Bank of Russia

Russia's Dependence on Import of Intermediate Goods

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Summary

This paper assesses the direct and indirect dependence of Russia's economy on imports of intermediate consumption across various industries. The author compares these figures with similar data for other economies. Additionally, we indirectly take into account the quality aspect of this dependence, that is, a small number of possibly critical components for industries that might exist. We assess both the direct dependence of industries and their indirect dependence resulting from consumption of other sectors' products also containing imported components. The findings of the research suggest that the dependence of the sectors of the Russian economy on imports of intermediate goods is relatively low, even though the share of imports for certain industries can be high in absolute terms. In most of the sectors, dependence on imports is the same as or does not exceed the average for a similar group of economies.

Contents

1. Introduction

Measuring the economy's reliance on imports of intermediate goods and services and of investment goods is essential to estimate the depth of possible effects on potential GDP resulting from external trade restrictions and to assess the degree of structural transformation of the economy required to adjust to the new reality.[1] This reliance can be extensive or intensive. The former implies high import content in particular intermediate goods used to manufacture other products. The latter means that specific imported intermediates are critical for manufacturing process (e.g. due to production technology). In both cases, the restriction on the use of imported components not only affects the manufacturing process in a particular industry, but also causes induced effects on other industries – suppliers of products for this industry (an upstream industry) or buyers of its products (a downstream industry). All this together might have an unexpected impact on output in the economy, its structure, and relative prices. The objective of this research is to carry out a cross-country comparative analysis of such dependence of economic sectors using a range of variables measuring their reliance on imports.

This paper measures Russian industries' reliance on imported intermediates as compared to the same industries in a large group of advanced and emerging market economies. As sectoral data on investment goods imports are unavailable, our research only addresses the dependence on imports of intermediate goods but not capital. We give a quantitative assessment of the reliance on imports. However, even when import quantities are actually insignificant, they might turn out to be critical for output in a particular industry (e.g. due to production technology). This aspect is considered in this paper only indirectly as precise data are unavailable. We assess both the direct dependence of industries and their indirect dependence resulting from consumption of other sectors' products also containing imported components. The analysis of the reliance on imports includes calculations of two groups of indicators, namely import content in intermediate inputs and in outputs. For this, we used the OECD Input-Output Tables for 2018 (OECD, 2021) highlighting intersectoral relationships in 66 countries and 45 industries. The calculations were made according to the standard methodology of working with input-output tables described by, for instance, Loschky and Ritter (2006). We have no information about any research in Russia with a similar cross-country analysis.

The findings evidence that a range of industries really have high import content in their intermediate consumption. Nevertheless, the proportion of imports in most of these industries does not exceed the mean/median in a sample of economies. This result does not depend on the method used to measure the reliance on imports. To a certain extent, the derived result is explained by the fact that Russia is rich in energy resources and other commodities. However, even after leaving out commodity imports, the levels of import dependence still remain below the median for the majority of industries. Additionally, we assess the reliance on imports from the group of countries that have imposed sanctions against Russia – they account on average for 61% of total imports of intermediate goods.[2] The results show that such industries as automobile production, manufacture of rubber and plastics, and electronics are expectedly most dependent on imports according to the majority of measures. As our calculations do not take into account Russian economic sectors' reliance on investment imports, we observe a lower estimate of industries' overall

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[1] External trade restrictions in the new reality imply not only direct restrictions on imports of certain goods to Russia, but also challenges associated with logistics and cross-border payments.

[2] The arithmetic mean for industries.

dependence on imports and, accordingly, a lower estimate of the needs and opportunities for import substitution.

This research has the following structure. Section 2 presents the review of literature. Section 3 describes the data used. Section 4 details the calculation methodology. Section 5 contains the results of the calculations made.

2. Literature review

The article presents the analysis of input-output tables – a model developed by Wasssily Leontief, a Nobel Prize winner. The possibilities of using this model were described by, for instance, Shirov (2018). Specifically, among other things, input-output tables may be used to estimate the elasticity of gross value added (GVA) resulting from changes in final demand components (e.g., exports).[3] Bussiere et al. (2013) also emphasise the role of the input-output model for estimating the elasticity of imports with respect to changes in individual categories of final demand, which improves the possibilities for forecasting imports and the balance of trade.

This research relies on and complements literature in several areas. Firstly, this paper compares import content of intermediate consumption in Russian industries' outputs against similar indicators of a large group of economies based on the OECD Input-Output Tables for 2015–2018.[4] The calculations follow the methodology described by Loschky and Ritter (2006). The comparison is based on a sample of 66 countries, including advanced and emerging market economies, and 45 groups of industries, which provides a clearer understanding of a relative level of import dependence. Additionally, Russia is compared with countries having a similar size of the economy and size of the population.

Bravo and Alvarez (2012) make calculations, which are similar to ours, for Spain, Germany, France, and Italy using the OECD Input-Output Tables. They focus on a lower elasticity of GVA resulting from changes in final demand components in Spain, as compared to other countries, explaining this by high import content in intermediate consumption. Reis and Rua (2009) repeat the analysis for Portugal, focusing on the leakage ratio, that is, the share of the domestic economy's losses due to the use of imported raw materials and components, which is equivalent to total imports calculated herein. Breda et al. (2007) assess import content in exports of a number of euro area countries. Contrastingly, this research focuses on import content in output rather than in exports because this is a potential decline in output that is of primary interest. Erduman et al. (2019) assess changes in import content for Turkey. The method used in Subsection 5.2 is similar to the one mentioned in the above articles. However, we make calculations for a larger group of countries and carry out a cross-country comparison. The studies mentioned in this review rely on the input-output tables prepared by the OECD or (supra)national statistical agencies as data sources. Feenstra and Gordon (1996) refer to the share of import inputs in total inputs, which is similar to the indicator calculated in Subsection 5.1 hereof.

As regards research based on data about Russia, Berezinskaya (2017) analyses the Russian economy's reliance on imports over the period from 2006 to 2011. In her article, she applies two approaches to analyse import dependence: 1) the analysis of statistics on external trade (e.g., the proportion of investment or intermediate goods in imports); and 2) the assessment of the share of imported inputs in enterprises' total inputs. Her study, however, does not include a cross-country comparison and ignores indirect imports.[5]

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[3] Namely, if the proportion of imports of intermediate consumption in exports is above zero, a part of export growth will 'leak' through imports.

[4] Considering that 2020–2021 are probably not representative in terms of the structure of the economy due to the coronavirus pandemic, data for 2015–2018 are actually most relevant.

[5] Berezinskaya and Vedev (2015) give an example of the calculation taking into account indirect imports only for a few selected industries.

An article by Kalinin et al. (2021) assesses the effect of the decrease in exports from China on the Russian economy and provides the findings regarding the reliance of particular industries on imports.[6] However, this information is given on a selective basis and only in relation to China. The WIOD Input-Output Tables were used as the main source of information.

Shirov et al. (2015 (a)) build an integrated model of an intersectoral balance for Belarus, Kazakhstan, and Ukraine. Using this model, they calculate trade coefficients for these countries reflecting the share of a partner country in total consumption of intermediate and end products from industry i. According to the results, Russia's reliance on imports from the countries in the sample is not high. The authors complement their analysis with scenario-based calculations of two types: 1) changes in trade coefficients; and 2) an economic decline in a country – trade partner.

Simachev et el. (2016) complement the above studies with quantitative assessments of import dependence using survey findings. The main conclusions of the authors are as follows: 1) a higher level of import dependence is typical of high-technology companies, technological leaders, and enterprises facing strong competition; and 2) the main reason for the use of imports is the absence of Russian analogues, and this problem is most relevant exactly for the high-technology sector. Summing up the above, we can say that the methods estimating the economy's dependence on imports vary in the domestic literature and often differ from those presented herein.

