

ASSESSING THE DYNAMICS OF PARTICIPATION BY A REGION IN INTERREGIONAL AND INTERNATIONAL EXCHANGE PROCESSES BASED ON CHANGES IN THE RATIO OF INTERMEDIATE AND FINAL PRODUCTS

The article advances a hypothesis that the increase of intermediate consumption following the rise of material costs on the principles of innovation and modernization temporarily reduces the level of economic efficiency but, later, leads to multiple-fold growth in the volume of final product which, in turn, improves the economic potential and competitiveness of the region and ensures its increasing participation in interregional and international exchange processes. The authors examined the main factors that determine the changes of these parameters in a market economy, and studied the intermediate and final products, export, import, etc. They identified and confirmed with the analysis, calculations and statistics presented in this article that it is possible to measure these factors by using the input-output tables. The purpose of this paper to assess the quantitative interdependence between the growth of intermediate and final products by analyzing the interregional and international exchanges in a systemic context of macroeconomic indicators describing the socio-economic development of the region in the period of planned and market economy, and to identify the participation of the region in the division of labor and implementation of innovations in order to increase the gross regional product. The authors used the example of economic development in the Republic of Bashkortostan to reveal that a greater involvement of the region in international economic processes led to higher export and import flows, while reducing the exportation/importation of goods to/from other regions of the Russian Federation. In this case, they observed that the region was oriented towards the exports of products made by fuel and energy sector. They also determined that, in the reviewed period, the proportions of intermediate and final products changed towards the increase of the final products, which is the evidence of improving conditions for the higher competitiveness of the region. The authors demonstrated by using the example of oil and oil processing industries that the modernization and implementation of innovative approaches to the organization of production, while increasing the volumes of intermediate consumption, are nevertheless the effective tools for a multiple-fold increase in the volumes of final products.

Keywords: Reproduction potential of the region, aggregate social product, gross regional product, balance of the national economy, system of national accounts, intermediate and final product, exportation, export, importation, import

Introduction

The reproduction potential of the region includes all its potential capabilities, such as the resources (natural, capital, labor) and the size of regional economy (gross regional product, *GRP*) determined by the structure of the regional economy and nature of its participation in interregional and international exchange [1, P. 12–17]. It affects the competitiveness of the region and the autonomy of development in the process of decentralization [2].

The condition of the region's inter-district and international exchange is functionally dependent on the specialization of the territory in manufacturing particular products. The interregional exchange describes the processes of exportation/importation of products to/from other regions of the Russian Federation. The international exchange is based on the processes of export of the products from the region to other countries and import to the region.

In this case, the quality, composition, and structure of natural and raw material resources, particularly in the exchange of heavy-load products, determine the intensity of economic ties. The changes are mainly related to the dynamics of technological processes [3]. The disruptive effect is produced by innovations used by the region with a varying degree of success. A.I. Tatarkin and O.A. Romanova view the full consideration of regional characteristics as one of the main long-term priorities of industrial policy [4, P. 19]. At the same time, the weakening of rigid principles underlying the functioning of the unified national economic system in the period of planned economy has changed the nature of regional ties following the expansion of market-based mechanisms in interregional and international exchanges.

The investments are related to export and exportation. Each international transaction represents some sort of exchange. For example, the value of goods or services sold by one region (exportation and

export) must be equal to the value of assets acquired by the same region (net foreign investments). There is not only the relationship between investments and innovation, but also the impact of these indicators on the volumes of *GRP*, exportation and export of the region, unemployment level and inflation [5–8]. A.G. Aganbegyan identifies the decline in investments and Western sanctions as the main causes of the crisis in the Russian economy [9, P. 492].

