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Traditional and New Methods of Pension Authentication in China: Reasons, Methods and Problems

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ABSTRACT

The article discusses the topic of the digitalization of the pension systems in the People's Republic of China, the spread of the new social authentication methods and the new pension payment confirmation system in the country. The population ageing problem is forcing the government of the People's Republic of China to develop new methods of social support for the retired citizens. The article deals with the problems of pension payment confirmation for the Chinese, who are currently abroad, as well as the methods of solving the issue. Special attention is paid to the problem of pension authentication through overseas Chinese multifunctional centers (MFC). The article studies the main positive and negative aspects of "traditional" and "new" methods of pension authentication.

Keywords: population ageing; digitalization; pension authentication; IT technology in the pension system; electronic system; institutionalization; standardization; pension fund management; single database

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INTRODUCTION

The population of the People's Republic of China is estimated at over 1.4 billion in 2020, making it the most populous country in the world. In addition, China has the highest median age, a consequence of its long-standing "one family, one child" policy. China's population growth rate is only 3.88% (137th in the world in 2020). According to the country's seventh national census, the proportion of people over 65 in the total population reached 13.5% in 2020, making China soon to be considered an ageing society by international standards. To alleviate this problem, the Chinese government has begun to actively introduce and develop new methods of social support for pensioners.

It was in 2010 that China started encountering difficulties in authenticating pensioners for social insurance and benefits for the first time. The thing is that many citizens, once they reach retirement age, are unable to register with the pension fund in order to receive social benefits in the future. The main barriers to this are:

1. Lack of information on how to obtain the service.

2. Ignorance or poor knowledge of information technology.

3. Lack of opportunity to process pension payments in person.

4 Lack of institutionalisation and standardized management of the pension fund.

5. Not yet well-adapted database of people of retirement age.

With the development of the digital economy and the adoption of the latest IT technologies, China has become one of the top three countries in terms of the IT industry development index (see figure). According to the 48th "China Internet Development Statistics Report" [published by the China Internet Network Information Center (CNNIC) on August 27, 2021], the number of internet users in the country reached 1.011 billion as

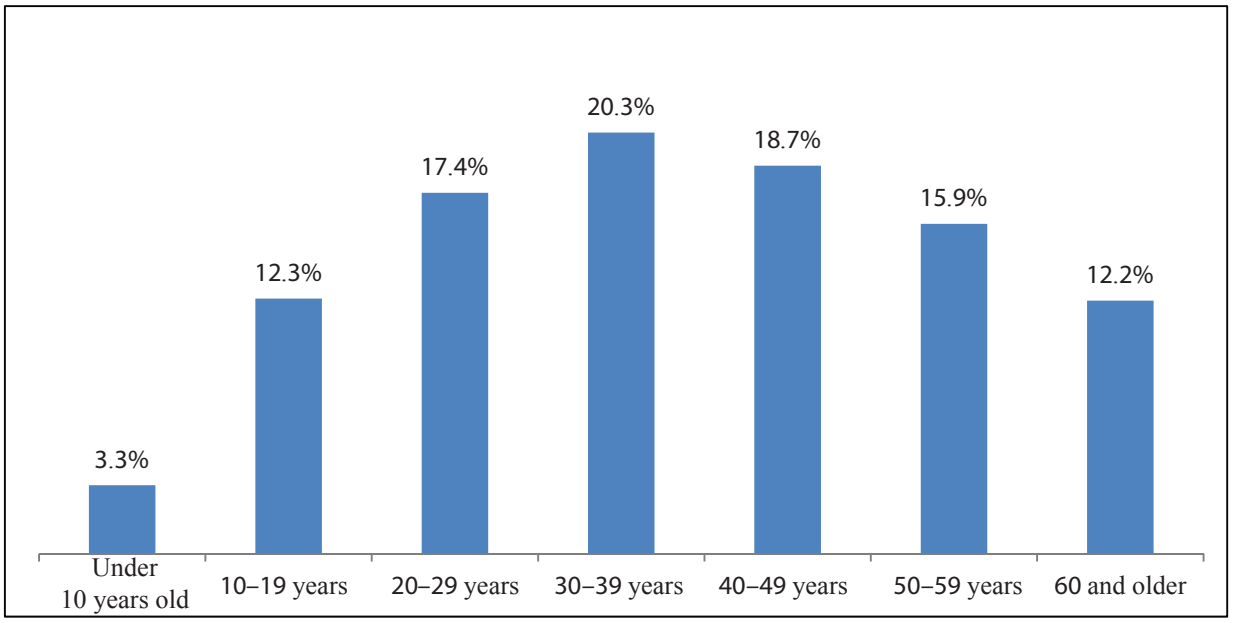

Fig. **Percentage of Internet users in China by different age categories in 2020**

Source: URL: http://surl.li/bhmst

of June 2021, with an internet penetration rate of 71.6%. Thus, the Chinese population is now the largest and most active digital society in the world [1].

However, the latest IT technologies are primarily developed for government organisations, but they are not sufficiently adapted for the population. Therefore, it is sometimes very difficult for people (especially the elderly) to master them, and only a certain segment of the population can make full use of the latest technology. Therefore, in the future, those who have digital skills will be able to adapt relatively easily to the new digital tools, while the rest of the population will increasingly lag behind. The Chinese government is now actively tackling this problem by creating special courses for older people.

The introduction of information technology into China's pension system is paying off. Until recently, when the country's population was poorly equipped with smartphones and computers, elderly people had to go to the pension fund or local administration in person when they needed it. All recipient data was, of course, stored on paper in the city archives or in the relevant local organisations. The future pensioner had a very complicated process of collecting and submitting his or her documents. People living in rural or remote areas had particular difficulties, because with no administrative structures nearby, they had to travel to neighbouring urban counties or cities, which, of course, slowed down the process of drawing up their pensions. Another category of people for whom this is a problem — are the Chinese living abroad. According to the migration statistics, in 2021 there were more than 45 million Chinese living outside the country, about 17% of whom were of retirement age. Not everyone can return home to apply for a pension and then come to the PRC every year in the future to receive the pension.[1]

In the fast-developing modern world, the traditional method of drawing and receiving pension payments is no longer appropriate.

[1] Trends in the spread and development of overseas Chinese. Official website of the Overseas Chinese Affairs Office of the State Council of the People's Republic of China. URL: http://qwgzyj.gqb.gov.cn/yjytt/155/1830.shtml

In addition to the problems mentioned above, it has a number of significant disadvantages. For example, storing databases on paper is not the most reliable method. In Heilongjiang province, for example, an entire archive of documents was lost in a fire in the 1990s. Because of this, some workers, when they reached retirement age, had to restore their data on their own [2]. This procedure was specific: former employees had to find their former bosses to confirm their seniority on their own responsibility. In addition, documents had to be provided to prove the fact that the factory had paid the person's insurance premiums during the period of employment. The documents could be in the form of a payment slip, an accounting statement, a statement from the beneficiary's bank, etc.

There is another quite significant omission in the traditional method of receiving/confirming pensions, a problem that stems directly from the recipients themselves. Often, due to factors such as health status, remoteness of residence, workload of the pensioner, etc., the recipient makes a notarial power of attorney to someone to collect his/her pension. This method often provokes unscrupulous people to speculate. Firstly, it has happened that after the death of a pensioner, the proxy has been receiving his pension payments of a dead pensioner for a long time. Secondly, quite often trustees have misappropriated these payments, and the money did not reach the addressee. Of course, such unlawful actions are punished by law, but it is not always possible for the pension fund and other authorised bodies to fully trace all cash payments. The government has developed various methods to combat the misappropriation of pensions by third parties. For example, every year local government staff would visit pensioners and conduct a survey of their well-being. Unfortunately, this method has not always yielded positive results [3].

Such risks arise from the lack of a systematic, scientific, and standardised data processing mechanism, unclear staff responsibilities and inappropriate delegation of authority. The thing is that traditional methods of supervising the social welfare funds are rather archaic, powers are divided, and individuals rely on chance, which provokes them to commit crimes.

DIGITALISATION OF THE PENSION SYSTEM

The search for a way to solve these issues and problems has prompted the Chinese government to create a new method of insuring, validating, and receiving pension benefits by digitising these procedures. The main reason for the social security fund's operational risks is that the fund's population (income) and exports (expenditure) are not "managed" properly. Therefore, to bring the pension insurance "chain" to its logical conclusion, it is necessary to start by modernising and controlling the transaction management structure within the pension fund itself.

The year 2019 has been declared the Year of Progress of the Social Security Fund in China in terms of risk prevention and control. First and foremost, a major effort has been made to assess and reconcile the benefits and income bases of the insured. To this end, a 'five-party verification system' was established, the idea being that the authorised bodies such as the internal finance department of the company (the place of work of the insured), the commercial department, the local tax office, the banks and the pension fund finance department should work closely together. Any cash receipts or pension payments should only be made after approval by all five of these departments. In the event of any problems or any suspicion, each of these bodies has the right to contact the other bodies to clarify the data.

The mission of the "five-way verification platform" is to process large databases and extract important interlinked information, such as the highest and lowest wages of the insured persons. At the same time, artificial intelligence checks dubious information in the social security system to prevent or correct insurance duplication and close loopholes such as underreporting and underpayment to social security funds. Overall, the platform serves as government software for business and finance, enabling information to "work harder", data to "tell the truth", reduce human intervention, achieve accurate collection and disbursement of funds, automate financial accounting, monitor social security data statistics, audit internal governance, and manage information and monitor interdependent key positions. The system helps to effectively prevent risks that may arise in key departments, in key positions and in key parts of the management of the pension fund's operations.

Regarding the benefits of the latest (electronic) pension system, this method has helped to simplify all the procedures for submitting the necessary documents. For example, in the traditional drawing of the social benefit the person often did not always understand what documents he had to collect and in what order it had to be done. With the introduction of the electronic system, he or she simply needs to register in the application (on the website), fill in an electronic questionnaire with personal data, and the software will automatically make a request to all the necessary administrative structures [4]. The future pensioner only has to go in person to the pension fund to obtain a ready-made pension certificate. The programme allows pensioners to find out what payments they will receive in the future.

According to the traditional rules, the insured person has to visit the pension fund in person every year to confirm their data in order to avoid unnecessary payments or the misappropriation of pension payments by third parties in the event of the death of the pensioner. Now, thanks to the digitalisation of databases and the integration of all procedures into the electronic system, a pensioner can confirm his or her pension status from a smartphone without leaving home. All they have to do is to log in to the application, follow the instructions and the software will automatically update their data and confirm their social status. For authentication, the application will prompt the user to do some verification activities online, e.g., to enter their surname and first name, identity card number, count to ten, look left, look right, blink, etc. [5] All these physical actions are recorded on the smartphone's front camera and broadcast to the pension fund's electronic system. Once all processes have been completed, the pensioner will have an 'approved' status in their personal account, indicating the validity period of the authentication. However, if the biometric confirmation fails or if the system identifies any suspicious activity during the authentication process, the application will offer to go through the procedure again after 24 hours or to contact the support service in person to rectify the problem or for further investigation.

The advantage of this system is that people (namely pensioners) can now complete the authentication procedure at any time convenient to them. There is also no need to visit the relevant organisations in person. The system protects savings, and in the event of suspicious activity on the pension account, it automatically blocks transactions and informs the owner of the blockage and the means of how to rectify the problem.

In the case of Chinese overseas residents, it was only a short period of time ago that the processing of pension payments and the confirmation of their retirement status was a

headache for many of them. Nowadays, there is a fairly flexible policy for this category of pensioners. At present, there are special multifunctional centres abroad, which solve many issues related to the registration of pension documents for Chinese citizens. One of the most important services — is the processing of pension payments and the confirmation of social status for Chinese citizens living abroad. In the archives of overseas Chinese multifunctional centres, one can find records on service provision, for example: "Mr Wang, a Chinese man from Wenzhou, who had worked in China for many years, has now settled in Milan, Italy. Mr Wang, who reached legal retirement age in October 2019, learned through the Chinese multifunctional centre in Milan that he now does not need to return to Wenzhou to process his pension. This procedure can be done in Milan. Through the Chinese multifunctional centre, Mr Wang adds on WeChat messenger the contacts of the local Wenzhou staff in Milan. After completing the basic pension application form and sending it to the staff member via WeChat, Mr. Wang is scheduled for an online meeting with the representatives from the Chinese pension fund. At the appointed time, Mr Wang arrives at the Chinese multifunctional centre, where a video link is set up with the China Pension Fund under the guidance of the staff. When the procedure is launched, the video system automatically recognises and compares Mr Wang's face with his photo on the ID card and, if the comparison result is positive, China Pension Fund staff record and generate a document which is remotely sent back to Mr Wang for verification and signature confirmation. The entire processing is archived through video recording. Once the video link has been established, Mr Wang's guardian (relative) who lives in Wenzhou receives a power of attorney issued by the Wenzhou Pension Fund the following day to go through the final procedure for Mr Wang's pension." [6].