Secondly, we complement the existing measures of industries' import dependence with new ones that could, at least indirectly, factor in how critical imports are for manufacturing. The standard approach applied by, for instance, Erduman et al. (2019) ignores that the imports of products of industry i might account for a small share in the output of industry j, but can have very low elasticity of substitution with domestic alternatives or other similar products and thus be critical for manufacturing products j. We try to take this into account, specifically we assess import dependence ignoring the share of imports in intermediate consumption.

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[6] Due to both lower imports directly from China and a contraction of imports from the rest of the world following a reduction in exports from China to the rest of the world.

3. Data

The main data source for this research is the OECD Input-Output Tables for 2015–2018 (OECD, 2021) that contain information on intermediate consumption and the final use of goods and services broken down by industry and country. The advantage of the chosen source, in particular, in comparison with the Rosstat Input-Output Tables, is that it enables to determine intersectoral relationships in the context of a large group of countries. The OECD Input-Output Tables provide information on 66 economies, [7] including 38 OECD countries, and 45 industries (see Annex 1).[8][9] On the other hand, the Rosstat's input-output tables provide more detailed data for Russia. Nevertheless, we use the OECD tables as a source of data since the purpose of this paper is to conduct a cross-country analysis. Although, we replicated calculations of some of the indicators for Russia based on Rosstat's working materials for 2018 about the resources of goods and services and their use, broken down by industry according to the OECD classification[10]. The obtained results did not differ significantly from those presented in the main part of this work. For example, the greatest dependence on imports, just as in the case of OECD data, was observed in the pharmaceutical, automotive, textile industries, etc.

Additionally, descriptive statistics are calculated for two subsamples, namely countries with the population / PPP GDP above the median. Information on the size of the population was taken from the World Bank's World Development Indicators databank (World Bank, 2022), and data on PPP GDP – from the IMF's World Economic Outlook database (IMF, 2022). In both cases, we use the figures for 2018. This paper also estimates the dependence on imports from the group of countries that have imposed economic sanctions against Russia. These are countries put on the list of 'unfriendly states' pursuant to Resolution of the Government of the Russian Federation No. 430-p, dated 5 March 2022.

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[7] All other countries were included in 'The Rest of the World'.

[8] The industries are specified according to the UN ISIC (Revision 4), with their subsequent additional grouping.

[9] The calculations for the descriptive statistics do not include the results for China and Mexico, as well as for the industry 'Activities of households'.

[10] The results are not presented in this work.

4. Methodology

This paper is an application study. The author's main objective is to estimate the Russian economy's dependence on intermediate goods imports. This objective is important and relevant considering the current external economic environment for Russia[11].

We calculate two groups of indicators: import content in intermediate inputs and in outputs. The first group includes three indicators. Indicator 1 is calculated for each industry j as the weighted average of the shares of imports used from industries-suppliers i:

$$l_j = \sum_i w_{i,j} * s_{i,j}$$

(1)

$$w_{i,j} = \frac{x_{i,j}^{imp}}{x_{i,j}}$$

(2)

$$s_{i,j} = \frac{x_{i,j}}{x_j}$$

(3)

where $x_{i,j}$ – intermediate consumption by industry j from industry i; $x_{i,j}^{imp}$ – intermediate consumption of imports by industry j from industry i; x_j – intermediate consumption by industry j from all industries; $w_{i,j}$ – the share of imports used by industry j from industry i; and $s_{i,j}$ – the share of consumption of industry j from industry i in total consumption of industry j.[12]

Indicator 2 is calculated as the arithmetic mean of $w_{i,j}$ for each industry j:

$$l_j = \frac{1}{N} \sum_i w_{i,j}$$

(4)

where N – the number of industries-suppliers for industry j. In this case, we assume revealed importance (criticality) of import: the larger is the share of imports of industry j from industry i in intermediate consumption, the more important (critical) are imports from industry i for industry j. We ignore that supplier i to industry j with high $w_{i,j}$ might have a low share of $s_{i,j}$, thus understating import dependence.

Indicator 3 is calculated as the weighted average of the deviations of the share of import consumption $w_{i,j}$ of a particular country and industry from the relevant median of the sample. This indicator is calculated similarly to the first one, except that, instead of $w_{i,j}$, we use $w'_{i,j}$:

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[11] The author does not aim to improve the understanding of the economic mechanisms of the sanctions. This issue was considered by, for instance, Shirov et al. (2015 (b)).

[12] This formula can be simplified to $l_j = \sum \frac{x_{i,j}^{imp}}{x_j}$. However, the estimates below contain variable $w_{i,j}$, due to which the calculations were made according to the above formula.

$$w'_{i,j} = w_{i,j} - w_{i,j}^{med}$$

(5)

In this case, we assume that, in the globalised economy, the structure of the same industries and, accordingly, their import dependence are similar.

The second group – import content in outputs – includes two indicators 1) direct imports and 2) total imports[13] including direct and indirect imports. Direct imports comprise goods and services that are directly used in the manufacture of a particular industry's end products. Indirect imports are domestic goods and services with import content that a particular industry uses in its manufacture indirectly, that is, through consumption from other domestic industries. These indicators are calculated in three steps:

1) First, we calculate the technical coefficient matrix A and the vector of intermediate consumption of imports z (Indicator 1). The matrix elements are calculated according to the respective formulas:

$$a_{i,j} = \frac{x_{i,j}^{dom}}{p_j}$$

(6)

$$z_{1,j} = \frac{v_{1,j}}{p_j}$$

(7)

where $x_{i,j}^{dom}$ is equal to intermediate consumption of industry j from industry i of the same economy; p_j – to final output of industry j; and $v_{1,j}$ – to intermediate consumption of imports by industry j ($\sum_i x_{i,j}^{imp}$). Accordingly, $a_{i,j}$ is the quantity of goods manufactured inside the country by industry i and used directly to manufacture a unit of product of industry j. Similarly, $z_{1,j}$ is equal to import quantities (from all industries) used directly to manufacture a unit of product of industry j.

2) The Leontief inverse matrix C is derived as follows:
$$C = (I - A)^{-1}$$

(8)

where I – the identity matrix.

3) We calculate the vector of the share of total (direct and indirect) imports in final output k (Indicator 2):
$$k = z_1 * C$$

(9)

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[13] Hereinafter, the term 'total imports' will be used to refer to the total of direct and indirect imports.

The elements of the obtained vector correspond to the share of total imports in the output of the relevant industry. The size of vector k is equal to the number of industries. Additionally, this paper also provides the estimate of non-commodity imports and imports from the countries that have imposed sanctions against Russia. In this case, variable $v_{1,j}$ only includes non-commodity imports or imports from the said countries, respectively. Non-commodity imports are imports from any industries, except the following:

- Mining of coal and lignite (code 05 under ISIC);
- Extraction of crude petroleum and natural gas (06);
- Mining of metal ores (07);
- Other mining and quarrying (08);
- Manufacture of coke and refined petroleum products (19);
- Manufacture of basic metals (24); and
- Electricity, gas, steam and air conditioning supply (35).

5. Results

5.1 Import content in intermediate inputs

This section presents the results of the analysis of Russian industries' dependence on imports with respect to our sample of countries. This subsection covers three indicators measuring import content in intermediate inputs. As a starting point for these indicators, we calculated the shares of imports $w_{i,j}$ in intermediate consumption of industry j from industry i for each pair of {j, i}. The first indicator I_j is the weighted average of the said shares for each particular industry j.