1. Retrospective analysis of interregional and international product flows based on input-output table

Let's consider the case of the Republic of Bashkortostan based on the information provided by the system of static input-output tables for reviewing the participation of this region in the inter-district and international exchange processes in the periods of planned economy and market economy. We consider the level of product manufacturing, exportation and export as equivalent factors. This approach allows not only to classify the industries by groups of specialization and regional industries, but also to find the intermediate groups of industries, the identification of which expands the possibility of studying their individual impact on the inter-district exchange of products. This is particularly relevant for the industries of territorial specialization that play a determinant role for the ties of the region with other regions.

The economic sectors that have their own production facilities are divided into four groups, such as the industries of specialization, developed service industries, highly commercial but underdeveloped industries and district industries. The classification is based on two indicators, such as the exportation coefficient and the level of development of industry in the region characterized by the average per capita production. We used the coefficient of 0.5 as the criterion for including the industries in the first indicator groups. If the ratio of products exported from the region to the products manufactured in the region is greater than or equal to 0.5, then the industry is referred either to the group of industries of specialization or the group of highly commercial but underdeveloped industries. If the exportation coefficient is less than 0.5, then the industry is referred to either the group of developed service industries or district industries. The level of development of the industry in the region is determined by comparing the ratios of the products manufactured by the industry of the region to the total population of the region with the similar indicators of the higher-level region. If the average per capita production in the region is no less than the average per capita production in the higher-level region, then the industry is referred to the group of industries of specialization or the group of developed service industries. In the opposite case, it is referred to the group of highly commercial but underdeveloped industries or the group of district industries [10].

The distribution of industries by groups in accordance with their values for two attributes in the diagram built in the form of a four-cell correlation table is shown in Table 1.

The inclusion of industries into a group is ultimately determined by the ratio of intermediate and final products in the dynamics of production of the region (Fig. 1). Over the period of 16 years, the share of the final product in the aggregate social product declined by about 10 percentage points. Consequently, the share of the intermediate product has increased indicating the strengthening of cost mechanism.

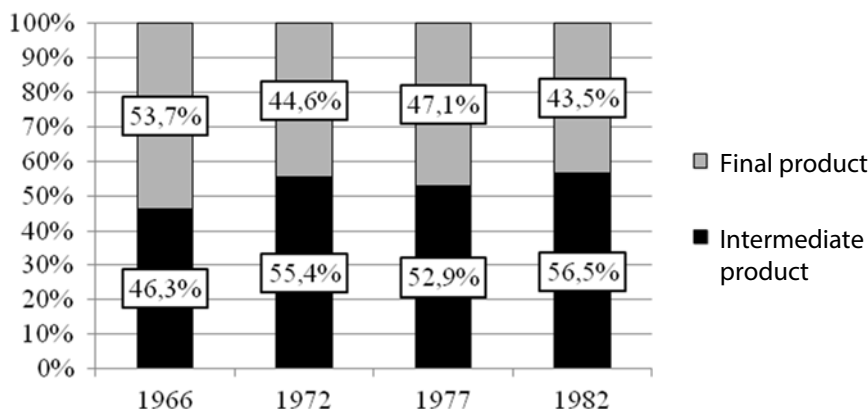


Fig. 1. The ratio of intermediate to final products in the planned economy

Table 1

The classification of industries of material production of Bashkir ASSR, 1966, 1972, 1977

