

GEOGRAPHICAL TENDENCIES OF MAIN PRODUCE EXPORTS OF LATVIA 2000-2013

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Abstract

Recently economic development has been an issue of intense research and discussion in an academic society. Many facets of countries' economic development were examined, including foreign trade. As a foundation of international cooperation, this indicator is relevant in observing one's internal development and external ties. In case of Latvia, this topic is heavily influenced by economists, and the geographical perspective is quite underdeveloped. In this research, the economic ties of Latvia were explored through the analysis of its main export groups in sectors of agriculture, forestry and fisheries throughout the first decade of the 21st century.

With the aim of establishing clear ties between Latvia and its major export markets, the statistics of foreign trade was analysed using frequency analysis. It can be reported that in general Latvian export markets are closely located and consist of the Baltic Sea Region countries such as Denmark, Germany, Russia and others. Despite the differences in commodity group destinations, it can be clearly stated that a division of trade flow still exists, separating it into two directions - Eastern and Western, where the former allocates the majority of Latvian processed commodities and more sophisticated goods, and the latter consumes raw materials and less transformed materials. This arguably shows a difference in demand in Western and Eastern markets, where the first mostly requires materials for its own industry, while the latter procures them for consumption on the local market, again pointing to a complexity of reforms required for the Latvian economic focus turning towards Western markets.

Key words: foreign trade, frequency analysis, agriculture, forestry, fisheries.

Introduction

Following the economic crisis of 2007-2009, the debate about the economic development in Latvia and many other countries has taken a big turn towards more sustainable and continuous economic policing than ever before. Due to a fast and fluctuating nature of the crisis, where the fall or stagnation of economies resembled a domino effect, the mechanisms of stabilisation used on previous occasions were not very effective; however, the heavy-handed interventions by state financial institutions in many cases led to quick or moderate recovery times. In case of Latvia, the damage was too great for it to recover on its own, so the international financial assistance was sought.

This is one of the few great background events that highlight the research field of the economic development of Latvia. In the last 20 years, Latvian economy has undergone a profound transformation from a post-socialist economy based on the production of agricultural and industrial goods to a more liberal economy, where services dominate production. Another aspect is the restructurization of its production sectors, where the agricultural part grew and the industrial one decreased considerably, with only few heavy industries surviving and the majority shifting to light industries, such as textiles, furniture and raw material re-processing. These changes, made to accommodate the Latvian economic transition to one closer to the European Union (further EU), were made prior to the 2004 enlargement of the EU, and continued even after, but at a faster, more optimistic speed, which led to an unprecedented growth rate. In few years between the Latvia's accession to the EU and the economic crisis, the economy of Latvia

developed very actively and sometimes with very unreasonable and hypertrophied ambitions, which led to intensive borrowing of free EU capital available on financial markets. As a result, industries had to bear the greatest toll when the crisis became a reality in Latvia. Stagnation, a sharp drop of Gross Domestic Product, recession and growing unemployment made it hard for many enterprises to continue their functioning, and many of them went bankrupt.

All these events made economists and those in the research field shift their attention to perspective development targets, evaluations of the existing trading patterns and connections, and to a more sustainable planning of economic development. In this scientific research, however, geography and spatial research has been secondary, priority being given to economic parameters and variables. Still, space and its structure are important since they are crucial in economic theories on good flows and production chains as noted by A. Smith and many others (Mažirina, 2007).

This research aims to analyse the spatial development of foreign trade of Latvia in particular, its export markets of major commodity groups using frequency analysis. This is achieved by:

- evaluating the existing extent of research in the field and completing a statistical overview in the period of interest;
- gathering export data of main commodity groups and using frequency analysis to pinpoint the major and continuously stable markets;
- analysing the results of the frequency analysis and interpreting them with additional qualitative data to explain a positive or negative trend, without relying on pure empirical data.