Indicator 1 is shown in Chart 1. The results evidence that import content in intermediate inputs is below the median in all industries except professional, scientific and technical activities. A number of industries have a lower dependence as compared to 90% of the economies in the sample: manufacture of coke and refined petroleum products, electricity and gas supply, land and air transport, trade, manufacture of chemicals and chemical products, manufacture of metals, etc. Electronics, manufacture of motor vehicles, manufacture of textiles, and manufacture of pharmaceuticals have the highest level of dependence.

Chart 1. Direct imports in intermediate inputs, % (Indicator 1)
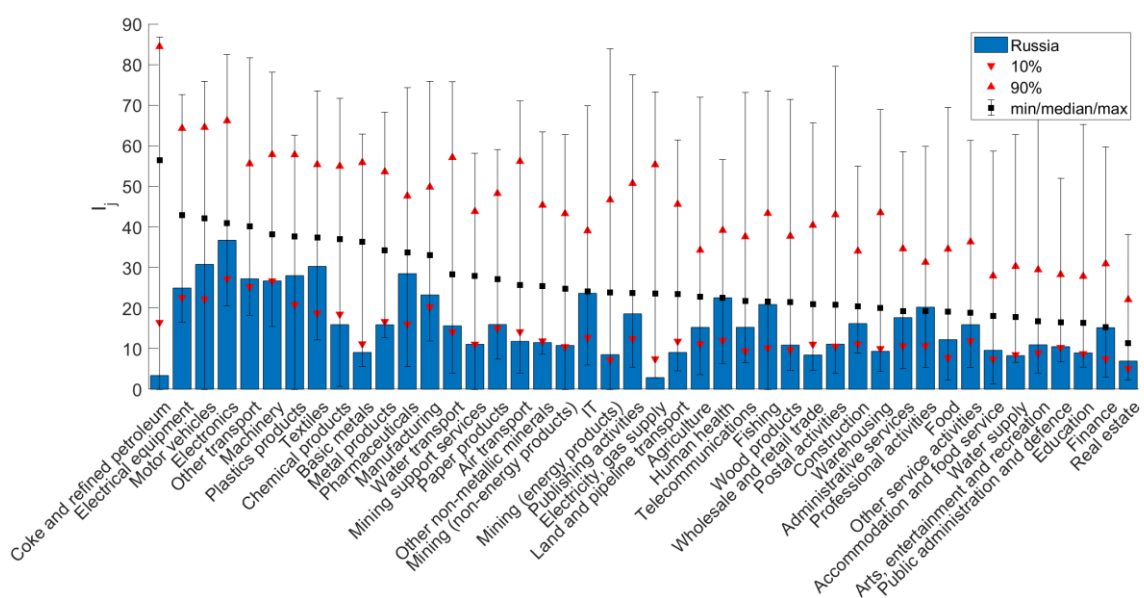
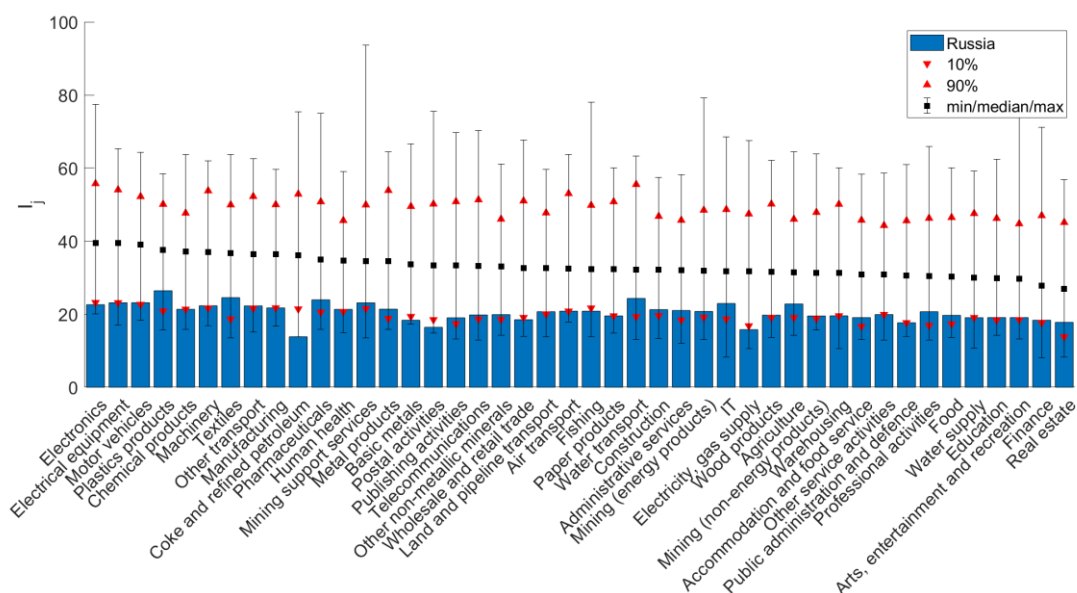Source: the author's calculations.

As Indicator 1 does not account to the possible critical role of imports in technological process, we also use Indicator 2 calculated as the arithmetic mean of the shares of import consumption from industries-suppliers in intermediate consumption of industry j.[14] In this case, we assume revealed importance (criticality) of import: the larger is the share of imports from industry i used by industry j in intermediate consumption, the more important are imports from industry i for industry j.

Indicator 2 supports the earlier made conclusions. Import content in all industries is below the median. It is at the level of the 10th percentile in most industries and even lower in some of them (e.g., manufacture of refined petroleum products, electricity and gas

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[14] If outputs in industry j critically depend on products from industry i, for instance, due to a manufacturing technology, but the share of consumption of industry j from industry i is low, then a potentially high share of imports from industry i measured in Indicator 1 will be underestimated.

supply, manufacture of metals, etc.). According to Indicator 2, manufacture of rubber and plastics products, manufacture of textiles, and water transport have the highest dependence on imports.

*Chart 2. Share of direct imports in intermediate inputs, % (Indicator 2)*

Source: the author's calculations.

Indicator 3 is calculated as the weighted average of the deviations of the share of import consumption by industry j from industry i relative to the median for this pair of {j, i} in the sample. Calculating Indicator 3, we assumed that, in the globalised economy, the structure of the same industries and, accordingly, their import dependence are similar. The values of Indicator 3 suggest that the share of imports in intermediate consumption in Russia is below the median in all industries.[15] Specifically, the difference is most significant in manufacture of refined petroleum products, manufacture of metals, and manufacture of motor vehicles (despite generally high import content in this industry).

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[15] It is important to note that the difference between the value of Indicator 1 for Russia and the related median is not equivalent to the value of Indicator 3.

Chart 3. Deviations of the share of direct imports in intermediate inputs from the median (Indicator 3)
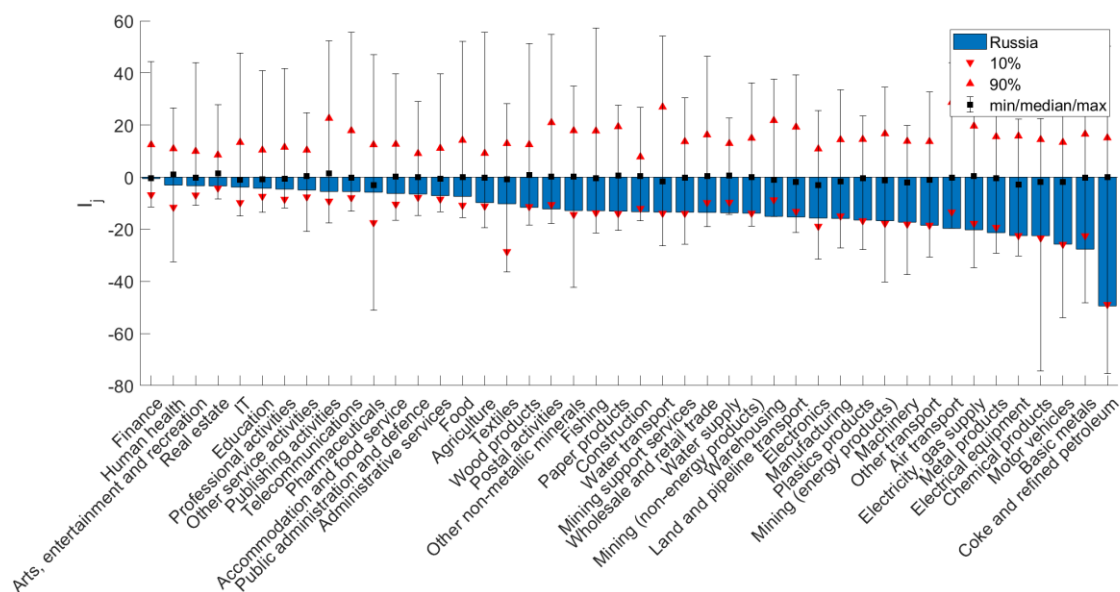
Source: the author's calculations.