Group of industries	1966				1972				1977			
	Number of industries	Share			Number of industries	Share			Number of industries	Share		
		in the products manufactured in BASSR	in the products of the relevant group of industries of the RSFSR	in exportation		in the products manufactured in BASSR	in the products of the relevant group of industries of the RSFSR	in exportation		in the products manufactured in BASSR	in the products of the relevant group of industries of the RSFSR	in exportation
1	2	3	4	5	6	7	8	9	10	11	12	13
Industries of specialization	$\frac{12}{14}$	$\frac{25.5}{25.9}$	$\frac{14.4}{12.9}$	$\frac{69.5}{71.4}$	$\frac{13}{14}$	$\frac{26.7}{26.8}$	$\frac{10.4}{10.3}$	$\frac{59.6}{60.3}$	$\frac{15}{18}$	$\frac{21.9}{23.2}$	$\frac{8.4}{9.6}$	$\frac{51.9}{54.6}$
Developed service industries	$\frac{9}{13}$	$\frac{38.7}{46.2}$	$\frac{3.6}{3.4}$	$\frac{8.7}{9.5}$	$\frac{11}{15}$	$\frac{35.7}{42.4}$	$\frac{3.4}{3.3}$	$\frac{5.7}{6.6}$	$\frac{8}{13}$	$\frac{28.2}{30.5}$	$\frac{4.2}{4.3}$	$\frac{11.5}{11.8}$
Highly commercial but underdeveloped industries	$\frac{15}{13}$	$\frac{7.4}{7}$	$\frac{1.2}{1.1}$	$\frac{13.7}{12.9}$	$\frac{22}{21}$	$\frac{11.3}{11.2}$	$\frac{1.2}{1.2}$	$\frac{22.7}{22.3}$	$\frac{24}{22}$	$\frac{13.6}{12.3}$	$\frac{1.3}{1.2}$	$\frac{25.6}{22.9}$
District Industries	$\frac{51}{47}$	$\frac{28.4}{20.9}$	$\frac{1.5}{1.3}$	$\frac{8.1}{6.2}$	$\frac{42}{38}$	$\frac{26.3}{19.6}$	$\frac{1.7}{1.5}$	$\frac{12}{10.8}$	$\frac{50}{44}$	$\frac{36.3}{34}$	$\frac{1.7}{1.8}$	$\frac{11}{10.7}$
Total	97	100		100	88	100		100	97	100		100

The numerator is per capita production of the industry (%).

The denominator is the production of the industry per employee in material production (%)

The aggregated average figures of intermediate and final products over the years of preparing the input-output tables in the form of aggregate matrices of the quadrants I and II are provided in Tables 2 and 3.

Table 2

The intermediate consumption between industries of the economy of Bashkir ASSR, in average over 1966–1982 (thousand rubles)

	Manufac- turing	Agriculture and forestry	Construc- tion	Tangible services	Products of other activities	Total material costs (intermediate product)
Manufacturing	4093648.6	296360.0	796352.2	207876.3	6162.5	5400399.6
Agriculture and forestry	668009.1	509142.5	0.0	7184.6	129.2	1184465.4
Construction	0.0	0.0	0.0	0.0	0.0	0.0
Tangible services	965952.8	98448.8	749.8	1434.9	16657.9	1083244.2
Products of other activities	10503.7	0.0	0.0	1491.4	100.5	12095.6
Total material costs	5738114.2	903951.3	797102.0	217987.2	23050.1	7680204.8
Depreciation	615095.9	133022.7	61746.0	115475.7	442.0	925782.3
Total material costs	6353210.1	1036974	858848.0	333462.9	23492.1	8605987.1

The final consumption of products of Bashkir ASSR, in average over 1966–1982 (thousand rubles)

	Non-manufacturing consumption	Gross asset formation	Compensation of fixed asset consumption and capital repair of fixed assets	Compensation of losses of fixed and current assets	Exportation and export	Total final product
Manufacturing	1884632.6	307554.3	338865.7	0	5228273	7759325.6
Agriculture and forestry	451449.2	89023.7	10914	24360.8	1692938	2268685.7
Construction	0	573385.5	827746.5	30635.8	0	1431767.8
Tangible services	0	0	0	0	268844.7	268844.7
Products of other activities	34737.7	-1676.7	12696.3	0	18688.7	64446
Total	2370819.5	968286.8	1190222.5	54996.6	7208744.4	11793069.8

The Republic increased its participation in interregional and international exchanges. The positive exchange balance (exportation and export minus importation and import) increased from 939 million rubles in 1966 to 2603.4 million rubles in 1982. At the same time, the share of exportation and export in the resources of Republic grew from 28.2 % in 1966 to 32.3 % in 1982 reflecting the increasing openness of the economy. However, the higher exportation and export of resources indicate the increasing distortion of the economy of the Republic and the discrepancy between the regional and national economic efficiency. Specifically, this has manifested itself in the fact that the economy of the Republic was functioning for the benefit of other regions while the standard of living in the Republic was lagging behind. For example, the output per employee in the material production sector of the Republic exceeded the average USSR level by 13.4 points while the use of national income per capita was lagging behind by 17 points.