Currently, there are 6 Chinese multifunctional centres abroad, based in Italy (Milan, Rome, Prato), France (Paris), South Africa (Johannesburg) and the UAE (Dubai) [6]. In the near future, the Chinese government plans to build similar multifunctional centres in other large countries with large concentrations of Chinese migrants, as well as to expand the mandate of the Chinese multifunctional centres themselves.

CONCLUSIONS

The introduction of new information tools in pension structures has improved administration, quality control, security checks and so on. For ordinary users, this new technology has helped to simplify the paperwork process, to get an accurate calculation of pension payments, and to enable citizens outside of China to process insurance payments. However, it should be noted that at present the "new method" is still undergoing adaptation and development. There are still some difficulties in the application of the verification of pension status method, namely:

1. In China at the moment, there are still remote regions where there is no access to the internet and therefore the residents have to deal with pension problems using the traditional method.

2. There is a certain percentage of the population in the country who do not know how to use the internet, and so they need to turn to someone for help.

3. The system does not yet have a common base (like, for example, "Gosuslugi" (Public services) in Russia), i.e., at the moment the system is different in each province, and people need to install the application specifically for their area.

4. The relatively small number of Chinese multifunctional centres abroad forces Chinese

citizens living there to deal with their issues in the old traditional way.

Digitalisation is the tool of the future. The development of information technology contributes to the systematisation of many processes, which makes life easier for the population. The active adoption and use of digital technologies is particularly relevant at a time of coronavirus pandemic and other social constraints.

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Analysis of Competition and Dominance Level on the Passenger Car Market of Republic of Korea

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ABSTRACT

The article is devoted to the analysis of statistical data provided by the Committee of Automakers of the Association of European Businesses (AEB) on the volume of sales of passenger cars of various brands on the market of the Republic of Korea from 2010 to 2021. The article describes the history and current trends of the market in question. Moreover, the authors summarize previously conducted research on this topic, providing a list of relevant studies. By using the competitive analysis tool — SV matrix, the study aims to provide information of scientific importance on the subject of competitive environment within the market under consideration, as well as to identify leading companies. An interpretation based on the results of the study is presented as well. It includes an explanation of the dynamics in the market, including changes in the market share of companies within the selected time period, a description of the specificities of the modern market leaders development and the reasons for the existing competitive environment. The conclusion is made about the relative stability of the South Korean automobile market, which has a national manufacturer and retailer as a market leader throughout the analyzed period. Moreover, quite a reasonable assumption is made about the relevance of the development pattern of the South Korean automobile market for the corresponding market of the Russian Federation.

Keywords: automobile market; automotive industry; competitive analysis; economic dominance; South Korea; SV matrix; manufacturers; theory of economic dominance

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INTRODUCTION

An analysis of the automotive market in the Republic of Korea (South Korea) is of considerable academic interest due to its fairly stable growth. The dynamics of car sales in the current stage (from 2010 to 2021) within the market in question are shown in *Fig. 1*.

Given the ongoing tensions with the Democratic People's Republic of Korea (which are also affecting the Republic of Korea's foreign and domestic policy in the 21st century.[1]), it can be seen in Figure 1 that sales volumes in the South Korean car market rose between 2010 and 2015 and remained fairly steady between 2016 and 2021, despite minor downturns (most notable of which happened in 2021). At the same time, by the middle of the period, sales of foreign brands in South Korea had increased significantly compared to the beginning of the period and, as of 2021, accounted for 19.3% of the total market in absolute terms. Thus, some geopolitical uncertainties as well as domestic challenges such as COVID-19,[2] do not make the country less attractive for foreign investments and foreign brands.

Although the South Korean automotive market differs significantly from the Russian market (due to the volatility of the latter amid the current geopolitical instability in the region, sanctions, and disruption to logistics links), company strategies in the South Korean automotive market could provide a good base for further building the domestic market. This is due to the fact that the national leader in automotive manufacturing and automotive retail is the Hyundai Motor Group (HMG) conglomerate, which, as of 2021, had a 73.9% market share (when Hyundai, Kia and Genesis brands are combined). Within the current Russian automotive market, only JSC "AvtoVAZ" could take on such a role because of the withdrawal of many foreign manufacturers from the Russian market and the institutional advantages already in place [1].

There have been many studies of the South Korean automotive market. For instance, D. Truett and L. Truett in their study proved that South Korean car companies achieved the minimum efficient scale of production from the period 1977 to 2006. D.S. Lee conducted a competitive analysis of the Republic of Korea and French car markets from 2000 to 2016 using the revealed comparative advantage index (RCA),[3] the trade specialisation index (TSI)[4] and the international market share index. The analysis revealed that in terms of import-export relationships, the Korean automobile market is more competitive than the French market, with a significantly higher predominance of exports in its structure [2–5].

The emergence of the South Korean automotive industry was a direct result of the government's industrial policy since 1962. [6, 7]. The government took the following measures: a ban on imports of foreign components and/or cars (at different times), preferential loans, export subsidies and tax breaks for domestic manufacturers and retailers, as well as end consumers [4, 6]. An important part of the development of the South Korean economy from the 1960s onwards were the chaebol, — family-run conglomerates which aimed to increase Korea's GDP, develop innovations, and create stable, well-paid jobs, as there was a great

[1] URL: https://www.bbc.com/news/world-asia-pacific-15292674 (accessed on 24.10.2022).

[2] Paul Dyer Policy and institutional responses to COVID-19: South Korea. URL: https://www.brookings.edu/research/policy-and-institutional-responses-to-covid-19-south-korea/ (accessed on 24.10.2022).

[3] Calculated as the ratio of the share of exports of a particular product type in a country's total exports to the share of the same product type in world exports. The index was proposed by the Hungarian economist B. Balázsá.

[4] The index is used to analyse the competitive position and stage of development of a product, helping to determine whether a country may be an exporter or importer of a product.

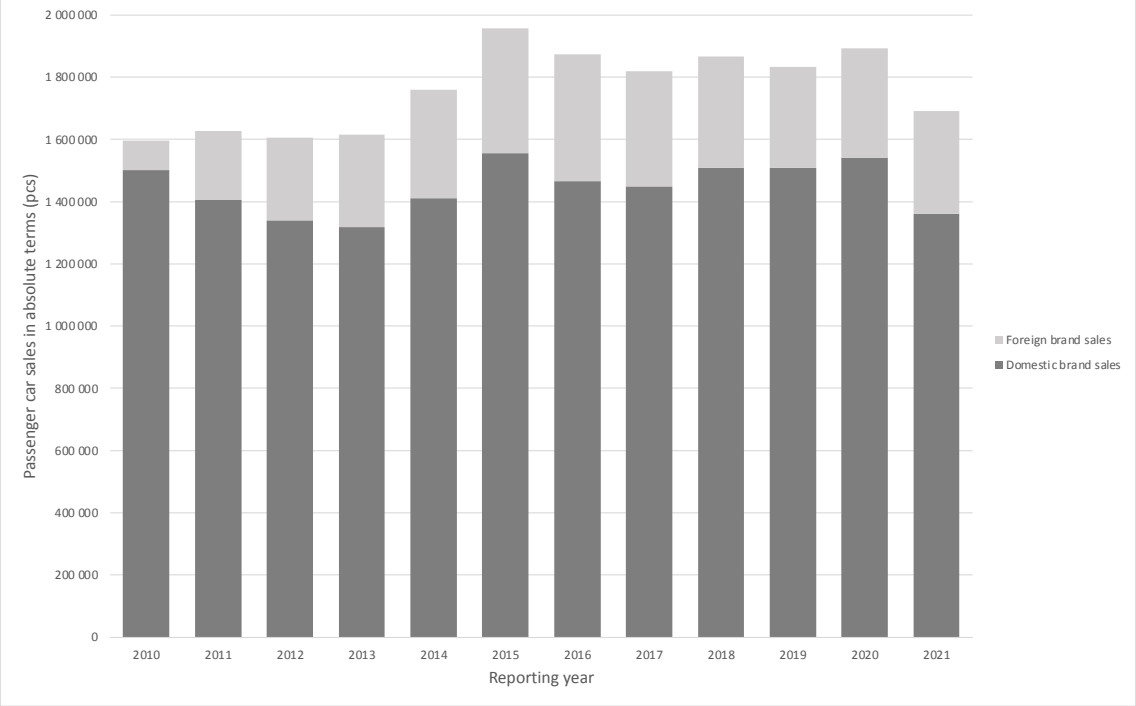

Fig. 1. **Passenger car sales dynamics in South Korea from 2010 to 2021 in thousand units**

Source: compiled by the authors per the URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

shortage of them at the time [8]. Therefore, until the 1990s the chaebol received the bulk of public financing, often in the form of soft/beneficial loans (9). In the early 1990s, the state effectively lost its institutional leverage and influence over these companies, and their aggregate GDP was higher than the national GDP [10], but after the Asian financial crisis, some conglomerates went bankrupt because of the lack of flexibility of large companies, which led to a change in government policy and a focus on SME development [11]. At the moment, the largest representatives of "chaebol" include, among others, Hyundai Motor Company, Kia, Samsung, etc. [9, 12].

With the support of the chaebol in the early 1960s, Kia Industrial and Shinjin Motors began to expand their production based on technological cooperation with Japanese companies [13]. It was not until 1968, the Hyundai Motor Company (HMC) entered the market with the opening (with the help of Ford's technological developments) of its plant. In the same year, the Asian Auto Company started commercial production of four-wheelers with the help of Fiat and FFSA technologies [7]. Thus, a competitive environment was formed in the automobile market of South Korea in 1968 due to the four listed dominant pioneer companies. It is also an important fact that each of them used foreign technological advances to enter the domestic market and win a significant share of it [14].

The next stage in the establishment of competition in the market in question began in the 1990s, when there were 9 competing companies with a consolidated production of 1.5 million units per year [7, 15]. However, from 1997 to 2001, against the background of the Asian financial crisis, the number of key companies was reduced to 5 manufacturers as a result of market restructuring. For example, Daewoo Automotive completed a merger with Ssangyong Motor Company, becoming Ssangyong Motors. HMC absorbed ASIA Motors. In 2000, Renault bought out

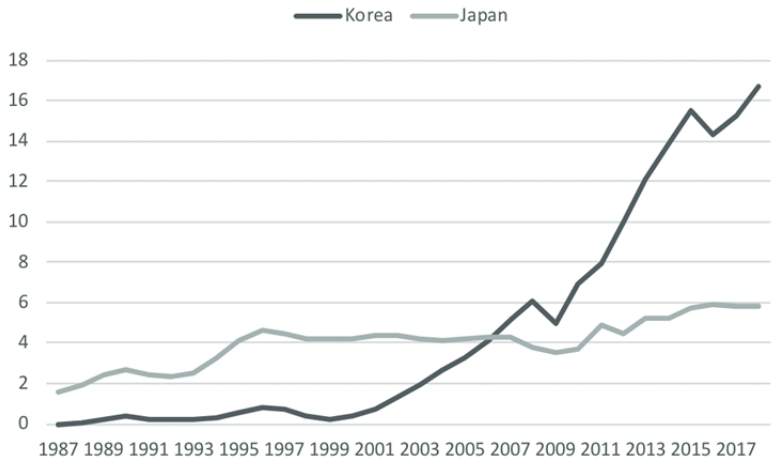

Fig. 2. **Market share of the imported cars in Korea and Japan from 1987 to 2018, %**

Source: [16].

Samsung Motors and Daewoo Motors was sold to General Motors. As a result, Hyundai, Kia (HMG conglomerate), GM Daewoo, Ssangyong and Renault-Samsung became the leading companies [7]. It is important to note that, as of October 2022, these 5 companies are the key members of the Korea Automobile Manufacturers Association (KAMA), but GM Daewoo is now called GM Korea and Renault-Samsung has been renamed Renault Korea.[5] Hyundai and Kia began to dramatically increase production volumes and expand deliveries to emerging markets starting from 2001 [7]. This trend led to HMG gaining a share of about 70% of the domestic automotive market in 2001 and continued to maintain its position at about this level until 2013. [3, 6, 7].

Also specific to the South Korean automotive market is the historical dominance of domestic car manufacturers over imported ones. Up until 2007, the share of foreign cars did not exceed 4% of the total market [16] (*Figure 2*). This was justified by rigid barriers and tariff restrictions on the supply of imported cars (up to 50%), as well as by the overall structure of the market, which was dominated by "chaebol" companies, which enjoyed state subsidies and made it difficult for new players to enter the domestic market [16, 17]. However, later on, unlike the Japanese automotive market, the Korean market became more open to foreign manufacturers primarily due to the above-mentioned mergers.

