competitiveness of Latvia's wood industry.

Relative unit values (RUV) of trade with Sweden, United Kingdom and Germany are shown in Figure 9.



**Figure 9. Latvia's relative unit value of trade with Sweden, United Kingdom and Germany, unit value of export/unit value of import** (Authors, Eurostat)

As calculations show (Figure 9), we can conclude that overall quality competitiveness of Latvia's wood industry is low with three trade partners: Sweden, United Kingdom and Germany. In all years RUV is lower than 1 except year 2007 when Latvia's unit value of export to United Kingdom exceeded unit value of import from United Kingdom ( $RUV > 1$ ). It could be explained with some differences in prices but not quality, because unit value of export was 317,23 euro/100 kg and unit value of import was 268,18 euro/100 kg.

From these results we can conclude that overall quality of exported wood products is lower than imported from Sweden, United Kingdom and Germany. Of course, we are looking at large product group and further research is needed to compare certain products in order to get better evidence about quality competitiveness.

Results also show the flow of the products. If Latvia is exporting lower added value products, than Sweden, United Kingdom and Germany are adding extra value and selling these goods further to other courtiers.

### Conclusions

Quality competitiveness is difficult to measure for the very same reason as it is difficult to define quality itself. If measuring quality on company level has quite long history with high degree of sophistication, measuring quality level and quality competitiveness of a country is still very debatable, since there are not very much research in this area. There were many attempts from different researchers to define set of

indicators to measure quality competitiveness.

One of the universal indicators used to measure quality of exports is unit value of the products - gross value of exports in euro divided by kilogram. The unit value in general depends on demand and prices, but specifically it reflects changes in quality, shifts to higher product segments and to other value enhancing features (service component, design, and advertising). Therefore, unit value is often applied as an indicator in attempts to measure quality and vertical product differentiation. Like any comprehensive indicator, it has advantages and disadvantages therefore researchers have to be careful in setting the research limitations.

Calculations made by authors' shows that overall quality of exported wood products is lower than imported from Sweden, United Kingdom and Germany. Although in year 2007 Latvia's quality competitiveness of wood industry was higher than United Kingdom's.

Further research is needed to compare certain products within product group "wood and articles of wood" in order to get better evidence about quality competitiveness of Latvia's wood industry.

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