

Analysis of Czech Agricultural Exports to Russia Using Mirror Statistics

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ABSTRACT

Objective: The objective of the article is to verify the possibilities of mirror statistics of Russian imports for the analysis and identification of problems of Czech agricultural exports to the Russian market.

Research Design & Methods: The supply of agricultural products and foodstuffs (APF) to Russia in 2015-2018 was the focus of the study. We scrutinised the permissibility of using mirror statistics for analysis and formulated algorithms for aggregating and disaggregating foreign trade indices (FT-indices) in calculating and studying the group dynamics of the most important APF goods.

Findings: We prove the acceptability of using mirror statistics for APF from the viewpoint of methodological standards by determining the position of the most important Czech APF products on the Russian market, including a comparison with similar imported goods. The study revealed that Czech statistics on beer exports to Russia should be increased by the amount of re-exports.

Implications & Recommendations: We formulate recommendations for the development of Czech APF exports to Russia for leaders' goods, taking into account prices for similar imported goods. For beer (trade leader), we recommend enhancing the use of the intellectual property factor for trade growth. Moreover, we give recommendations on statistics of Czech exports to Russia on the need to adjust beer export volumes taking into account re-exports.

Contribution & Value Added: The research is original, as there were no studies prior to this one that would apply mirror statistics as an additional database and tool for identifying export problems not observed by national statistics.

Article type: research article

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INTRODUCTION

The Russian market is the largest market for agricultural products and foodstuffs (APF) goods among all European countries, including the Czech Republic. Therefore, the practical analysis of the condition, sales conditions, and prices of goods exported to the Russian market is in demand and relevant for each country trading with Russia.

Growing barriers to APF trading in the Russian market, especially the currently existing lists of mutual sanctions – including trade restrictions between the EU and Russia on APF – have significantly affected the volume and structure of mutual trade. Against this background, trade and trade policies require regular and comprehensive monitoring, including analyses with traditional tools and statistics, along with the development of additional methods for identifying and studying emerging problems.

Traditionally, a country's export analysis is based on national statistics (Szczepaniak, 2019). However, the analysis of the same flow based on mirror statistics of the host country in the form of its import is of indubitable practical interest.

In general, mirror statistics is closer to the real conditions of a sales market, since it fixes the cost and quantity of goods for sale on the domestic market of the importing country.

The purpose of this article is to study the possibilities of mirror statistics of Russian imports to analyse and identify problems of Czech APF exports to the Russian market. To achieve this goal, we analysed three subtopics. The first subtopic considers mirror statistics as an additional source of information and proves the possibility of using statistics on Russian APF imports in terms of methodological standards. The second subtopic proposes methods of aggregation and disaggregation of FT-indices to further analyse the dynamics of the most important groups of goods and explore the possibilities of recovery and expansion of APF exports. The third subtopic examines the mirror statistics of deliveries of the leader of the Czech trade – beer – which reveals the underestimation of Czech export statistics on beer supplies to Russia, along with the problem of re-export and parallel import. All studies within the framework of this work were conducted for the first time.

The article consists of the following sections. First, we review the subject literature. Next, we describe the applied methods and techniques of research. Third section presents results of the study, along with discussion. The article ends with concluding remarks.

LITERATURE REVIEW

Studies about problems of mirror statistics are scarce, which is explained by the difficulties of the gathering of initial data and the problematic subsequent interpretation of results of mirror comparison of information. The main volume of publications focuses on the topic of increasing the reliability of statistics (Markowicz & Baran, 2019). What predominates the field are macroeconomic comparisons of data of the total value of trade results with the recording of the largest deviations, including between countries; e.g. see publications of the Central Bank of Russia (BOPR-CMD, 2019), but also Javorsek (2016), Valiev (2016), Seltsovsky (2009). Moreover, we also note publications that conduct a wide mirror comparison of the value results of trade at the level of trade partners of the country, including mirror comparison by product groups and sometimes by selected goods (CCSKR, 2014; Troshina & Kislitsyna, 2008; Korolev, Zhukovskaya, Trofimova & Chertko, 2007; EIFRF, 2003).

From our viewpoint, the common drawback of mirror statistics research is its wide focus, when asymmetry studies are conducted on the almost complete composition of product groups with the comparison of values of trade. In this case, due to the large amount of information, the interpretation of results is difficult and often remain at the level of fixing the fact of asymmetry and determining its size, followed by an assessment of the estimated losses of budget revenues. Based on mirror comparisons, a rather large number of different estimation techniques have also been proposed on this subject; e.g. see the discussion of data comparison techniques and a list of sources in Mantusov and Tibekin (2015; 2016), Bartokova (2019), Borak and Vacek (2018), Ferto (2018). Furthermore, as a general drawback, we note that data on natural supplies of goods and prices remain unused in almost all publications devoted to the topic of comparing mirror statistics.

We conclude that the practical use of mirror statistics has its own characteristics and is not always possible due to large discrepancies or asymmetries in the volumes of comparable flows of national statistics and statistics of the host country, when the reliability of the data is doubtful (asymmetry is higher than the permissible values) and requires additional checks. However, large discrepancies in mirror data are not recorded everywhere; in a number of publications this fact is noted both for goods and for countries. Nevertheless, we did not find any publications that would consider the further use of “normal” mirror statistics as an additional source of information – along with national statistics – for studying goods trade between countries.