The basis for the current development of the South Korean automotive market has been government reforms and company strategies to increase the innovation component of the industrial sector [18]. Currently, the Republic of Korea is one of the key producers and suppliers of innovative technologies that, among other things, originate from the automotive industry. This trend is also reflected in scientific literature [19–22]. At the current stage, special emphasis is placed on "green" technologies and the production of electric vehicles. It is assumed that within the framework of the concept of transition to the "Euro-7" emission standard, the purchase of cars with internal combustion engines will be banned by 2035. In the first half of 2022 alone, 70,000 electric cars were sold, an increase of 73.5% compared to the same period last year.[6]

[5] Korea Automobile Manufacturers Association. URL: https://www.kama.or.kr/MainController?cmd=eng (accessed on 24.10.2022).

[6] URL: https://www.koreaherald.com/view.php?ud=20220731000133 (accessed on 24.10.2022).

The analysis of competition and company shares within the South Korean automotive market has been presented in Korean-language academic articles, selected English-language articles [7], as well as industry and regional association reports [23]. Nevertheless, to date, no in-depth research has been conducted on the specifics of competition and dominance in the market in question, but rather on specific aspects of its functioning (including SWOT analysis) [24], government influence and initiatives [6, 15], the general development vector and the history of emergence of the national leader — Hyundai Motor Company [7, 13, 25] and the impact of foreign direct investment (FDI) on the host country market [26].

Thus, after reviewing the academic literature on the Korean automotive market, it can be concluded that there is a lack of research on the topic of competition within the market. Consequently, a more in-depth analysis would help to determine the specifics of the interaction of companies in the market, identify leaders and the sustainability of their positions, and confirm the assumption of relative market stability with the predominance of domestic manufacturers in the sales structure.

THE METHOD USED

The key method used for research is the SV (Strength/Variety) matrix, which is a modernized tool for studying the interaction of companies, countries, or other economic units within a particular market [27]. The matrix makes it possible to understand whether there is a dominant group in the analyzed market, to determine its structure and specifics of internal links.

Economic dominance theory (EDT) plays an important role in understanding and interpreting the SV matrix results [28]. According to this theory, companies are divided into three types: 1) alpha companies; 2) beta companies and 3) gamma companies. An important distinguishing feature of alpha-companies is the opportunity to take advantage of the institutional advantages that are available to them due to close cooperation with the government. These can include: preferential loans, debt financing, business subsidies, etc. In the South Korean market, these are the "chaebol" companies mentioned above.

The following tools are used to construct the matrix: the Linde coefficient and the Herfindahl-Hirschman index, as well as the slightly modified CR market concentration and Hall-Teidman HT coefficient (CRSV and HTSV) indices. This approach makes it possible to structure the statistical data collected for the market in question and to identify the type of competition within it together with the specific relationships within the companies of the dominant group [27].

The SV matrix is a graph consisting of four quadrants — areas within which the market in question can be located in a given time period. Here is a description of each of the quadrants and an indication of their significance for understanding the competitive situation in the market:

1. Quadrant G — is the dominant group, which holds over 65% of the market. However, there are significant differences between its members, for example, the dominant group has two players, but one of them has a much larger share and actually regulates the market.
2. Quadrant B 4 — in which the leaders also have a market share of more than 65%, but companies tend to be quite similar to each other in terms of their indicators.
3. RO (Red Ocean) quadrant, where the market share held by the alpha companies is less than 65% (typically 30 to 65%); nevertheless, the companies are similar to each other.
4. Quadrant I, where market players are highly differentiated amongst themselves,

Table 1

New cars sales in the Republic of Korea from 2010 to 2021, units

Year, brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total	Share per period, %
Hyundai	659 570	684 157	667 777	638 995	685 191	713 591	610 508	632 323	660 645	685 041	679 471	588 082	7 905 351	**38.6**
Kia	484 512	493 003	482 060	458 000	465 200	527 500	535 000	521 550	531 700	521 145	552 400	535 018	6 107 088	**29.8**
Samsung	155 697	109 221	59 926	60 027	80 003	80 017	111 087	99 846	84 954	79 081	90 300	57 480	1 067 639	**5.2**
Chevrolet		104 216	124 794	118 393	131 723	130 139	154 910	107 246	72 645	56 938	68 621	50 816	1 120 441	**5.5**
Daewoo	128 094	25 686	10 304	14 386	6 967	9 246	8 785	6 691	5901	5349	4439	1989	227 837	**1.1**
SsangYong	32 459	38 651	47 700	63 972	69 036	99 664	103 554	106 677	109 140	107 829	87 889	56 363	922 934	**4.5**
BMW	16 798	23 293	28 152	33 066	40 174	47 877	48 459	59 624	50 524	44 191	58 393	65 669	516 220	**2.5**
Mercedes-Benz	16 115	19 534	20 389	24 780	35 213	46 994	56 343	68 861	70 798	78 133	76 879	76 152	590 191	**2.9**
Volkswagen	10 154	12 436	18 395	25 649	30 719	35 778	13 178		15 390	8510	17 615	14 364	202 188	**1.0**
Audi	7920	10 345	15 126	20 044	27 647	32 538	16 718	962	12 450	11 930	25 513	25 615	206 808	**1.0**
Toyota	6629	5020	10 795	7438	6840	7825	9265	11 698	16 774	10 611	6154	6441	105 490	0.5
Mini	2220	4282	5927	6301	6572	7501	8632	9562	9191	10 222	11 245	11 148	92 803	0.5
Volvo	1638	1480	1768	1960	2976	4238	5206	6604	8524	10 570	12 798	15 053	72 815	0.4
Genesis						530	48 134	56 616	61 345	56 801	108 384	138 756	470 566	**2.3**
Others	34 187	48 350	48 610	64 976	71 991	89 855	95 654	105 030	103 070	94 975	73 663	65 013	895 374	4.4
Overall sales	**1 555 993**	**1 579 674**	**1 541 723**	1 537 987	1 660 252	1 833 293	1 825 433	1 793 290	1 813 051	1 781 326	1 873 764	1 707 959	20 503 745	

Source: compiled by the authors per the URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

but collectively have a share of less than 65%. They have the characteristics of either a natural monopoly or, conversely, a market with no barriers to entry.

Similar studies to the one presented in this paper were conducted on the basis of the automotive markets of Russia, Brazil and South Africa, where the sales figures of the leading brands were analyzed [1; pp. 29–31]. The authors study the structure of the domestic market of the listed countries, determine the type of competition and dominant groups of companies in specific periods of time. Also by means of the SV matrix the competition between companies within the group is analyzed and the results are visualized. However, the SV matrix has been successfully applied not only to the analysis of automotive markets, but also, for example, to the market of agricultural organizations [32], which determines its universality. Due to the fact that similar studies have not been conducted for the automotive market of the Republic of Korea, it can be stated that this analysis is scientifically new.

DESCRIPTION OF THE DATA AND RESULTS

The authors have collected statistical data on new car sales in South Korea. The measure is the number of cars sold per year in units, and the time period considered in the paper is limited to the period from 2010 to 2021, which is a total of 12 years. The data used in the study is based on Auto Vercity service, which provides both monthly and annual statistics for new car sales in the Republic of Korea, depending on the brand of the car.[7] The data on the website is provided by the Automobile Manufacturers Committee of the Association of European Businesses (AEB). The primary data are compiled in *Table 1*.

Table 1 shows that Hyundai and Kia have been the key market players over the period under review, even despite periodic declines. The average share of these companies over the period was 38.6% and 29.8% respectively, totalling 68.4%, i.e., more than half of the South Korean car market. The following brands accounted for 1% of the market or more: Chevrolet, Samsung, SsangYong, Mercedez-Benz, BMW, Genesis, Daewoo, Volkswagen, and Audi. Together, this accounted for 26% of the market during the period. Consequently, the remaining smaller entrants were allocated an overall market share of 5.6% within the period under review. For most of the brands listed above, the sales dynamics can be considered somewhat fluctuating, with periods of losing market share and regaining it. However, the dynamics of the Daewoo and Genesis brands should be examined in more detail. As the fourth-largest company by sales in 2010 with a market share of 8.2%, Daewoo began to lose ground rapidly and steadily (an overall negative growth rate of 98.4% for the period). In contrast, following the launch of mass production of Genesis in 2015, based on a separate premium Hyundai sub-brand (Hyundai had previously launched GENESIS in 2008[8]), sales of this brand started to show year-on-year growth (an overall growth rate of 188.3% for the period). Thus, as of 2021, Genesis has a market share of 8.1% and is in third place in terms of sales.

The authors ranked the collected data by the size of the company's market share and selected key players for each year. The shares of the top ten brands separately for each year and the results of calculating the indices required to build the matrix are shown in the *Table 2* below.

[7] General statistics on new car sales in South Korea. URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/ (accessed on 26.10.2022).

[8] Hyundai Experiences, Vehicle History 2000. URL: https://www.hyundai.com/worldwide/en/footer/hyundai-experiences/vehicle-history/2000/genesis (accessed on 30.10.2022).

Table 2

Shares of key companies in the South Korean automative market from 2010 to 2021, %*

Year, brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hyundai	**42.4**	**43.3**	**43.3**	**41.5**	**41.3**	**38.9**	**33.4**	**35.3**	**36.4**	**38.5**	**36.3**	**34.4**
Kia	**31.1**	**31.2**	**31.3**	**29.8**	**28.0**	**28.8**	**29.3**	**29.1**	**29.3**	**29.3**	**29.5**	**31.3**
Genesis							2.6	3.2	3.4	3.2	5.8	8.1
Mercedes-Benz	1.0	1.2	1.3	1.6	2.1	2.6	3.1	3.8	3.9	4.4	4.1	4.5
BMW	1.1	1.5	1.8	2.1	2.4	2.6	2.7	3.3	2.8	2.5	3.1	3.8
Samsung	10.0	6.9	3.9	3.9	4.8	4.4	6.1	5.6	4.7	4.4	4.8	3.4
SsangYong	2.1	2.4	3.1	4.2	4.2	5.4	5.7	5.9	6.0	6.1	4.7	3.3
Chevrolet		6.6	8.1	7.7	7.9	7.1	8.5	6.0	4.0	3.2	3.7	3.0
Audi	0.5	0.7	1.0	1.3	1.7	1.8	0.9				1.4	1.5
Volvo												0.9
Daewoo	8.2	1.6		0.9								
Volkswagen	0.7	0.8	1.2	1.7	1.9	2.0			0.8		0.9	
Toyota	0.4		0.7						0.9			
Opel					0.6	0.7	0.8	0.9		0.7		
Lexus								0.7		0.7		
Linde =>	2	2	2	2	2	2	2	2	2	2	2	2
CRSV	73.5	74.5	74.6	71.3	69.3	67.7	62.8	64.3	65.8	67.7	65.7	65.8
HTSV	0.08	0.09	0.09	0.09	0.11	0.08	0.03	0.05	0.06	0.07	0.05	0.02
Quadrant	B4	B4	B4	B4	G	B4	RO	RO	B4	B4	B4	B4

Source: compiled and calculated by the authors зук URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

* *Note:* The cells of those brands that were not in the top 10 in terms of sales share in a particular year are in grey.

