# Assessment of Russian economic growth potential in 2024-2030

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ORIGINAL ARTICLE

**Abstract.** The Russian economy faced serious problems: a shortage of labour; economic sanctions, and high depreciation of fixed capital. The economic policy of the Russian authorities is inconsistent. It includes the desire to increase investments in fixed capital is accompanied by their artificial restraint through monetary and financial policies. Indeed, the scientific literature makes various proposals for economic policy changes. However, we believe the insufficient attention is paid to the objective possibilities of accelerating the renewal of fixed capital. The purpose of the study is to determine the growth opportunities of the Russian economy in 2024-2030 on the basis of accelerating fixed capital renovation. We used methods of mathematical statistics and simulation modelling. Information research base: official statistics. We constructed two objectively possible trajectories of the Russian economy development for 2023-2030 have been constructed in terms of accelerating fixed capital renovation. According to the research, the trajectory with a higher rate of capital renewal provides a significant acceleration of economic development and significantly reduces the country's dependence on equipment imports and exports of raw materials, even with a reduction in the total number of employees. To realize the potential of economic growth, changes in property relations, effective management system are necessary; their essence is in the formation of national economic planning through indicative planning, foreign trade, currency regulation, and nationalisation of management.

**Keywords:** economic growth potential; simulation model of the economy; renewal of fixed assets; growth trajectory; state economic policy; state planning

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## Introduction

Recently, Russia has faced an increasing shortage of labour[1]. Under the current economic policy, it does not allow ones to increase and maintain the low rates of economic growth. An increase in the number of migrant workers provides only a short-term improvement; it does not provide an increase in labour productivity – the main factor of economic development. In addition, labour immigration causes escalating of social issues, the growth of crime, and ethnic tension. The situation is aggravated by the high depreciation of fixed assets in most economic sector. It manifested, for example, in serious accidents at infrastructure facilities; the continuing tangible dependence of the economy on technology raw materials imports and exports; sanctions imposed by the United States and its satellites; resources for the Special Military Operation (SMO) in Ukraine.

The material basis for overcoming the obstacles in development of our country can only be the rapid renovation of production technical base.

The purpose of the study is to identify objective opportunities and ways to accelerate the technical re-equipment of the Russian economy and assess its effect.

*Theoretical framework*

Addressing the problem of production modernisation in economic literature is associated primarily with an increase in fixed capital investment. It can be achieved in various ways, including: changing the

[1] *Vedomosti. (2023). The Russian Academy of Sciences assessed the shortage of personnel in Russia at 4.8 million people. Retrieved from: https://www.vedomosti.ru/economics/news/2023/12/24/1012656-otsenili (accessed 20.08.2024) (in Russian).*

depreciation policy[2]; profit taxation [1; 7]; cancellation of the tax manoeuvre[3]; monetary policy [2]; targeted lending at a reduced interest rate[4]; public-private partnership[5]; attraction of foreign capital [3; 4]; use of the industrial development funds[6]; increasing the volume of lending to SMEs [5]; activation of budgetary policy without increasing taxes [6], etc.

As a rule, one of the main reasons for the slow renovation of fixed capital is considered to be the shortage of companies' capital [8].

In this regard, in 2018, when the share of investments in fixed assets amounted to 17.3% of GDP, the Government of the Russian Federation approved a plan to increase this indicator up to 25% in 2020-2022[7]. However, in 2020-2022, the share of investments in fixed assets in GDP decreased to 14-15% [9].

Moreover, governmental financial block limited the volume of investments in the national economy in accordance with the «budget rule» and measures against inflation through a high interest rate. There is an opinion on independent position of the Central Bank in stimulation of the economic growth [10]. In addition, according to the Central Bank's management, due to the «overheating» of the economy, expressed in an increase in labour shortages, increased investment will only cause the inflation[8].

In this regard, a there is a discussion on the expediency of attracting migrant workers[9].

A number of authors consider the resumption of the growth of Russian exports as a source of funds for the budget and investments [11]. However, the «budget rule» prevents the use of these funds as investments. However, SMO made the government had to break this «rule» to ensure the armed forces.

Import substitution is often considered the most important condition for a technological breakthrough [12]. However, a reduction of imports, with the same or growing exports, inevitably causes an increase in the current account and capital outflow, i.e. causes a reduction of investments in the country's economy. Also, there is an opinion that import substitution, as a rule, is less effective than import itself [13].

The most of authors develop recommendations within the framework of the current system of economy state regulation based on the neoclassical theory of state indirect impact on the market of final goods and services. The other researchers believe the practical use of strategic planning[10] [14-15]; the transition to a mobilization economy [16-17]; the «Stalinist model» of the economy [18-19] as ways of addressing.

However, these proposals concern with a further increase in the role of the state in the economy. Therefore, many authors see negative aspects in them[11]. According to scientific literature, the state, being the «private property of the bureaucracy costs an ordinary Russian citizen prohibitively expensive, without any real help from the state» [20].

Currently, there is a need to renovate the fixed assets. Indeed, a few researchers consider it an effective one. In our opinion, the most comprehensive assessment provided by the Siberian Branch of the Russian

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*[2] Prokhorova, E. K. (2024). State fixed assets impact on the development of Russian industry in the context of international sanctions. Retrieved from: http: Prokhorov_30–36.pdf (imi-samara.ru) (accessed 20.07.2024) (in Russian).*

*[3] Valery Hartung on importance to cancel the tax maneuver March 10, 2022. (2024). Retrieved from: https://spravedlivo.ru/11899310 (accessed 20.07.2024) (in Russian).*

*[4] Glazyev, S. (2024). Monetary containment of Russia. Retrieved from: https://www.youtube.com/watch?v=OyjKRxp3Pf0 (accessed 20.07.2024).*

*[5] Public-private partnership in Russia: the results of 2023 and the main trends (2024). Roscongress Foundation. Retrieved from: https://roscongress.org / (accessed 20.07.2024).*

*[6] Industrial Development Fund. News (2024). Retrieved from: https://frprf.ru/press-tsentr/novosti / (accessed: 20.07.2024).*

