

SPECIFIC FEATURES OF RUSSIA'S INTEGRATION IN GLOBAL AND REGIONAL VALUE CHAINS

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A study of international value chains implies both estimating the scale of involvement of each country in the global economy and analysing the factors that influence the integration of companies based in different countries in value chains. The latter is of special interest due to the necessity to improve the instruments applied in industrial and trade policies in order to create adequate conditions for boosting companies' competitiveness in the world market, so as to ensure growth based on manufactures exports and the development of industry and the services sector. As shown by the results of our analysis, protectionist policy (raised customs tariff, imposition of non-tariff barriers) will have a negative impact on the volume of value added exports. And, on the contrary, the measures conducive to production capacity expansion will promote a country's involvement in the global production chains, which in its turn will boost the volume of value added exports, thus creating incentives for further economic growth.

An integral component of world economy globalization is the deepening cooperation between countries and the formation of international value chains. The development of such chains means that the successive stages of the production process are broken up and distributed between different countries in order to minimize the costs of commodity production at each of these stages. As various links of the production process are divided by state borders, the gross trade flow (gross exports) significantly increases, and this fact cannot be accounted for only by the increasing demand for the end product. So it becomes necessary to analyse the specificities of added value flows in the form of commodities and services, as well as foreign trade. Due to the increasing prominence of the regionalization trends caused by the slowdown in trade liberalization at the global level, the role of the State in creating adequate conditions for a more close involvement of companies in the value chains also becomes more prominent. So, an analysis of the factors influencing a country's involvement in value added chains will help to improve the relevant trade policy measures and instruments.

Global Value Chains Participation Indexes

The estimation of a country's involvement in value chains may be based on a variety of indicators:

- global chains participation index;
- vertical or horizontal integration level;
- national added value share in gross exports;
- competitive advantages index calculated on the basis of value added exports¹.

¹ For further details, see Daudin G., Riffart C. and Schweisguth D. Who produces for whom in the world economy? // Canadian Journal of Economics, Revue canadienne d'économique. Vol. 44. No 4, 2011. P. 1403–1437; Koopman R., Wang Z. and Wei S.J. Tracing value-added and double counting in gross exports // National Bureau of Economic Research. No w18579. 2012; Wang Z., Wei S.J. and Zhu K. Quantifying international production sharing at the bilateral and sector levels // National Bureau of Economic Research. No w19677. 2013.

Not all of these indicators reflect specifically a country's input in value creation in the framework of production chains. Some of them measure its level of dependency on partners in the production of specific commodities and services (for example, if the production of services rendered to end consumers and /or companies requires the use of imported equipment).

Thus, in particular, the global value chains participation index¹ (*Table 1*) describes two 'areas' of a country's involvement in value chains:

- the use, by industry and the services sector of commodities manufactures in other countries, in the production of exported commodities²;
- value added creation in a country for the production of exported commodities for end or intermediate consumption, to be later used by the importer countries in the production of exported commodities³.

On the average, a country's index of integration in global value chains amounts to 57%. The highest integration levels are typically observed in the EU countries (66%), which in part can be explained by the existence of the common internal market; next come the of countries of East and Southeast Asia (56%). The lowest indices are displayed by South Asia and South America (about 38%).

However, the high level of integration of some countries in global value chains (*Table 1*) may also be indicative of their involvement as suppliers of mineral resources – low value added products (resources), which are processed in the partner countries and then exported to other countries. In particular, countries like Russia or Saudi Arabia have high added value shares and relatively low shares of imports in their exports. Countries like Singapore characteristically have a share of imported intermediate components in their exports, which is caused, among other things, also by their specialization on assembly production. The prevalence of the former component over the latter in Japan points to the ample share of manufactured products in that country's value added exports, in particular its specialization in the development and manufacture of hi-tech products. In the case of Germany this index most likely reflects the country's role of an integrator producer, with an active involvement of suppliers from across the globe in its end-product manufacture, including the manufacture of investment products.

