

The analysis of trade relations of Russia with Germany and France

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Abstract—The subject of the study is the trade relations between Russia and Germany and France in the conditions of sluggish global recession and long-term sanctions pressure on the Russian economy. The purpose of the study was to identify commodity clusters that ensure the stability of commodity relations. The source of the estimated statistical indicators is the information of the Federal customs service of the Russian Federation, and the method is the cluster analysis of the commodity agglomeration for export and import. The study identified the optimal clusters of commodity relations between Russia, Germany and France. It is shown that the trade turnover between Russia and Germany in the commodity cluster "Mineral fuel, oil and their distillation products; bituminous substances; mineral waxes" is a fundamental factor in the formation of trade relations for the EU countries. France, as a member of the European Union, will adhere to the structure of trade turnover in Germany, including through the fragmentation of saturated commodity clusters. In the context of increasing US sanctions pressure, Russia will ensure its existence in its traditional role as a "raw materials appendix" to the European Union, keeping trade relations with Germany.

Keywords—import, cluster analysis, system, structure, commodity agglomeration, turnover, export, efficiency.

I. INTRODUCTION

Considering the trade relations between Germany and Russia, it should be noted that historically they have been fundamental in shaping the fate of Europe. In the European context, trade relations between Germany and Russia have become the basis of international relations between the EU and Russia. However, during 2012 – 2013 the continuity of Germany's policy towards Russia, aggravated by the Ukrainian crisis, was regarded as completed [1]. Moreover, the share of the least traded imports from the EU and Russia began to diverge (the EU share is growing, and Russia is declining) [2]. According to the Federal customs service (FCS) of the Russian Federation, Russia's trade with Germany for the period 2016 – 2018 will amount to \$116.7 billion, the main article on HS "Mineral fuel, oil and their distillation products; bituminous substances; mineral waxes" – 24% and "Secret code" – 21%. At the same time, exports from Russia to Germany is \$60.9 billion ("Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes" – 46% and "Secret code" – 40%), and

imports to Russia from Germany – \$248 million ("Secret code" – 100%).

Turnover trade between Russia and France on HS "Secret code" is \$12.4 billion (100%), exports and imports – by \$6.2 billion respectively. Consequently, Germany is a key importer of Russian goods under the FEACN "Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes" [3, 4], but it's second to France in the export of goods to Russia under the FEACN "Secret code" [5].

To increase the efficiency of trade turnover, taking into account the advantages of French exports to Russia and Russian imports to Germany, it is necessary to identify the optimal commodity groups. To assess and analyze trade relations between Russia, Germany and France, a new approach based on cluster analysis of commodity groups is needed [6]. Assessment is based on projected figures of Federal customs service of Russia (FCS) in 2019.

II. METHODS

To analyze the trade relations of Russia with Germany and France we used the hierarchical cluster analysis [7], with correlation of the estimated indicators on measuring objects [8].

Despite the variety of clustering methods (similarities or distances (Euclidean distance, squared Euclidean distance, city-block (Manhattan) distance, Chebychev distance, power distance, Mahalanobis distance, etc.) the criterion squared Euclidean distance was chosen to form clusters between objects. In this case, the association algorithm does not depend on whether the studied distances are actually real distances or some other derivative measure of the distance more significant for a researcher. That is, the researcher must choose the correct method for his specific case [9].

III. ANALYSIS

Agglomeration of indicators of Russian imports. To agglomerate indicators of Russian imports from Germany and France, based on the cluster analysis let's try to carry out the ranking of products and groups of products according to the projected figures of the Russian Federal customs service for 2019, (Table 1).

TABLE I. RANKING OF RUSSIAN IMPORTS

Germany		Place	France	
Goods and commodity groups	USD		Goods and commodity groups	USD
Nuclear reactors, boilers, equipment and mechanical devices, their parts	8538315877.18	1	Nuclear reactors, boilers, equipment and mechanical devices, their parts	1608113244.57
Means of land transport, except for railway or tram rolling stock, and their parts and accessories	4866686501.57	2	Pharmaceutical products	1072693529.94
Pharmaceutical products	2902697619.82	3	Essential oils and resinoids; perfumery, cosmetics or toiletries	1047643807.07
Electric machines and equipment, their parts; sound recording and sound reproducing equipment, equipment for recording and reproduction of television image and sound, their parts and accessories	2157125435.25	4	Means of land transport, except for railway or tram rolling stock, and their parts and accessories	713376337.83
Plastics and plastic products	2046876921.58	5	Other chemical products	514078774.08
...
Special fabrics; tufted textile materials; lace; tapestries; edgings; embroideries	1289220.49	78	Other vegetable textile fibers; paper yarn and paper yarn fabrics	82918.20
...		
Manufactures of straw, of Esparto or of other plaiting materials; basketware and wickerwork	53215.06	87		

Note to the table: Germany on HS includes 87 items, France – 78. All items can be determined according to the Federal customs service of the Russian Federation.