*[7] The government approved a plan to accelerate the growth rate of investments in fixed assets and increase their share in GDP to 25% (2024). Retrieved from: http://government.ru/news/35925/ (accessed 20.08.2024) (in Russian).*

*[8] E. Nabiullina assessed the overheating of the Russian economy. (2024). RBC. Finance. Retrieved from: https://www.rbc.ru/finances /07/06/2024/66632ef59a7947dfc40c0b09 (accessed 20.08.2024).*

*[9] Degotkova, I. (2023). Experts argued about the benefits of attracting migrants to Russia. RBC Group of Companies. News. 10/25/2023. Retrieved from: https://www.rbc.ru/rbcfreenews/66745dac9a79470a53da1c77 (accessed 20.08.2024) (in Russian).*

*[10] Glazyev, S. Yu. (2024). The program of socio-economic development of Russia. Social Justice and Economic Growth, 2024. Retrieved from: https://www.glazev.ru (accessed 20.08.2024) (in Russian).*

*[11] Pronko Yu. (2024). Do officials not care about people? Kickbacks only! TC Tsargrad, 06/21/2024. Retrieved from: https://tsargrad.tv/shows/pronko-chinovnikam-plevat-na-ljudej-glavnoe-otkaty-2_1017718 (accessed 20.08.2024) (in Russian).*

Academy of Sciences and Novosibirsk State University[12]. According to their calculations, the renewal of fixed assets in accordance with the normative service life would allow ones to raise the rate of economic growth up to 6% per year. Indeed, it would be necessary to increase investments in fixed assets by 1.5 times, which is impossible yet. During SWO in 2023, the share of investments in GDP increased to only 15% [21].

According to these points of view analysis, nowadays there is no theoretical and practical basis for interpreting the shortage of labour as a reason both for increasing the importation of migrant workers into the country and for limiting investments in the economy.

The expansion of migrant labour using (except expats) will basically only allow us to load and further operate, but not update, the existing equipment. It will give a one-time increase in output, but will not increase labour productivity. For instance, to achieve an increase in GDP by 1%, it is necessary to attract more than 700 thousand migrants. For annual increase of 4%, almost 3 million foreign workers should be imported annually. It will inevitably cause an aggravation of social issues, increase in crime, and ethnic tension.

The main direction of increasing labour productivity is the improvement of the instruments of labour. Indeed, it is possible to increase labour productivity by increasing employees qualifications. However, increase in labour productivity limited by the technology itself when it remains the same.

To address the issue of productivity growth and labour shortage, it requires updating the instruments of labour themselves. Therefore, the restriction of capital investments allows ones only to realise the short-term benefit of capital owners in using cheap labour instead of updating fixed capital. Indeed, it prevents the economy from the crisis.

The basis for addressing the issue of labour shortage (labour productivity growth) is the renewal of labour resources in existing organizations. It is the replacement of machines parts with new ones, or the installation of new equipment on the site, workshop, or enterprise. As a result, labour productivity is increasing and the need for labour is decreasing. Upgrading existing equipment has less effect in terms of reducing the need for workers, since the old equipment remains, although labour productivity increases. Transferring of workers between enterprises in order to increase employment with more efficient instruments of labour is limited. It provides spontaneous competition for workers between organizations and only exacerbates the problem.

It takes from several months to 1-2 years to replace the old equipment with the new one; the same time is necessary for the training of personnel to work on new equipment.

On the basis of reducing the need for labour reduces the shortage of personnel, appeared the prerequisites for workers' employment in newly created industries, including the production of instruments of labour.

Usually, the renovation of fixed capital is associated with the possibilities of monetary investments of business entities. But its renovation does not require money; it requires renovation of instruments of labour only. They can be manufactured domestically or imported. Currently, both sources are in use. However, they do not ensure proper renewal of fixed capital. It provides a high level of its depreciation, including the level of labour productivity [9].

To accelerate the process of fixed capital renewal, it is necessary to increase the inflow of new labour assets into the economy to replace deteriorated ones, both through domestic production and imports. Therefore, there is a need firstly rapidly increase the import of investment goods – primarily for the re-equipment and expansion of domestic production of labour instruments (in fields of mechanical engineering and industrial construction) and industries supplying it with the necessary material resources and services. Then, based on an increase in the output of labour instruments, proceed to reduce their imports and turn the country into a net exporter of equipment.

Import substitution will not provide a rapid increase in the equipment influx, since it is aimed at reducing imports of machinery. The domestic production of machinery development along with increase in its import, will dramatically increase this influx and subsequently accelerate import substitution.

Approximately according to this logic, the technical reconstruction of the Soviet economy during the

[12] *Baranov, A. O., & Kvaktun, M. I. (2024). Forecasting accelerated renewal of fixed assets in Russia using a dynamic cross–industry model. Retrieved from: https://ecfor.ru/publication/prognoz-obnovleniya-osnovnogo-kapitala-v-rossii (accessed 20.07.2024) (in Russian).*

first five-year plans was provided [22]. Nowadays, the same paradigm should be implemented in order to achieve national technological independence of the country.

Today, as in the years of industrialisation, our country is under the sanctions. Purchasing of new equipment is significantly complicated. To purchase the necessary equipment, there is a practice of using parallel imports, copying technologies, barter, digital currencies, and other import substitution schemes. In complex, it ensures national security in the context of a «hybrid war» [23]. Previously, the Soviet Union and the People's Republic of China are copying equipment and components. Subsequently, they successfully addressed with technological sovereignty achievement.

First of all, it requires the import of the necessary highly efficient equipment have not been producing domestically. In the future, its production should also be established, including through its copying and modernisation.

In case the import of equipment that is the most efficient is absolutely impossible, it will help to design the competitive products. Firstly, it is necessary to modernise and expand the machine tool industry, revive it on the basis of imported and the best domestic equipment, in order to build machinery based on it.

For types of equipment need to be produced domestically and imported at the same time, equal conditions of competition should be created. The protectionist measures should be applied to ensure national production development.