It has been found that the indicators of inter-district and international participation of the region remained fairly stable over a long development period. With this in mind, we conducted a comparative analysis by matching the retrospective information of the national economy balance (*NEB*) with the system of national accounts. To this end, we recalculated the macroeconomic indicators under national economy balance system into the system of national accounts, thereby making the transition from the aggregate social product to *GRP*. *GRP* of Bashkir ASSR, which could have emerged under the conditions of 1966, was calculated in accordance with the following formula:

$$BASSR\ GRP = NEB\ NI + Inp + Dmp + Dnp. \quad (1)$$

Where *NEB NI* is the national income under *NEB* system; *Inp* is the income in the non-production sphere; *Dmp* is the depreciation in material production; *Dnp* is the depreciation in the non-production sphere.

In this case, *NEB NI* is assumed to be specified from the input-output table for 1966 as the total of net product in quadrant 3 of the input-output table, which was 3819.7 million rubles in the prices of the reporting year. The depreciation in the material production was extracted from quadrant 1 of the input-output table as the sum of the corresponding line. The input-output table has no information on the income in the non-production sphere. We used the following methodical technique to determine it. The input-output table includes the indicator of material costs in the non-production sphere (without depreciation), which is equal to 145.4 million rubles. The indicators for the national accounts of the Republic of Bashkortostan for 1995–2012 were used to adapt to *NEB* classification by grouping the industries of the material production and non-production sphere. Then, based on the indicators of the non-production sphere, we calculated the volumes of gross output (*GO*), intermediate consumption (*IC*), gross value added (*GVA*) and the share of the last two items in the gross output. The analysis of trends in the share of above items revealed that their changes were insignificant and varied around following average values: for intermediate consumption, 39.8 % of the gross output in the non-production sphere; and for *GVA*, 60.2 % of the gross output in the non-production sphere.

With information on *IC* in the non-production sphere for 1966 and its share in *GO* (39.8 %), we were able to calculate the *GO* of the non-production sphere for 1966 (365.1 million rubles). Next, we determined *GVA* of the non-production sphere as the difference between *GO* and *IC* (365.1 – 145.4 = 219.7 million rubles). The difference includes two indicators, such as income and depreciation in the non-production sphere. The above formula allows to recalculate *GRP* for conditions of 1966:

$$GRP = 3819.7 + 219.7 + 405.1 = 4444.5 \text{ million rubles In current prices.}$$

Similar calculations were performed for the conditions of 1972, 1977, and 1982. The results are reflected in Table 4.

Table 4

The calculation of gross regional product of Bashkir ASSR (in the prices of the reporting year, million rubles)

Years	<i>NEB NI</i>	Intermediate consumption in the non-production sphere (–)	Output in non-production sphere (+)	Depreciation in the material production sphere (+)	<i>GRP</i>
1966	3819.7	145.4	365.1	405.1	4444.5
1972	5283.3	377.7	948.5	728.3	6582.4
1977	6887.9	288.0	723.3	1013.7	8336.9
1982	8315.4	506.5	1272.0	1516.3	10597.2

As a result of calculations, we obtained methodologically comparable macroeconomic indicators describing the trends in the period of planned economy and market economy in 1966–2014. It should be noted that, when preparing the input-output tables of the Bashkir ASSR for 1966 and 1972, the export of products from the Republic was presented as a separate item, but shown together with the exportation in the column "exportation, including export of products", and the import of products was shown together with importation in the line "importation, including import of products" to the republic. As a result, in the presented retrospective analysis, the relevant exchange indicators reflect exportation, including export, and importation, including import of products, which describes both the inter-district and International exchange of products (Table 5).