Before starting to analyse the statistics, it was crucial to observe the current trends in this research. On the local level, the research concentrated on international connections and trade (Karnups, 2004; Mažirina, 2007; Rupeika, 2010; Žuravļovs, 2012), foreign trade development as a major economic development element (Vasiļjeva, 2007; Privalova, 2008; Svilāns, 2008; Ovčinnikova, 2011), foreign trade as a descriptor of international integrity and a tool for further European/World integration (Būmane, 2007; Lagune, 2007; Kolesnikova, 2008; Fadejeva and Meļihovs, 2009). On the other hand, in the international scientific community, the research of foreign trade as an economic development component was mostly concentrated on the largest trading partners (Berentsen, 2012; Bērtaite and Liepa, 2011; Kantar et al., 2011), commodity turnover (Birzins, 2004; Keišs et al., 2009; Devaeva, 2006), and the analysis of traded commodity type or group (Berentsen, 2012; Gingrich, 2011; Devaeva, 2006).

Materials and Methods

The data used in this research were taken from the Central Statistical Bureau of Latvia. The data from the year 2000 to 2013 were collected for all foreign trade transactions in the selected groups, which represented the major sectors of the Latvian economy such as agriculture, fisheries and forestry. The data from the whole data set were selected based on four digit international goods nomenclature:

- 02 – Meat and its processed goods;
- 03 – Fish and its processed goods;
- 04 – Milk and its processed goods;
- 10 – Grains;
- 11 – Grain processed goods;
- 16 – Prepared foodstuffs and conserves;
- 44 – Forestry goods;

The mentioned groups were further processed to fit the preliminary analysis criteria by being sorted by a year, month, and country in one matrix. The preliminary analysis involved the preparation of a binary matrix, by substituting any positive trade instance for 1 and the rest for 0. Using the formula below, a frequency of export can be calculated:

$$P = \sum(N1+N2+N3+ \dots +Nx)/X, \quad (1)$$

Frequency calculation formula

Where – P is frequency,

X – is a number of months in the observed period,
and N – is a value for every month in the matrix.

Thus, the analysis gives a string of frequencies that describe the export frequency for any export position of goods to a given state. For further analysis, the data were transformed again combining all the data into 5 major groups: 02 – meat products, 03 – fish products,

04 – milk products, 10 – grains and its products and 44 – forestry products. Further some countries were excluded (Yugoslavia and its succession states, Sudan and ex-Dutch colonies in the Caribbean), as they were in the periods of transition, and these might have caused serious misinterpretations and heterogeneities in the matrixes.

The transformed data of 5 columns were used in calculating a function from the relative frequency that would give an opportunity to determine whether the H_0 could be dismissed. H_0 was formulated as follows: export to any selected country/market at any selected time is random in nature. For that purpose, R. Fisher φ -function is the best (See Formula 2) (Kraštinš and Ciemiņa, 2003, 161).

$$\varphi = \frac{2\pi}{180} \arcsin(\sqrt{p}) \quad (2)$$

Fisher φ calculation formula, where p- is frequency

Then, using formula in Figure 3, t-empirical can be calculated, and using formula in Figure 4 t-theoretical can also be obtained:

$$t_a = \frac{|\varphi_1 - \varphi_2|}{\sqrt{\frac{n_1 + n_2}{n_1 \times n_2}}} \quad (3)$$

T_{emp} calculation formula

$$v = n_1 + n_2 - 2 \quad (4)$$

T_{theo} calculation formula

Formula 4 shows the calculation for the degrees of freedom, where n_1 is the number of observations in the general set, but n_2 the number of observations for one country, φ_1 is Fisher transformation for indicator frequency for the general set, φ_2 is Fisher transformation for indicator frequency in the general for one country: V – Number of the degrees of freedom; T- theoretical is based on the T- distribution (T-tables) according degrees of freedom.

As a result, it is possible to obtain T_{emp} value that can give a relative frequency from which it is possible to speculate a possibility of export occurring in any randomly selected month into the country under observation. Hence, all countries can be divided into 3 groups, after the calculation of t-statistics of significance:

1) Export markets – where the export occurrence probability is statistically high – where T_{emp} is greater than 2, and the average frequency of the export group is smaller than that of the observed country;

2) Export markets – where the export occurrence probability is statistically low - T_{emp} is greater than 2,

and the average frequency of export group is greater than that of the observed countries. This group also includes all the countries with no export records;

3) Export markets – where export has eventual character - T_{emp} is less than 2, and H_0 cannot be dismissed.

