

Forecast of Economic Development in Russia 2022-2035

V.I. Antipov

Institute of Control Sciences RAS
Moscow, Russia
valeriantipov27@yandex.ru

F.F. Pashchenko

Institute of Control Sciences RAS
Moscow, Russia
pif-70@yandex.ru

Y.I. Kudinov

Lipetsk State Technical University
Lipetsk, Russia
kudinov.yi@mail.ru

E.S. Duvanov

Lipetsk State Technical University
Lipetsk, Russia
evgenyduvanov@yandex.ru

Abstract—The article describes the technology of making a long-term forecast of the development of the Russian economy, the need for which arose in connection with the large-scale sanctions of the West. To make a new forecast for 2022-2035, it is proposed to use the P1-4-2(2022-3) model, which converts the initial data scenario corresponding to sanctions into a forecast. The scenario is expert assessments of changes in exports and imports, as well as the ruble exchange rate and oil prices. The forecast is a sequence of solutions of systems of linear equations, the coefficients of which depend on the scenario. This article has practical and methodological application in the educational field in the field of economics. Obtaining these graphs and conclusions from them help students to visually navigate the economic situation in the country, as well as to make a forecast based on the obtained graphs.

Keywords—*estimates of GDP and inflation by World Bank experts, model of reproduction of Russia's GDP, scenario conditions, forecast charts*

I. INTRODUCTION

According to official government forecasts, Russia's GDP growth by the end of 2022 should be 3%, inflation — 4%, the average annual dollar exchange rate — 72.1 rubles, the price of Urals crude oil — 62.2 dollars per barrel... But none of these indicators will be achieved due to the fact that the Russian economy (after sanctions) goes into "blind defense" already this year.

According to journalists, GDP will fall by 10%, and inflation, according to Kudrin, may reach 17-20%. On April 7, Prime Minister Mikhail Mishustin said that the economy would need at least six months to recover and rebuild after the sanctions. On April 11, the Ministry of Economic Development announced that the Russian economy could recover to the indicators of the end of 2021 in a year.

According to the World Bank forecast, Russia's GDP will shrink by 11.2% by the end of the year, and inflation will accelerate to 22% (8.4% in 2021). Exports of goods and services will decrease by 30.9%, imports — by 35.2%. The share of the population with incomes below the established poverty line will grow to 12.8% in 2022 (11% in 2021). In 2023 and 2024, GDP growth will be 0.6% and 1.3%, respectively.

Factors of the crisis situation:

- Mass exodus of foreign companies from Russia, accompanied by the closure of production facilities.

- Total disruption of logistics supply chains of goods and raw materials and own restrictions on export supplies.
- Zeroing of foreign investments and a radical decline in domestic investments due to a sharp increase in the key rate of the Bank of Russia.
- The volume of housing construction in the country may decrease by 20%, commercial real estate — by 40%.
- Germany expects to reduce its dependence on Russian natural gas to 30% in the coming months (at the end of March this year, this figure has already reached 40% instead of the previous 55%).
- Foreign partners refused to commit to MS-21 and SSJ 100.
- The United States, Great Britain, Canada and the EU have imposed a ban on the use of international reserves by the Central Bank of Russia, effectively freezing the foreign exchange reserves of the Central Bank of the Russian Federation in the amount of \$ 640 billion.
- Prices for rolled metal have not decreased and continue to grow. Other building materials are becoming more expensive at a rate of 120% per annum.

In response to the sanctions, the Central Bank of the Russian Federation introduced capital controls and raised interest rates, despite significant risks to the country's economy. On 02/28/2022, the Central Bank raised the key rate from 9.5% to 20% in an attempt to support the value of the ruble, which has fallen by more than 20% against the dollar in February 27 alone.

The Central Bank also ordered all exporters to sell 80% of their foreign exchange earnings from exports and banned brokers from selling securities owned by non-residents. incorporating the applicable criteria that follow.

II. GENERAL INFORMATION

The P1-4-2(2022-3) model is a new tool for economists, ministries and higher administration. And it is necessary to learn how to use the new tool, i.e. to "understand" what the model "says" about and make appropriate decisions. The accuracy of the model has yet to be evaluated. We have yet to create the Forecast automated control system - a dialog system for manipulating background information, forecast variations and scenario variants. It is still necessary to train the technical

staff and determine the directions for improving the model in accordance with its functional purpose.