There are objective opportunities for a significant increase in imports of investment goods. They are as follows:

– current account funds (see Table 1);

– the Russian Federation international reserves (on August 16, 2024 amounted to $ 609.9 bn USD)[13]. Despite about $300 bn USD of reserves are frozen by Western banks, the amount of available reserves exceeds about $ 130 bn USD can be used for import purchases without any threats to foreign trade continuity.

– replacing part of the import of less important goods; their production can be easily established domestically by small businesses (fasteners, accessories, underwear, toys, etc.).

**Table 1** – Some indicators of Russia's foreign economic activity (USD, bn)

| Period | 2020 | 2021 | 2022 | 2023 | 7 months of 2024 |
|---|---|---|---|---|---|
| Current account positions, eop[14] | 37.35 | 124.95 | 237.68 | 50.22 | 39.7 |
| Import of investment goods | 60.74 | 88.16 | now | now | now |

*Sourcs: [9]*

Therefore, there are objective opportunities for a significant increase in imports of machinery to provide domestic engineering and related industries growth.

It is necessary to assess their implementation using and determine the methodology for intended effect assessment.

**Methods**

The basis for assessing the effect of renewal, a 4-sector model of the intersectoral balance was used. It simulates the development of the Russian economy in 2005-2019 [24]; data by Rosstat [9], the Ministry of Finance[15], and the Bank of Russia[16], methods of correlation and regression analysis, simulation modelling

[13] *Bank of Russia. (2024). Retrieved from: https://www.cbr.ru/ (accessed 20.08.2024) (in Russian).*

[14] *CBR. (2024). Statistical Bulletin of the Bank of Russia. Retrieved from: http://www.cbr.ru/statistics/bbs/ (accessed: 20.08.2024) (in Russian).*

[15] *The Ministry of Finance of the Russian Federation. (2024). Statistics Retrieved from: https://minfin.gov.ru/ru/statistics/ (accessed 20.08.2024) (in Russian).*

[16] *CBR. (2024). Statistical Bulletin of the Bank of Russia. Retrieved from: http://www.cbr.ru/statistics/bbs/ (accessed: 20.08.2024) (in*

were used.

The model is as follows. The sectors of the model concern with all types of economic activity differ from each other in the economic purposes:

– production of instruments of labour (sector 1);
– overhauling and reconstruction of instrument of labour (sector 2);
– production of consumer goods and final services (sector 3);
– intermediate non-production services (sector 4).

Sector 1 includes: agriculture, forestry, hunting, fishing, and fish farming; extractive industries; partially: manufacturing, production and distribution of electricity, gas, and water; construction (maintenance of buildings and structures), trade; freight transport, i.e. activities the results of which are used by economic entities and relate to the material costs.

Mechanical engineering and construction are partially attributed to sector 2. Two main subsectors are identified: 2a) Establishing of new instruments of labour; 2b) Overhauling and reconstruction of instruments of labour

Sector 3 partially includes: manufacturing; production, and distribution of electricity, gas, and water (for the population); construction (housing), transport (passenger), communications, trade and repairs (in terms of public services), hotel activities, catering; other services (public administration, social security, education, healthcare, etc.)

Sector 4. It includes: financial activities, real estate, rental services (including science).

Using the methods of mathematical statistics for each sector, the dependences of labour productivity, material consumption of products, unit costs of intermediate consumption, and labour stock ratio when working in one shift on the share of newly introduced funds in the existing fixed assets were estimated.

The statistical significance of the dependencies was verified using models based on the dynamics of output, material costs, intermediate consumption, and the volume of funds. It is quite high. In most cases, the correlation coefficients of the simulated and actual dynamics of the indicators is 0.97-0.99; the lowest one is 0.83; the standard deviations did not exceed 1%.

The correlation between sectors is a system of following balance:

1) production and use of sector 1 products;
2) production and use of instruments of labour;
3) instruments of labour overhaul and reconstruction works;
4) intermediate services of a non-productive nature;
5) labour force.

The model also includes the usual balance of fixed assets by sector, indicators of value added, and final consumption.

The main control variables in the model are as follows: the volume of input and retirement of fixed assets; the number of employed in sectors; the degree of utilization of production capacities; the volume of foreign trade in investment, intermediate and consumer goods; the size of international reserves; the unemployment rate.

Exogenous values are considered to be indicators of the total number of employees, net factor income, and net current transfers.

Based on the described model, balanced growth trajectories objectively possible in 2005-2019 were constructed. According to them, Russia would become a net exporter of production equipment and a significant increase in economic growth rates without increasing exports of raw materials and employed [24].

The described model was also used to assess the effect of various options for updating fixed assets in the Russian economy for 2024-2030. Moreover, the previously established dependencies of economic activity indicators by the sectors on the share of newly introduced fixed assets in the existing fixed capital remain. All calculations are in the basic prices of 2023.

In terms of the hybrid war, a component was allocated as part of the final product to provide the armed

*Russian).*

forces, including: production of weapons, including fixed assets (equipment) – the result of the work of sector 2; and material resources (ammunition) – part of the products of sector 1; consumer goods and services (uniforms, food, etc.), which are supplied by Sector 3.

Military costs of the Russian Federation budget in 2023 were 6,652.0 bn RUB; in 2024 – 10,737.0 bn RUB[17]. The employed in the armed forces is 2,209.1 thousand people[18].

Two possible trajectories of the Russian economy development for 2024-2030 were calculated:

1) inertial – while maintaining the parameters of renewal of fixed capital and foreign economic activity developed over the previous period;

2) with the accelerated renewal of fixed capital due to the initial increase in imports of investment goods and the subsequent transition to its reduction based on the rise in domestic production of instruments of labour.

Prerequisites:

1) When constructing an inertial trajectory:

– maintaining the renewal and retirement ratios of fixed assets typical for recent years, including for sector 1: 5.4% and 0.5%, respectively; sector 2: 8.0% and 0.5%, respectively; sector 3: 3.0% and 0.5%, respectively; sector 4: 3.7% and 0.8%, respectively.