Let us note that mirror statistics as a full-fledged information base is closer to the real conditions of the sales market, because accounts for the cost and quantity of goods of different countries for sale on the domestic market of the importing country, taking into account logistics and insurance cost.

The focus of the study was narrowed down to the group of APF (HS 01-24)¹, for which we examined exports from the Czech Republic to the Russian market and investigated the possibilities of its analysis based on data from mirror statistics of Russian imports. To solve this problem, the article will firstly assesses the acceptability of using mirror statistics for APF in terms of existing methodological standards. Here, in the context of the classical analysis of foreign trade flows (by sections, product groups, list of main goods, and the behaviour of trade leaders), we will conduct the comparison of mirror value data at the level of all product APF groups (HS 01-24), then according to the list of main import goods, and finally by leading products. In conclusion, we will consider the asymmetry of not only cost but also natural deliveries for the leader of trade in the Russian market – Czech beer – along with its possible causes, emerging trade problems, suggestions for solutions.

¹ The Harmonized Commodity Description and Coding System generally referred to as “Harmonized System” or simply “HS” is a multipurpose international product nomenclature developed by the World Customs Organization. The system is used by more than 200 countries and economies as the basis for their Customs tariffs and for the collection of international trade statistics. Over 98% of the merchandise in international trade is classified in terms of the HS. Source: <http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx>.

MATERIAL AND METHODS

Mirror Statistics

As we know, international trade between two countries is simultaneously monitored and registered by the customs services of these countries. The result is a two-sided display of trade data, which is commonly referred to as mirror statistics. Theoretically, in the mirror statistics, the export of goods from country A to country B should equal the import from country B from country A, whereas the import from country B to country A should equal the export from country A to country B. However, in practice the mentioned trade volumes usually differ and, at times, they differ dramatically. In general, experts associate the presence of differences or *asymmetry* in the data of mirror statistics with two groups of reasons: the customs methodology for fixing flows and various errors in determining the customs value of goods, including those associated with understating customs value to reduce budget deductions and organise capital flight (cf. IMTS, 2010).

What is considered a normal asymmetry of mirror flows? First of all, the asymmetry of the data is associated with the difference in prices of recorded flows. As we know, according to customs statistics methodology (IEMD, 2018), the value of exporting goods of country A to the market of country B is represented by statistics of country A in Free On Board (FOB) prices, while imports of goods from country A to country B are represented by statistics of country B at Cost, Insurance, and Freight (CIF) prices, which additionally include costs of insurance and transportation of goods. According to the International Monetary Fund (IMF), the world average CIF/FOB value is 1.06 (DOTS, 2018, p. xii; Bogdanova & Chuplanov, 2010, p. 47), although earlier studies use the coefficient of 1.10 (EIFRF, 2003; DOTS, 2011). Currently, the Central Bank of Russia at the mirror comparing statistics for countries outside of the Commonwealth of Independent States (CIS) applies coefficient 1.0588 (BOPR-C, 2018, p. 1). Moreover, we note that permissible differences in estimates depend on the specifics of goods and are determined by the amount of expenses not only for transportation and insurance but also losses during transportation and calendar differences in sending and receiving goods.

Thus, we may conclude that, in general, the permissible discrepancy in estimates for trade with non-CIS countries is usually taken equal to 6-10%. In the future, when assessing the acceptability of the asymmetry of value flows, we will focus on the indicated values.

What is registered more precisely: export or import? To this question, the United Nations statistics experts answer that, for a given country, imports are usually recorded with more accuracy than exports, because imports are the main revenue base of the state budget and exports are not (IEMD, 2018). The general view of experts on the accuracy of data collected by customs offices is that import data are more reliable than export data because customs services are more serious about recording imported goods for purposes of budget revenue from duties collection, taxes, and other regulatory controls (Hamanaka, 2011, p.1; EIFRF, 2003).

The conclusion about the smaller asymmetry of import flows of mirror statistics was practically confirmed when comparing Czech export statistics on APF and mirror statistics on the import of Czech goods to Belarus (Yurik, 2017). Indeed, the mirror data of Czech imports from Belarus and Belarusian exports to the Czech Republic had rather large differences, while data on the opposite flow to Belarus differed within the limits of methodologically permissible norms.

Research Design with Mirror Statistics

Within the framework of the designated topic, the study focused on the APF group (HS 01-24). In the beginning, to assess the practical use of mirror statistics in the analysis of competitive positions of Czech APF goods in the Russian market, we compared the statistics of Czech exports to the Russian Federation and statistics of Russian imports from the Czech Republic. Next, on the basis of the Federal Customs Service of the Russian Federation database (FCSR), we compiled a list of imports of Czech APF goods to Russia from 29 items (99% of the trade volume), within which we distinguished 12 main goods (more than 90% of trade) and three leading goods (60% of trade volume). We then calculated foreign trade (FT) indices of price, quantity, and value for the selection of groups of goods using the proposed methods. Based on FT-indices and mirror statistics, we estimated the position of the leaders' products surrounded by similar imported goods from other countries and the prospects for expanding trade on the Russian market. In conclusion, we compared the asymmetry of mirror statistics of natural supplies for the three leading products of Czech APF imports to Russia (more than 60% of trade) and commented on possible causes of deviations.