- The fundamental characteristics of the Russian economy are the inherent dependencies between the parameters of the economy, which are resistant to «interference» and change slightly over time. Fig. 1-4 shows the fundamental characteristics of the Russian economy. There are many of them (about 20), but we will limit ourselves to listing only a few.
- The algorithm of the model is a sequence of arithmetic and logical operations with fundamental characteristics of the economy, carried out taking into account the scenario of the initial data. The model in each year of the forecast period (by solving a system of linear equations) balances the indicators of the Account of goods and services of the SNA in current and comparable prices.
- An inertial forecast is an assessment of the lower limit of economic development, provided that there are no cardinal «control influences» of the government. This is a forecast of development «according to the trend».
- The initial data scenario is a set of indicators (control parameters) that affect economic dynamics, the values of which are determined by the «CUSTOMER» – the operating party and the «OPPONENT». The scenario reflects hypotheses about the behavior of both the «enemy» and the «operating side».
- The result of the forecast is the trajectory of economic development in the form of a sequence of balanced indicators (in current and comparable prices) in the forecast interval. The P1-4-2(2022-3) model operates not with specific, but generalized indicators, which are determined by fundamental characteristics and scenario conditions. And scenario conditions are formulated by experts who «feel» the general situation. Their «flair» is challenged by literally everyone, but not everyone can become an «expert». They are strictly selected. The true values of the parameters of GDP and inflation in 2022 in a year we will learn from the newspapers, but for now there are only personal and model estimates.

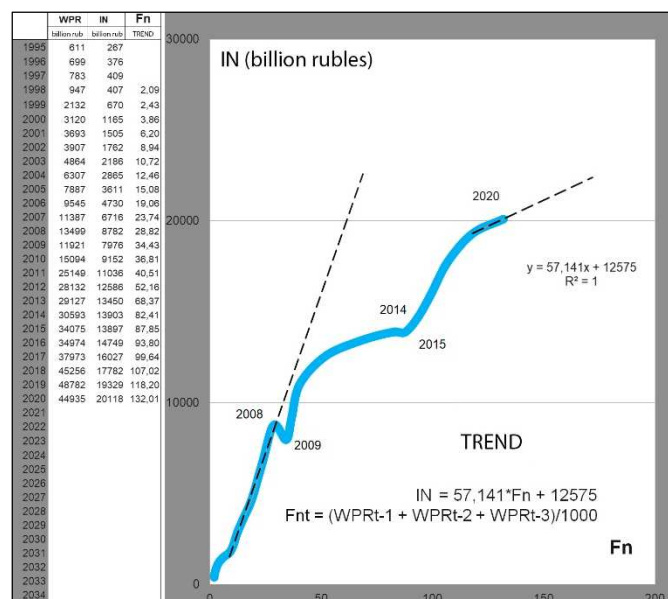


Fig. 1. Regression of investments in OK from gross profit.

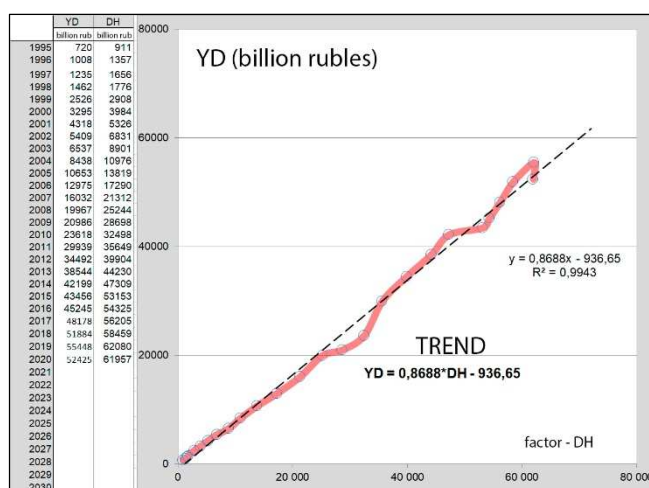


Fig. 2. Regression of expenses on CP DH from the monetary income of the population.