The analysis of the above indicators suggests that a number of industries really have high import content (e.g., electronics). However, it is below the median in nearly all industries regardless of the measures selected. Moreover, import content in a number of industries is at the level of the 10th percentile or even lower (power generation, manufacture of refined petroleum products, manufacture of metals, etc.). Hence, we can make a preliminary conclusion that the Russian economy is less dependent on intermediate imports than many other economies at least in terms of quantities.

However, these findings are partially explained by the following factors, some of which will be the focus of the next subsection:

- The calculations ignore indirect imports.
- The sample is biased towards advanced economies (38 of 68) that are more engaged in the world economy. In particular, the sample includes small economies that are by default highly dependent on imports (Luxembourg, Malta, Singapore, etc.).
- Russia is rich in energy resources and other commodities that account for a substantial proportion in other economies' imports.
- The calculations only factor in import content in intermediate consumption and not in investment.
- Russia is weakly engaged in global value chains.

5.2 Import content in outputs

5.2.1 Imports from all countries

In this subsection, the focus of the analysis will be shifted from import content in intermediate inputs towards import content in outputs. The first indicator considered herein reflects the share of direct imports, that is, imports that are directly used in the manufacture of products of a particular industry. The results are given in Chart 4. For Russia, the share of direct imports is below the median for all industries, except IT and professional, scientific and technical activities. Such industries as manufacture of

motor vehicles, electronics, and manufacture of rubber and plastics products have the highest dependence on imports.

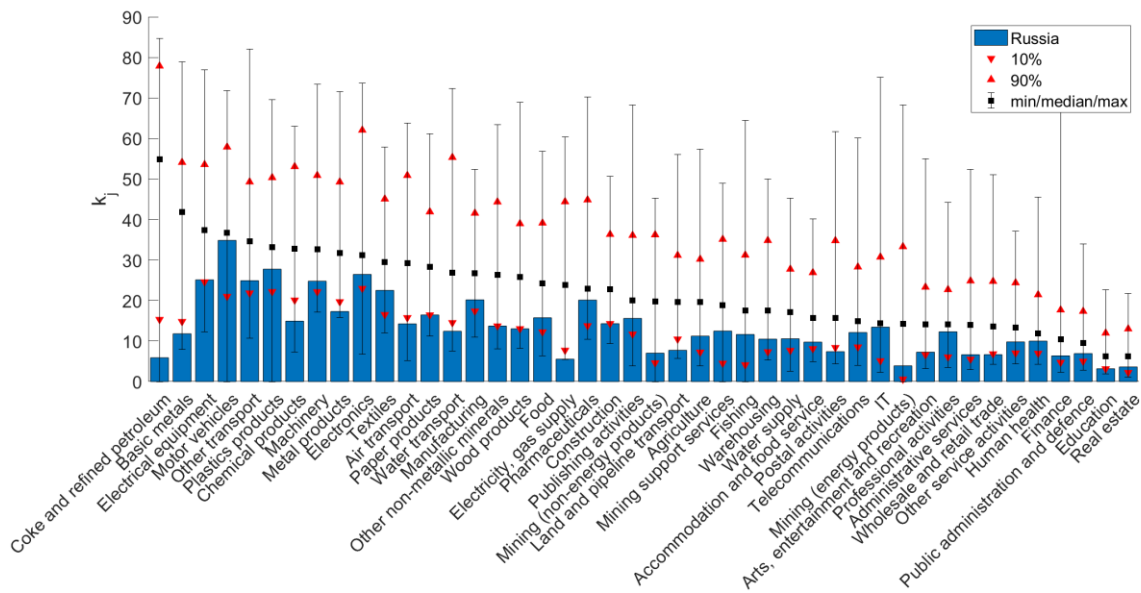*Chart 4. Share of direct imports in outputs, %*
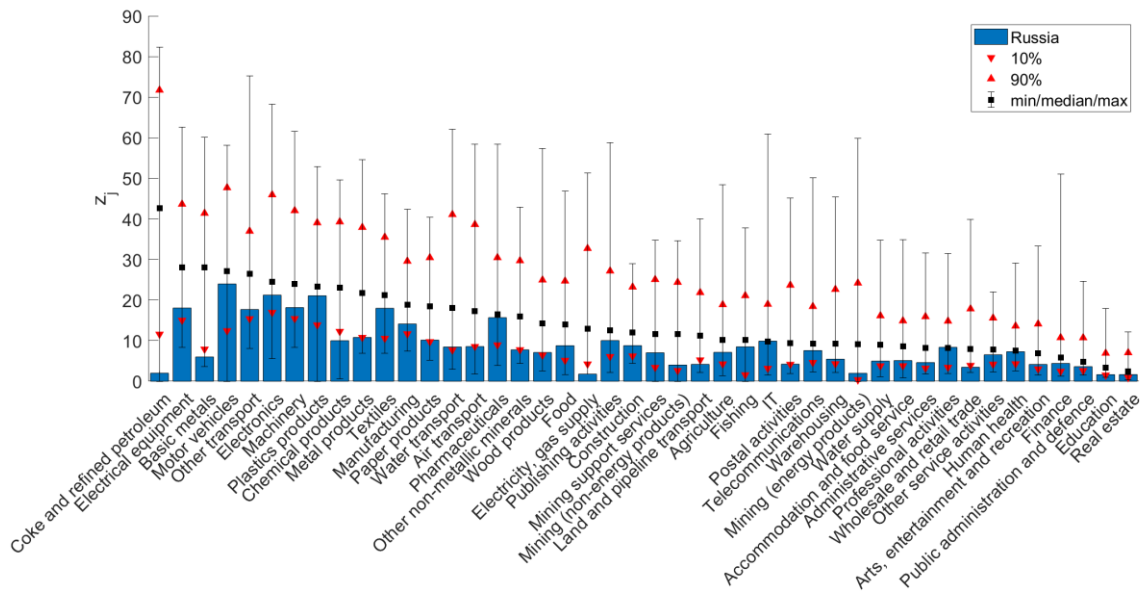
Source: the author's calculations.