Table 5

The absolute indicators of *GRP*, inter-district and international exchange of the Republic of Bashkortostan, million rubles

Years	<i>GRP</i>	Exportation and export	Importation and import	Balance
1966	4444,5	2651.9	1712.9	939
1972	6582.4	4264.3	3275.5	988.8
1977	8336.9	6519.6	4424.7	2094.9
1982	10597.2	9399	6795.7	2603.3
2009	647911.7	399765.1	72744.9	327679.8
2010	759203.3	615424.2	81880.7	535543.5
2011	941023.6	725152	106844.5	618307.5
2012	1149384.6	755527.7	135694.2	619833.5
2013	126698.3	839091.2	141029.8	698061.4
2014	1343857.2	898638.2	143788.6	760749.6

We can see a steady growth trend (in absolute values) in *GRP*, exportation and export, importation, and import, and their balance. With other things being equal, this is a positive indicator showing the strengthening of exchange activities of the Republic along with its *GRP* growth. For example, while the *GRP* (at current prices of relevant years) grew by 302.4 times in 1966–2014, the exportation and export were growing at an accelerated rate and increased by 338.9 times, but importation and import lagged behind (increased by 83.9 times). In the period under review, the highest growth was registered by the positive balance of inter-district and international exchange (increased by 810.2 times).

However, the picture changes somewhat when we consider the relative parameters of the involvement of the Republic of Bashkortostan in interregional and international processes (Table 6).

The relative indicators of inter-district and international exchange of the Republic of Bashkortostan, %

Indicator	Year									
	1966	1972	1977	1982	2009	2010	2011	2012	2013	2014
Ratio of exportation to <i>GRP</i>	59.7	64.8	78.2	87.2	38.9	44.1	43.6	35.6	32.7	30.8
Ratio of export to <i>GRP</i>				1.5	22.8	36.9	33.5	30.1	33.5	36.1
Ratio of importation to <i>GRP</i>	38.5	49.8	53.1	60	8.7	8.3	8.4	8.5	8.5	8.1
Ratio of import to <i>GRP</i>				4.1	2.6	2.5	2.9	3.3	2.6	2.6
Share of exportation and importation balance in <i>GRP</i>	—*	—	—	27.2	30.2	35.8	35.1	27.1	24.2	22.7
Share of net export in <i>GRP</i>	—	—	—	-2.6	20.2	34.5	30.6	26.8	30.9	33.5
Share of exportation (including export) and importation (including import) balance in <i>GRP</i>	21.1	15	25.1	24.6	50.5	70.3	65.7	53.9	55.1	56.2

* No information available.

While in 1966–1982 the total exportation (including export) and importation (including import) balance stood at about 21 % of *GRP*, in 2009–2014, it was approximately 59 % (increased by 1.8 times). If we look at the ratio of exportation and export to *GRP*, we can see that, by 1982, it reached almost 89 % but has fallen to 67 % by 2014. For the ratio of exportation and export to *GRP*, we observed the drop from 64.1 % in 1982 to 10 % in 2014. Relative indicators allow to conclude that there was a general decline in the involvement of the Republic in external economic processes. There has also been no increase in import. For example, while in 1982 it amounted to more than 4 % of *GRP*, in 2014, this figure was only 2.6 %. The level of importation shows signs of decline.

This analysis leads to important conclusions:

— The transition to market economy failed to increase the aggregate involvement of the Republic of Bashkortostan into external processes in relative terms; moreover, we can observe a growing isolation of the economy, particularly, in terms of importation;

— The substitution of exportation by export and sharp drop in the volumes of importation leads to a weakening of interregional ties and, as a result, to disintegration of Russia's economic space, on the one hand, and on the other, to real economic losses, since the transformation of interregional flows into international ones leads to diversion of significant financial resources from the Russian Federation, which could have generated a multiplier effect within the country.