– Maintaining net exports at the average level of recent years, including intermediate goods in 18,574.3 bn RUB; investment goods: 7,166.5 bn RUB; consumer goods and services: 4,139.4 bn RUB.

– Maintaining the same structure of the employed by sector.

– Maintaining the value of the current account at the level of 2023, i.e. 4,278.1 bn RUB.

– An increase in arms production by 3 times in 2025 compared to 2023; stabilisation at this level; an annual increase in the provision of the armed forces with consumer goods and services by 6% per year – by 1.5 times in 2030.

2) When constructing a trajectory with accelerated renewal of fixed assets:

– the use of part of the international reserves accumulated in 2023 for import purchases – 11,898 bn RUB in 2023 prices (approximately $ 132.2 bn USD). Maintaining those in the future at an average of $ 175 bn USD.

– The expenditure of current account funds for the import of goods per year 4,278.1 bn RUB (about $ 47.5 bn USD).

– Increasing the coefficients of renewal and retirement of fixed assets in economic sectors due to the import of investment goods and accelerating the growth of instruments of labour.

– An increase in arms production in 2025 compared to 2023 by 3.77 times, followed by an annual growth of 6% per year; in 2030 – an increase of 5 times compared to 2023; an increase in the provision of the armed forces with consumer goods and services in 2025 – by 2.27 times, then by 6% in a year, in 2030 – 1.5 times (as in the previous case).

A common prerequisite for both trajectories: annual reductions in total employment – 100,000 in 2024 and 150,000 each year thereafter.

This is due to a significant natural decrease in the population and a tendency to decrease the migration influx.

Indeed, the natural decrease for 2022 was 543.4 thousand people; for 2023 – 438.3 thousand people; for 5 months of 2024 – 281.8 thousand people (For the same period of 2023 – 236.8 thousand people) The migration increase for 5 months of 2023 was 109.7 thousand people; for 5 months of 2024 – 58.7 thousand people. The total population of Russia in January: May 2024 decreased by 223.1 thousand people.

However, the number of people employed in the Russian economy in the first half of 2024 was slightly higher than in the first half of the previous year. Indeed, it was due to reducing the unemployed and increasing the number of people participating in the SMO in Ukraine.

*[17] Duma. (2024). Federal Budget 2024-2026: basic figures. Retrieved from: http://duma.gov.ru/news/58339/ (accessed 20.08.2024) (in Russian).*

*[18] TASS. (2024). How the staffing of the Armed Forces of the Russian Federation changed. Retrieved from https://tass.ru/info/19436809 (accessed 20.08.2024) (in Russian).*

The year 2023 was taken as the starting point for both trajectories. The main indicators of the Russian economy are shown in Table 2.

**Table 2** – Performance indicators of economic sectors in 2023

| | Sectors | | | | | Total |
|---|---|---|---|---|---|---|
| | 1 | 2a | 2b | 3 | 4 | |
| Fixed assets at the beginning of the year, bn RUB | 216,692.5 | 6,590.5 | 1,957.5 | 152,582.3 | 49,578.6 | 427,401 |
| Fixed assets at the end of the year, bn RUB | 231,395.8 | 7,037.7 | 2,090.3 | 162,935.5 | 52,942.6 | 456,402 |
| Employment, thousand people | 24,435.2 | 3,802 | 1,129.2 | 38,860.8 | 5,372.8 | 73,600 |
| Intermediate consumption, bn RUB | 69,638.2 | 10,358.3 | 3076.6 | 55,158.5 | 7,792.8 | 146,024.4 |
| Newly introduced funds, bn RUB | 12,281.8 | 566.5 | 168.3 | 6,109.4 | 1,868.5 | 20,994.5 |
| Retired fixed assets, bn RUB | 1,300.2 | 39.6 | 11.7 | 915.5 | 297.5 | 2,564.4 |
| Output, bn RUB | 125,474.9 | 13,828 | 4,106.9 | 116,107.7 | 42,465.2 | 30,1982.7 |
| Material costs, bn RUB | 47,178 | 7,781.6 | 2,311.3 | 40,472.2 | 5,816.2 | 103,559.4 |

*Source: calculated on the basis of [21; 25]*

**Results**

Each trajectory included assessment by year for 2024-2030 by the following indicators:

– by economy sectors: the volume of input and disposal of fixed assets; their availability at the beginning and end of the year;

– average annual number of employed persons; output; intermediate consumption; material costs; value added; net exports; increase in product stocks (for sectors 1 and 3); labour productivity, material consumption of products, the degree of utilisation of production capacities, and a number of other indicators;

– for the economy as a whole: gross value added; final consumption, including and without including military costs; gross output; employment summary indicators

The indicators of the inertial trajectory assessed in terms of the assumptions above. Calculations of trajectory indicators with accelerated renewal of fixed assets characterised by higher rates of input and retirement of fixed assets; an increase in imports of labour in the early years is due to the use of international reserves and current account funds. Then the volume of imports of instruments of labour decreases, and their net exports indicators become positive ones. Therefore, net exports of raw materials and supplies are declining.

Additionally, this trajectory assumes an annual increase in the cost of training and encouraging employees to work on new equipment – 687-772 bn RUB. It depends on the share of new equipment in the fixed capital at the beginning of the year. To meet these costs, imports of consumer goods and services are increasing in the same volume. It is provided by the expense of international reserves and the current account. In total, to increase imports of labour and consumer goods and services, it is planned to allocate international reserves by 11,700 bn RUB; annual use of current account funds is 4,278.1 bn RUB.

Moreover, the volume of necessary goods imports is important in terms of the trajectory of accelerated renewal of fixed assets. In case of insufficient funds in the current account or an unforeseen significant reduction in the volume of international reserves, they can be secured by reducing imports of less significant goods and services.)

The trajectory of accelerated fixed capital renewal is supposed firstly to focus on accelerating the growth of the production of instruments of labour (sector 2a), and later on accelerating the growth of consumer sector 3.

The differences in the indicators of reproduction of fixed capital between the trajectories are shown in Table 3.