The growth of gross exports does not always point to a country's increasing input in the value of a commodity. When analysing the specificities of international trade, it appears necessary to apply the indicators of the volume of added value exports (or imports), expressed in gross exports (or imports) of commodities for intermediate and end consumption.

At the same time, in the analysis of value chains, when its goal is to identify the possibilities and potential for incorporating in these chains the companies operating in a given country, it is essential to give consideration to the by-sector structure of value added exports. Thus, in some countries, the exports of value added created in the services sector takes up a substantial share in their total value added exports⁴ (for example, in Hong Kong and

1 Global Value Chains Participation Index describes the degree of involvement in global supplies chains; calculated by the OECD; see OECD Global Value Chains indicators (Database) – https://stats.oecd.org/Index.aspx?DataSetCode=GVC_INDICATORS

2 Backward or upstream participation – share of imports in exports.

3 Forward or downstream participation – share in exports of those commodities that are used by at least one more country in its production for exports.

4 It should be emphasized that a significant role in the creation of value added exported by a country may be played by the services sector, the latter not necessarily being a direct

Cyprus this index is above 70%; in The Netherlands and Canada – around 55% (Fig. 1)). It should be noted that, in the group of countries under consideration¹, the share of value added in exports over the period from 1995 through 2011 increased in China, Hong Kong, Saudi Arabia, Columbia, Indonesia and Canada.

Table 1

BY-COUNTRY GLOBAL VALUE CHAINS PARTICIPATION INDEXES, 2011

Country	2011	I	II
Luxembourg	70.8	58.9	11.9
Republic of Korea	62.1	41.6	20.5
Singapore	61.6	41.7	19.9
Malaysia	60.4	40.6	19.8
Belgium	57.9	34.4	23.5
Finland	57.3	34.6	22.7
Russia	51.8	13.7	38.1
Germany	49.6	25.5	24.1
China	47.7	32.1	15.6
The Netherlands	47.5	20	27.5
Japan	47.4	14.6	32.8
Mexico	46.8	31.7	15.1
Republic of South Africa	46	19.5	26.5
Saudi Arabia	45.3	3.3	42
Australia	43.6	14.1	29.5
Indonesia	43.5	12	31.5
India	43.1	24	19.1
Canada	42.4	23.4	19
Turkey	41	25.7	15.3
USA	39.9	15	24.9
Brazil	35.2	10.7	24.5
Argentina	30.5	14.1	16.4

Note: I – share of imported value added in exports; II – share in exports of national value added, used by a partner country for the production of its exports.

Source: compiled by the authors, based on Trade in Value Added (TiVA). OECD.Stat: OECD-WTO Initiative, October, 2015. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1# (download date: 30 November 2015).

Examples of International Value Chains

The differences in the national value added shares in exports, production fragmentation and, consequently, the significant share in exports (value added) of intermediate commodities can be graphically illustrated by the following value chain (based on available statistics). Fig. 2 shows US imports of chemical products and non-metallic mineral products² from Russia and Germany (based on data for 2011)³.