Results and Discussion

The analysis shows a significant geographical differentiation of export markets for different commodity types and significant shifts that occurred in these markets due to different economic or political events, such as Latvia’s accession to the EU and the economic recession in 2007-2009, as well as the new economic policy following the crisis management policies.

Analysing the mentioned groups in a successive order, it can be noted that the first (i.e. meat and its products) group has a relatively small geography; it is mainly restricted to the Baltic Sea region and encompasses mostly the immediate neighbours and historical trade partners of Latvia such as Germany, Poland, Denmark and the Czech Republic. Subsequently, further markets such as Austria and Cyprus, and even the Netherlands are also significant. The UK and Ireland being in the range of significant export markets can also indicate a previously noted ‘goods follow people effect’ mentioned in other studies (Berjoza and Paiders, 2013), where it appeared as an explanation for sustainable and constant export of Latvian processed fish to Western European countries with significant ex-Soviet expatriate communities. Few significant markets at a considerable geographical distance were also noted, for instance Panama and Liberia. Export to these countries can be explained by

the fact that many ships in Latvian ports are registered in ‘cheap flag nations’ such as the mentioned ones, meaning this export does not describe the trade relations between Latvia and these countries, but mostly order preferences of a ship crew.

Looking into detail on the data of the fish and fish products group, a wider geography was observed. It covered not only Europe, but also North American and Central Asian countries, making it one of the most geographically diverse export networks in this study. The export markets are generally focused on particular commodity types, for example, live and fresh fish were majorly exported around the Baltic Sea, predominantly to Lithuania and Estonia, while fresh processed fish and processed red fish were exported to Western Europe and the rest - to Eastern Europe. Canned fish, usually sprats or mackerels, smoked, salted and differently processed fish were the dominating Latvian products exported to the Eastern European and Asian countries.

In this group, the internal differentiation of the market played a great role in distinguishing trade flows as noted in Berjoza and Paiders (2013) work on fisheries, but this did not give away a stable market disposition. It should be noted that a largest volume of export in this major group consists of such processed fish as canned sprat, so in many aspects any volume analysis would give the major markets a pattern consistent with this groups export. On the other hand, in this study, the method of binarisation was applied, so the total volume had no significant impact, proving that even less significant export groups, such as fresh fish, frozen fish, fish fillets and others, were equally subject to a wider differentiation of export, which was similar to that of canned fish.