Methods of FT-Indices Calculation

In Russian statistics, FT-indices are calculated based on the Laspeyres formula:

$$I^P = \frac{\sum p^1 q^0}{\sum p^0 q^0} \quad (1)$$

where:

- p^0, p^1 - is the price per unit of goods in the reference and reporting years;
- q^0, q^1 - is the quantity of goods in the reference and reporting years;
- I^P - Laspeyres average price index.

For calculating FT-indices, we used methods of aggregation and disaggregation of indices that are a modification of general methods (Pushkin & Yurik, 2018), adapted to solve the problems under consideration.

To describe the algorithm for calculating FT-indices, we will use the following notation:

- n, k – the quantity of goods in the sample and in the selected group;
- p_i^0, p_i^1 – the price of goods i in the reference and reporting years;
- q_i^0, q_i^1 – the quantity of goods i in the reference and reporting years;
- s_i^0, s_i^1 – the value of goods i in the reference and reporting years;
- S_n^0, S_n^1 – the value of all n goods in the reference and reporting years;
- S_n^{01} – the value of all n goods in the reference year at the prices of the reporting year (numerator of the Laspeyres formula (1));
- I_n^s, I_n^p, I_n^q – value index, average price index and quantity index of the reporting year to the reference year for a group of n goods.

Aggregation: total FT-indices for a list of n products.

Initially known: $s_i^1, s_i^0, q_i^1, q_i^0, i = 1, 2, \dots, n$.

Moreover, we calculate the total value of n goods:

$$S_n^1 = \sum_{i=1}^n s_i^1, \quad S_n^0 = \sum_{i=1}^n s_i^0 \quad (2)$$

Next, we note that the denominator of formula (1) is equal to S_n^0 :

$$\sum_{i=1}^n p_i^0 q_i^0 = \sum_{i=1}^n s_i^0 = S_n^0 \quad (3)$$

and the numerator can be calculated by the formula:

$$S_n^{01} = \sum_{i=1}^n p_i^1 q_i^0 \quad (4)$$

Then the value index, average price index and quantity index for a list of n products are calculated with formulas:

$$I_n^S = \frac{S_n^1}{S_n^0} \quad (5)$$

$$I_n^P = \frac{S_n^{01}}{S_n^0} \quad (6)$$

$$I_n^Q = \frac{I_n^S}{I_n^P} \quad (7)$$

Disaggregation: total indices for a group of k products and a group of other $(n - k)$ products.

For a group of k products ($k < n$), initially known: $s_j^1, s_j^0, q_j^1, q_j^0, j = 1, 2, \dots, k$. To determine FT-indices using formulas (2) - (4), we calculate the required total parameter values for $n = k$, and then the final value index, the average price index, and the quantity index for the group using formulas (5) - (7) for $n = k$.

For the group of other $(n - k)$ goods, the total values of formulas (2) - (4) – necessary for calculating the three indices – are defined as the difference between the corresponding amounts for n and k goods. Then, the value index, the average price index, and the quantity index for the remaining $(n - k)$ goods are calculated according to formulas (8) - (10):

$$I_k^S = \frac{S_k^1}{S_k^0} = \frac{(S_n^1 - S_k^1)}{(S_n^0 - S_k^0)} \quad (8)$$

$$I_k^P = \frac{S_k^{01}}{S_k^0} = \frac{(S_n^{01} - S_k^{01})}{(S_n^0 - S_k^0)} \quad (9)$$

$$I_k^Q = \frac{I_k^S}{I_k^P} \quad (10)$$

Using the formulas (1) - (10), we calculated the indices in Table 2.

Initial Data

The interval of presentation of all indicators is 2015-2018. The study simultaneously used the United Nations database (UN COMTRADE, 2019; general asymmetry) and the database of the Federal Customs Service of the Russian Federation (FCSR, 2019; main goods). Note that the data from the two indicated databases are identical, while possible minor deviations are associated with technical adjustments at the level of national statistical services, which are not always promptly reflected in the UN COMTRADE database.

RESULTS AND DISCUSSION

The Asymmetry of Mirror Statistics of the Czech Republic and Russia for APF

Mirror comparison of the data of export and import of Czech goods to the Russian market is presented in Table 1.

The comparison of the overall results shows that from 2015 to 2018 shows the total Czech exports to Russia (FOB prices minus Czech statistics) were higher than the volumes of Russian imports from the Czech Republic (CIF prices minus FCS of the Russian Federation) by 11% on average. This unnatural asymmetry of data indicates problems with errors

in reporting and determining the customs value of goods that may mask shadow operations, taxes minimisation, and capital flight, which requires additional analysis by both statisticians and customs officers should it reach critical volumes.

Table 1. Mirror comparison of APF trade data

HS	CIF: Russian import from the Czech Rep.			FOB: Czech export to Russia			CIF/FOB		
	2015	2017	2018	2015	2017	2018	2015	2017	2018
	thous USD			thous USD					
Total	2 679 134	3 216 554	3 775 324	3 199 490	3 539 595	4 116 618	84%	91%	92%
01-24	100 324	125 876	156 776	95 556	115 661	143 593	105%	109%	109%

Source: own elaboration of data from UN COMTRADE (2019).