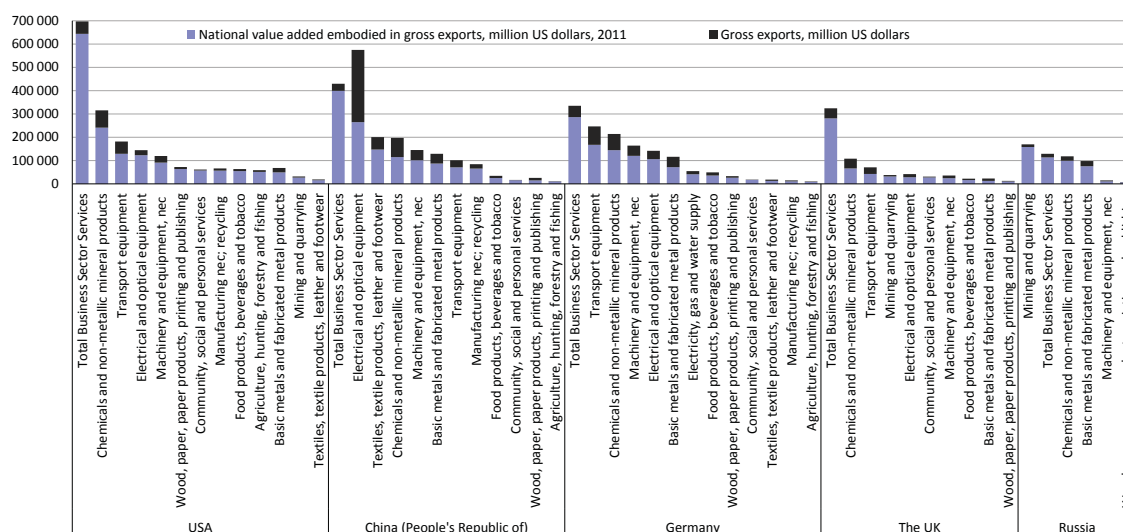
exporter, but providing the necessary backing for the production process (financial services, transport, wholesale companies, etc.).

1 Hong Kong, India, China, Malaysia, Singapore, Thailand, Taiwan, South Korea, Japan; Argentina, Brazil, Columbia; Canada, Mexico; USA; Russia, Saudi Arabia; Israel, Turkey; South Africa, Australia; the UK, Germany, Spain, Italy, Poland, France, Finland.

2 C23t26 Chemicals and non-metallic minerals. These include, among other things, petroleum products, chemical products, rubber, plastic products.

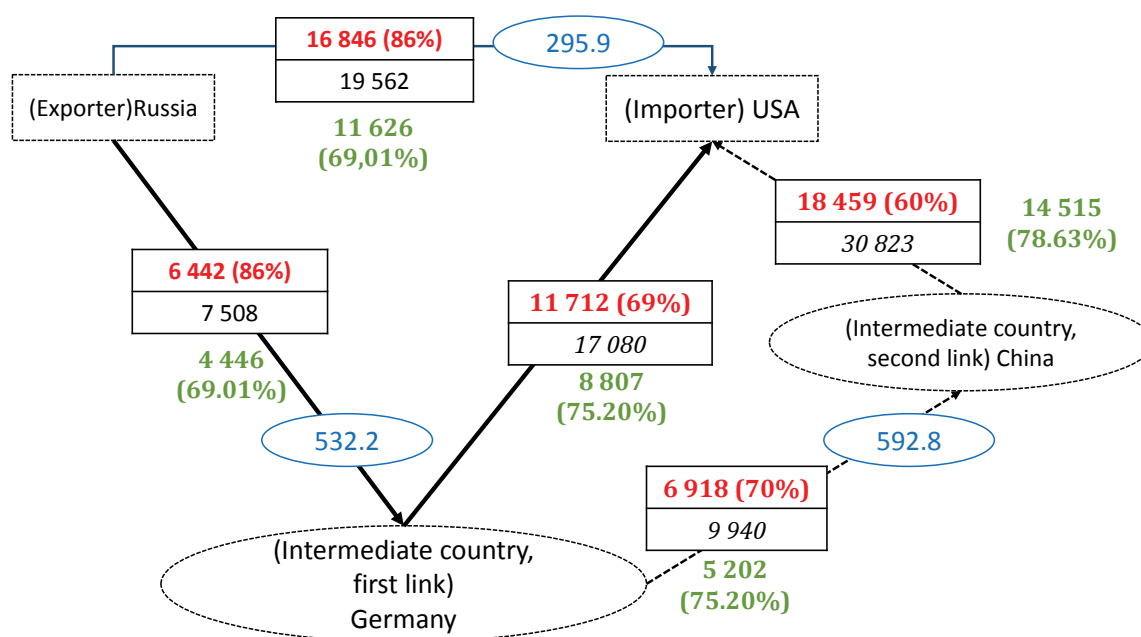
3 In particular, US imports from Russia amounted to \$ 19,562m, where the share of value added created in Russia was 86%, or \$ 16,846m. 69% of its volume was accounted for by intermediate commodities (\$ 11,626m).