2. Improving the structure of products manufactured in the region

As for the change in the ratio of intermediate and final products of the republic, we can note that it is changing in a positive way: if, by 1982, the share of final product fell to 43.5 %, it exceeded 50 % by 2012. This results from the impact of the market economy, which forces the economic agents to reduce material costs in order to maintain their competitiveness (Fig. 2).

With its developed economy, broad sectoral specialization and strong reproduction potential, the Republic of Bashkortostan nevertheless does not take full advantage of its capabilities [11]. The fuel and energy complex (*FEC*) of the Republic constitutes a substantial part of its economy. In the structure of products shipped in 2014, the products of *FEC* accounted for 82.9 % of the total value under the item

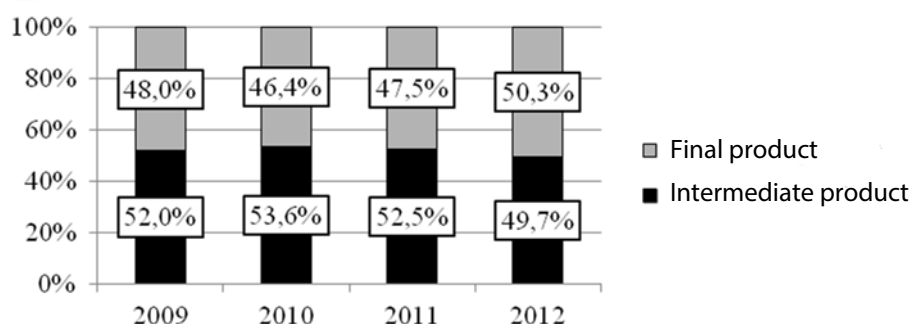


Fig. 2. The ratio of intermediate and final products in the Republic of Bashkortostan, %

"Production of minerals" or for 3.2 % of *GVA*; and the coke products, petroleum products, chemicals, rubber products and plastics accounted for 66.7 %¹ of the total value under the item "Manufacturing" (i.e., 19.5 % of *GVA*)². The fuel and energy resources represent the bulk of the republic's export (Table 7), which makes the economy dependent on world energy prices and energy demand.

Table 7

The product structure of export in the Republic of Bashkortostan, 2014*

Economic activity	USD million	%	% in 2011 (for comparison)
Food and agricultural raw materials	27.9	0.2	0.7
Products of fuel and energy complex	11847.7	86.0	83.9
Products of chemical industry, synthetic rubber	737	5.4	8.5
Wood, pulp and paper products	78.3	0.6	0.5
Metals and metal products	274.7	2.0	2
Machinery, equipment and vehicles	806.1	5.9	4.4

* Regiony Rossii. Sotsialno-ekonomicheskie pokazateli. 2015: stat. sb. [Regions of Russia: Socio-economic indicators. 2015: Statistical Book]. (2015). Rosstat. Moscow, 600–601. (In Russ.). P. 1253.

The largest company in the Republic of Bashkortostan involved in oil production and refining is PJSC JSOC Bashneft. In 2015, it produced 19.9 million tons of oil, of which 6.7 million tons were exported. At the same time, 95 % of crude oil remaining after the export is refined in Bashkortostan³, and only 0.3 million tons is shipped to other Russian regions. In other words, the total share of exportation and export of the crude oil by PJSC JSOC Bashneft was 35.1 % (7 million tons) in 2015.

How would the revenues from the sale of Bashkir oil increase, if it had not been shipped and exported in the crude form, but completely refined into the final product? This would certainly increase the intermediate consumption, but the gains in the volumes of the final product would be substantially higher. In such case, the development would occur not only in the oil refining industry of the Republic, but also in the region as a whole, since virtually all industries in the economy are interconnected.