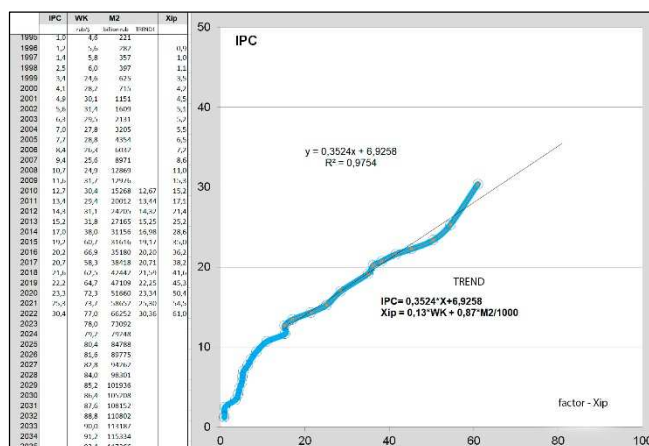


Fig. 3. Regression of the consumer price index from the exchange rate of the ruble and M2.

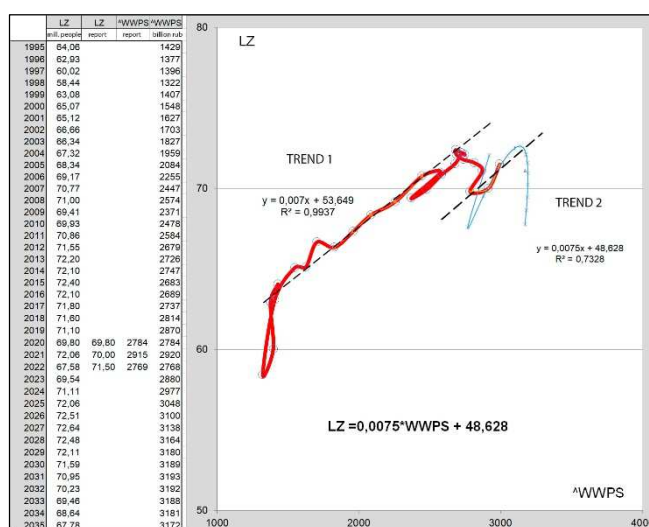


Fig. 4. Labor characteristics of the Russian economy.

III. SOURCE DATA AND ALGORITHM

Let's list the scenario parameters of the model assigned by experts:

- N — population of Russia.
- kR — labor force ratio (share).
- aS — the coefficient of intermediate consumption in SC.
- $n1$ — the coefficient of net taxes on production.
- $n2$ — the ratio of net taxes on production and imports.
- $M2$ — money supply $M2$ is a function of time.
- CNF — the price of BRENT crude oil.
- WK — ruble exchange rate.
- Pem — basic rate of modified exports.
- $qIMS$ — the share of imports in domestic output in SC.

The population forecast is given by ROSSTAT. The share of the labor force is almost a constant figure. The intermediate consumption coefficient is a stable value with a clear trend. Net tax coefficients are variable values with a clear trend. The gentle mass M2 is an inertial quantity with a clear trend. The forecast of all other scenario parameters is the subject of «fierce» disputes among experts. But the main influence on the GDP rate is the basic rate of $m/\text{exports}$. Fig. 5-7 shows graphs of only some scenario conditions. Fig. 8 shows the diagram of the «core» of the computational algorithm of the model.

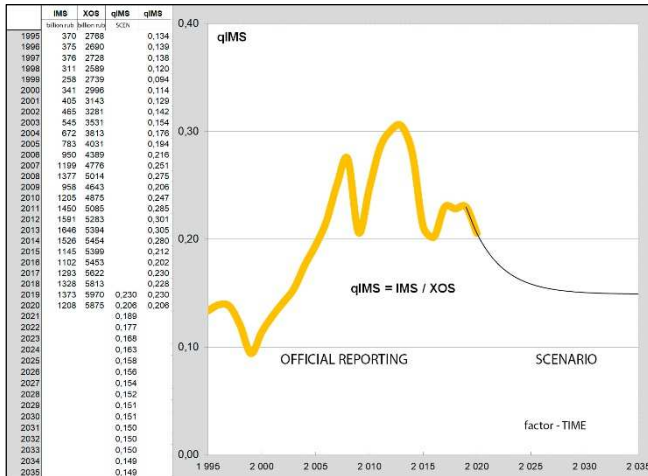


Fig. 5. The share of imports in the domestic market in comparable prices in 1995.