SPECIFIC FEATURES OF RUSSIA'S INTEGRATION



Source: compiled by the authors, based on Trade in Value Added (TiVA). OECD.Stat: OECD-WTO Initiative, October, 2015. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2.

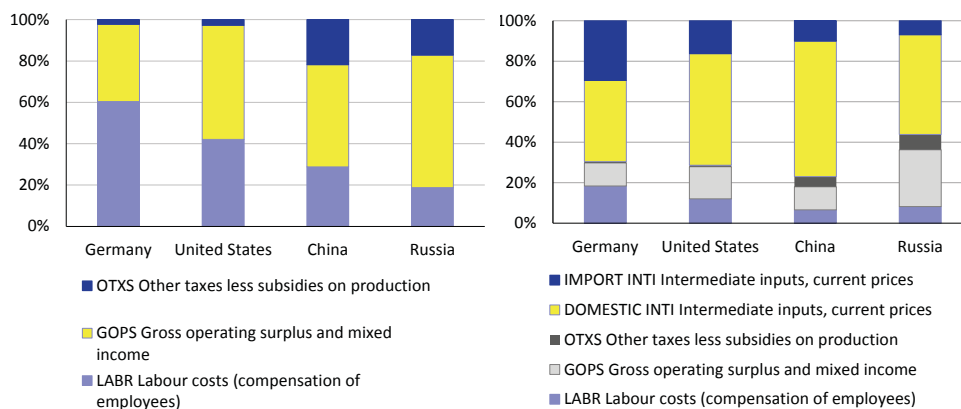
Fig. 1. The Structure of Exports and the Volume of Value Added Exports, 2011, Main Articles



Note: in black – gross exports from one country to another (million USD); in red – value added exports (million USD, share in gross exports); in green – exports value added in the form of intermediate commodities (million USD, and the share of added value in exports); in blue – the volume of the partner country's value added imports, exported (to all countries) after commodity manufacturing (in particular, by Germany from Russia – to China, the USA and all the countries taken together) (million USD).

Source: compiled by the authors, based on Trade in Value Added (TiVA). OECD. Stat: OECD-WTO Initiative, October, 2015. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2; STAN Input-Output Total, Domestic and Imports. OECD. Stat (OECD Input-Output Database), March, 2012. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2.

Fig. 2. Value Added, in Exports by Partner Countries, As Exemplified by the Sector of Chemical and Non-metallic Mineral Products, Million USD, Based on Data for 2011



Source: compiled by the authors, based on STANInput-OutputTotal, DomesticandImports. OECD. Stat (OECD Input-Output Database), March, 2012. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2.

Fig. 3. The Gross Output Structure, the National Value Added Structure for the Three Partner Countries in the Chain, Chemicals and Non-metallic Minerals, the mid-2000s

Firstly, it is obvious that the share of national value added in exports may vary widely (60–86%)¹. Secondly, the ratio of end products to intermediate products in value added exports also varies (due to the specificity of this sector, the by-country differentiation in the share of intermediate commodities is negligible: 69–79%)².

The structure of value added and output may widely vary between countries (even across one sector). Thus, in particular, from Fig. 3 (left-hand side table) it follows that the share of labour costs in value added created in this sector, in China amounts to 29%, and in Germany – to 60%. Similarly, the share of intermediate costs in output in China is 77%, and in Russia it is 56% (Fig. 3, right-hand side table).

While the previous example illustrates the specialization of countries in the framework of the links in their value chain in one and the same sector, the next one (metallurgy and metalworking³ and transport equipment⁴) focuses more on Russia's specialization in low added value products. This sector takes up a significant share in the volume of added value imported from Russia to the other countries, which then export it further along their value chains⁵.