Nonetheless, the analysis of the overall share of direct and indirect imports is of principal interest. Indirect imports comprise imports that are used in the manufacture of a particular industry's products indirectly, that is, through consumption from other domestic industries. The indicator is shown in Chart 5. [16] When indirect imports are factored in, import content increases by 4.6 pp on average. For individual industries, indirect imports are more important than for the economy in general (see Chart 6). For instance, indirect imports in manufacture of motor vehicles exceed 10% of output value, which probably reflects a large share of assembly operations for this industry. Accordingly, when indirect imports are factored in, this confirms that manufacture of motor vehicles is most reliant on imports. Nevertheless, the earlier conclusions regarding a relatively low dependence of the Russian economy are still relevant.
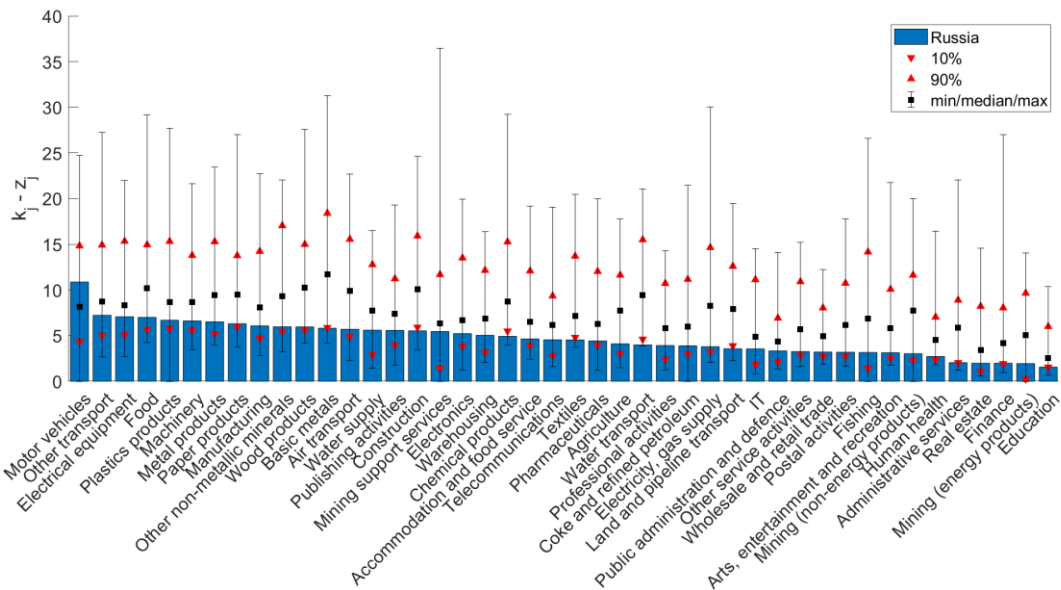
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[16] Hereinafter, we refer to total imports, unless indicated otherwise.

Chart 5. Share of total imports in outputs, %

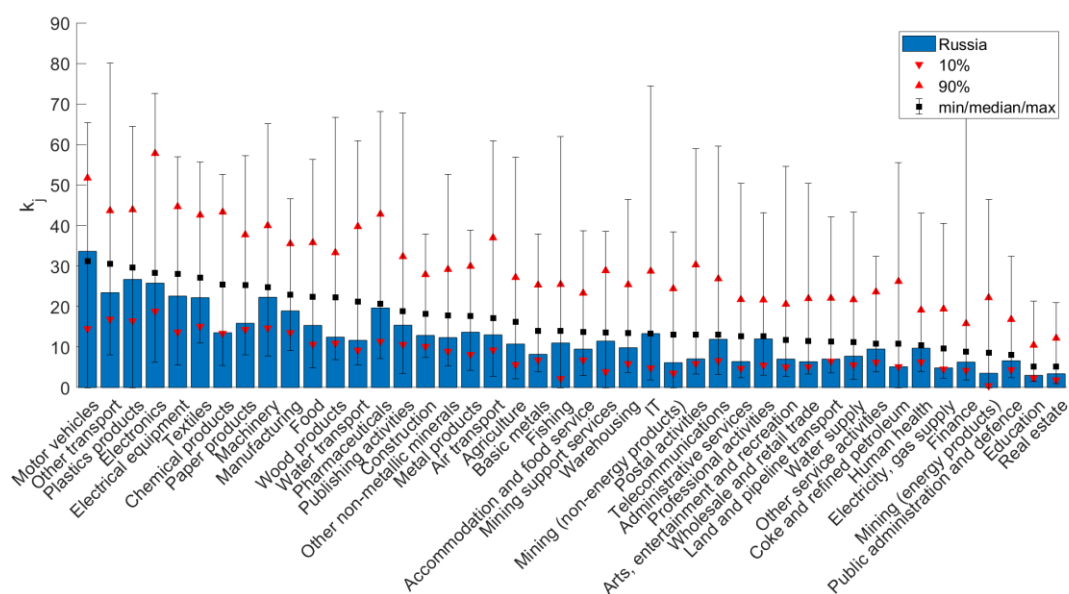Source: the author's calculations.

Chart 6. Share of indirect imports in outputs, %

Source: the author's calculations.

As noted at the end of the previous subsection, Russia possesses unique reserves of energy resources and other commodities, which is why its import mostly concludes non-commodities products. Hence, to ensure a meaningful comparison, it would be reasonable to additionally consider only non-commodity imports. The results obtained (Chart 7) really evidence that the gap between the median and the Russian economy decreases when commodity imports are left out, but the values for most industries are still below the median.

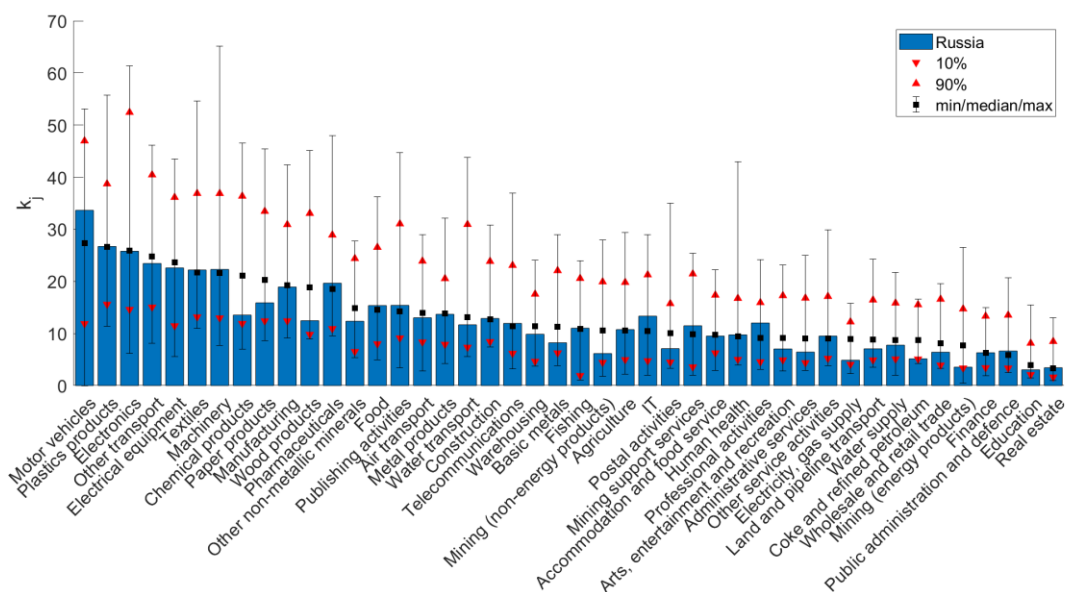*Chart 7. Share of non-commodity imports in outputs, %*

Source: the author's calculations.

This paper also studies two subsamples of countries that are comparable with Russia in terms of economic and demographic indicators, which is needed due to the uneven composition of the original sample. Specifically, it includes city-states (Singapore, Hong Kong, etc.) that traditionally have a large share of imports. Chart 8 shows the results for a group of countries with a population of above the median in the original sample, and Chart 9 – for countries with PPP GDP above the median. When the sample is limited, this increases the number of industries where import content exceeds the new median to 9 and 19, respectively. These industries include manufacture of motor vehicles, IT, professional, scientific and technical activities, mining support service activities, etc.[17]

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[17] The Annex also includes a chart showing the change in the difference between the value for Russia and the median after commodity imports are left out and the sample is limited (8.4 pp on average).