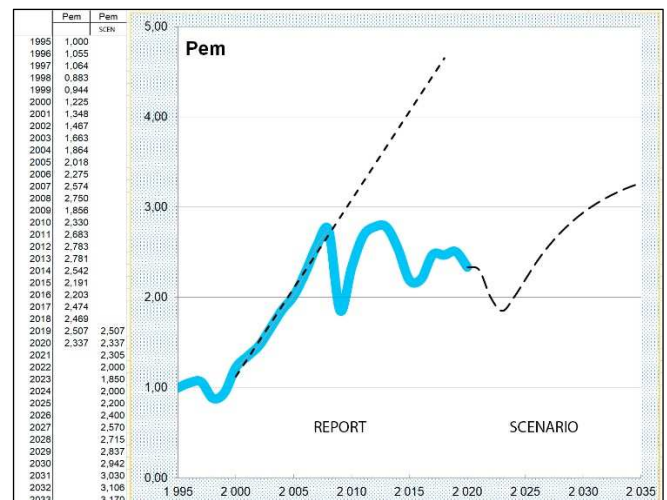


Fig. 6. Dynamics of the basic rate of modified exports.

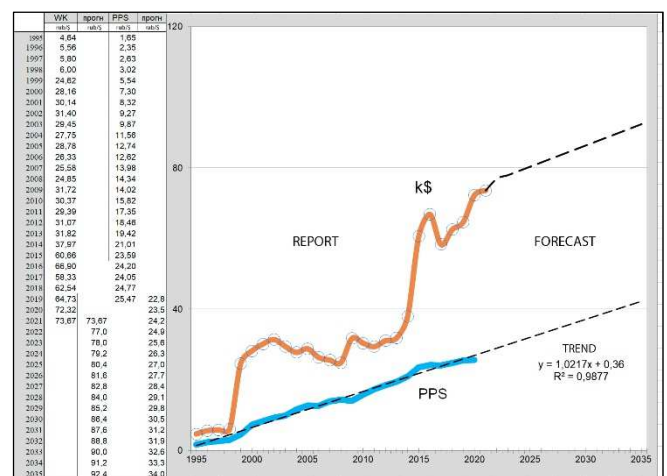


Fig. 7. The average annual exchange rate of the ruble (rub/\$).

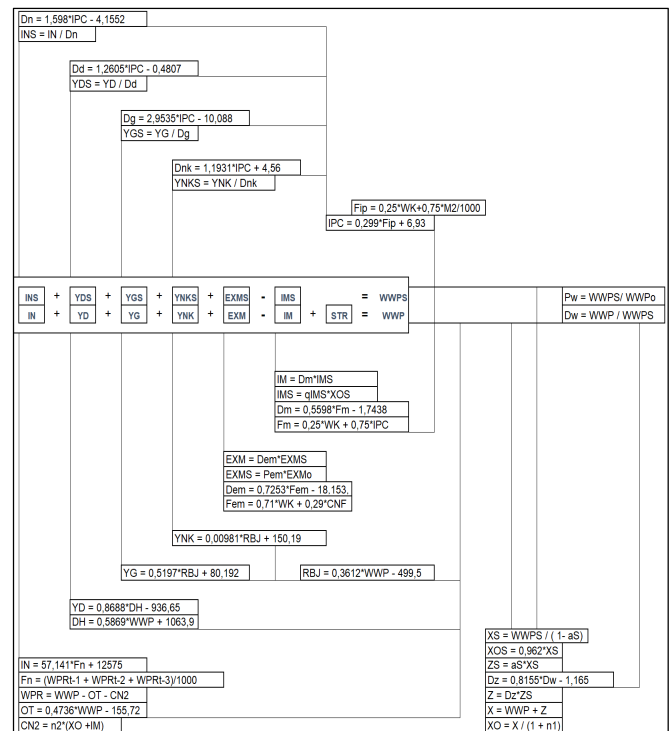


Fig. 8. The scheme of the computational algorithm of the model P1-4-2(2022-3).