The products of this sector are used intensively in the manufacture of higher value added commodities⁶. As seen from Fig. 4, the transport equipment sector accounts for a substantial share of Russia's added value imports,

1 In China's exports it is 60%, in Germany's exports – 70%; in Russia's exports – 86%.

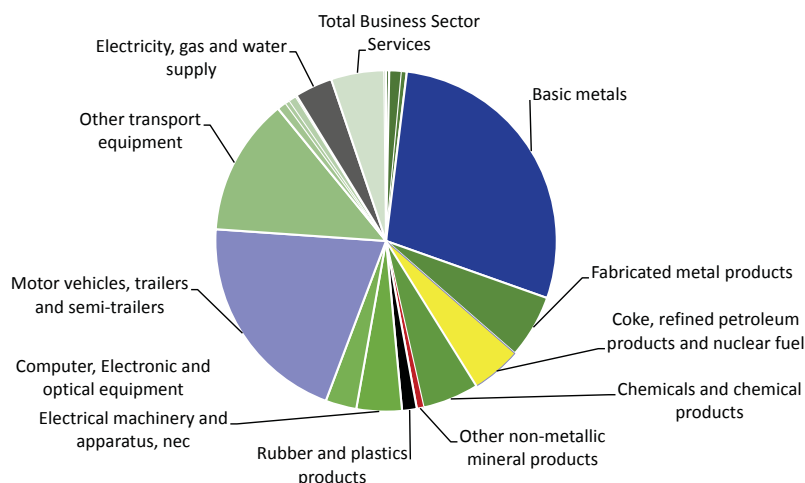
2 The share of intermediate commodities in Russia's exports is 69%, in Germany's exports – 75%, in China's exports – 79%.

3 C 27 Basic metals; C28 Fabricated metal products except machinery and equipment.

4 C34t35 Transport Equipment.

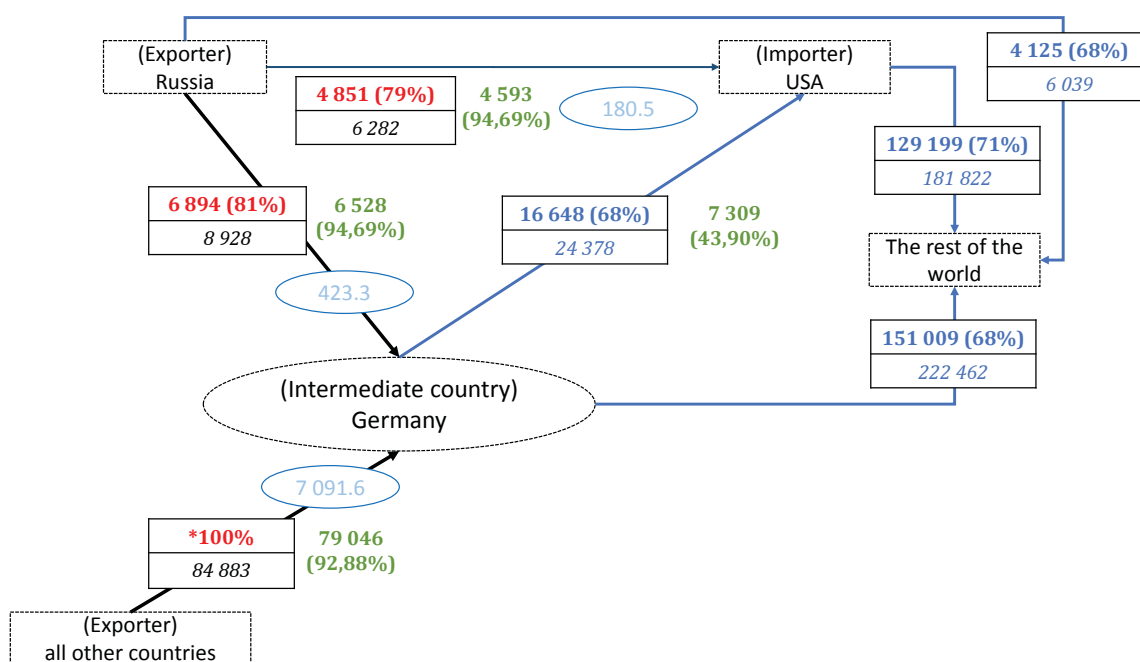
5 In terms of the Global Value Chains Participation Index, this component describes forward or downstream participation. Out of the total value added exports to all countries, to be exported further along their value chains, this sector accounts for 6.7%. If we take Germany alone, its share is 8.5%. In this, big shares are taken up only by business services (38.2%) and mineral resources extraction (34.3%). The high share of business services can be explained by the significant inputs of the transport and wholesale (and retail) sectors.