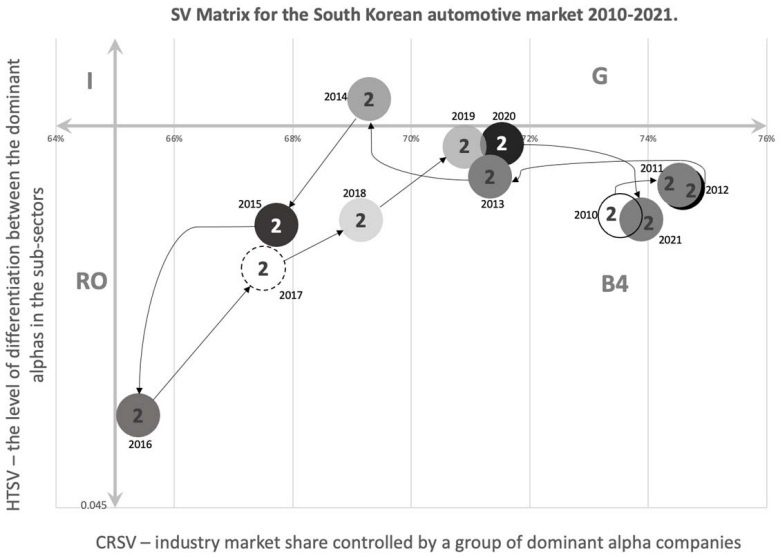

Fig. 3. **SV matrix of the dominance level for the South Korean cars market from 2010 to 2021**

Source: compiled and calculated by the authors per URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

Table 3

Shares of the key companies in the South Korean automotive market from 2010 to 2021, total shares of Hyundai and Genesis are taken into account, %*

Year, brand	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hyundai + Genesis	**42.4**	**43.3**	**43.3**	**41.5**	**41.3**	**39.0**	**36.1**	**38.4**	**39.8**	**41.6**	**42.0**	**42.6**
Kia	**31.1**	**31.2**	**31.3**	**29.8**	**28.0**	**28.8**	**29.3**	**29.1**	**29.3**	**29.3**	**29.5**	**31.3**
Mercedes-Benz	1.0	1.2	1.3	1.6	2.1	2.6	3.1	3.8	3.9	4.4	4.1	4.5
BMW	1.1	1.5	1.8	2.1	2.4	2.6	2.7	3.3	2.8	2.5	3.1	3.8
Samsung	10.0	6.9	3.9	3.9	4.8	4.4	6.1	5.6	4.7	4.4	4.8	3.4
SsangYong	2.1	2.4	3.1	4.2	4.2	5.4	5.7	5.9	6.0	6.1	4.7	3.3
Chevrolet		6.6	8.1	7.7	7.9	7.1	8.5	6.0	4.0	3.2	3.7	3.0
Audi	0.5	0.7	1.0	1.3	1.7	1.8	0.9			0.7	1.4	1.5
Volvo											0.7	0.9
Volkswagen	0.7	0.8	1.2	1.7	1.9	2.0	0.7		0.8		0.9	0.8
Daewoo	8.2	1.6		0.9								
Toyota	0.4		0.7					0.7	0.9			
Opel					0.6	0.7	0.8	0.9		0.7		
Lexus								0.7	0.7	0.7		
Linde =>	2	2	2	2	2	2	2	2	2	2	2	2
CRSV	73.9	71.5	70.9	69.1	67.5	65.4	67.7	69.3	71.3	74.6	74.5	73.5
HTSV	0.082	0.096	0.096	0.082	0.074	0.055	0.081	0.106	0.090	0.088	0.088	0.083
Quadrant	B4	B4	B4	B4	B4	B4	B4	G	B4	B4	B4	B4

Source: compiled and calculated by the authors per URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

* *Note:* The cells of those brands that were not in the top 10 in terms of sales share in a particular year are in grey.

Based on the calculations in this table, the two undisputed leaders of the South Korean car market are Hyundai and Kia, which in fact represent the dominant nucleus. There are also five brands that have been consistently in the ranking in terms of sales: Samsung, Chevrolet, SsangYong, BMW, and Mercedes-Benz. That said, Genesis' share has been rising since 2015, with the brand ranking unchallenged third in sales in 2020 and 2022. The other companies mostly do not hold a share of more than 2% of the market.

Fig. 3 shows the SV matrix for the South Korean automotive market.

During the period under review — from 2010 to 2021 — the South Korean automotive market moved between the three quadrants B 4 (oligopoly), RO (red ocean) and even G (single player leadership). However, for 9 out of 12 years the market has been in the B 4 quadrant (from 2010 to 2013, in 2015 and from 2018 to 2021), then it had two similar leaders — Hyundai and Kia. And it was in 2021 that these brands had the closest market shares to each other — 34.4% and 31.3%, respectively. In 2014, the market moved into quadrant G, driven by Hyundai's (41.3% of the market) larger lead over Kia (28.0% of the market), as, compared to 2013, the former company's share declined by just 0.2%, while the latter company's share fell by 1.8%. 2015 was a watershed year, with the market then in the B 4 area, but Hyundai began to lose ground, effectively giving up its share to smaller players. This dynamic led to the market being in the RO quadrant in 2016 and 2017, with the dominant group having a consolidated market share of less than 65% and brands such as Chevrolet, SsangYong, BMW, Mercedes-Benz, and Genesis 'taking

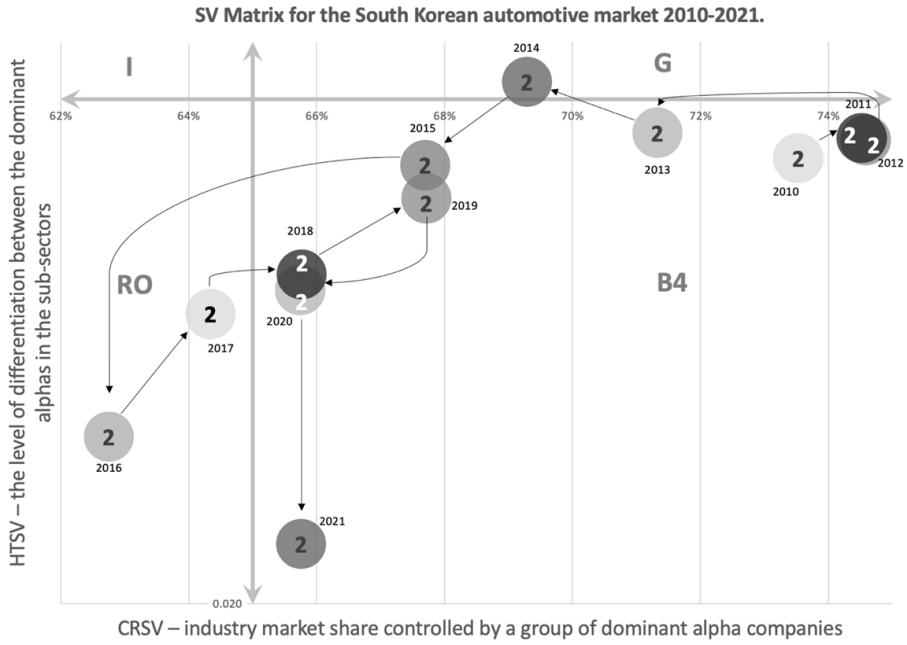

Fig. 4. **SV matrix for assessing the dominance level for the automotive market of South Korea in the period from 2010 to 2021, total shares of Hyundai and Genesis are taken into account**

Source: compiled and calculated by the authors per the URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

over' some of the consumers. It could be said that this period was the beginning of the successful growth of the Genesis brand. In line with this, it is also of academic interest to construct an SV matrix for the South Korean automotive market, but on the condition that the shares of Hyundai and Genesis are considered together, as both brands are part of Hyundai Motor, and further growth in the Genesis share could lead to another breakaway of Hyundai from Kia and a move into quadrant G in the future. The estimates for the second variant of the SV matrix are shown in *Table 3*.

Based on the above data, a matrix is compiled (*Fig. 4*).

When analysing the second SV matrix, where Hyundai and Genesis shares are taken together, it can be seen that the market has been predominantly in quadrant B 4 over the period under review. It is worth noting that in the case of the Hyundai and Genesis combined share calculation, the market does not move into the RO quadrant in either year, effectively indicating that under the previous scenario in 2016 and 2017, it was Genesis that played a key role in some market differentiation and shift to the RO area. When considering the second variant of the SV matrix, the market can be considered even more resilient. It mainly changes position within quadrant B 4, i.e., by reducing or increasing the aggregate share of companies in the dominant group.

INTERPRETATION OF THE RESULTS OBTAINED

In line with the data presented within the SV matrix, it can be noted that the South Korean automotive market has a stable dominant group both in terms of its size — 2 key players from 2010 to 2021 — and in terms of the brands that comprise it throughout the time period in question — Hyundai and Kia. Their combined market share did not fall below 62% over the entire study period.

What are the reasons for their dominance? First of all, these companies,

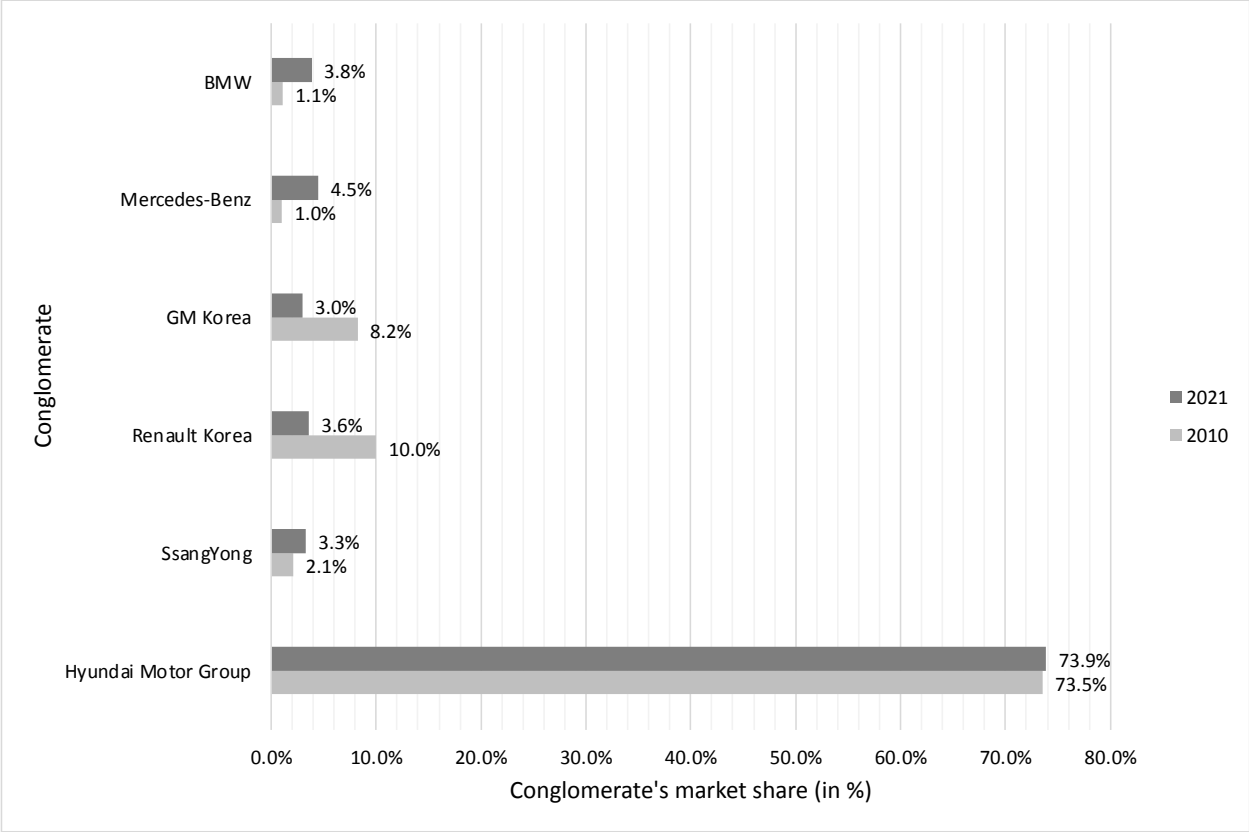

Fig. 5. **Distribution of brand shares within alliances in 2010 and 2021, %**

Source: compiled and calculated by the authors per the URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

along with Genesis, are part of South Korea's largest industrial conglomerate, the Hyundai Motor Group.[9] HMG is able to control the supply chain by owning subsidiaries in different industries. For example, Hyundai Mobis, Hyundai Transys, etc. are engaged in auto parts production, Hyundai Glovis is a transport company, and Hyundai Steel is one of the largest steel companies. There are divisions that deal with finance (Hyundai Capital, Hyundai Card, etc.).[10] Secondly, HMG brands are indigenous South Korean companies that are part of the "chaebol" category and benefit from government preferences. In addition, an important characteristic is the variability of the model range, which includes lower-priced models (under USD 20,000),[11] electric cars and hydrogen-powered models being tested (Hyundai IONIQ, Nexo, Kia Niro, etc.),[12] as well as premium cars under the Genesis brand,[13] which makes it possible to meet the needs of different target audiences. Thirdly, South Korean consumers are committed to the domestic car industry. Up until the early 2000s, for example, car service workers were arrogant towards drivers of foreign cars because it was believed that foreign brands were buying up the country's assets,

[9] Hyundai Motor Group Affiliates. URL: https://www.hyundaimotorgroup.com/main/mainRecommend (accessed on 12.11.2022).

[10] Ibidem.

[11] Hyundai Models. URL: https://www.hyundai.com/au/en/cars (accessed on 12.11.2022), Kia Vehicles; URL: https://www.kia.com/us/en/vehicles (accessed on 12.11.2022).

[12] Ibidem.