In contrast to the overall results, a mirror comparison of APF trade data (Table 1) shows a generally normal situation with an average valuation excess of CIF prices over FOB by 6-7%, which is comparable to the ratio of 1.0588 of the Central Bank of Russia for calculating the balance of payments (BOPR-C, 2018). Noteworthy, focus on a specific APF product group allowed us to find a positive result for the asymmetry of mirror data.

Thus, we may conclude that the use of import statistics of the Federal Customs Service of the Russian Federation for the analysis of mirror data on the Czech APF trade in the Russian market is generally possible in view of methodologically permissible differences in data.

Czech Exports in the Mirror of Russian Statistics: Main APF Goods and Trade Development Prospects

According to the statistics (Figure 1), Russian APF import from the Czech Republic in 2018 reached the maximum pre-crisis level – before the introduction of Russian countersanctions for the EU countries in August 2014 – and exceeded it.

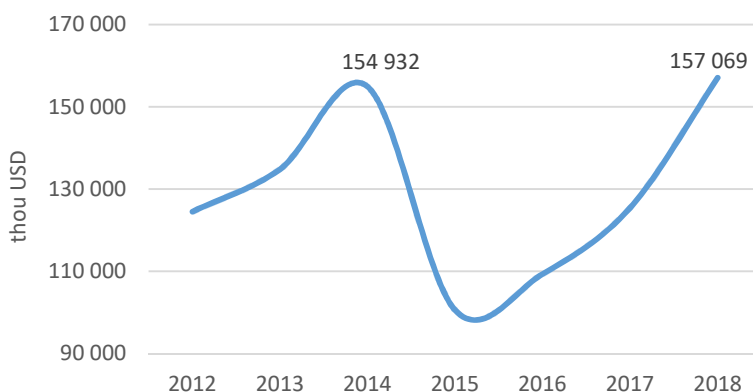


Figure 1. Russian APF import from the Czech Republic

Source: own elaboration of the FCSR data (2019).

We will analyse the dynamics of the commodity structure of Czech APF supplies to the Russian market in 2015-2018 after the introduction of Russian countersanctions.

Main APF Goods and the Top Three Products

To analyse trends and patterns of Czech APF exports to the Russian market, we selected the interval 2015-2018; that is, the period after the introduction of Russian sanctions on agricultural products against EU countries. Based on the data of the Federal Customs Service of the Russian Federation, we compiled a list of imports of Czech APF goods to Russia, which includes 29 products (sample depth 98.6% for 2018). Using the aggregation method described above, total indices were calculated for 29 main goods, including the group of 12 goods with the largest share of value, but also for other goods (Table 2).

As Table 2 reveals, the centre of trade interests of Czech APF exports to Russia concentrates on the group of the main 12 goods (94% of the total in 2018). Deliveries of these goods had an upward growing dynamic (all indices are more than one) and for 2015-2018 they increased in value on average by 1.7 times (by 62 million USD), based on rising prices and physical volumes by 16% and 48%.

It should be noted that almost 3/4 of the growth in exports was achieved due to the three leading products: beer, animal feed, birds' eggs. By 2018, their share amounted to 2/3 of the export volume (Figure 2).

Let us consider these products in more detail in increasing order of importance. FCSR mirror statistics of imports allows us to analyse the position of Czech goods on the Russian market in comparison with similar goods imported from other countries. We should note that Czech export statistics do not have such data for comparative analysis.

The third place – position 0407, birds' eggs – after 2015 increased sales volumes by 23% with a slight decrease in prices (by 3%) and an increase in natural supplies (by 27%). However, already in 2018, while maintaining the growth in value (by 13%), a noticeable increase in prices (by 19%) was recorded with a decrease in natural supplies (by 4%). However, Russian statistics on imports of these products from other non-CIS countries (Table 3) shows that among the four non-CIS countries with a market share of more than 75%, Czech products have the lowest price, despite its growth from 3.44 to 4.10 USD/kg.

This means that the prospects for trading in the birds' eggs market for the Czech Republic are stable: the market share is high – second or third place among non-CIS countries – while prices are lower than most of competitors' prices. In the future, one should pay attention to the increase in natural supplies while prices continue to rise; possibly to the leader level of the Netherlands 4.28 USD/kg and then to the average non-CIS price of 5.59 USD/kg.

The second place – position 2309, animal feed – increased trade volume for 2015-2018 more than twofold, while the price and natural supplies increased by 10% and 1.9 times, respectively. Although the price slightly decreased for this position (by 7%) in 2018, the increase in natural supplies by almost 20% ensured an increase in trade volume by 12%. In this case, the assortment is probably changing towards cheaper and more demanded types of feed. However, this conclusion is not certain.

Russian statistics on imports of animal feed suppliers from non-CIS countries show an increase in average prices from 1.83 to 1.99 USD/kg. As Table 4 reveals, feed prices in 2018 rose in all countries on the list, except for the Czech Republic. This is a hint to Czech marketers from the Russian market: it is possible and necessary to increase the price up to the level average for the market (1.99 USD/kg) and even higher.