6 In Germany's transport equipment sector's gross output, as seen from the input-output tables, the inputs of imported and domestically manufactured intermediate products (metallurgy and metalworking) amount to 3.7% and 6.8% respectively.



Source: compiled by the authors, based on Trade in Value Added (TiVA). OECD.Stat: OECD-WTO Initiative, October, 2015. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2; STAN Input-Output Total, Domestic and Imports. OECD.Stat (OECD Input-Output Database), March, 2012. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2.

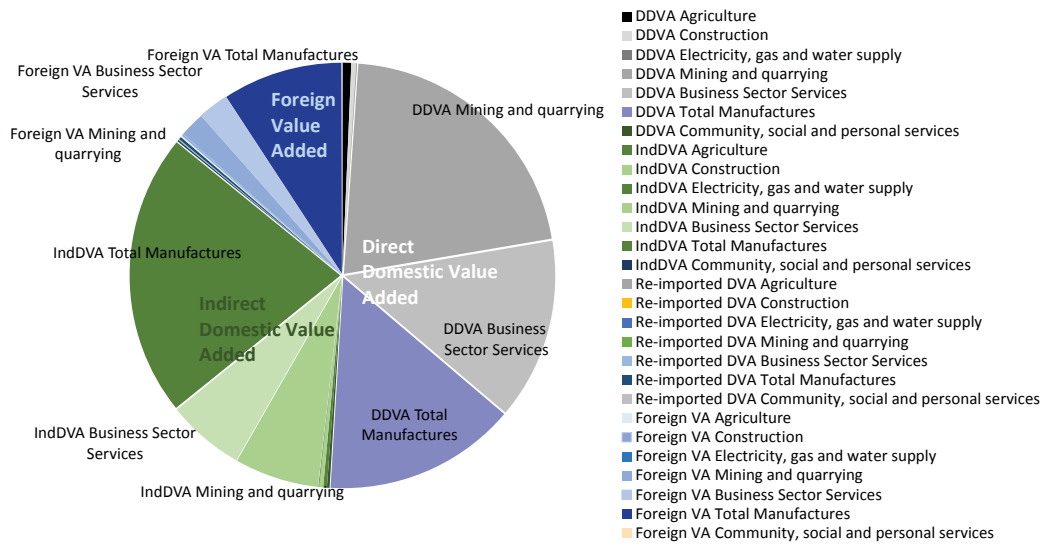
Fig. 4. The Distribution of the Value Added Created in the Metallurgy and Metalworking Sector (C27 Basicmetals), Imported from Russia to Germany and Used in the Production of Its Exports, by Exporting Sector (Germany), 2011



Note: in italics – gross exports (million USD); in red semi bold – value added exports in products of metallurgy and metalworking (million USD, share in gross exports); in blue semi bold – exports of transport equipment (million USD, share in gross exports); in green – exports of value added in the form of intermediate commodities (million USD, share in total value added exports).

Source: compiled by the authors, based on Trade in Value Added (TiVA). OECD.Stat: OECD-WTO Initiative, October, 2015. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2; STAN Input-Output Total, Domestic and Imports. OECD.Stat (OECD Input-Output Database), March, 2012. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2.