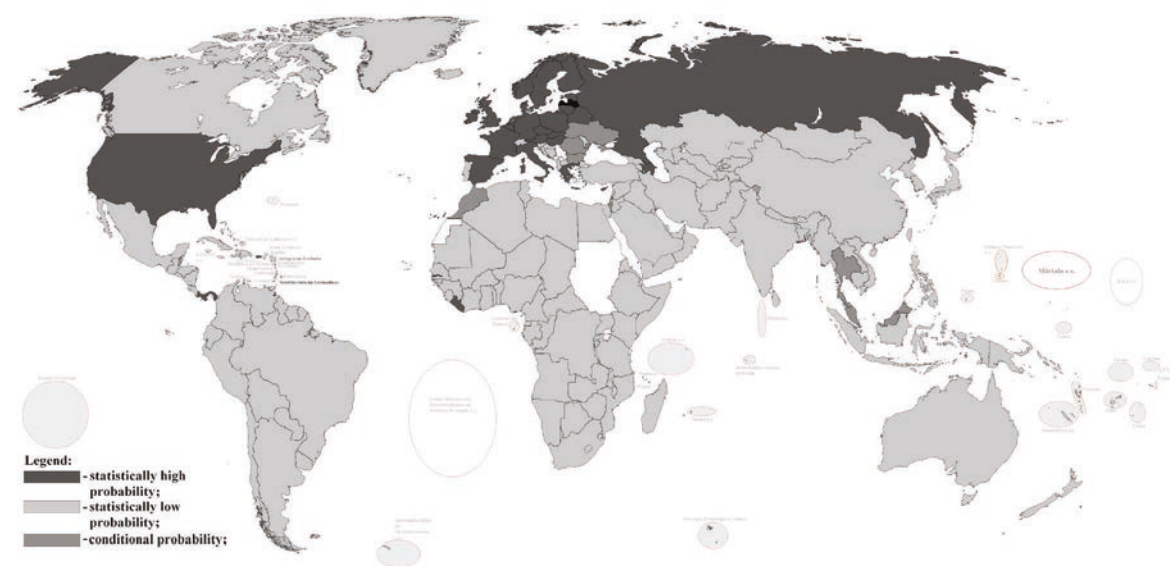


Figure 1. Export markets by probability for dairy and dairy products in the observed period.

Table 1

**Cheese and cottage cheese export volumes by major export markets in the period from 2000 to 2013
(in million Euros, country names given in ISO codes)**

State	00	01	02	03	04	05	06	07	08	09	10	11	12	13
DE	1.19	2.96	1.57	2.8	5.01	12.24	12.82	15.3	19.11	7	10.53	9.52	8.62	12.36
DK	0.17	0.05	1.13	1.95	3.72	3.35	1.51	0.96	0.26	0.1	0	0.51	0.38	0.88
EE	0.54	0.85	1	1.04	1.18	1.17	1.06	2.38	5.01	3.77	3.26	4.33	4.64	5.52
FI	0	0	0	0	0	0.46	0.79	2.64	2.48	0.26	0.02	0.06	0.01	0
GB	0.1	0.01	0.01	0.12	1.09	0.64	0.09	0.60	1.01	0.57	0.26	0.36	0.53	0.98
IT	0.06	0	0.03	0.23	0.59	7.99	9.10	4.13	2.44	2.89	5.3	4.57	1.81	1.13
LT	0.15	0.19	0.3	0.81	1.02	1.03	1.73	1.24	1.72	2.16	2.39	5.62	6.92	6.96
NL	2.27	5.43	4.89	6.57	2.65	0.56	1.80	1.03	0.76	0.13	0.43	2.65	7.42	5.94
PL	0.04	0	0	0.01	0.60	0.23	0.35	0.3	0.16	0.29	2.02	0.96	2.16	1.45
RU	0.28	0.054	0.13	0.10	0.55	1.32	3.43	5.65	7.53	4.72	13.3	18.04	15.67	15.24

Analyzing dairy and dairy products, it was noted that the geography of export is extensive. Figure 1 shows a chart of the frequency analysis results, which indicate that stable and significant markets were concentrated in Europe. Detailed insight into a distribution of export market shares amongst different export positions reveal a significance of two general groups – fresh milk and cream and cheese and cottage cheese exports. So, it can be noted that the extent of the geographical export market can be determined by the ‘expiration date’ of the product, hence a relatively narrow geography for fresh milk and cream and wider - for cheese and cottage cheese. Similarly to the previous group, an additional transformation of input data managed to annul the effect of larger group shares in total volume statistic. So, it can be stated that frequency analysis can effectively distinguish and show stable export markets, without a distortion caused by greater or smaller values of total export, its general shares and volumes of exported goods.

Another important aspect disclosed by the analysis of the 3rd group can be seen in Table 1, where export dynamics for all significantly large export markets is shown. It is seen that prior to 2004, the dominating export market was the Netherlands, which imported a large portion of Latvian cheese and cottage cheese, but after the accession of Latvia to the EU and its inclusion in the common European economic space, the significance and volumes of export to Germany and Italy grew significantly, effectively tripling in a span of just few years. Consequently, during and after the economic crisis of 2007-2009, it can be seen that the export to Germany and Italy fell dramatically, while the export to Russia and Lithuania developed at a steady progressive pace.

The 2012-2013 showed a new decline, which might indicate a worsening international economic situation, despite recovery signs in some economies. A general trend for a recess in the major economies

can indicate wider dispersion of Latvian export amongst several significant and new markets that were not included in this chart due to a low total volume in the span of a decade, although, the scenario of potential differentiation of Latvian export markets was mentioned before (Svilāns, 2008; Vasiļjeva, 2007). This can ask for further research in the future for more accurate evaluations.