Table 2. Russian APF import from the Czech Republic: the set of main goods with the largest share of value

HS	Product groups, products	2015		2018		2018-2015, thou USD	Indices 2018/2015			Indices 2018/2017		
		Value, thou USD	Share	Value, thou USD	Share		price	volume	value	price	volume	value
01-24	Agricultural products and foodstuffs	100 532	100%	157 069	100%	56 537	–	–	1.562	–	–	1.252
29	main goods	96 794	96.3%	154 930	98.6%	58 136	1.151	1.390	1.601	1.093	1.153	1.260
	- 12 main goods with the largest share of value	85 760	85.3%	147 868	94.1%	62 108	1.162	1.483	1.724	1.092	1.170	1.277
2203	Beer	14 570	14.5%	36 629	23.3%	22 059	0.976	2.575	2.514	1.046	1.470	1.538
2309	Animal feed	17 056	17.0%	34 769	22.1%	17 714	1.099	1.855	2.039	0.932	1.197	1.116
0407	Birds' eggs	21 308	21.2%	26 204	16.7%	4 896	0.969	1.269	1.230	1.194	0.949	1.133
1207	Other oil seeds and oleaginous fruits	11 618	11.6%	18 193	11.6%	6 574	1.700	0.921	1.566	1.684	0.927	1.562
2208	Spirits, liqueurs and other spirituous, beverages	3 596	3.6%	5 708	3.6%	2 112	1.099	1.444	1.587	0.990	1.113	1.102
1905	Pastry, cakes, biscuits and other bakers'wares	2 016	2.0%	5 330	3.4%	3 313	1.218	2.170	2.643	0.741	2.644	1.959
2106	Reparations not elsewhere specified or included	3 723	3.7%	5 088	3.2%	1 365	1.433	0.954	1.367	0.687	1.805	1.241
1704	Sugar confectionery (including white chocolate)	3 684	3.7%	3 847	2.4%	163	1.258	0.830	1.044	1.151	0.937	1.078
1210	Hop cones	2 778	2.8%	3 832	2.4%	1 054	1.360	1.014	1.379	1.112	0.765	0.851
1302	Vegetable saps and extracts	1 564	1.6%	3 689	2.3%	2 125	1.528	1.544	2.359	0.966	1.777	1.717
1107	Malt; whether or not roasted	3 525	3.5%	2 925	1.9%	-600	0.962	0.862	0.830	1.039	0.862	0.896
2202	Waters mineral and aerated	323	0.3%	1 656	1.1%	1 333	1.180	4.348	5.129	1.166	2.439	2.844
	- other 17 main goods	11 034	0.3%	7 063	1.1%	-3 972	1.064	0.601	0.640	1.112	0.883	0.982

Source: own elaboration of the FCSR data (2019), using formulas (1)-(10).

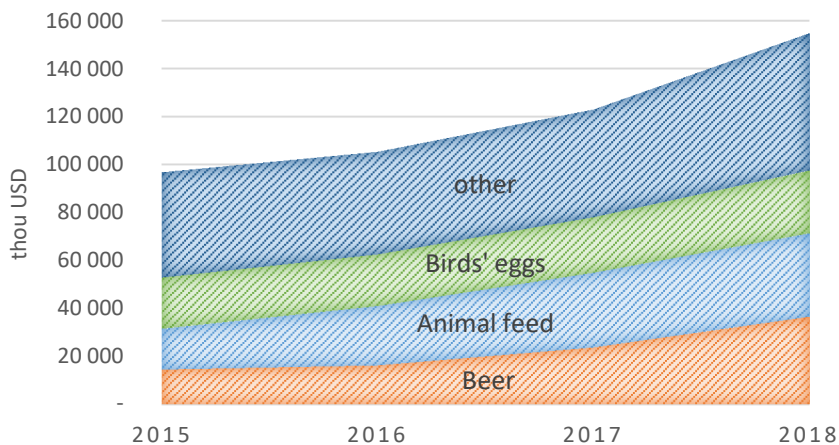


Figure 2. Czech APF in the Russian market: The top three products

Source: own elaboration of the FCSR data (2019).

Table 3. The Russian birds' eggs market: main supplies from non-CIS countries

Groups of countries, countries	thous, USD	Price, USD/kg	Share (vol.)	thous, USD	Price, USD/kg	Share (vol.)
	2017			2018		
	0407 Birds' eggs					
non-CIS	178 561.3	5.28	100.0%	214 658.4	5.59	100.0%
NL	49 055.9	3.94	36.8%	60 308.6	4.28	36.7%
DE	33 516.4	5.43	18.3%	39 028.3	5.89	17.2%
CZ	23 127.1	3.44	19.9%	26 203.6	4.10	16.6%
FR	26 828.3	12.17	6.5%	23 031.8	13.17	4.6%
Other	46 033.6	7.38	18.5%	66 086.1	6.90	24.9%

NL – Netherlands; DE – Germany; CZ – Czech Republic; FR – France.

Source: own elaboration of the FCSR data (2019).

In general, the prospects for growth in the supply of Czech animal feed on the Russian market are not disturbing. Czech producers use modern technology for the manufacture of animal feed, up to the premium segment. These products are in demand and have no Russian counterparts that can satisfy domestic demand.

The first place takes the leader of the APF trade – Czech beer – whose supplies value for 2015-2018 generally rose 2.5 times, with an increase in natural volumes of 2.6 times and a slight decrease in prices (by 2%). We note that in 2018 an average price increase of 5% was recorded with a good increase in natural supplies (1.5 times). The indicated quality of dynamics (all indices are more than one) indicates a steady increase in the competitiveness of Czech beer in the Russian market.