Fig. 5. Exports from Russia, Germany, the USA of Transport Equipment; Products of Metallurgy and Metalworking from Russia, 2011



Source: compiled by the authors, based on Trade in Value Added (TiVA). OECD.Stat: OECD-WTO Initiative, October, 2015. http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C2.

Fig. 6. The Structure of Russian Exports, by Sector and by Value Added Component in Exports, 2011

which are later on transformed into exports of intermediate or end products. In Germany’s exports, transport equipment comes second after exports of business services (Fig. 4).

As seen from Fig. 5, the value added exports from Russia’s transport equipment sector amount to \$ 4bn, and those from the USA and Germany – to \$ 129bn and \$ 168bn respectively. This figure includes exports from Germany to the USA (\$ 17bn), where approximately 44% is taken up by intermediate (investment) products.

On the whole, the inputs of the extracting sectors in Russia’s exports are substantial (in terms of both gross exports and value added exports)¹ (Fig. 5 and 6).

Factors Influencing Value Added Exports

Thus, as the production process becomes more fragmentary, and the developing global and regional value chains more prominent, it also becomes increasingly important to study the impacts of various economic policy instruments on the roles played by national companies in the creation of value chains². In this connection, given the possibility of positive external effects resulting from the development of certain specific sectors in a national economy (or types of economic activity), it is especially imperative to create mechanisms and instruments designed to boost value added exports in the form of high value added products or hi-tech services, or R&D exports³.

1 In this connection it should be noted that a significant share in the structure of manufactures exports is taken up by indirect value added (Fig. 6) – Indirect Value Added (see the explanations offered earlier in the text).

2 Of no less importance is the study of the mutual impacts of FDI and value added exports (as well as value added re-imports), as well as of the factors influencing companies’ decisions to undertake FDI. It is obvious that one of the upshots of FDI growth may become an increasing share of national value added in a country’s exports.

3 An analysis global value chains is important, among other things, from the point of view of the estimated impact of protectionist policies. In conditions of production fragmentation, a country’s policies in the sphere of exports and imports become significantly interrelated

The authors, in the framework of the joint study conducted by the Russian Presidential Academy of National Economy and Public Administration, and the Russian Foreign Trade Academy of the RF Ministry of Economic Development 'Analysis of Global Chains in International Trade Models', developed a model of value added exports and analysed the dependence of their growth¹ on the following factors:

- the changes in the levels of production costs in each of countries that functions as links in each production chain;
- the changes in the protectionism level in an importer country;
- the existence of trade agreements between the countries that functions as links in each production chain.

Our analysis demonstrated that the rising price index in those countries that represent the intermediate links in production chains has a negative impact on the growth index of value added exports (both total exports of all the sectors and manufacture exports). In practical terms, this may mean that increasing production and transport costs may negatively influence the integration of the companies of a given country in world production chains in the capacity of value added generators. We may also say that, in face of a rising price index in an 'intermediate' country, the degree of slowdown in the growth rate of value added exports will directly correlate with the degree of involvement² of that country as a partner in a production chain. Thus, the higher the dependence of costs on one of the 'links', the more the increasing prices in that link undermine the competitive capacity of the exporter country. In this connection, it should be emphasized that the exporter country itself may function as that particular link.

(especially if we consider the fact that the production of certain types of services requires a substantial volume of physical capital; thus, for example, in order to get going the sectors like telecommunications, transport, medical services, etc., it is necessary to invest in fixed assets). The increasing number of partner countries along a value chain enhances the impact of tariffs on trade. In other words, the protectionist policy measures undertaken by a country influence not only its external partners in trade, but also its domestic producers (for further information, see *Interconnected economies: benefiting from global value chains*, OECD, 2013. 54 p.). Thus, an effective tariff rate calculated on the basis of tradable value added, may be significantly above the established export tariff.