Figure 2 provides an illustration of the frequency analysis results of grain and its product exports, in which the geographical extent is similar to that of meat groups, but general diversity of export is similar to that of fish and dairy groups. As it can be seen, the stable markets are once again localised in the nearest vicinity of Latvia. Countries can be divided in two groups: ones with a potential shortage of examined commodities due to harsher environment (Spain, Greece, Austria, Uzbekistan and Kazakhstan) or extreme rates of consumption (Thailand, the USA and Belize).

The Results of this group are also significant because they are the best illustration of the essence of the method used for the research. Figure 3 provides the information on the main export markets in terms of sheer volume for the most significant portions of this export niche. In comparison to Figure 2, many significant export markets of this group are not shown as stable by the frequency analysis, thus proving the hypothesis that there is some strong interrelation between the frequency analysis results and the sheer volume analysis results.

In the end, it is important to observe some export patterns in forestry commodity export. The range of stable markets for this group is tremendous. It includes all major European markets, Chinese and Japanese markets, North American markets, Central Asian markets, even relatively exotic Egyptian and Guinea markets. It proves that wide nomenclature of goods with long preservation time can be exported further and stored longer for best realisation price,

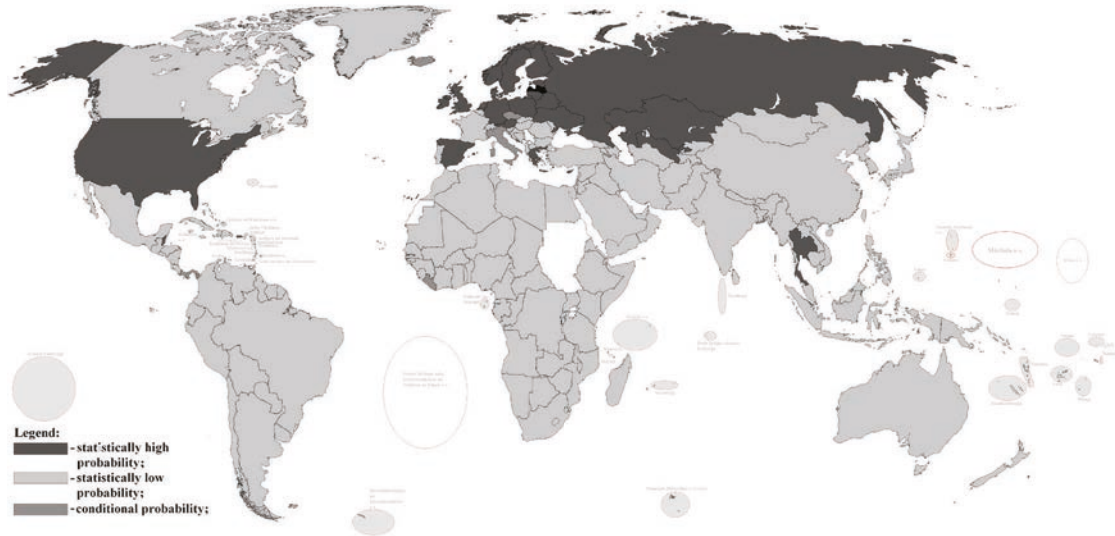


Figure 2. Export markets by export probability for grain and its products in the observed period.