Chart 8. Share of non-commodity imports in outputs, % (countries with the size of population above the median)

Source: the author's calculations.

Chart 9. Share of non-commodity imports in outputs, % (countries with PPS GDP above the median)
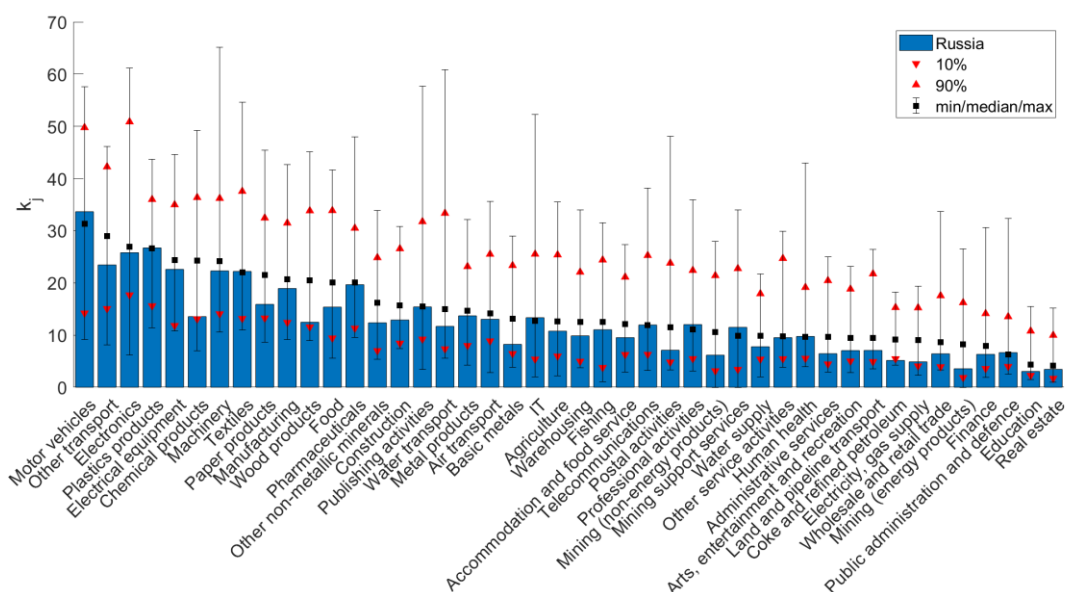
Source: the author's calculations.

5.2.2 Imports from the countries that have imposed sanctions

As a number of countries have enacted economic sanctions against Russia, the Russian economy's reliance on imports from these countries is of special interest. According to the findings, the share of imports from these states averages 8.1% in outputs (see Chart 10).[18] As before, the dependence on imports is the highest in such industries

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[18] Some countries that have announced sanctions against Russia are represented in the sample through 'The Rest of the World'; therefore, imports from these countries were not excluded. Nonetheless, the proportion of imports from these states can be assumed to be minor.

as manufacture of motor vehicles (24.6%), manufacture of rubber and plastic products (17.7%), manufacture of other transport equipment (15.6%), etc. The share of imports in Russia is below the median, which can be explained, in particular, by a bias in the sample towards the countries that have imposed sanctions against Russia (39 of 66). This group of states probably has close political and, consequently, economic ties, which determines a relatively high level of the median. That said, the comparison with the BRICS member states[19] that have not introduced sanctions against Russia makes it possible to conclude that Russia's dependence on imports from the 'unfriendly' countries and the BRICS member states is comparable (the difference between the median for these states and Russia averages 0.5 pp).

Chart 10. Imports from the 'unfriendly' countries in outputs, %
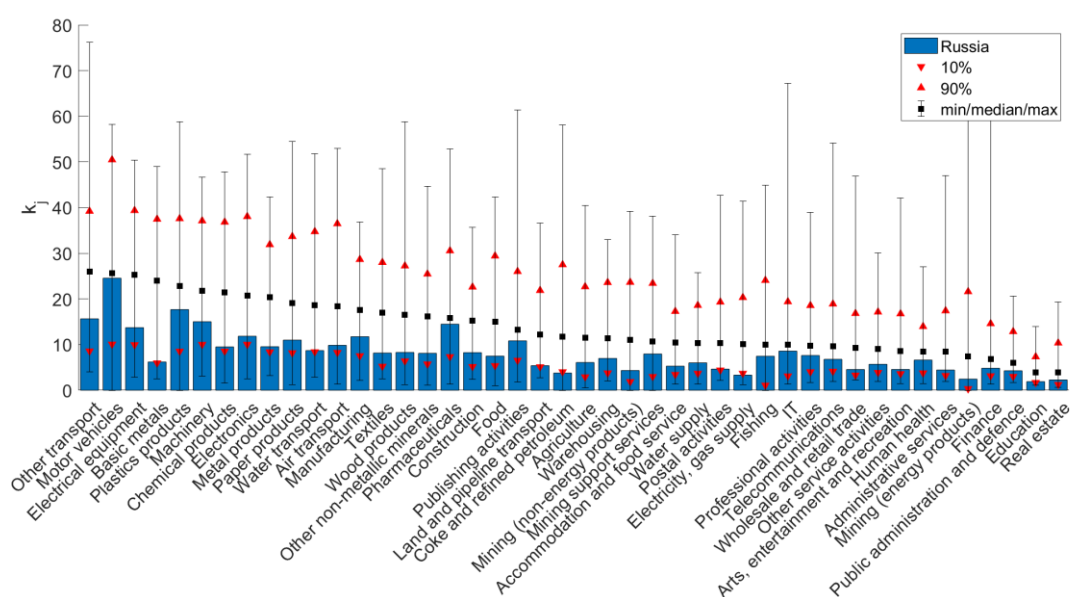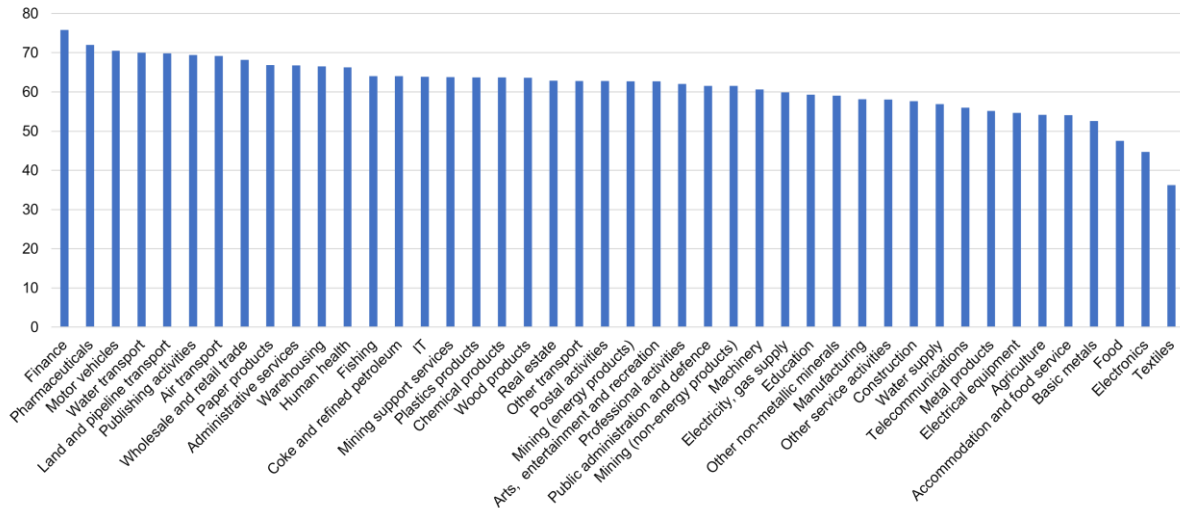

Source: the author's calculations.