[13] Genesis Models. URL: https://www.genesis.com/worldwide/en/main.html (accessed on 12.11.2022).

thereby diluting the ownership structure and shifting the centre of control.[14]

Further interpretation requires consideration of key companies according to economic dominance theory (EDT) [28]. A comparison of brand shares in 2010 and 2021 within alliances is shown in *Fig. 5*, where it is also possible to determine the brand affiliation to one or another conglomerate.

According to the economic dominance theory (EDT), the HMG conglomerate (Hyundai, Kia, Genesis) can be described as an alpha company. Excluding the premium sub-brand Genesis, Hyundai and Kia had a combined share of 73.5% in 2020. Accordingly, HMG's strategy aims to retain market share. While in 2010 this was only possible at the expense of the two similar brands, in today's environment the company is betting heavily on Genesis, which as a standalone brand has an 8.1% share in 2021.

SsangYong is also a national car brand, but unlike Hyundai, it was taken over by Indian carmaker Mahindra & Mahindra in 2011, which mainly specialised in agricultural machinery and several SUV models.[15] From then on, South Korea's market share began to improve and grew until 2019, when a downturn began, leading to the company declaring bankruptcy at the end of 2020.[16] Reasons for the less-than-successful partnership between SsangYong and Mahindra & Mahindra include low brand awareness compared to Hyundai, and the promotion and sale of models as a direct Mahindra sub-brand rather than as part of a premium strategy and other sales channels.[17] As of summer 2022, the nation's largest chemical and steel conglomerate KG Group has been mandated to buy the assets of SsangYong, once again targeting the domestic market.[18] Within the economic dominance theory (EDT), SsangYong can be described as a gamma-company.

The Renault Korea and GM Korea conglomerates have similar market share dynamics from 2010 to 2021 (falling from 10 to 3.6% and from 8.2% to 3% respectively). The history of GM Korea began in 2002 when General Motors, in the face of declining market share in the US, decided to implement its plans to expand the international market for the Chevrolet.[19] However, after Daewoo's former CEO was sentenced to 10 years in prison for embezzlement and fraud in 2006, Daewoo lost its popularity with consumers.[20] In fact, within the period under review, GM Korea became the R&D and production location for Chevrolet's small cars for export to China, the US and India.[21] In 2022 it was announced that an additional Chevrolet production plant would be opened in Korea, increasing production volumes by around 500,000 units per year.[22] A small number of Daewoo cars are still in demand in Korea, but this does not affect the market much.

Unlike GM Korea, Samsung's merger with Renault for the domestic market emphasised the production of Samsung-branded cars.[23]

[14] In Daewoo, GM finds gold in overall gloom. URL: https://www.nytimes.com/2006/05/23/business/worldbusiness/23iht-daewoo.html (accessed on 13.11.2022).

[15] SsangYong: The history of a brand with an uncertain future. URL: https://www.carexpert.com.au/car-news/ssangyong-the-history-of-a-brand-with-an-uncertain-future (accessed on 13.11.2022).

[16] Court allows KG Group to buy carmaker SsangYong Motor. URL: https://www.interfax.ru/business/849290 (accessed on 13.11.2022).

[17] Ibidem.

[18] Ibidem.

[19] In Daewoo, GM finds gold in overall gloom. URL: https://www.nytimes.com/2006/05/23/business/worldbusiness/23iht-daewoo.html (accessed on 13.11.2022).

[20] Daewoo founder sentenced to 10 years in prison. URL: https://www.nbcnews.com/id/wbna13043919 (accessed on 13.11.2022).

[21] Daewoo's Epic Flop Wasn't the End for Its Cars. URL: https://www.motortrend.com/features/daewoo-cars-history-chevrolet-gm-korea/ (accessed on 13.11.2022).

[22] GM's New Korea Plant to Boost Capacity to 500,000 Cars in Nation. URL: https://www.bloomberg.com/news/articles/2022–10–19/gm-s-new-korea-plant-to-boost-capacity-to-500–000-cars-in-nation?leadSource=uverify%20wall (accessed on 13.11.2022).

[23] South Korea: Renault Samsung Motors. URL: https://www.renaultgroup.com/en/news-on-air/news/south-korea-renault-samsung-motors/ (accessed on 13.11.2022).

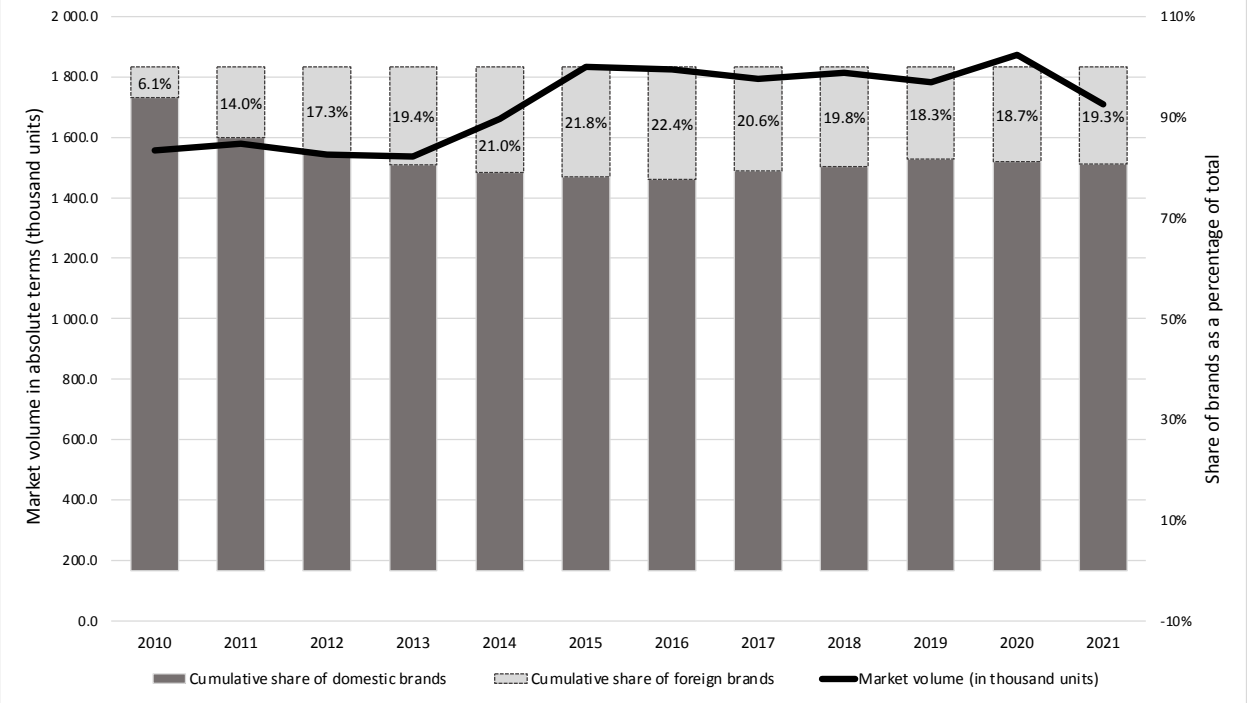

Fig. 6. **Dynamics of the combined shares of domestic and foreign companies in the cars market of South Korea in the period from 2010 to 2021 (in %) in comparison with the change in the market volume (in thousand units)**

Source: compiled and calculated by the authors per the URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

This trend is reflected in Renault's low brand share, but Samsung's stable presence in the structure of the top 10 companies over the period under review. In March 2022, the conglomerate changed its name from Renault Samsung Motors to Renault Korea, reflecting the expiry of Samsung's contract[24] and the sale of Renault's remaining 19.9% stake to Samsung Motors.[25] The final decision to pull out of the deal came after an epidemiologically difficult 2020, when domestic sales fell to 2004 levels and exports fell by 78%.[26] From 2022, cars made by Renault in Korea will be sold under the French brand name, leading to the disappearance of the Samsung brand as it existed before.[27] Consequently, after a more point-by-point analysis of GM Korea and Renault Korea, it can be concluded that they are also gamma companies in the South Korean passenger car market.

Within a separate group we should also consider the Mercedes-Benz and BMW brands which, in addition to their German origins, have a similar development scenario from 2010 to 2021. In 2010 the companies had market shares of 1 and 1.1% respectively. In 2021, the growth of Mercedes-Benz's share became more significant and reached a market share of 4.5%. BMW was able to increase its share to 3.8% of the market. An important factor when interpreting in the context of the economic dominance theory (EDT) is that both companies are foreign ones and they produce premium passenger cars.

[24] Korea's Renault Samsung has changed its name: it is now simply Renault Korea. URL: https://motor.ru/news/renault-samsung-18–03–2022.htm (accessed on 13.11.2022).

[25] How will exit from auto manufacturing help Samsung? URL: https://www.just-auto.com/analysis/how-will-exit-from-auto-manufacturing-help-samsung/ (accessed on 13.11.2022).

[26] Ibidem.

[27] Ibidem.

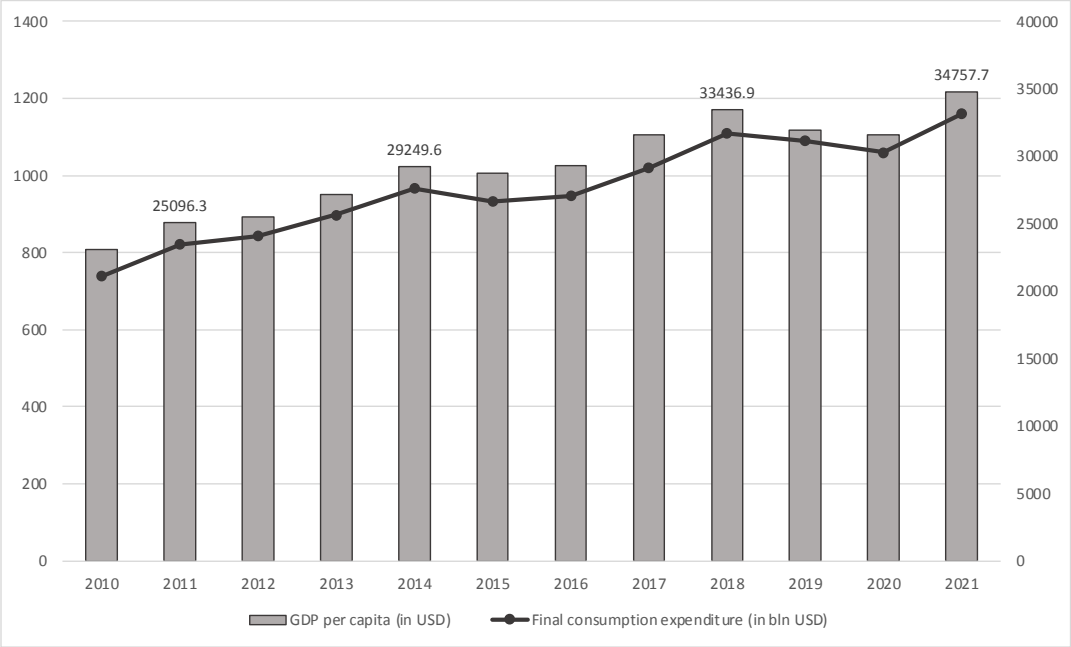

Fig. 7. **Progress in the well-being of the population of South Korea between 2010 and 2021, expressed in terms of GDP per capita (in USD) and final consumption expenditure (in billion USD)**

Source: compiled by the authors per the URL: https://data.worldbank.org/indicator/NE.CON.TOTL.CD?locations=KR, https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KR

Therefore, it can be said that Mercedes-Benz and BMW are gamma companies in the South Korean passenger car market, which is highly nationally oriented.

For a more in-depth analysis, it was decided to divide the study period into three segments according to changes in market volume in absolute terms, as well as the distribution of market shares between domestic and foreign companies (*Fig. 6*).

The first period,— from 2010 to 2012 inclusive,— can be characterised as a time of continued leadership by domestic producers. In the second period, from 2013 to 2015 — the market grew by 19.2%, and the shares of foreign brands began to grow significantly, exceeding those of the leaders (Hyundai and Kia), as shown in *Fig. 7*. In the third and longest period — from 2016 to 2021 — the domestic premium brand Genesis was launched into mass production and sale, and HMG regained its cherished (since 2019) 70% of the market.