**Table 3** – Indicators of fixed assets reproduction for 2023-2030 with inertial (I) and accelerated (Y) options for updating fixed assets

| Indicator | Average renewal rate, % | | Average retirement rate, % | | The share of retired fixed assets in the volume of fixed assets at the beginning of 2023 | | The share of introduced fixed assets in the volume of fixed assets at the end of 2030 | | Growth in the volume of fixed assets at the end of the year, times | |
|---|---|---|---|---|---|---|---|---|---|---|
| Option | I | Y | I | Y | I | Y | I | Y | I | Y |
| Sector 1 | 4.3 | 5.9 | 0.5 | 5.0 | 4.7 | 41.4 | 30.4 | 45.9 | 1.30 | 1.07 |
| Sector 2 | 7.6 | 15.1 | 0.5 | 6.0 | 5.4 | 74.0 | 46.7 | 85.5 | 1.72 | 1.89 |
| Sector 3 | 3.0 | 6.3 | 0.5 | 3.0 | 4.4 | 27.2 | 21.3 | 44.8 | 1.19 | 1.28 |
| Sector 4 | 2.2 | 6.3 | 0.8 | 2.9 | 6.3 | 20.5 | 16.9 | 44.6 | 1.09 | 1.27 |
| The economy | 3.7 | 6.4 | 0.05 | 4.0 | 4.9 | 29.6 | 26.4 | 46.7 | 1.25 | 1.19 |

*Source: composed by the author*

By the table, under accelerated fixed capital renewal, the share of funds introduced in 2023-2030 in fixed capital at the end of 2030 (46.7%) is much higher than under inertial renewal (26.4%). The share of funds withdrawn during this period in the volume of funds at the beginning of 2023 under the accelerated version is also higher: 29.6% versus 4.9%. The growth of the total volume of fixed assets in the accelerated version (1.19 times) is less than in the inertial version (1.25), but they are more updated and their load factor is higher.

The renewal of fixed assets in sector 2 is faster. The share of capital aged 0-8 years in funds at the end of 2030 is 85.5%; in 2023-2030 74.0% of funds used in 2023 were eliminated. In the inertial version, the corresponding figures are 46.7 and 5.4%. In other sectors, the rate of renewal of fixed capital is approximately the same, but significantly higher with the accelerated version than with the inertial one.

The results of accelerating the renewal of fixed assets affected the growth indicators (see Table 4).

**Table 4** – Assessment of economic growth indicators for 2023-2030 in accordance with inertial (I) and accelerated (Y) options for updating fixed assets

| Indicator (bn RUB) | Growth over the period, times | | Average annual growth, % | |
|---|---|---|---|---|
| | Option I | Option Y | Option I | Option Y |
| Output, sector 1 | 1.117 | 1.191 | 1.016 | 1.025 |
| Output, sector 2 | 1.218 | 2.702 | 1.029 | 1.153 |
| Output, sector 3 | 1.251 | 1.418 | 1.033 | 1.051 |
| Output, sector 4 | 1.266 | 1.548 | 1.034 | 1.064 |
| Total output | 1.216 | 1.452 | 1.028 | 1.055 |
| Employment, sector 1 | 0.912 | 0.906 | 0.987 | 0.986 |
| Employment, sector 2 | 0.942 | 1.666 | 0.992 | 1.076 |
| Employment, sector 3 | 1.026 | 0.939 | 1.004 | 0.991 |
| Employment, sector 4 | 1.090 | 1.024 | 1.012 | 1.003 |
| Employment, total | 0.986 | 0.986 | 0.998 | 0.998 |

| Indicator (bn RUB) | Growth over the period, times | | Average annual growth, % | |
|---|---|---|---|---|
| | Option I | Option Y | Option I | Option Y |
| Final consumption, including military costs | 1.283 | 1.448 | 1.036 | 1.054 |
| Final consumption without military costs | 1.276 | 1.455 | 1.035 | 1.055 |
| Gross value added | 1.281 | 1.615 | 1.036 | 1.071 |
| Production of military equipment | 3.000 | 5.000 | 1.170 | 1.258 |
| Total military costs | 2.153 | 3.022 | 1.116 | 1.171 |
| Labour productivity by value added | 1.224 | 1.638 | 1.029 | 1.073 |

*Source: composed by the author*

Therefore, the acceleration of the renewal of fixed assets has significantly increased all growth indicators of both sectors and the economy as a whole. The difference in the dynamics of growth in gross value added, as the final source of all income in the country, is shown in figure 1.

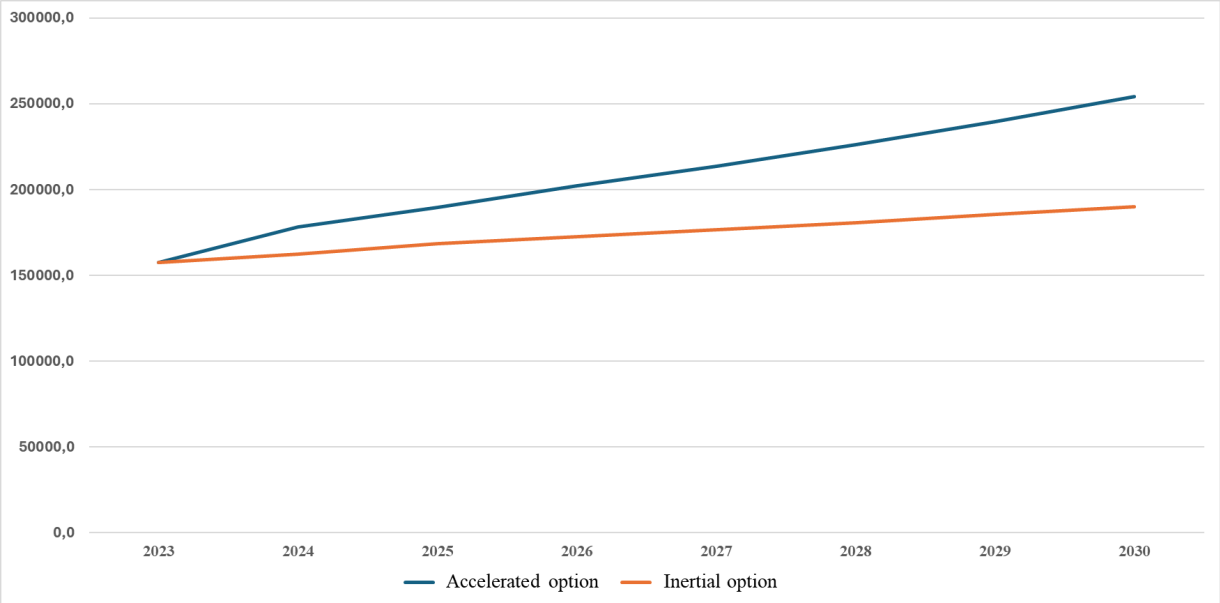


**Figure 1.** Dynamics of gross value added under the inertial and accelerated option of updating fixed capital, in basic prices of 2023, bn RUB