Let's assess the feasibility of this mode of development based on the information from the input-output table of the region.

The quantitative relationship between the various economic activities of the region can be evaluated with the information on the production of goods and services by the enterprises of one economic activity that are using the resources of other economic activity. When preparing the input-output table, the principles used in this method of analyzing the production volumes are applied through direct material cost ratios. Mathematically, they can be calculated in accordance with the following formula [12, P. 139]:

$$x_{ij} = a_{ij} \times X_j, \quad (2)$$

Where a_{ij} is the quantity of products of economic activity i required to produce a unit of products of economic activity j ; X_j is the total volume of production consumed by the economic activity from all other economic activities to make its products (intermediate product for activity j); x_{ij} shows the entire flow of products of economic activity i used in the production by economic activity (gross output of activity j).

In the input-output table, we can apply the following equation to assess the flows of goods and services used and produced by one economic activity:

$$x_i = x_{i1} + x_{i2} + \dots + y_i, \quad (3)$$

Where y_i describes the amount of final consumption by this economic activity of the national economy.

The provided formulas can be applied as a tool for detailed analysis of production by specific economic activity in order to address our task of identifying the gain in the volumes of final products in the Republic of Bashkortostan in the case of complete refining of the oil produced in the region.

¹ Regiony Rossii. Sotsialno-ekonomicheskie pokazateli. 2015: stat. sb. [Regions of Russia: Socio-economic indicators. 2015: Statistical Book]. (2015). Rosstat. Moscow, 600–601. (In Russ.)

² *ibid.* P. 605.

³ PJSC JSOC Bashneft. Retrieved from: www.bashneft.ru (date of access: 10/31/2016). (In Russ.)

The transition to market relations allowed to achieve a considerable depth of oil refining (for PJSC JSOC Bashneft, 85.8 % in 2015), although the ratio of crude oil consumed within and exported from the region has not changed significantly. At the same time, this level of refining depth does yet meet the international standards. In recent years, the company was increasing the volumes of oil production, which indicates its extensive development of the company and, therefore, the extensive development of the republic's oil industry in general (Bashneft represents 95 % of it). Even the existing fixed assets have not been fully utilized, as the level of capacity utilization fluctuated in the range of 85–89 % in 2010–2014. However, the company makes a fairly large amount of investments (their total value increased from 30.8 billion rubles in 2012 to 48.3 billion rubles in 2014, including 15.5 billion rubles and 36.2 billion for the exploration and production, respectively).

Approximately, 30 % all petroleum products shipped from the Republic of Bashkortostan to other regions of the Russian Federation are motor petrol, diesel fuel and fuel oil (Table 8). In 2014, the shipped volumes exceeded by many times the imported volumes – for motor petrol, by 23.5 times; for diesel fuel, by 28.2 times; and for fuel oil, by 234 times. Some dependence on imported motor petrol and diesel fuel shows that there are producers of better quality products outside the Republic.

Table 8

The exchange of petroleum products between the Republic of Bashkortostan and the regions of the Russian Federation*

Oil product	Exportation				Importation			
	2005	2010	2012	2014	2005	2010	2012	2014
Motor petrol, thousand tons	3294	3624	3565	3507	122	104	169	149
Diesel fuel, thousand tons	2892	2940	2061	2332	312	155	127	82.6
Fuel oil, thousand tons	2621	2095	2398	2153	4.7	4.7	15.9	9.2

* Regiony Rossii. Sotsialno-ekonomicheskie pokazateli. 2015: stat. sb. [Regions of Russia: Socio-economic indicators. 2015: Statistical Book]. (2015). Rosstat. Moscow, 891–894, 923–928. (In Russ.)