The share of imports from the states that have enacted sanctions against Russia averages 60% in total imports. However, this figure varies across industries. Specifically, it reaches 75.8% in finance. Moreover, two countries – the USA and the UK – account for over a third in total imports. Conversely, the proportion of imports from the 'unfriendly' states in manufacture of textiles and electronics is only 36% and 44.8%, respectively. In both cases, China accounts for 30% to 40% in total imports. However, these products can also be manufactured by companies headquartered in the countries that have announced sanctions. The situation for non-commodity imports is similar as imports from this group of countries are predominantly non-commodity goods.

Summing up the obtained results, it is possible to conclude that import dependence in most industries of the Russian economy is lower than in many countries, even after leaving out commodity imports and limiting the sample. As to the industries that have a larger share of imports, the difference with the median is often minor. One of the factors behind this result is probably Russia's less intense involvement in global value chains or participation therein at early stages. Nonetheless, considering that the world economy

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[19] We used data for Turkey instead of China.

is closely integrated, even when import dependence is relatively low, imports remain critical for outputs in certain industries.[20]

Chart 11. Imports from the 'unfriendly' countries in total imports, %

Source: the author's calculations.

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[20] Although import dependence in manufacture of motor vehicles is close to the median on average, the restrictions on component imports and foreign companies' exit have actually entailed a suspension of operations in the industry, including at Russian plants (the output of motor vehicles decreased by 96.7% in May).

6. Conclusion

In this paper, we calculated a range of indicators of the economy's dependence on imports (including by indirectly taking into account the quality aspect of this dependence) and carried out a comparative analysis of the Russian economy's reliance on imported raw materials and components against a large sample of other countries. The study revealed that the proportion of imports of intermediate consumption in most Russian industries is lower than that in many other economies. Specifically, the share of total imports in 43 of 45 industries turned out to be below the median in our sample. To factor in Russia's richness in commodities and energy resources, we also estimated the country's reliance on non-commodity imports, but this did not affect the main findings. Even compared with the countries having a similar size of the economy and size of the population, import content in most industries is still below the median. Import dependence is the highest in manufacture of motor vehicles, manufacture of rubber and plastics products, and electronics. Additionally, we evaluated imports from the countries that have announced sanctions against Russia accounting on average for 61% in Russian industries' total imports of raw materials and components.

The main factor of Russia's comparatively low dependence on imports of intermediate consumption is probably its low involvement in global value chains or participation therein at early stages. Nevertheless, even though the proportion of imports is relatively low, imports can still be critical in certain industries' outputs. This is especially important, considering that we cannot analyse industries' dependence on investment imports due to the lack of data.

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Annexes
Annex 1. List of countries and industries in the OECD Input-Output Tables

Table 1. List of countries

	OECD countries		Non-OECD economies
AUS	Australia	ARG	Argentina
AUT	Austria	BRA	Brazil
BEL	Belgium	BRN	Brunei Darussalam
CAN	Canada	BGR	Bulgaria
CHL	Chile	KHM	Cambodia
COL	Colombia	CHN	China (People's Republic of China)
CRI	Costa Rica	HRV	Croatia
CZE	Czech Republic - Czechia	CYP	Cyprus
DNK	Denmark	IND	India
EST	Estonia	IDN	Indonesia
FIN	Finland	HKG	Hong Kong, China
FRA	France	KAZ	Kazakhstan
DEU	Germany	LAO	Lao People's Democratic Republic
GRC	Greece	MYS	Malaysia
HUN	Hungary	MLT	Malta
ISL	Iceland	MAR	Morocco
IRL	Ireland	MMR	Myanmar
ISR	Israel	PER	Peru
ITA	Italy	PHL	Philippines
JPN	Japan	ROU	Romania
KOR	Korea	RUS	Russian Federation
LVA	Latvia	SAU	Saudi Arabia
LTU	Lithuania	SGP	Singapore
LUX	Luxembourg	ZAF	South Africa
MEX	Mexico	TWN	Chinese Taipei
NLD	Netherlands	THA	Thailand
NZL	New Zealand	TUN	Tunisia
NOR	Norway	VNM	Vietnam
POL	Poland	ROW	Rest of the World
PRT	Portugal		
SVK	Slovak Republic		
SVN	Slovenia		
ESP	Spain		
SWE	Sweden		
CHE	Switzerland		
TUR	Turkey		
GBR	United Kingdom		
USA	United States		

Source: OECD.

Table 2. List of industries

| Code	Industry	ISIC Rev.4
D01T02	Agriculture, hunting, forestry	01, 02
D03	Fishing and aquaculture	03
D05T06	Mining and quarrying, energy producing products	05, 06
D07T08	Mining and quarrying, non-energy producing products	07, 08
D09	Mining support service activities	09
D10T12	Food products, beverages and tobacco	10, 11, 12
D13T15	Textiles, textile products, leather and footwear	13, 14, 15
D16	Wood and products of wood and cork	16
D17T18	Paper products and printing	17, 18
D19	Coke and refined petroleum products	19
D20	Chemical and chemical products	20
D21	Pharmaceuticals, medicinal chemical and botanical products	21
D22	Rubber and plastics products	22
D23	Other non-metallic mineral products	23
D24	Basic metals	24
D25	Fabricated metal products	25
D26	Computer, electronic and optical equipment	26
D27	Electrical equipment	27
D28	Machinery and equipment, nec	28
D29	Motor vehicles, trailers and semi-trailers	29
D30	Other transport equipment	30
D31T33	Manufacturing nec; repair and installation of machinery and equipment	31, 32, 33
D35	Electricity, gas, steam and air conditioning supply	35
D36T39	Water supply; sewerage, waste management and remediation activities	36, 37, 38, 39
D41T43	Construction	41, 42, 43
D45T47	Wholesale and retail trade; repair of motor vehicles	45, 46, 47
D49	Land transport and transport via pipelines	49
D50	Water transport	50
D51	Air transport	51
D52	Warehousing and support activities for transportation	52
D53	Postal and courier activities	53
D55T56	Accommodation and food service activities	55, 56
D58T60	Publishing, audiovisual and broadcasting activities	58, 59, 60
D61	Telecommunications	61
D62T63	IT and other information services	62, 63
D64T66	Financial and insurance activities	64, 65, 66
D68	Real estate activities	68
D69T75	Professional, scientific and technical activities	69 to 75
D77T82	Administrative and support services	77 to 82
D84	Public administration and defence; compulsory social security	84
D85	Education	85
D86T88	Human health and social work activities	86, 87, 88
D90T93	Arts, entertainment and recreation	90, 91, 92, 93
D94T96	Other service activities	94,95, 96

|		
D97T98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	97, 98

Source: OECD.