IV. CONCLUSION

The government has practically lost control of the GDP reproduction process and is engaged in «patching up credit gaps» in industries. The government (through tax and pension reforms) brought the domestic market to complete exhaustion, which led the economy to extreme dependence on exports. The government «does not notice» the ultra-high key rate of the Central Bank, which does not allow industries (small and medium-sized businesses) to use domestic loans. The government «did not notice» how the Central Bank and the Ministry of Finance transferred half of Russia's gold and foreign exchange reserves abroad, which (in connection with the events in Ukraine) the USA and England began to rule. This and much more (implicitly) reflected in the trends of the fundamental characteristics of the economy. Therefore, the model (reflecting the initial fluctuations in GDP rates due to fluctuations in exports) for a long period (in 2035) showed a complete attenuation of GDP growth rates, stabilization of CP DH and reduction of CP GOS. Fig. 9-12 shows only some forecast indicators of the Russian economy. Of course, inertial development does not suit the country's top leadership. Of course, measures to stimulate economic growth are being worked out now. But without evaluating their results according to the model, the selection of the most cost-effective state and industry programs will be very difficult.

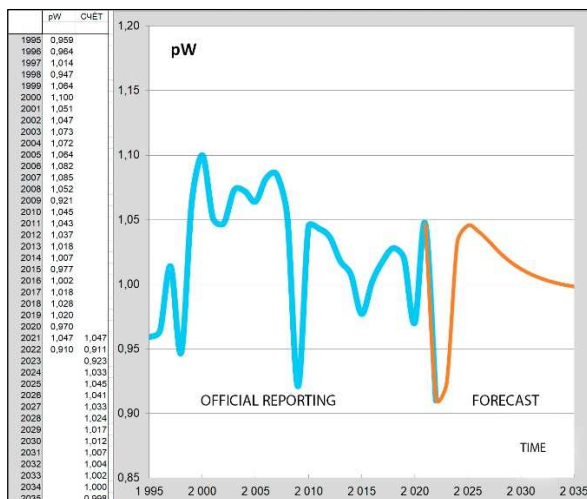


Fig. 9. Dynamics of annual GDP rates in Russia.

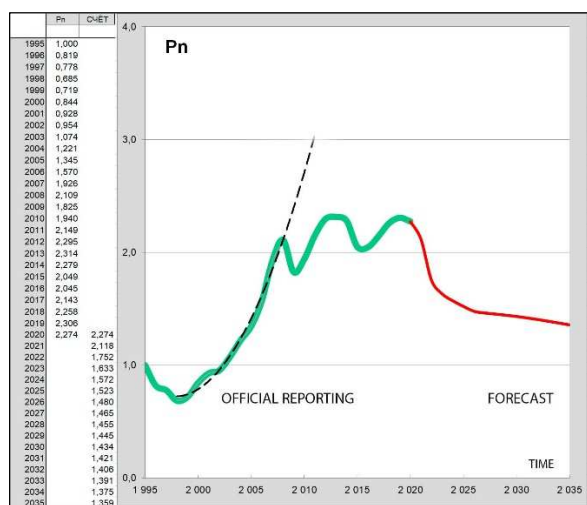


Fig. 10. Dynamics of the basic rates of investments in fixed assets.

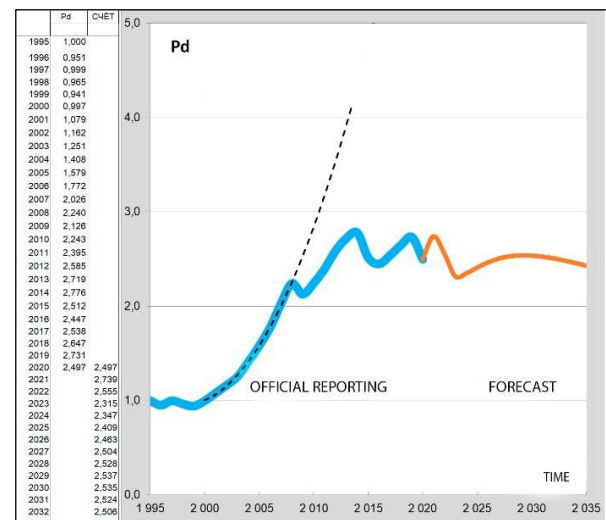


Fig. 11. Dynamics of basic rates of final consumption of households.