*Source: composed by the author*

The accelerated option of updating fixed capital allows the state to finance the military forces in large volumes, while final consumption, excluding military costs, will also increase faster than with the inertial option (Fig. 2 and 3).

However, using the accelerated option of updating fixed capital reduces the Russian economy dependence on the import of instruments of labour. According to Figure 4, Russia could become a net exporter of investment goods by 2030.

Additionally, the accelerated version reduces the dependence of the Russian economy on the export of raw materials (see Figure 5)

Due to the acceleration of the renewal of fixed assets, starting from 2027, there is a decrease in net exports of intermediate goods with a constant increase in their domestic use. Continuing the same course, Russia could become a zero net exporter of these resources in 2031, and a net importer thereafter. Meanwhile, production in sector 1 will be higher than under the inertial variant (see Table 4).

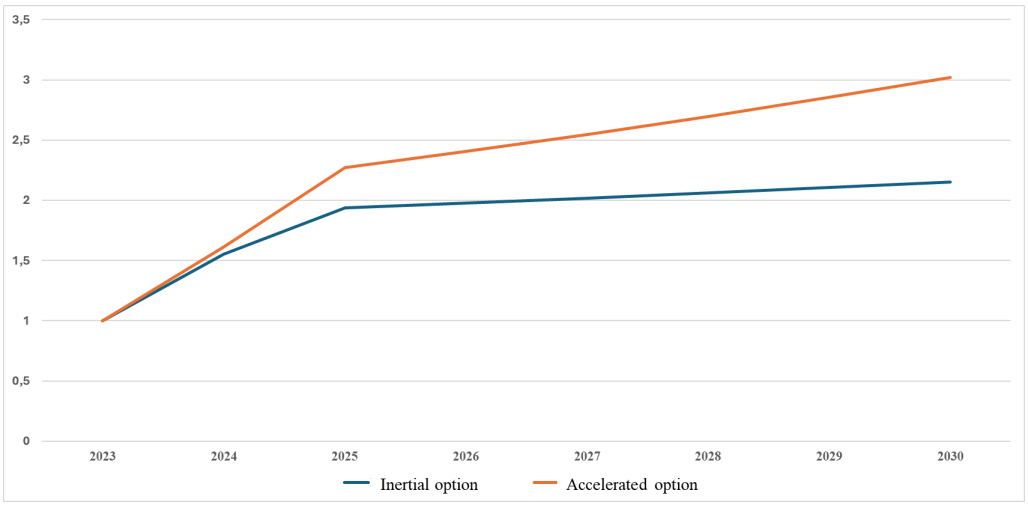


**Figure 2.** Growth in output of products and services for military purposes with inertial and accelerated options for updating fixed assets, times

*Source: composed by the author*

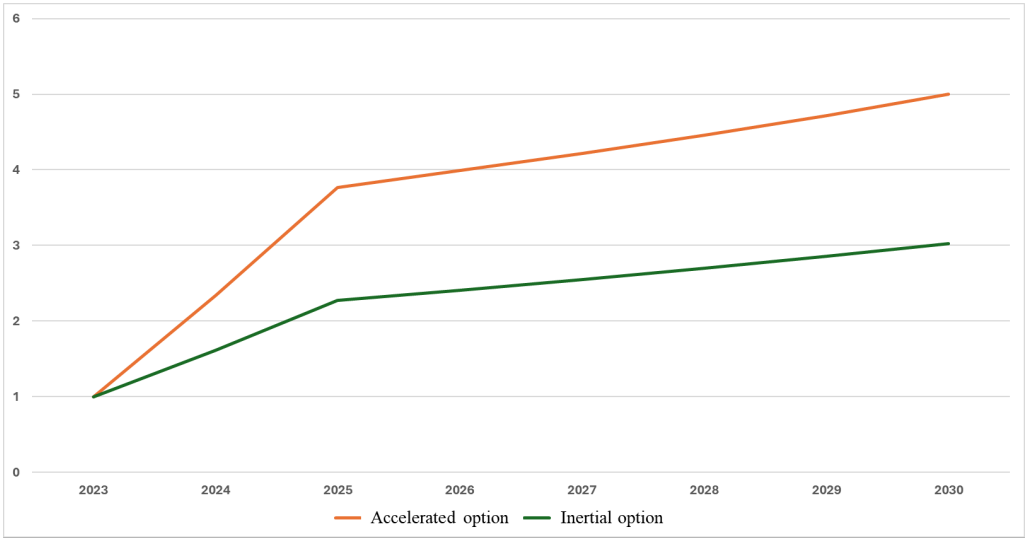


**Figure 3.** Growth in the output of military equipment and ammunition with inertial and accelerated options for updating fixed assets, times