1 The empirical study relies on the model that analyses the factors influencing the growth rate of value added exports, suggested by Noguera (Noguera G. *Trade Costs and Gravity for Gross and Value Added Trade // Job Market Paper*. Columbia University, 2012. P.: <https://economics.indiana.edu/home/about-us/events/conferences-and-workshops/2013/files/2013-01-23-01.pdf>); in their turn, the authors estimate the dependence of the growth rates of value added exports on various factors on the basis of the trade model approach that relies on the gravity equation of trade with global input–output matrices. For more details on the calculation of the volume of value added in the form of exports, see Koopman R., Wang Z. and Wei S.J. *Tracing value-added and double counting in gross exports // National Bureau of Economic Research*, No w18579, 2012; Miroudot S., Yamano N. *Towards the Measurement of Trade in Value-Added Terms: Policy Rationale and Methodological Challenges // Trade in Value Added*, 2013. P. 41; Johnson R.C., Noguera G. *Accounting for intermediates: Production sharing and trade in value added // Journal of International Economics*. Vol. 86. No 2. 2012. P. 224–236. An alternative approach to the analysis of factors influencing the trade flows along global value chains employs the gravity equation of trade in intermediate products. In particular, it is explained in the study by Baldwin, Taglioni (Baldwin R., Taglioni D. *Gravity chains: Estimating bilateral trade flows when parts and components trade is important // National Bureau of Economic Research*. No w16672, 2011).

2 In this context, the involvement in a production chain is understood not as a country's share in the creation of a commodity's end value, which is difficult to follow on the basis of available data, but as the share of value added exported through that country to the importer country.

On the basis of the results of our analysis it can be said that GDP growth in the importer country has a positive impact on the growth of value added exports in the trade between the pair of countries under consideration; in other words, the increasing demand for imports of commodities (end and intermediate products) and services pushed up the growth rate of value added exports.

Besides, the growth of value added exports directly correlates with the growth of output in the intermediate country. That is, on the one hand, the expanding production and increasing production capacities in the intermediate country determine the economic potential growth of the entire production chain. Besides, the higher the involvement of the intermediate country in the value chain, the higher the value added growth. On the other hand, value added exports may increase because the rising domestic demand in the intermediate country will absorb part of the resources that had previously been used in the framework of the production chain. As a result, the exporter country's value added will replace the lost resources (given that the country in question will be capable of creating no less profitable conditions). Moreover, the growth of value added exports as a result of the increasing output in the intermediate countries will be on the average higher in the services sector than in the manufacturing industry. If the entire production chain is viewed as a single economic system, with due regard for the fact that in the services sector the bulk of value added is exported directly, it becomes clear that, in the situation of a changing structure of a country's economy, growth of the economic potential of the country functioning as a link in a value chain boosts that chain's competitive capacity in the services market. This may have to do both with the supply of better and more expensive services and with the expansion of the supply spectrum by the addition of some new services.

In the course of the study, it was found that the existence of preferential trade agreements between countries pushed up the volume of value added trade. In this connection, the higher is the number of sectors covered by a trade agreement, and the more detailed its structure, the higher is the growth rate of value added exports.

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An analysis of trade flows in terms of value added in the form of commodities and services helps to identify the role of a country in the international division of labor. The key difference of this approach from the traditional one is that it focuses on the demand for value added and on its supply, on the identification and assessment of the impacts of factors that determine the competitive capacity of national companies in international value chains and the degrees of their involvement in the process of value added creation.

The approach to trade analysis in terms of value added views a production chain as a single economic 'capacity unit' and illustrates more vividly the fact that the import policies (in the form of tariff and non-tariff barriers) pursued by the countries participating in a value chain may have a strong impact on value added exports. Although the available international and national statistics make it impossible to follow up the formation of value added in the production of each commodity, this approach will make it possible to achieve a much better understanding of the key factors determining the principles of setting up the production chains, and conduce to the elaboration of better instrument of industrial and trade policies. ●