Source: Ranking is based on the figures of "Statistics of foreign trade of Russia. Federal customs service of the Russian Federation. URL: <http://data.trendeconomy.ru>

The cluster analysis of Russian import indicators concerning the trading partners of Germany and France

revealed clusters with a high order of commodity agglomeration (Table 2).

TABLE II. CLUSTERS OF RUSSIAN IMPORTS

Germany		Place	France	
Nuclear reactors, boilers, equipment and mechanical devices, their parts	Pharmaceutical products Means of land transport, except for railway or tram rolling stock, and their parts and accessories			Nuclear reactors, boilers, equipment and mechanical devices, their parts
Pharmaceutical products	Other chemical products		Means of land transport, except for railway or tram rolling stock, and their parts and accessories	Optical, photographic, cinematographic, measuring, control, precision, medical or surgical instruments and apparatus, their parts and accessories
	Optical, photographic, cinematographic, measuring, control, precision, medical or surgical instruments and apparatus, their parts and accessories			Other chemical products
	Electric machines and equipment, their parts; sound recording and sound reproducing equipment, equipment for recording and reproduction of television image and sound, their parts and accessories			Paper and cardboard; items of paper or cardboard Ferrous metal products
Other chemical products	Tools, implements, Cutlery, spoons and forks of base metal, their parts of base metal		Other chemical products	Plastics and plastic products
	Paper and cardboard; items of paper or cardboard			
Tools, implements, Cutlery, spoons and forks of base metal, their parts of base metal	Protein substances; modified starches; adhesives; enzymes		Paper and cardboard; items of paper or cardboard	Aluminium and aluminium products
	Alcoholic and non-alcoholic beverages and vinegar			
	Other items of base metals			

Note to the table: the cross-group relation is the square of the Euclidean distance. The ratio of Metropolitan area > 1E+15.

Source: calculations are based on figures from "SPSS Statistics 22" based on "Statistics of foreign trade of Russia. Federal customs service of the Russian Federation. URL: <http://data.trendeconomy.ru>

Agglomeration of indicators of Russian exports. To agglomerate indicators of Russian exports to Germany and France, based on the cluster analysis, carry out the ranking

of products and groups of products according to the forecasts for 2019, the Federal customs service of Russia (Table 3).

TABLE III. RANKING OF RUSSIAN EXPORT

Germany		Place	France	
Goods and commodity groups	USD		Goods and commodity groups	USD
Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes	26786548444.39	1	Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes	5928079805.82
Ferrous metals	674264749.08	2	Nuclear reactors, boilers, equipment and mechanical devices; their parts	134500759.63
Copper and copper products	396889050.72	3	Wood and items of wood; wood charcoal	95906196.60
Optical, photographic, cinematographic, measuring, control, precision, medical or surgical instruments and apparatus, their parts and accessories	343553816.61	4	Ferrous metals	78914726.20
Wood and items of wood; wood charcoal	320095747.59	5	Organic chemicals	75227671.57
...
Cocoa and its products	10901565.70	36	Headgear and their parts	32553.30
...
Works of art, collectibles and Antiques	122134.93	63		

Note to the table: Germany on HS includes 63 items, France – 36. All items can be determined according to the Federal customs service of the Russian Federation.
Source: Ranking is based on the figures from "Statistics of foreign trade of Russia. Federal customs service of the Russian Federation. URL: <http://data.trendeconomy.ru>

The cluster analysis of Russian import indicators concerning the trading partners of Germany and France

identified clusters with a high order of commodity agglomeration (Table 4).

Table 4 Clusters of Russian export

Germany		Place	France	
Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes	Ferrous metals			Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes
Ferrous metals	Copper and copper products		Nuclear reactors, boilers, equipment and mechanical devices, their parts	Rubber and rubber products
Copper and copper products	Aluminium and aluminium products		Rubber and rubber products	Wood and items of wood; wood charcoal
	Optical, photographic, cinematographic, measuring, control, precision, medical or surgical instruments and apparatus, their parts and accessories		Other base metals, cermets, their products	
Aluminium and aluminium products	Furniture, bedding, mattresses, mattress bases, sofa cushions and similar stuffed furniture accessories; lamps and lighting equipment, not named or included elsewhere; light signs, light plates with names		Other base metals, cermets, their products	Furniture, bedding, mattresses, mattress bases, sofa cushions and similar stuffed furniture accessories; lamps and lighting equipment, not named or included elsewhere; light signs, light plates with names
	Electric machines and equipment, their parts; sound recording and sound reproducing equipment, equipment for recording and reproduction of television image and sound, their parts and accessories			Electric machines and equipment, their parts; sound recording and sound reproducing equipment, equipment for recording and reproduction of television image and sound, their parts and accessories
	Plastics and plastic products			
	Ores, slag and ash			