Annex 2. Additional charts

Chart 1. Subsample of countries with a population above the median in the original sample
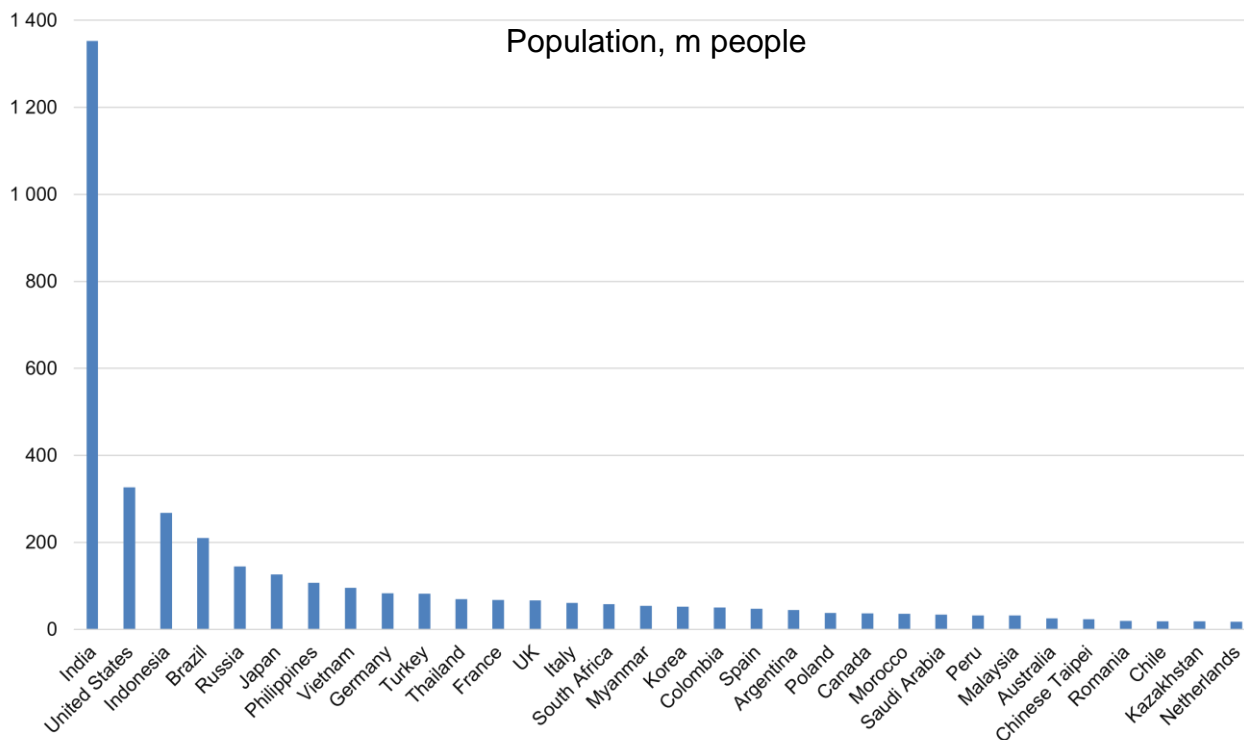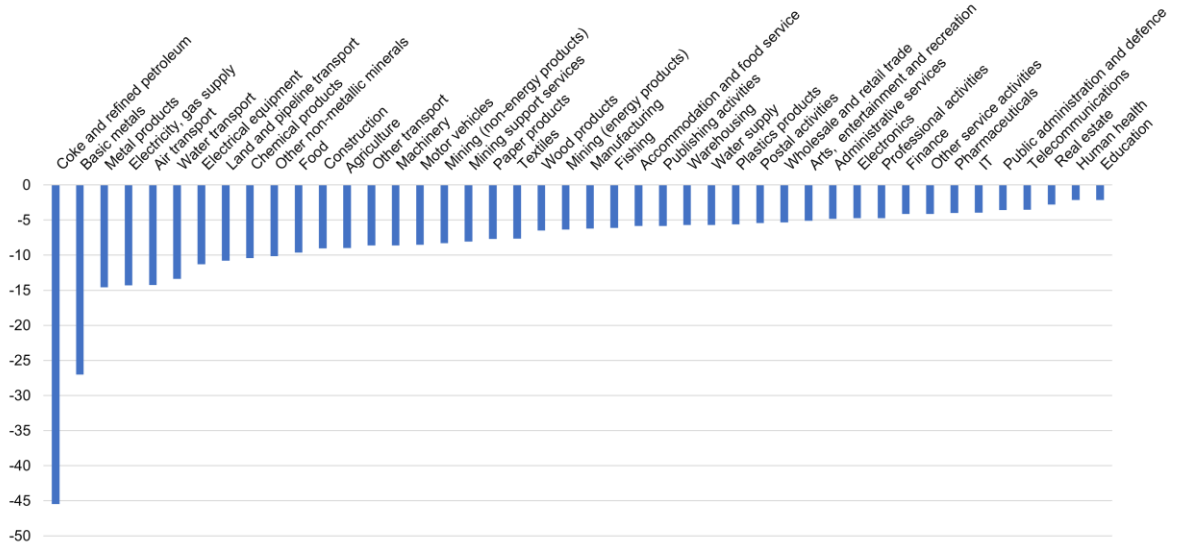

Sources: the author's calculations, World Bank (2022).

Chart 2. Subsample of countries with PPS GDP above the median in the original sample
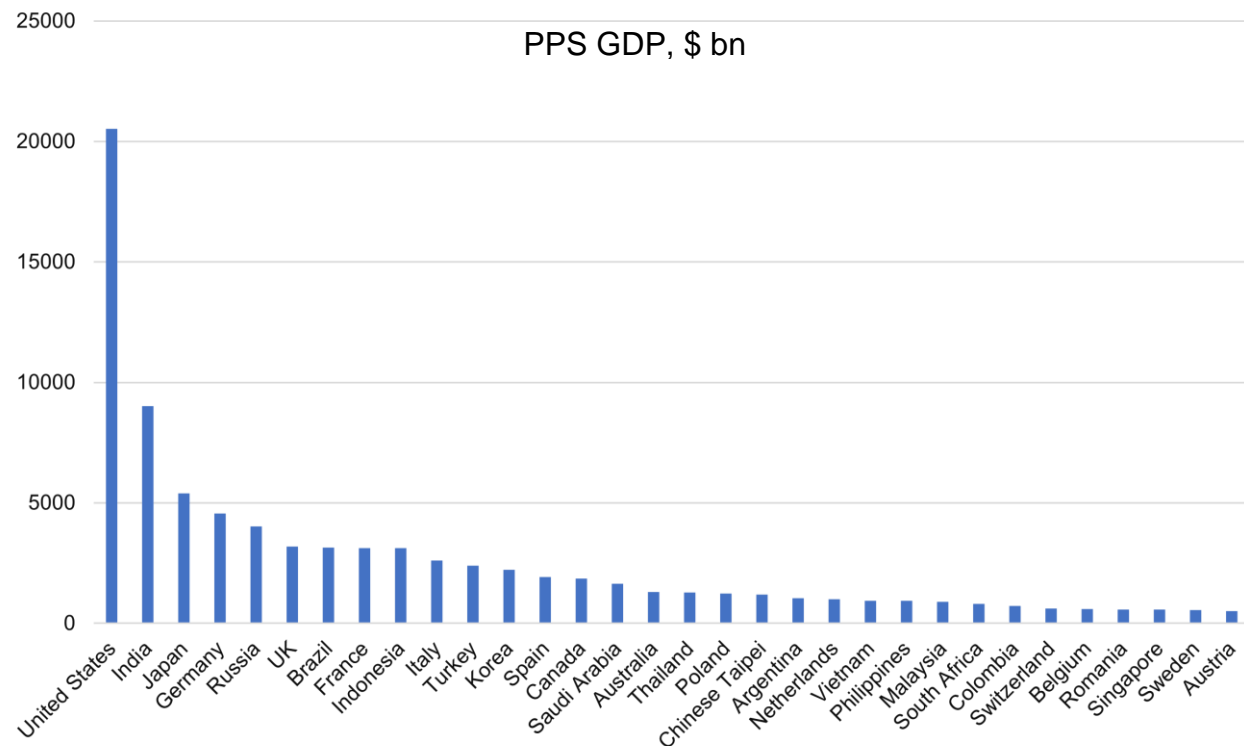
Sources: the author's calculations, IMF (2022).

Chart 3. Change in the difference between the median and Russia in different calculations, pp

Source: the author's calculations.