From 2010 to 2012, the South Korean passenger car market showed a fairly stable sales trend, at around 1.56 million units per year. However, the brand structure has begun to diversify more and more, as evidenced by the increase in the combined market share of foreign brands from 6.1% in 2010 to 17.3% in 2012 (*Fig. 6*). Often, the increase in consumption of imported cars indicates an increase in the well-being of the population, which is willing to pay for foreign quality and cover additional costs in the form of logistics costs. *Fig. 7* shows statistics on GDP per capita and total final consumption expenditure from 2010 to 2021.[28] Fig. 7 shows that 2011 and 2012 were marked by growth in GDP per capita (+10.3%), as well as a mirror trend of growth in final consumption expenditure. It was from this time that the gradual increase

[28] Final consumption expenditure — Korea, Rep. URL: https://data.worldbank.org/indicator/NE.CON.TOTL.CD?locations=KR; GDP per capita — Korea, Rep. URL: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KR (accessed on 13.11.2022).

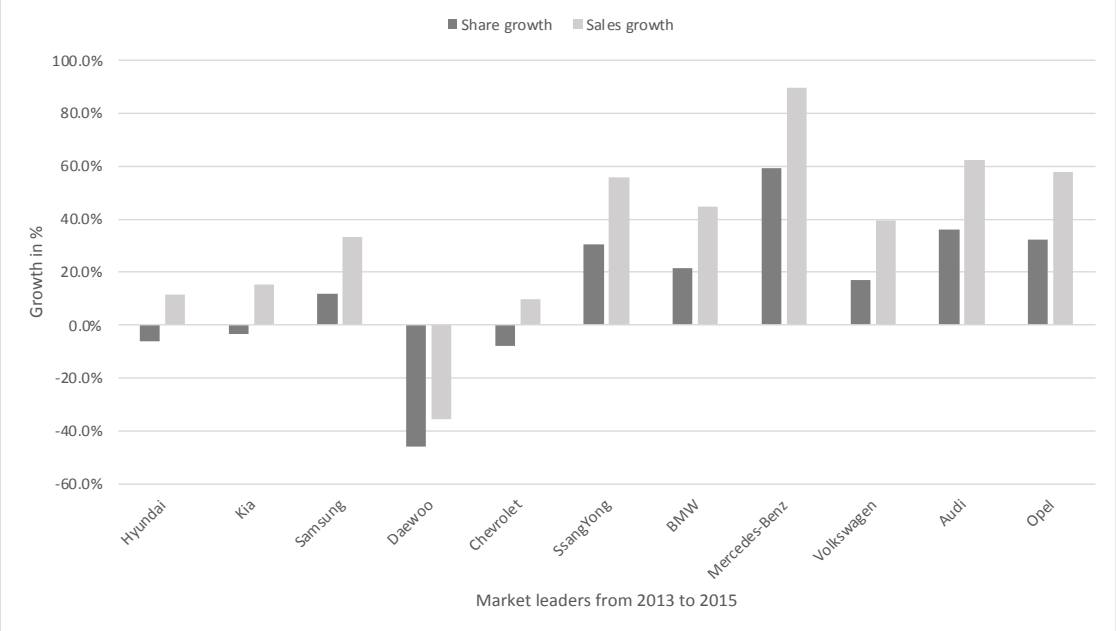

Fig. 8. **Comparison of absolute (sales volume) and relative (market share by sales volume) growth of leading companies in the period from 2013 to 2015**

Source: compiled and calculated by the authors per the URL: https://auto.vercity.ru/statistics/sales/asia/2021/south_korea/01–12/

in the share of foreign brands began, which confirms the assumption made.

The second reason for the rise in the share of foreign brands is the foreign trade policy chosen by the South Korean state since the beginning of 2011. At that time, the trade agreement between South Korea and the EU resulted in the elimination of customs duties on 98.7% of goods. It also removed non-tariff barriers to imports of the key EU products into the country: automotive, chemicals, pharmaceuticals, and electronics. In the first five years of the agreement, i.e., up to 2016, EU exports to Korea increased by 55% — to a record $ 90 billion.[29]

The next highlighted period is a logical continuation of the chosen foreign trade policy. During this period, it was the German brands that began to gain market share (*Fig. 8*) and accounted for approximately 71% of all imported cars.[30] This period is also marked by a sharp increase in sales volumes in absolute terms, indicating an increase in consumption of automotive products in general. This trend is also related to the growth in the welfare of the population (*Fig. 7*). GDP per capita reached $ 29,249.6 in 2014 and, despite a slight decline in 2015 and a stabilisation in 2016, was a record year. A comparison of the absolute and relative growth of market-leading companies from 2013 to 2015 is shown in *Fig. 8*.

The horizontal axis of the graph shows the names of the leading companies and the vertical axis shows the percentage scale of change in the level of growth. It can be seen that, in percentage terms, the sales growth of the companies in the dominant group, as well as the Korean brand Samsung, was lower than that of the smaller market players that sell imported cars (Mercedes-Benz, Audi, etc.) and

[29] EU-South Korea Free Trade Agreement. URL: https://trade.ec.europa.eu/access-to-markets/en/content/eu-south-korea-free-trade-agreement (accessed on 13.11.2022).

[30] Fortress Korea car market cracks under German luxury barrage. URL: https://www.reuters.com/article/autos-southkorea-idCNL3N 0T013920141116 (accessed on 13.11.2022).

the South Korean carmaker SsangYong. Thus, Hyundai and Kia had an increase in sales of 12% and 15% respectively, while Mercedes-Benz and Audi had 90% and 62%. The average market share gains of the dominant group were negative: –6.3% for Hyundai and –3.4% for Kia. In contrast, foreign companies showed a positive trend. The position of the German carmaker Mercedes-Benz improved most markedly: +59.1%. Audi, Opel and SsangYong also had similar growth rates (at least 30%), while BMW and Volkswagen had 21.5% and 17% respectively, which is markedly better than the dominant group. Negative performance was seen for Daewoo and Chevrolet, both of which are part of the same conglomerate, — GM Daewoo.

Thus, the period 2013–2015 was marked by an increase in the share and volume of imported car sales. In fact, Hyundai and Kia gave up some of their market share to smaller foreign players. At that time, HMG did not yet have a full-fledged premium brand,[31] which for the more affluent consumer segment was the reason for choosing brands such as Mercedes-Benz and BMW. It is important to mention the fact that this period marked the beginning of a review process of HMG's strategy. At that time the company took steps to launch its own premium brand, which determined the need to involve foreign experts in the strategy and promotion process.[32] This is where the third highlighted period begins, — from 2016 to 2021, when Hyundai, by diversifying its model range and entering a new segment, was once again able to stabilise its position and start competing with foreign brands already in the premium car market.

This period is characterised by the growth in prosperity and wellbeing of the population and the achievement of the highest GDP per capita as well as the highest share of final consumption expenditure (in 2021). HMG brands also started to grow again (primarily due to Genesis), but the combined share of foreign brands also stabilised and averaged 19.9% of the market. This timeframe is not particularly turbulent, apart from an increase in sales in 2020 due to industry support measures due to COVID-19 and a subsequent decline in market volume in absolute terms in 2021, driven by frequent supply chain disruptions due to second-wave pandemics in many countries.[33] However, the decline was exclusively in car sales, while their total value was a record — $ 62.9 billion (an increase of 1.8% compared to 2020).

CONCLUSIONS

South Korea is one of the few nations to have a stable automotive market based on the dominance of the domestic manufacturer. Whereas in the 1960s Hyundai was intended to be one of the first national car manufacturers to assemble domestic cars, though not the best in functionality, as of today HMG has become a high-tech company with a presence in all segments of the automotive market. Even with preferential foreign trade with the EU, HMG alpha with its Hyundai, Kia and Genesis brands respectively holds the top 3 market shares. However, the South Korean passenger car market is not a closed market and there has been an increase in the cumulative share of foreign companies within the period boundary. The SV Matrix also shows that the market in question in 2021 has effectively returned to where it was in 2010 (quadrant B 4 with a high market

[31] Hyundai Motor launches new global luxury brand, «Genesis». URL: https://www.hyundai.news/eu/articles/press-releases/hyundai-motor-launches-new-global-luxury-brand-genesis.html (accessed on 13.11.2022).

[32] Hyundai Announces Manfred Fitzgerald to lead Genesis Brand Strategy. URL: https://www.hyundai.news/eu/articles/press-releases/hyundai-motor-announces-manfred-fitzgerald-to-lead-genesis-brand-strategy.html (accessed on 13.11.2022).

[33] Auto sales by value hit record in 2021, while unit sales fall. URL: https://koreajoongangdaily.joins.com/2022/04/06/business/industry/korea-korean-auto-market-car-market/20220406171522791.html (accessed on 13.11.2022).

share for the two key brands), i.e., Hyundai has been able to maintain its leading position through its strategic actions.

However, the South Korean market is interesting not only in itself, but also as a relevant development case for the Russian automotive market. As Russia is now becoming a country more oriented towards domestic producers and an import substitution strategy, Hyundai's story could serve as an example for a major domestic company, JSC "AvtoVAZ". Given that the state aid is provided in the early stages, this company has the prerequisites to develop quality products based on proven technologies and sell them at reasonable prices, which will help it to take a significant share of the market. Therefore, studying the specifics of the South Korean market in general and Hyundai in particular is relevant and justified.

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Change of the Management System and Formation of the Russian Wartime Mobilization Economy Model during the First World War

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ABSTRACT

The problem of the economic transformation has always been one of the main issues for the economists of all times. Nowadays it gains particular relevancy. The first experience of transforming the peacetime market economy into the economy based on the wartime mobilization principles was acquired by Russia during the First World War, which is considered the first total war in history. To provide the army with all the necessary weapon, ammunition and food a concentration of all the powers, resources and assets was needed. To win it was necessary to change the system of the governmental administration by filling it with new content. The article highlights the main stages of the new management structure formation, which could face the challenges of that time; a characteristic of the new administrative bodies is given as well as the general range of problems which the government faced while reforming the administration system.

Keywords: wartime mobilization economy; stavka of the supreme commander; main artillery directorate; S.N. Vankov's organization; special administrative commission on artillery; special council; All-Russian zemstvo union; All-Russian union of cities; military-industrial committees

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History repeats itself
Thucydides (c. 460 — c. 400 BC).

INTRODUCTION

The events of present days convince us of the topicality of the aphorism expressed by the ancient Greek historian. Indeed, much of what is happening now resembles in form and content what Russia faced a hundred years ago. Russia approached the beginning of the First World War with the experience of a failed war with Japan, with incomplete reforms, economic and political contradictions, with an erroneous military-strategic assessment of the future war, etc. "There was a striking unanimity in European military circles regarding the likely duration of the war: military writers of all countries, and the most respected representatives of the General Staff maintained the idea that the coming war could not be long, that its probable duration would be about 3 months, and the maximum would be about half a year, that all serious military operations would be over by then and the fate of the war would be decided," wrote in the 1920s the General, Professor N.A. Danilov [1]. The war would deplete the stocks of expensive weapons, ammunition and equipment and it would force the enemy to sit down at the negotiating table. The military plans did not rely on organizing military production, but on supplying the army and navy with peacetime-prepared supplies.

Strategic planning errors led to military, economic, moral and image losses for Russia. Only the mobilisation of all forces and resources could overcome the complexities and difficulties caused by both previous miscalculations and new problems. The logic of war demanded a restructuring of the governing bodies. Success on the frontlines depended on the awareness and the speed of decision-making.

NEW GOVERNING BODIES AT THE INITIAL STAGE OF THE WAR

Three days before the outbreak of the war a document was adopted which determined the structure of army command during the war — the "Field command of the troops in wartime". The Stavka of the Supreme Commander-in-Chief was declared the supreme body of military administration. It was created at the beginning of the war and it consisted of the Quartermaster-General's Office, which was responsible for developing operational issues, the Office of the Chief of Military Communications, which managed the transport in the war zone, and the Naval Office. The Chief of Staff had a civilian office and even a diplomatic section. However, there was no structure in charge of supplying and ensuring armaments to the army. "Under the Supreme Commander-in-Chief," — General A.A. Manikovsky later noted, — "there was no special body responsible for and in charge of supplying the active armies. [2]. The Facility and maintenance departments of the Military and Naval Ministries were to handle the most complex organizational, managerial, and logistical tasks. They were tasked with the delivery of weapons, ammunition, and equipment from the rear army depots to the active army. During the first year and a half of the war the post of an intendant i.e., commissaryship did not exist in the army. It was only on January 5, 1916 that a temporary provision for the Field Inspector-General of Artillery under the supervision of the Supreme Commander-in-Chief was approved, who was entrusted with the general management and supervision of the timely, orderly supply of the troops with weapons and ammunition. [3].

The war necessitated the creation of new management institutions. In August 1914, a Directorate for Food Supplies to the army fronts (the so-called "Khlebarmia") was established under the General Directorate of Agriculture, which had local (but not in all provinces) staffs of commissioners [4]. The document promulgated on 29 August 1914, entitled "Regulations on Localities Under Martial Law," granted the army commanders broad powers: to prohibit or restrict the export of food and forage from the front-line zone, it also allowed them to set purchase prices for products intended for army shops and regulate the production of certain branches of the food industry. Part of the management of the economy in the front-line areas passed into the hands of the military and wartime administration.