Note to the table: the cross-group relation is the square of the Euclidean distance. The ratio of Metropolitan area > 1E+14.
Source: calculations are based on figures from "SPSS Statistics 22" based on "Statistics of foreign trade of Russia. Federal customs service of the Russian Federation. URL: <http://data.trendeconomy.ru>

IV. DISCUSSION OF RESULTS

The results of ranking (see Table 1) and cluster analysis (see Table 2) of Russian imports showed the same "leadership" of commodity clusters in Germany and France – "Nuclear reactors, boilers, equipment and mechanical devices, their parts" and "Pharmaceutical products", "Means of land transport, except for railway or tram rolling stock,

and their parts and accessories". The most saturated commodity clusters are revealed:

- Germany: pharmaceutical products [10]; tools, implements, Cutlery, spoons and forks of base metal, their parts of base metal;
- France: Optical, photographic, cinematographic, measuring, control, precision, medical or surgical instruments and apparatus, their parts and

accessories; nuclear reactors, boilers, equipment and mechanical devices, their parts; means of land transport, except for railway or tram rolling stock, and their parts and accessories.

The commodity agglomeration of Russian imports showed a stable Germany leadership position, which dominates France [11], although France is trying to increase its trade advantages by crushing saturated commodity clusters. In the segment of non-economic relations, in the context of prolonged sanctions pressure [12] and reducing the efficiency of Russian foreign economic activity, France can replace the following commodity clusters: nuclear reactors, boilers, equipment and mechanical devices, their parts [13, 14]; means of land transport, except for railway or tram rolling stock, and their parts and accessories; pharmaceutical products.

Clusters with a high order of commodity agglomeration were identified after ranking (Table 3) and analyzing (Table 4) Russian exports indicators concerning the trading partners of Germany and France:

- Germany – "Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes" and "Ferrous metals»;
- France – "Mineral fuel, oil and products of their distillation; bituminous substances; mineral waxes" and "Nuclear reactors, boilers, equipment and mechanical devices, their parts".

It should be noted Germany and France are cultivating bilateral energy relations with Russia because of a common position on Russian gas dependence [15].

Another rise in oil prices gives Russia the opportunity to diversify export [16, 17]. High-tech exports in the Russian trade turnover are associated with the following saturated commodity clusters (see Table 4):

- Germany: aluminium and aluminium products; optical, photographic, cinematographic, measuring, control, precision, medical or surgical instruments and apparatus, their parts and accessories; furniture, bedding, mattresses, mattress supports, sofa cushions and similar stuffed furniture accessories [18];
- France: nuclear reactors [19], boilers, equipment and mechanical devices, their parts; other base metals, cermet, their products.

The saturation of commodity clusters of Russian exports shows the priorities of development of trade relations with Germany. At the same time, France can receive significant preferences from Russian exports in the following clusters: other base metals, cermet, their products; furniture, bedding, mattresses, mattress bases, sofa cushions and similar stuffed furniture; lamps and lighting equipment, not named or included elsewhere; light signs, light plates with names.

In the context of a sluggish global recession and prolonged sanctions pressure on the Russian economy [20], trade turnover between Germany and Russia is a fundamental factor in the formation of trade relations for the EU countries.

Germany, being the largest importer of Russian gas, determines the content of trade turnover for the EU countries. With all the political and economic wars against Russia, Germany, and the EU countries through it, will develop trade relations at the raw material level despite the further strengthening of sanctions pressure of the United States.

France, within the limits of its economy, will adhere to the structure of German trade turnover. This position will strengthen competition between Germany and France in the Russian commodity market, thereby demonstrating the "imaginary" capabilities of the French economy. Nevertheless, France is trying to increase its trade advantages by breaking up saturated commodity clusters.

V. CONCLUSION

Agglomeration indicators of the Russian exports has confirmed Germany leading position not only on the commodity cluster "Fuel, mineral oils and products of their distillation; bituminous substances; mineral waxes", but on the saturation of commodity clusters. Russia may increase high-tech exports in 2019 to France in the commodity cluster "Nuclear reactors, boilers, equipment and mechanical devices, their parts."

Trade relations between Russia, Germany and France are based on imports of oil and gas from Russia.

Trade relations between Russia, Germany and France are based on imports of oil and gas from Russia. It is primarily due to the lack of high-tech industrial sector in Russia and high dependence on oil and gas revenues.

On the one hand, Germany and France will need Russian supplies of mineral fuel, oil and products of their distillation in the foreseeable future, if it does not find a significant and sustainable alternative applicant. On the other hand Russia has needs in German and French goods, services and direct investment.

The biggest problem of Germany and France is the stability of supply of "Fuel, mineral oils and products of their distillation; bituminous substances; mineral waxes" from Russia. Russia is the reliable supplier for decades. At the same time, the Russian economy stagnation will jeopardize high-tech exports from Germany and France, including by reducing energy imports from Russia.

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