Russian statistics on beer imports from non-CIS countries recorded the Czech Republic's second place in this market with a share of natural supplies in 2018 of 16%. The first and third places were occupied by Germany and Belgium (44% and 9% respectively). As Table 5 shows, the average price of beer from non-CIS countries in 2018 decreased by 4

cents to 1.05 USD/L, including German and Belgian reduction of beer prices by 6 cents, respectively, to 0.97 USD/L and 9 cents to 1.3 USD/L.

Table 4. The Russian market of animal feed: main deliveries from non-CIS countries

Groups of countries, countries	thous, USD	Price, USD/kg	Share (vol.)	thous, USD	Price, USD/kg	Share (vol.)
	2017			2018		
	2203 Beer made from malt					
non-CIS	167 629.6	1.09	100.0%	267 572.7	1.05	100.0%
DE	64 550.6	1.03	40.9%	108 639.3	0.97	44.1%
CZ	23 814.3	0.88	17.6%	36 629.1	0.92	15.6%
BE	20 763.4	1.39	9.7%	30 479.1	1.30	9.2%
LT	5 513.1	0.69	5.2%	10 787.1	0.70	6.0%
GB	10 127.5	1.36	4.8%	15 202.0	1.41	4.2%
Other	42 860.7	1.28	21.7%	65 836.1	1.25	20.8%

FR – France; DE – Germany; IT – Italy; NL – Netherlands; DK – Denmark; CN – China; CZ – Czech Republic; NO – Norway.
Source: own elaboration of the FCSR data (2019).

Table 5. Russian beer market: main deliveries from non-CIS countries

Groups of countries, countries	thous, USD	Price, USD/kg	Share (vol.)	thous, USD	Price, USD/kg	Share (vol.)
	2017			2018		
	2309 Animal feed					
non-CIS	686 911.1	1.83	100.0%	727 080.4	1.99	100.0%
FR	100 495.2	1.99	13.5%	103 758.2	2.28	12.5%
DE	76 989.7	1.71	12.0%	66 319.5	2.02	9.0%
IT	53 292.2	1.68	8.4%	56 169.0	1.89	8.2%
NL	56 491.0	1.94	7.7%	52 222.3	1.98	7.2%
DK	41 987.7	1.43	7.8%	42 185.7	1.58	7.3%
CN	26 658.4	1.11	6.4%	35 396.0	1.47	6.6%
CZ	31 160.1	1.88	4.4%	34 769.1	1.75	5.4%
NO	8 432.3	1.43	1.6%	34 640.7	1.46	6.5%
Other	291 404.5	2.04	38.1%	301 619.9	2.22	37.3%

DE – Germany; CZ – Czech Republic; BE – Belgium; LT – Lithuania; GB – Great Britain.
Source: own elaboration of the FCSR data (2019).

At the same time, the price of Czech beer grew by 4 cents to 0.92 USD/L. As a result, the price gap between Czech and German beer was reduced to 5 cents (in 2017, it equalled 15 cents), which is quite risky and does not correspond to the current dynamics and price structure in the beer market.

According to our estimates, the demand for original Czech beer in the Russian market will continue a growth tendency in both the number of deliveries and prices, since the closest competitors from non-CIS countries still have a price gap for Czech beer. Moreover, it is possible to recommend the supply expansion of premium Czech beer. Judging by the prices for German and Belgian beer, the Russian market is ready to pay more for high-quality original beer brewed and bottled in the Czech Republic.

Furthermore, for group 2203 (beer) the calculations show that the coefficient of deviation of value indicators of mirror data to be higher than permissible values: 1.17 and 1.13

in 2017 and 2018, respectively, instead of the average norm of 1.05. Since beer tops the list of main products (see Table 2), we continued to analyse mirror statistics to discover the possible reasons for this asymmetry.

The Analysis of the Asymmetry of Mirror Data by Quantity on the Example of Beer

The Czech Republic is proud of its national drink, and Czech beer is famous around the world. Moreover, since January 2008, “Czech beer” is a protected designation of the European Union (PGI; protected geographical indication). This mark is considered to be intellectual property and is protected by the EU law in order to preserve the good name and quality of beer produced in the Czech Republic. Moreover, the entry of the designation “Czech beer” in the EU registry provides an opportunity to protect the traditions of Czech brewing and production technology, not to mention prevent the emergence of fakes that breweries could sell as Czech beer and, thereby, abuse the unique qualities of the original product (CAFIA, 2019).

According to the EU protected designation, “Czech beer cannot be considered a product made in the Czech Republic in an unconventional way or produced in the traditional way, but abroad” (Czech beer, 2008). As explained by the Czech Ministry of Agriculture regarding the PGI designation, “the purpose of certification was to clearly identify the specifics of the product under the name “Czech beer”. Excluded were drinks made according to the traditional recipe, but not in the Czech Republic, as well as drinks made in the Czech Republic without following the classic recipe” (Our brand, 2009).

Let us analyse the data of mirror statistics for beer. Obviously, when comparing mirror flows, the norm is considered to be an almost complete coincidence of the physical volumes of supplies; a slight difference may be due to possible losses during transportation.

A comparison of Czech exports to Russia (Czech statistics) and Russian imports from the Czech Republic (Russian statistics) on beer in physical terms (in litres) revealed by the following results (Table 6).