A decree of 8 December 1914 granted similar rights to commanders of rear military districts. By a law of 17 February 1915, in accordance with the governors and commissioners, they could fix maximum prices for food purchased for the army, restrict its export, and carry out requisitions. In March 1915 the Ministry of Trade and Industry set up a Committee for the Supply of Food to the Population, which had previously been the responsibility of the Ministry of Internal Affairs; the Minister of Railways was charged with overseeing the extraction and export of coal from the Donbass.

The measures taken were mainly ad hoc, not always well thought out and systematic. This confused the activities of the military authorities and the local administration and caused inter-agency conflicts.

For a long time, the idea that the war would be short-lived had had a very negative effect on government circles. This can explain the inconsistent and haphazard manner in which the government acted at the beginning of the war. The result was the armament crisis and the "shell famine" at the end of 1914. By this time the military leadership came to the conclusion that emergency measures were needed. The stockpiles were running out and the state industry was unable to fully supply the army. Quartermaster-General of the Stavka Yu.N. Danilov wrote in exile: "The size and scale of the needs exceeded all the most sweeping assumptions and, therefore, it was increasingly difficult to go on satisfying them. The rear could not keep up with the front, and the army was shrinking day by day as its supplies were diminishing". [5].

At first, the Tsar and his inner circle believed that it was sufficient to extend the powers of the

existing civil and military authorities. They did not envisage the creation of new administrative structures. However, the failures at the fronts showed the low efficiency of the existing administrative system. Particular dissatisfaction was caused by the activities of the General Artillery Administration (GAA) which supplied the army with arms and ammunition.[1]

The shortage of ammunition prompted the Chief of Stavka, Grand Duke Nikolai Nikolayevich, to initiate and propose the creation of a Special Administrative (Ordinance) Commission on Artillery. On February 15, 1915 it was established as part of the War Ministry. The Commission was to "promote the provision of the army in the field of artillery equipment by monitoring and controlling the activities of institutions involved in the artillery supply: the use of available means of combat, the procurement of new means by order, purchase, as well as expanding the productivity of factories, the application of new inventions in the artillery field, etc." [6].

It was commissioned to establish working "ties between the army in force and the bodies in charge of producing and supplying artillery items". The Commission was given the right to control the activities of the GAA and its subordinate organisations and persons involved in the execution of military orders, and the management of public and private enterprises. A noteworthy point of the Regulations is that "the control and general attitude to private and state factories in fact should not go beyond the existing legal provisions, the highest approved resolutions of the Council of Ministers and interdepartmental agreements". [7]. This meant that the authorities were still clinging to peacetime procedures, which provided for bidding for government contracts, observing a large number of formalities in their execution, and so on.

The Commission made many efforts to provide fuel, materials, equipment, and labour for the defence enterprises. One of the major and most successful measures was the establishment of a special organisation by General S.N. Vankov. The task of producing three-inch shells, that was the main calibre in the field artillery, using the French technology, was given to a commissioner of the GAA in the shortest possible time. While continuing to produce shells complying with the Russian standards, the organization needed to engage new enterprises. Having started work in April 1915, in a month it managed to engage 49 medium and small enterprises in fulfilling a million-dollar order, creating a "closed-cycle" production [8]. [8]. All enterprises were grouped into four groups headed by the "parent" factory. By 1917, Vankov's organization employed 442 state and private factories, producing the entire range of products needed to create shells. It participated in the construction of new industrial enterprises. [9].

The war demonstrated the shortcomings of the existing management system, which was unprepared for large-scale military confrontation. Its most important flaw was its unpreparedness to quickly restructure its work, to adapt to new conditions and demands, and the lack of clear coordination and interaction between the management bodies.

In the early months of the war, the supreme power used its decades-long practice of decision-making. During the peace years, when faced with challenges, the government responded by setting up commissions and meetings involving officials and interested parties, inviting experts. These temporary bodies had no power of any kind. They had only a consultative function. This practice, which went on for many years, helped to develop a certain type of a manager who tended to make exclusively collegial decisions, who tried to delegate and shift responsibility to others, who could not find a quick and systematic approach to resolving the problems at hand. There were very

[1] GAA was established on December 28th, 1862. It provided the troops with all types of weapons and ammunition, ensured combat training of artillery units, was responsible for the improvement of military technology and weapons. On the eve of World War, I the GAA Command was responsible for 50 military factories that produced artillery weapons, 22 central artillery depots, and 12 district offices. 200 private companies contracted to produce artillery weapons and ammunition.

few Russian managers who were prepared to take responsibility without the fear of consequences. The "meetings system" was also in place during the war, i.e., the old management style of decision-making was reproduced under extraordinary conditions.

SPECIAL ORDINANCE COMMISSION FOR ARTILLERY

The logic of development, meanwhile, dictated changes in state-building issues. During 1915 the system of military and economic regulation began to take shape. The following establishments were created: a Special Ordinance Commission for Artillery (January 1, 1915), a Special Meeting on Strengthening the Supply of the Active Army with Essential Allowances types (May 1915), a Special Meeting on strengthening the artillery supply of the Active Army, renamed on June 7, 1915 into a Special Meeting to combine activities to provide the army in the field of military and material supplies.

There were high expectations for the work of these new structures. They were given considerable powers. The Special Ordinance Commission on Artillery (SOC) "to establish a real link between the active army and the bodies in charge of the manufacture and supply of artillery items" was charged with the duty "to contribute in all measures to provide the active army with artillery supplies". The chairman of the SOC, subordinate to the Stavka, was charged with "presenting to the GAA and its subordinate bodies the requirements of the army", seeking their implementation, "demanding from the bodies concerned the information about the needs of the army", and applying measures to meet these needs, "both within the Empire and abroad". [10].

The Commission had the right to control all the institutions of the military department connected with supplying the army with artillery supplies; to inspect and control the activities of enterprises of all forms of ownership, which fulfilled the orders of the GAA; to execute the requisition of property and sequester enterprises in cases where they were unable to obtain the voluntary consent of their owners to perform military orders. At the same time however, the provision contained a proviso that "the control and general attitude to private and state factories and plants should not go beyond the current legal provisions". [10]. This restriction indicated the half-heartedness and inconsistency of the decisions made, i.e., on the one hand, the Commission was given greater rights up to requisitions and sequestration, but on the other hand, it had to be guided by the legislation of pre-war times

The creation of the Special Ordinance Commission on Artillery (SOC) was the first attempt to establish an organisation of an extraordinary character. However, its activities were very poorly coordinated with those of the General Staff (Stavka) of the Supreme Commander-in-Chief, the Council of Ministers, and individual ministries, especially the War Ministry and its directorates, so it was abolished by the order of Nicholas II on 30 June 1915.

As the history of the war has shown, the new management structures were not particularly effective. The results were far from what had been hoped for. There were many reasons for this. Among the most important were a narrow departmental approach to solving the problems, a lack of coordination between different levels of institutions, and the ambitions of the heads of the government departments. Created as a response to military challenges, they were abolished after a short time because of the conflict with the existing management model. Quite typical was a situation where complex issues were resolved at the level of personal contacts between the leaders. In testimony to the Supreme Commission of Inquiry, Grand Duke Sergei Mikhailovich lamented: "There was no possibility of taking measures to raise the productivity of the factories other than personal or through his representatives appeals to the leadership". [10]. But despite the short duration of their activities, they laid the basis for the mobilisation deployment of industry and created the conditions for the involvement of new

enterprises in solving the tasks at hand. In times of emergency, unconventional solutions were needed, as well as new people.

The Russian army's heavy defeat in the Carpathians, the rapid retreat from Galicia and the "great retreat" in the spring and summer of 1915 sent shockwaves through the country. The outburst of indignation in society was unprecedented. No one had expected such a catastrophe. The difficult situation at the fronts made it necessary for the authorities to concentrate all the country's resource potential in their hands and to start involving private business in the fulfilment of the army's tasks. This was demanded not only by the military situation at the fronts, but also by the patriotic public in the country.

Due to military setbacks, the military industrial management system had to be adjusted, and the regulatory role of the state had to be strengthened in order to bring together the public and private industrial sectors. Planning, interaction between government agencies, and the coordination between the executive bodies and the civil society organisations became a priority for all government agencies.

SECTORAL MEETINGS

In the summer of 1915, the authorities came to the conclusion that a solution to the emerging situation would be to establish special administrative bodies with greater powers to intervene in the economy. The war had disrupted the established production, trade, and financial ties. Problems of fuel, transport and food supply became particularly acute. To resolve them, three special, «sectoral» meetings on fuel, transport and food were established. On 30 August 1915 a Special Meeting on the Arrangement of Refugees was set up.

All of them were given considerable powers. The Special Fuel Board could set "ceiling prices" for all types of fuel, distribute fuel among the consumers, change board members and company directors, impose sequestration, order fuel audits, change the terms of contracts, etc. The Food Council was given exclusive rights. It could procure food and forage for the army by all means, regulate trade and prices, confiscate livestock, food, forage and seeds and override the decisions of local authorities regarding trade and supply of towns. The Special Conference on Transportation focused on increasing the capacity of the railways, supplying them with rolling stock, building access tracks, and purchasing rolling stock. It was authorised to establish "compulsory use" of railway rolling stock, steamers, barges, etc.

The purpose of the Special Meetings was to coordinate and unify the efforts of all the governing bodies. They were all of an emergency, temporary nature [12]. In order to coordinate their activities, a Special Ministerial Conference was created in the summer of 1916 under the direction of the chairman of the Council of Ministers, to which all the sectoral meetings were subordinated.

The Special Meetings were "supreme institutions" in their field. They were headed by the respective ministers, who had extraordinary powers, the right to set up their own apparatus and a network of local committees and branches. Only the Transport Conference had no local apparatus. Its orders were carried out by the apparatus of the Ministry of Transport. The heads of the meetings were responsible to the Tsar. The Chairmen of Special Meetings were vested with considerable rights, but their decisions were not binding, but only recommendatory in nature and needed approval by the Chairman of the Special Defense Conference. The agenda of the meetings was proposed by the Chairman.

The work of the Special Meetings followed a well-established pattern — through branch committees, preparatory commissions, etc. The chairmen of the working bodies were appointed by the chairmen of the Meetings, who determined the range of issues to be dealt with. The records were kept by the offices of the respective ministries.

SPECIAL CONFERENCE ON DEFENCE

On 17 August 1915 a "Special Conference for the discussion and unification of defence measures" (Special Conference on Defence) began its

work. It consisted of the members of the State Duma and State Council, the representatives of ministries and departments, and big business. Among the members of the Conference were few people with practical experience of industry, who understood the issues of supplying a multimillion army. General A.A. Manikovsky would later write that "the Conference is too crowded a body for productive work". [2].

The new organisational structure was to become the central coordinating and regulating body for the management of the emerging military-mobilisation economy. The Special Council supervised the distribution of military orders between Russian and foreign factories and firms; controlled the activities of public and private enterprises fulfilling the orders of the War Department; facilitated the construction of new factories and the expansion of the existing ones; agreed on the transportation of military goods; provided defense plants' workers with food, set wages at these enterprises.

The Chairman of the Special Defence Conference, the Minister of War, had exceptionally wide-ranging powers. He could close enterprises that did not fulfil government orders; he could demand priority fulfilment of orders from the treasury; sequester private enterprises and appoint commissioners to manage them; remove soldiers from service as well as remove directors, managers and boards of enterprises working for defence; and appoint managers of enterprises. Resolutions of the Council of Ministers of 16 January and 25 October 1916 further increased the rights of the chairman of the Council.

A special meeting was formed on the principle of unanimity. The Chairman set the agenda and could invite anyone to the meeting. If he was not present at the meeting, the Assistant Minister of War chaired it. The chief of the Office of the Minister of War was responsible for managing the affairs and the office work of the meeting. The entire state apparatus was subordinate to the Ministry of War, which is logical, since in August 1915, the Supreme Commander-in-Chief of the War Ministry, and the Minister of Defence were in charge. And it was Nicholas II who became the Supreme Commander-in-Chief in August 1915. Under the new configuration of power, the civilian departments occupied a secondary position. The meeting is a body designed to deal with military tasks — logistical and administrative support issues as well as sustainment operations have been relegated to the back burner and faded into insignificance. The provision of the population was outside the view of the Defence Council, with the most negative consequences.