If the depth of oil refining in Bashkortostan reaches the maximum (more than 95 %), this would allow to ship for exportation and export primarily the motor petrol and diesel fuel by sharply reducing the share of fuel oil. The prices for motor petrol and diesel fuel are about 2.5 times higher than those for crude oil and even more than those for fuel oil. For example, in the Republic of Bashkortostan, a ton of oil has the production cost of 5829.9 rubles; for a ton of motor petrol, this figure is 15476.0 rubles (2.7 times higher than for crude oil); and, for diesel fuel, 13532.0 rubles. (2.3 times higher than for crude oil). Therefore, the innovations in oil refining should primarily increase its depth, which will improve the process efficiency for the entire industry [13] that, in turn, will increase the share of the final product per unit of intermediate product across the economy in general. The potential structure of commercial production of petroleum products is provided in Table 9. 4.4 million tons of petroleum products could have been made of all crude oil exported from the Republic (in 2012, 4.8 million tons). This includes 1.7 million tons of diesel fuel, 1.1 million tons of motor petrol, 0.7 million tons of fuel oil, 0.4 million tons of vacuum gas oil and 0.6 million tons of other products. Let's compare the increasing costs and proceeds generated by full refining.

Table 9

The product structure of Bashneft oil refining complex, million tons per year, average for 2012–2013*

Product name	million tons	%
Volumes of crude oil refining	21.1	100
Commercial production of petroleum products	19.1	91.4
including:		
Diesel fuel	7.5	34.9
Motor petrol (including stable natural gasoline)	4.9	22.9
Fuel oil	2.9	13.8
Vacuum gas oil	1.2	8
Other	2.6	11.8

* PJSC JSOC Bashneft. Retrieved from: www.bashneft.ru (date of access: 10/31/2016). (In Russ.)

The costs of the production for 4.8 million tons of oil are 27893.5 million rubles, while the proceeds from its sale are 49728 million rubles. In this case, the gross profit will be 21834.5 million rubles. With the production of only the top quality motor petrol (i.e., the high category AI-95 and above) and given that the waste would account for 0.4 million tons, the production costs of 4.4 million tons of motor petrol would be 68094.4 million rubles, while the proceeds would be 92250.4 million rubles. The gross profit would be 24156 million rubles, which is 2321.5 million rubles more than the profit from the sale of crude oil.

If all non-refined Bashkir oil is used to produce diesel fuel, then the costs for producing 4.4 million tons would be 59540.8 million rubles and the generated proceeds would be 103452.8 million rubles. The gross profit from the production of diesel fuel is 43912 million rubles, which is 2 times higher than the proceeds from the sales of crude oil only.

The above evidence suggests that it is many times more profitable to refine the oil than to simply ship it in a crude form. This is also confirmed by intersectoral studies. Our calculations with regard to the oil production and refining industry of the Republic of Bashkortostan based on the method of input-output tables showed that the increase of intermediate consumption costs within the quadrant 1 leads to a three-fold increase of the final product within the quadrant 2.

So far, the prevalent view on the targets for the development of regional economy was the reduction of intermediate product and increase of final product of the region to ensure the economic growth [14, 15]. This study allowed the authors to conclude that such attitude needs some revision: it is necessary to increase the intermediate product in those innovative areas that can generate a many-fold increase of the final product. In this case, such increase should be implemented in a systemic context of exportation and export, importation and import processes to maximize the benefits of changing the ratio of intermediate and final products. It is necessary to build an optimum combination of the most important (in the opinion of the authors) regional economic indicators, such as Intermediate and final products, exportation and export, importation and import.

Conclusion

The conducted study allowed to make the following conclusions:

— It has been proved that, at the level of region (subjects of the Russian Federation), the role of exchange processes is substantially higher than at the level of national economy, and it tends to increase;

— The complexity of external economic exchange at the regional level is caused by the existence of multi-channel flows generated by the decisive role of exportation and importation of products, unlike the national economy, where these functions are ensured by export-import operations;

— The increase of intermediate product through higher material costs on the basis of innovation and modernization leads simultaneously to the many-fold growth of the final product of the region and, as a result, to its higher economic potential and competitiveness.

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