Table 6. Mirror comparison of Czech beer data (in litres)

Commodity flows	2015	2017	2018
Russian import from the Czech Republic	15 437 391	27 061 624	39 750 351
Czech export to Russia	15 226 590	24 216 116	37 434 856
Import / Export	101%	112%	106%
Import - Export	210 801	2 845 508	2 315 495

Source: own elaboration of the UN COMTRADE data (2019).

As follows from Table 6, the import of Czech beer to Russia from the Czech Republic was higher than the Czech export of these volumes to the Russian market: in 2015, 2017, and 2018 by 1%, 12%, and 6%, respectively. This unnatural asymmetry of the data indicates that along with the original Czech beer from the Czech Republic, “Czech beer” was also imported to the Russian market from other countries, and the amount of this beer is growing year to year. Over the past two years, the volume of supplies of “Czech beer” not from the Czech Republic generally exceeded the mark of 2 million litres per year and fixed at this level.

Deliveries of goods from one country to another through other countries – including for sale – are not prohibited and are called re-exports. In the final country, according to the methodology of customs statistics and the rule of the country of origin, these goods are

attributed to imports from the first country; in our case, Russian customs refer the volumes of beer re-export to imports from the Czech Republic to the Russian Federation. We do not question the figures of Russian statistics on beer, since these figures are repeatedly checked by the customs and tax authorities of the Russian Federation in the process of calculating customs duties, excise tax, and VAT. Czech statistics do not see these volumes. From this we can conclude that the volume of Czech beer exports to Russia is underestimated in Czech statistics by at least 2 million litres due to the neglect of re-export.

Marketing Strategies for Expanding International Sales at Special Market Prices and Mirror Asymmetry

It is known that re-export often occurs due to the fault of the manufacturer itself, as a result of the implementation of a regional marketing strategy with a special reduction in prices to expand sales and consolidate in the new market; in our case, one of the EU countries. A future re-exporter buys this product and exports it abroad (in our case, to Russia). At the same time, the manufacturer-supplier of goods at a special price may not even know about the existence of a re-exporter. The manufacturer-supplier will report on the successful implementation of the strategy and expand sales in the regional market (EU country), while the re-exporter will also expand his business and be proud of his personal sales success; in our case, in the Russian market. As a result, it is precisely on the Russian market that two sellers of the same product compete, while a re-exporter has more opportunities to lower prices on this market than the original manufacturer. It is practically impossible to counteract such unfair competition, since the re-exporter legally acquired the goods and legally supplies them for export. There is only one exception: if a beer has an Intellectual Property (IP) marking – registered trademark, including the one protected in the EU by the PGI designation or similar – it is equivalent to a trademark in the legislative area. Thus, in the absence of permission from the copyright holder, re-export turns into parallel imports, the counteractions of which are quite well known, including in judicial practice. In this case, the copyright holder may hold the seller liable for the sale of goods without his consent to the export ban and significant fines (Losev, 2019).

Therefore, the marketing services of Czech beer producers in the Czech Republic must take into account the indicated features of the Czech beer trade with IP-marking when preparing plans (marketing strategies) for expanding regional sales with a special price for the product.

For beer without an IP marking, low prices can provoke the organisation of re-export of goods, including with unfair competition in the foreign market of the same product. In this case, it is almost impossible to identify a re-exporter and oppose re-export, which is what Czech producers must take into account up to and including refusal of such trading schemes. For beer with an IP marking, the actions of the re-exporter are unlawful – they violate intellectual property rights – and can be classified as the organisation parallel import by unauthorised copyright holders. Here, re-export can be suppressed by customs and prohibited by the court. On the Russian market for beer in particular, the IP marking (PGI Czech beer) should be included in the register of intellectual property of the FCS of the Russian Federation. So far as we know, this is not the case, and PGI Czech beer intellectual property rights are not protected on the Russian market.

At the same time, large international companies provide legal protection for parallel imports through registered brands and trademarks. For example, in Russia, lawsuits by

Heineken (the owner of the Krušovice brand) were satisfied against parallel importers of Krušovice beer to the Russian market with compensation for losses and the prohibition of importing beer without permission from the Heineken copyright holder (Parallel import, 2013). However, small Czech breweries that produce PGI-labelled beer should also be able to protect their Intellectual Property (IP) when exporting to the Russian market. So far, PGI marking as an IP-object for markets outside of the EU remains a decoration element.

The Czech state should not remain aloof from the problems of national business and provide assistance in registering and maintaining the PGI-marking Czech beer on the Russian market. The Czech state should work to activate the intellectual property factor when exporting Czech PGI beer to the market of the EAEU countries (Russia, Belarus, Armenia, Kazakhstan, and Kyrgyzstan), so that the Czech national world-quality product can earn more revenue for both the state and producers-copyright holders of the PGI-marking, through which the traditions and technologies of unique Czech brewing are legally protected and supported.

Thus, we achieved the goal of the study. We showed the possibilities of using mirror statistics to identify export problems of APF to the Russian market. Within the framework of the study, we proved the methodological acceptability of using mirror statistics for research tasks and conducted an analysis of the supply of the most important Czech APF products to Russian market. We developed recommendations for expanding their sales taking into account prices for similar products imported to the Russian market from other countries were developed. Moreover, the study identified a new problem of beer (trade leader) re-export at the macro level, investigated its root causes, and prepared recommendations for Czech statistics: the need to adjust statistics and increase beer export volumes to Russia by taking re-export into account. Moreover, we formulated recommendations to expand trade in the Russian market for business and trade policies based on the reinforcement of the role of the intellectual property factor.