*Source: composed by the author*

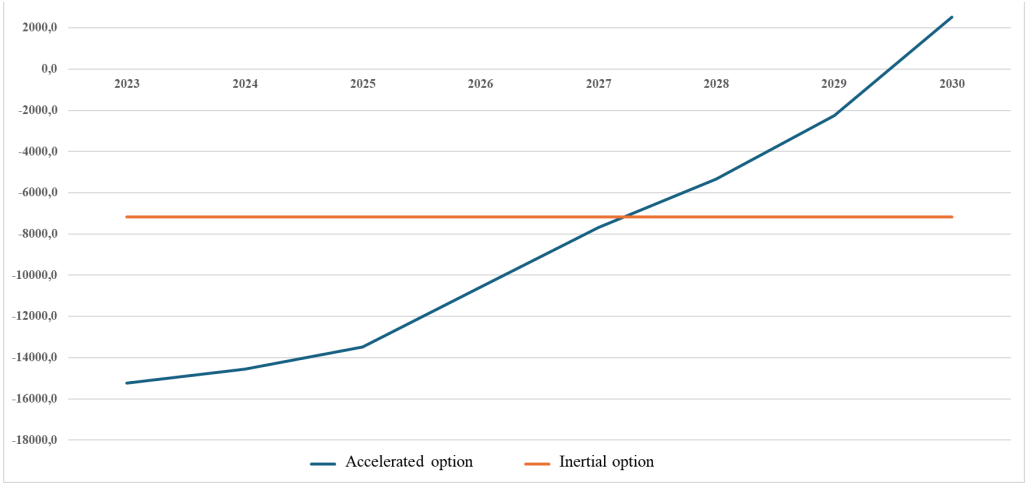


**Figure 4.** Dynamics of the volume of net exports of investment goods with accelerated and inertial options for updating fixed assets, at basic prices in 2023, bn RUB

*Source: composed by the author*

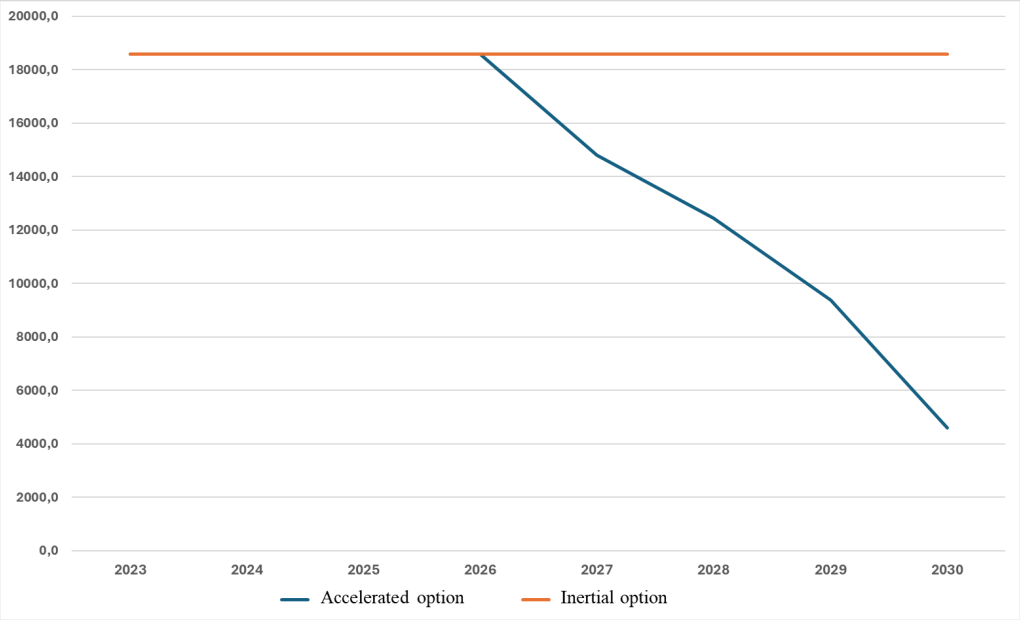


**Figure 5.** Dynamics of the volume of net exports of investment goods with accelerated and inertial options for updating fixed assets, at basic prices in 2023, bn RUB

*Source: composed by the author*

The use of accelerated renewal of fixed capital significantly changes economy structure (see Table 5).

**Table 5** – Assessment of indicators of economy structure by sectors in 2024 with inertial (I) and accelerated (Y) options for updating fixed capital, %

| Option | I | Y | I | Y | I | Y | I | Y |
|---|---|---|---|---|---|---|---|---|
| Indicator | Employed | | Added value | | Output | | Fixed assets at the end of the year | |
| Sector 1 | 31.8 | 30.5 | 31.8 | 25 | 37.3 | 33.3 | 53.5 | 45.1 |
| Sector 2 | 6.4 | 11.5 | 3.3 | 17.6 | 5.8 | 10.8 | 2.9 | 3.5 |
| Sector 3 | 53 | 50.5 | 41.8 | 36.2 | 42.5 | 41.2 | 33.7 | 38.7 |
| Sector 4 | 8.8 | 7.6 | 23.1 | 21.2 | 14.3 | 14.7 | 10 | 12.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Source: composed by the author*

The role of sector 2 (production of instruments of labour) is increasing. The role of other sectors is generally decreasing, especially of sector 1 (intermediate goods production). Meanwhile, output in all sectors is growing at a higher rate than the inertial variant.

Hence, the acceleration of the renewal of fixed capital can significantly accelerate the development of the economy, improve its structure, reduce dependence on the export of raw materials and import of equipment, decrease shortage of labour resources, an increase the utilisation of production capacities.

**Discussion**

Indeed, both of these trajectories are not the only possible ones, since they are built on certain prerequisites. Nevertheless, the acceleration of the renewal of fixed capital significantly increases the pace of economic growth and allows ones to decrease the shortage of labour, the dependence of the economy on imports of machinery and exports of raw materials. Moreover, the faster the technical base of production is updated, the faster is the process itself.

Meanwhile, it is obvious the limits of acceleration of fixed assets renewal determined by the effective service life of the instruments of labour, the possibility of importing goods, the need to ensure full employment, etc. Therefore, the rate of renewal of fixed capital should not exceed the reasonable limits. The update speed in

the accelerated update trajectory constructed above is not the maximum one; it may be increased.

Furthermore, it is possible to use the increase in the production of labour inputs domestically rather than for export, as suggested in the constructed trajectory. For instance, the machinery produced can be used to accelerate the renewal of fixed capital in economic sectors, increasing their development rate. The choice of method of utilisation of instruments of labour growing volume is determined by economic policy itself.