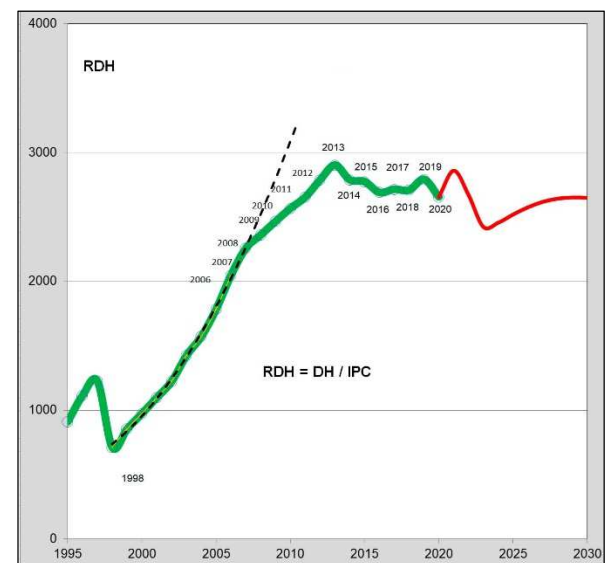


Fig. 12. Dynamics of real monetary incomes of the population.

This article has practical and methodological application in the educational field in the field of economics. Obtaining these graphs and conclusions from them help students to visually navigate the economic situation in the country, as well as to make a forecast based on the obtained graphs.

REFERENCES

- [1] Antipov, V.I., Mitin, N.A., Pashchenko, F.F.. «Модель воспроизводства ВВП России P1-4-0(2021-1)» (Russian GDP Reproduction Model P1-4-0(2021-1)), Moscow, Institute of Control Sciences RAS Press, pp. 114, 2020 (in Russian)
- [2] Antipov, V.I., Pashchenko, A.F., Mitin, N.A., Malinetsky, G.G., Duvanov, E.S., Kudinov, Y.I.. «Toolkit for Strategic Planning of the Russian Economy». 2021 3rd International Conference on Control Systems, Mathematical Modeling, Automation and Energy Efficiency (SUMMA): 2021: 420- 425.
- [3] Ivanov, Y.N.. «Основы национального счетоводства (международный стандарт)» (Fundamentals of National Accounting (international standard)), INFRA-M, pp.480, 2005 (in Russian)
- [4] National accounts of Russia in 1995-2002: Statistical collection/ Rosstat, pp. 157, 2003.
- [5] National accounts of Russia in 1998-2005: Statistical collection/ Rosstat, pp. 145, 2006.
- [6] National accounts of Russia in 2000-2007: Statistical collection/ Rosstat, pp. 213, 2008.

- [7] National accounts of Russia in 2001-2008: Statistical collection/ Rosstat, pp. 253, 2009.
- [8] National accounts of Russia in 2002-2009: Statistical collection/ Rosstat, pp. 325, 2010.
- [9] National accounts of Russia in 2003-2010: Statistical collection/ Rosstat, pp. 333, 2011.
- [10] National accounts of Russia in 2004-2011: Statistical collection/ Rosstat, pp. 341, 2012.
- [11] National accounts of Russia in 2005-2012: Statistical collection/ Rosstat, pp. 363, 2013.
- [12] National accounts of Russia in 2006-2013: Statistical collection/ Rosstat, 2014.
- [13] National accounts of Russia in 2007-2014: Statistical collection/ Rosstat, pp. 304, 2015.
- [14] National accounts of Russia in 2008-2016: Statistical collection/ Rosstat, pp. 263, 2017.
- [15] National accounts of Russia in 2014-2018: Statistical collection/ Rosstat, pp. 245, 2019.
- [16] National accounts of Russia in 2013-2020: Statistical collection/ Rosstat, pp. 429, 2021.