The conducted research is original. Prior to this research, there were no studies that would use mirror statistics as an additional database and tool for identifying export problems unobserved by national statistics.

CONCLUSIONS

The analysis of a country's exports is traditionally based on national statistics. However, the analysis of the same stream on the basis of the host country's mirror statistics in the form of its imports is no less important.

In mirror statistics, the export of goods from one country to another should theoretically be equal to the import of goods to the latter country from the former one, and vice versa. However, the mentioned trade volumes usually differ in practice. The asymmetry of the data is due to the difference in prices of the recorded flows. As is known, according to the customs statistics methodology, the value of exporting goods of country A is represented in FOB prices, while that of imported goods – at CIF prices, which additionally includes the costs of insurance and transportation of goods. Moreover, the asymmetry of mirror data can also be associated with various errors in determining the customs value, masking shadow operations and capital flight.

Currently, the general view of expert statisticians on the accuracy of data collected by customs offices is that import data are more reliable than export data, because customs services are more serious about recording imported goods for the purpose of tariff

revenue collection, taxes, etc. This fact was confirmed by us on the example of the import of Czech APF goods to the Russian market. The mirror comparison of APF trade data showed a generally normal situation with an average valuation excess of CIF prices over FOB by an average of 6%, which is comparable to the ratio of 1.0588 of the Central Bank of Russia for calculating the balance of payments for non-CIS countries. Based on the results, we concluded that – taking into account the methodologically permissible differences in the mirror data – statistics on Russian imports can be used to analyse the export of Czech APF goods to the Russian market.

To analyse the supply of Czech APF to the Russian market, we proposed algorithms for aggregating and disaggregating FT-indices based on the Laspeyres formula. The aggregation algorithm allows us to calculate the total FT-index, including by the group of goods. The disaggregation algorithm allows for the isolation of additional groups of goods and the calculation of group indices by recounting the remaining aggregated indices without involving goods outside of the selected group.

For the 2015-2018 interval, using the database of the Federal Customs Service of the Russian Federation, we compiled a list of 29 main products (sample depth 99%) and their FT-indices, including the indices of the 12 main products (94%) with the highest weight and the top three (62 % of trade).

The analysis showed that the Czech Republic in APF trade in 2018 could achieve and overcome the historical maximum of trade in 2014; i.e. after the introduction of Russian countersanctions on agricultural products in August 2014. The basis of growth was formed by the upward (increasing) dynamics of supply growth: FT-indices of the group of 12 main goods were more than one, i.e. the increase in the value of supplies of the group was ensured by a simultaneous increase in prices and natural supplies. Herewith, the top three in four years provided more than 70% of the increase in the value of APF supplies to the Russian market.

For the three leaders, we conducted a market analysis of similar goods supplied from non-CIS countries and formulated recommendations on trade development. Thus, for position 0407 (birds' eggs), we noted that it holds one of the lowest prices among competitors in the market and recommended the further increase of trade volumes on the basis of rising prices that are below the average market price. The dynamics of supply growth at position 2309 (animal feed) is not a concern. However, the analysis showed that prices for all suppliers are rising, while prices for Czech products in 2018 fell below the average market level. Therefore, we recommended to increase trade volumes on the basis of rising prices and expanding the supply of premium feeds in demand on the Russian market, the production technologies of which have been mastered in the Czech Republic. For position 2203 (beer), the quality of supply growth (all indices are greater than one) indicates a growing demand for products. The price of Czech beer is lower than the market average and the prices of the closest competitors from Germany and Belgium, so they can be increased, since the Russian consumer is willing to pay more for the original Czech beer.

In conclusion, mirror data comparison of beer in litres showed that beer exports from the Czech Republic were significantly lower than Czech imports registered by Russian customs. First of all, this difference in mirror data reveals that Czech beer exports to Russia in the Czech statistics are underestimated by at least 2 million litres, due to the neglect of re-exports (in volumes in litres, re-export flow is comparable to beer trade in countries such as

Finland, Netherlands, Austria, or Poland). These deliveries pose a real threat of unfair competition on the Russian market for the same product at different prices from a direct supplier and the re-exporter who legally bought the product on the market of one of the EU countries with a special reduced price. Czech companies can only protect themselves from such re-export schemes if the beer has an IP-marking registered on the Russian market.

For business, we recommend to form special prices for external markets taking an unfair competition into account, while developing marketing strategies. In the case of uncontrolled sales strategies, there is a high risk of overall losses due to the re-export of cheaper beer. If there is a registered intellectual property trademark (PGI-mark), one should apply the possibility of legislative restriction and prohibition of deliveries to the Russian market due to the lack of permission of the manufacturer-holder of the intellectual property trademark.

For trade policy, we deem necessary state-level action aiming to enhance the intellectual property factor in the production and export of Czech beer – assistance in registering trademarks and PGI-marking Czech beer on the Russian market – so that Czech beer producers who use traditional technologies can get fair profit for the quality of their goods and have the opportunity to defend themselves against unfair competition in export.

In our opinion, an analysis of the post-sanctioned development of APF trade in the countries of the Visegrad Group – in which Poland occupies the first place in terms of trade volume – could be an interesting area for future research.

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