Building an accelerated renewal trajectory emphasised the movement and growth in efficiency of the economy outputs. There is an abstraction from value in the form of money circulation. Indeed, money circulation is assumed to merely serve the movement of consumer values. Otherwise, the goal was to improve output, increase labour productivity, and reduce the resource intensity of products and services. This development goal, as it shown by the experience of the USSR's development until the mid-1950s, presupposes the predominance of public rather than private ownership of the means of production.

The current slow development of the Russian economy is a consequence of the focus of economic activity on the growth of profit (surplus value), rather than the available opportunities for country development. It resulted in the predominant growth of raw materials and materials-producing industries, the decline of machine-building and other industries producing finished goods, capital outflow, low investment in fixed capital, slow renewal at many enterprises, and a growing shortage of labour (a resource cheaper for capital than new machinery).

Objective opportunities to accelerate the renewal of fixed capital and overall economic growth were in previous decades and are available now. However, they are not being implemented and unlikely to be implemented while maintaining the current system of economy state regulation. They are expressing mainly the interests of the bourgeois class, primarily export-oriented capital.

The most complete utilisation of the available potential for economic growth requires a transition to a socialist society based on the predominance of public ownership of the instruments of labour and a government. It correlates with the fundamental interests of the most employees.

However, changes, accelerating economic growth, are also possible in the economic system of modern Russia. They are justified by scientific literature [18]. Their essence is in strengthening the state influence on economic processes through indicative national economic planning, foreign trade and currency regulation, stimulating monetary and financial policy, nationalisation of the most important enterprises and even industries of the economy, etc. The governmental influence on the economic processes is also should be strengthened.

Particularly, the equipment imports should be centralised to ensure the national interests. However, it is associated with the currency from exports distribution. It is distributing through special industries (primarily to raw materials, metallurgy, chemical industry). Otherwise, the renewal and increase of fixed assets is primarily needed in machine-building and other import-competing industries.

Accounting for the existing differences in the profitability of enterprises and industries, only the state is able to redistribute currency for the purchase of necessary equipment abroad. For example, to provide it through the mandatory sale of foreign currency proceeds. Certainly, the centralised import of machinery should be based on enterprises requests; those should fulfil the state assignments for the development of production. Equipment purchased by the state can be leased to enterprises to achieve specific results, establish new production facilities. Enterprises should be financially responsible for fulfilling their obligations to the state.

The government only can establish new enterprises in industries with a long payback period of capital investments. Their development is necessary for ensuring the national security. Only the government is able to organise personnel training and subsequent distribution of trained employees.

The situation in the Russian economy clearly shows that Russia's capitalism is an inhibitor of the country's development. Fundamental changes are overdue both in property relations and in the system of government and management.

**Conclusion**

The basis for addressing the main challenges of the Russian economy labour shortage (growth of labour productivity), dependence on imported equipment and export of raw materials) is the renewal of the instruments of labour in existing enterprises.

To accelerate the process of fixed capital renewal, it is necessary to increase the inflow of new labour assets into the economy to replace deteriorated ones, both through domestic production and imports. Therefore, there is a need firstly rapidly increase the import of investment goods – primarily for the re-equipment and expansion of domestic production of labour instruments (in fields of mechanical engineering and industrial construction) and industries supplying it with the necessary material resources and services. Then, based on an increase in the output of labour instruments, proceed to reduce their imports and turn the country into a net exporter of equipment.

Import substitution will not provide a rapid increase in the equipment influx, since it is aimed at reducing imports of machinery. The domestic production of machinery development along with increase in its import, will dramatically increase this influx and subsequently accelerate import substitution.

There are objective opportunities for a significant increase in imports of investment goods. They are as follows:

– current account funds;
– international reserves of the Russian Federation;
– replacement of less important goods imports (their production could be provided domestically) by imports of necessary equipment and components.

To assess the effect of accelerating fixed capital renewal, we used a 4-sector inter-industry balance model constructed on the basis of statistical data for 2005-2019.

We have compiled two possible trajectories of Russia economic development for 2024-2030. They are as follows: inertial one includes preservation of the existing parameters of fixed capital renewal; with accelerated renewal of fixed capital due to the initial increase in imports of investment goods and subsequent transition to its reduction due to domestic production.

According to calculations, accelerated renewal of fixed capital will result in slower growth of total fixed assets. Indeed, they are renewed rapidly and their utilisation rate is higher. Fixed capital renewal is particularly rapid in the sector involving the production, modernisation and overhaul of fixed assets.

Indeed, the acceleration of the renewal of fixed capital significantly increases the pace of economic growth and allows ones to decrease the shortage of labour, the dependence of the economy on imports of machinery and exports of raw materials. Moreover, the faster the technical base of production is updated, the faster is the process itself.

However, there are limits to accelerating the renewal of fixed assets. Therefore, the rate of renewal of fixed capital should not exceed the reasonable limits.

The current slow development of the Russian economy is a consequence of the focus of economic activity on the growth of profit (surplus value), rather than the available opportunities for country development.

A transition to a socialist society is required to fully utilise the available potential for economic growth. Moreover, reforms, accelerating the economic growth, are also possible in Russia current economic system. Their essence is in strengthening the state influence on economic processes through indicative national economic planning, foreign trade and currency regulation, stimulating monetary and financial policy, nationalisation of the most important enterprises and even industries of the economy, etc. The governmental influence on the economic processes is also should be strengthened.

Specifically, imports of machinery should be centralised to renew fixed capital in machine building and other import-competing industries.

The situation in the Russian economy clearly shows that Russia's capitalism is an inhibitor of the country's development. Fundamental changes are overdue both in property relations and in the system of government and management.

The research results correlate with the issues of social reproduction and state economic policy in Russia.

Research prospects are in detailing simulation models of the Russian economy for constructing

development trajectories for the future and making recommendations on reforming the Russian economic system.

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**CONFLICT OF INTEREST**

The author declares no conflict of interest.

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