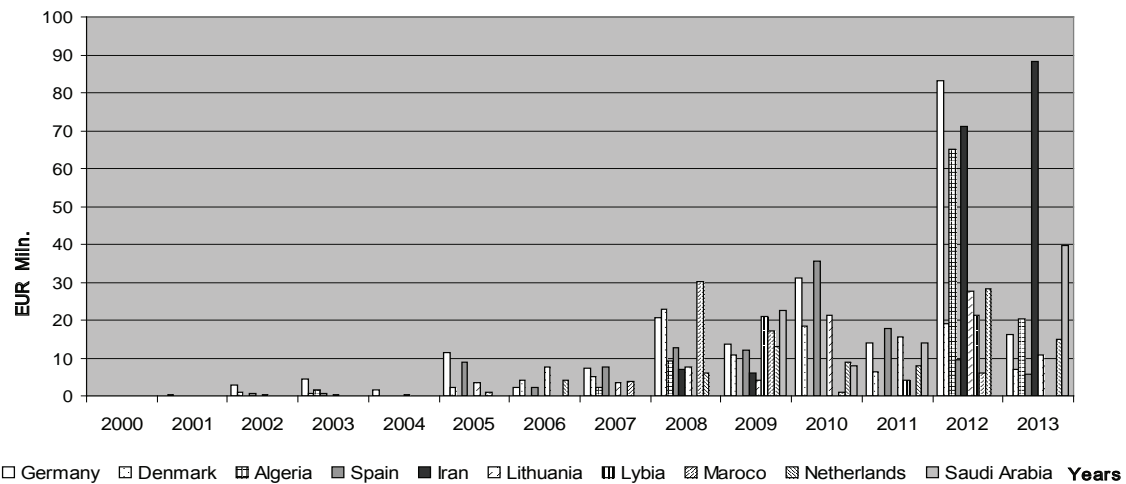


Figure 3. Wheat and wheat-rye mixture export volumes by major export markets in the observed period.

compared to perishable goods observed in the previous groups.

As it has been mentioned above, theoretical studies have strong economic inclination, that is, the main emphasis of the research is on economic impact, the parameters relevant for the field of academic or practical economy. Spatial information and data are used scarcely and only as vague illustration, despite the fact that it can be an important addition or facet, if appropriately used, as demonstrated by this research. Unlike economic variables, spatial ones often require additional insight and are able to provide in-depth information on processes and conditions, otherwise unnoticed or unexplained by simple numbers. Despite that this kind of data is often overlooked in research, even when its use could greatly improve the results.

On the other hand, some researchers such as Haibo (2004) and Kantar et al. (2011) stress that

spatial and particularly geographical information is one of the most crucial elements in the research of economic development and is instrumental in assisting the evaluation of possible future prospects. They came to these conclusions by analysing Chinese geo-economics in one case and Turkish foreign trade change in a period of a decade between the 20th and the 21st centuries. Others (Hall, 2006; Herkenrath, 2007; Kaminski and Raballand, 2009; Gingrich, 2011) also note the importance of spatial data in the research of economics, which provides additional parameters and explanations to some existing connections in economic interrelations. Hence, it is important to widen the scope of geographers' presence in the field of export studies and contribute to it by providing some geographical materials and insights into the problems and questions posed.

Conclusions

Export studies are internationally recognised subject of scientific interest. It is being ascertained by the range and the amount of papers and other works that research these flows not only in space, but also time. Unfortunately, in case of Latvia these studies are largely concentrated in the field of economics and their diversity is determined by a range of economic theories applied to their study, not by the prospects and possibilities of the multiple research angles of the phenomena. That calls for wider and deeper studies of trade flows in scientific fields other than economy.

By analysing Latvian export markets of agriculture, fisheries and forestry and observing the differences between the data acquired through two different empirical methods, it can be said that Latvian major export area is the Baltic Sea region (including Estonia, Lithuania, Finland, Sweden, Russia, Belarus, Poland, Germany, and Denmark) and adjoining nations (such as the Czech Republic, Norway, Slovakia, the Netherlands, Austria). The USA can also be mentioned as a stable trading partner for Latvia, but it is largely insignificant in terms of volumes.

The Analysis in this study confirms some findings from the previous work (Berjoza and Paiders, 2013) such as ‘goods follow people’, which specify a distribution of particular goods in terms of population migration and the demand for recognised and trusted brands (e.g. canned sprats); ‘export variety is determined by time’, which indicates the shrinkage of geography in proportion to the time the goods can be preserved unspoiled, giving advantage to non-organic/non-perishable goods (e.g. fresh food stuffs and forestry commodities).

The Applied methodology has successfully assisted in finding stable export markets of Latvian major economic sectors and has been effective in comparison with other less reliable methods, such as export volume analysis and others. The method could efficiently separate stable markets (i.e. markets with statistically significant probability being an export market) from unknown or rare markets (i.e. markets with statistically insignificant probability being an export market), as well as determine markets with random probability, which signify complex underlying processes and connections that make export to these markets possible in different cases.

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