There were district commissioners in the local communities. Most of them were military officers, mostly in the rank of the general. On 10 September 1915 "factory meetings" were established in 12 industrial and regional centres — Petrograd, Moscow, Nizhny Novgorod, the Urals, Kiev, Ekaterinoslavsk, etc. The meetings consisted of the representatives of local government agencies, zemstvo and city union organisations, military-industrial committees, and industrialists. The government thus recognised that the knowledge and experience of the latter could be useful in wartime conditions.

The meetings coordinated the work of enterprises in the local communities, built cooperative links between the enterprises, and implemented measures to make fuller use of the resources and production potential of the regions [12]. It was through them that they controlled the activities of the factories that carried out military orders. Their chairmen were given the right to carry out general and private requisitions, set workers' wages, change the nature and volume of the production, and issue advances, allowances, and loans. They made representations to the chairman of the Meetings for the removal from service of members of the boards, directors, and managers of public and private factories, if this was necessary.

The Special Defence Conference was supported by nine expert groups, whose activities were determined by the chairman. There were the following commissions: a general commission, a preparatory commission on artillery matters,

an observation commission, an evacuation commission, a requisitioning commission, a commission on providing enterprises fulfilling military orders with manpower, a commission on revising norms of sanitary and medical supplies for the army, a preparatory commission on aviation matters and a statistical bureau [6]. A special questionnaire commission was established under the Supervisory Commission, which was engaged in statistical and economic research, recording strikes, labour force, finding out the degree of industrial utilisation of individual districts and whole industries for defence work [6]. In addition to the permanent commissions, temporary committees were periodically established under the Meeting to monitor the activities of industrial districts and individual defence enterprises and develop various normative documents.

The Special Council procured arms abroad through the Russian Government Committee in London and the Committee for the Procurement of War and Material Supplies in the United States. It was entrusted with the task of placing and monitoring military orders from foreign manufacturers.

Meetings of the Defence Conference were held twice a week. A detailed journal of the meetings was kept and signed by the members of the meeting. In the event of disagreement with a decision taken by the chairman of the meeting, the members of the meeting were able to record a dissenting opinion. The workload was considerable. Sometimes up to 18 cases were considered at one meeting. The decision was sent to the Executive Commission, which prepared contracts with the executors. The Supervisory Board monitored the progress of the deliveries and the correct and timely performance of the contracts. Based on its conclusions, decisions were made on sequestrations, requisitions, changes of factory boards, etc.

The Special Defence Board was the main military customer. It accounted for 97% of all orders [11]. It received huge advances, up to 60% of the order amount, millions of non-repayable subsidies for production development, reconstruction of evacuated enterprises, and the purchase of machines, tools, and raw materials abroad. The Special Defence Conference had sanctioned the construction of no less than 75 new defence enterprises. Thanks to it, the chemical, automotive, aviation, electrical, bearing, and machine tool industries began to flourish. [13].

The leaders of the Special Meetings were obliged to report about all the decisions to the chairman of the Defence Conference. The Chairman could suspend the decisions of other meetings and, if he was unable to reach agreement with them, he would refer the matter under the consideration to the Council of Ministers. The Minister of War had wide-ranging powers in the industrial and financial fields. He was in charge of financing military orders within the country, spending money abroad. The order of their expenditure was approved by the Special Board. It could give enterprises binding orders, establish, and close industrial enterprises, set maximum prices for raw materials and finished products, set wages, carry out requisition of stocks of raw materials and semi-finished products, restrict private trade, change directors, and board members of enterprises, impose sequestration on immovable property, etc.

The defence meeting sought to coordinate the work of all the meetings. But in real life this was difficult to achieve, as the heads of the meetings were equal and acted independently. All the Special Meetings were given wide-ranging powers — they were responsible for providing the army with the necessary resources and facilities. The Council of Ministers was in charge of people's livelihood. Their interaction was irregular. Thus, there were two 'parallel' structures working in the rear, both of which were loosely connected, each trying to establish its own 'rules of the game'. [14].

Decisions taken by the Defence Council were often vague and inconsistent, even though it was vested with a broad mandate. Every issue was subjected to endless scrutiny, passed from one commission to another. Many of them were drowned in endless disputes and approvals, especially in complex and ambiguous cases, such

as the requisition of equipment from private enterprises, advances and loans for the expansion and refurbishment of private enterprises, etc. As I.V. Majewski rightly noted: "The Special Meeting in most cases did not actually make decisions, but only made recommendations". [15]. And A.A. Manikovsky, the head of the GAA, spoke more sharply, calling it a "politician's talking shop" with incredible discord, bureaucracy, and red tape routine [2].

In the early days the dialogue with the industry was conducted by the Defence Council through compromises and agreements rather than through directives and orders. The involvement of private industry was based on peacetime laws and regulations and was surrounded by a host of formalities which, in the words of General E.M. Smyslovsky, Assistant Chief of the General Artillery Administration (GAA), "became an artificial fortification, that was binding the procurer by the hands and feet". [16].

Another shortcoming of the Meeting was the lack of systematic work. Often, under the influence of a dynamically changing situation, it began to tackle new tasks without completing the old ones. The peacetime management style was carried over to wartime management style. Of course, many problems had to be solved for the first time by the state. Officials had no developed procedures, algorithms, or "protocols" for action. The government had to search by «trial and error» method for adequate and workable managerial tools and mechanisms to deal with the evolving circumstances.

The creation in August 1915 of military regulatory bodies in the form of a system of Special Boards, headed by the Special Defence Board, which had interdepartmental coordinating functions, was an important factor in the mobilisation and militarisation of industry and in the development and condition of all branches of production.

The experience of action of the structure of the Special Councils, the competencies of its individual structures, and the powers of its officials developed along the lines of centralisation, moving away from the consultative and collegial order of decision-making towards placing personal responsibility of the decision maker or whoever was in charge, which was fully justified by the wartime conditions. The war demanded from the State the continuous expansion of the scope of its intervention in all the most important branches of the national economy, in the activities of individual firms and manufacturers.

The institution of special meetings continued after the events of February and October 1917. They survived until March 1918, i.e., until the conclusion of the Brest Peace Treaty.

In addition to the Special Meetings, which were responsible for the overall management of military and economic mobilisation, bodies were set up to regulate particular branches of industry. In July 1915 a Committee for the Supply of Raw Materials to Cotton Factories was set up under the Ministry of Trade and Industry, followed by Committees for the Cloth, Flax and Jute Industries, which were based on the industry monopoly associations. The committees had a consultative function, but often the issues discussed at their meetings became ministerial decisions.

The syndicates "Prodamet" (Society for the Sale of Products of Russian Metallurgical Plants), "Krovlya" (Housetop), "Med" (Copper) and the Society of Copper-Rolling Plants with their extensive accounting and distribution apparatus were involved in the task of providing industrial enterprises with labour. Mining and metallurgical workers were actively involved in the work of the "Committee on the metallurgical industry" headed by General A.Z. Myshlaevsky, established in January 1916. Workers of the oil industry actively cooperated with the Chemical Committee established under the Chief Artillery Directorate and headed by Academician V.N. Ipatyev. The "Provoloka" ("Wire and cable") Syndicate was involved in the wirework of the Chief Military Technical Directorate [9].

In the spring of 1915, the question of the need for private business involvement in the defence sector became evident. The question of

the relationship between the government and the business came to the fore. On what principles should this relationship be based? How was it possible to achieve an equitable distribution of wartime burdens to all groups of the country's population, and prevent the owners of enterprises fulfilling military orders from becoming over-wealthy? How to curb the price appetite of private suppliers? These and many other questions had to be answered.

At first, traditionalism and an inability to take a fresh look at the emerging situation were manifested, for example, in the fact that military orders were allocated primarily to state (state-owned) enterprises and a small group of proven private companies, which had carried them out before the war. However, in the conditions of total full-scale war these enterprises were not able to provide the warring army with the necessary equipment in the required volume.

The country had no developed system for attracting private business for state needs, or for mobilising private industry. The lack of mechanisms for regulating relations between the government and private business, entrepreneurs and workers, and the government's indecision to militarise defence enterprises had a negative impact on the efficient use of existing production facilities. The government had to build relations with business from the ground up. Despite the difficulties, the number of private enterprises working for the fulfilment of military orders increased steadily at the outset of the war. By August 11, 1915, their number increased from 125 to 254, and the number of those fulfilling the orders of the Ministry of Intendant Department — increased from 169 to 575. [15].

PUBLIC ORGANISATIONS

Russian liberals were the first to set up the institutions of a military-mobilisation economy. They were given the right to form their own organisations and participate in the work of the executive branches of power. On 12 August 1914, the All-Russian Zemstvo Union (RZU) was established, and on 16 August the All-Russian Union of Towns (RTU). The Zemstvo Union united the representatives of zemstvo, the Town Union — united the public figures of the city, the intelligentsia, persons of "free professions", etc. [15]. The highest authority of each union was the congress of commissioners. Between the congresses, their affairs were conducted by the main committees of the unions under the chairmanship of the plenipotentiaries.

The Zemstvo Union was a branched structure. By the end of 1916, the number of Zemstvo Union institutions reached 7728, including the main committees — 174; provincial committees — 3454; front committees — 4100. By September 1917, there were 630 towns (about 75% of the total number) in the Union of Towns. The unions employed hundreds of thousands of people.

Starting from the first days of their existence, the organisations developed large-scale activities. The government entrusted the Zemstvo Union with the supply of food and medicines to the front, and the formation of medical and nutritional units. Field hospitals were opened at the front, as well as bathing and laundry units, workshops, warehouses, bakeries, etc. were operating at the front. With the assistance of Zemstvo Unions, brigades from Saratov, Petrograd, Stavropol, Tula, and other provinces were sent to the front. Since 1915, Zemstvo Union engaged in the organization of small industries and workshops for the production of cartage equipment and engineering and construction tools [17]. A pharmaceutical plant was opened in Moscow, which annually produced goods worth more than 1 million roubles. If at the beginning of the war the financial resources of the Zemstvo Union did not exceed 12 million roubles, allocated by zemstvo systems, then by January 1, 1916 the total amount of government allocations rose to nearly 190 million roubles.

The budget of the Union of Towns for the second half of 1916 for the treatment of the sick and wounded, for transport and sanitary measures reached 41.5 million roubles. The expenditure of the Union for 1917 amounted

to 232 million roubles, while the turnover was 464 million roubles. The Union fed 4.3 million workers and 8.6 million refugees in the feeding stations. In 13 sanitary trains of the Union of Towns 340,000 wounded were transported. By autumn of 1916 the number of beds on its books reached 200 thousand. 1 million 260 thousand wounded passed through the Union hospitals from 1914 to January 1916. [17].

On 10 July 1915 these unions set up the "Main Committee for the Supply of the Army of the All-Russian Zemstvo and Town Unions" (Zemgor), a united all-Russian committee of public organisations. The government granted Zemgor the rights of a paramilitary organisation. Its officials wore uniforms and were exempt from military service.

The purpose of the organisation was to coordinate the activities of small and handicraft and cottage industries to improve the supply of the army. It focused on converting them to the manufacture of military products. Zemgor's activities made it possible to provide the army with field fortification entrenchment tools, scrap tools, harness and saddlery, carts, release grenades, bombs, artillery shells, etc. The organisation supplied enterprises with raw materials, fuel, and necessary supplies.

It built its own industrial enterprises. It owned tanneries, canneries, fur shoe factories and dozens of small repair and tailoring workshops. In Moscow, Zemgor owned a factory for military field apparatus; a workshop which made the measuring instruments and gauges, or calibers needed in shell production; two mechanical factories; and an enterprise in Podolsk which made three-inch shells. At the end of 1916, Zemgor activities were discontinued.

On July 25–27, 1915 the 1st All-Russian Congress of Military-Industrial Committees (MIC) was held, and on August 27 of the same year the governmental "Regulations on Military-Industrial Committees" and the "Decree on the Procedure for the Formation and Operation of Military-Industrial Committees and Congresses" were adopted. These policy documents defined the organisations' legal status, their aims, and objectives.

"Regulations" stipulated that MICs were established for the time of war to assist government agencies in supplying the army and navy with all the necessary equipment and provisions, while the committee was a public organization that enjoyed the rights of a legal entity, i.e. the right to enter into contracts with private and public institutions and public organizations, as well as the right to own property, enter into binding relations, organize the acceptance and delivery of items for the army and navy needs, to appear in court. The treasury allocated 300 thousand roubles to the military-industrial committees. Subsequently, the government granted the MIC the right to receive 1% of all government contracts placed with their participation.

A network of MICs was established throughout the country. They were organised even in areas where there were no or almost no industrial enterprises capable of fulfilling military orders, such as Andijan in Fergana province, Kurgan in Tobolsk province, Petropavlovsk in Akmola province, Dagestan, and other localities. By the beginning of 1916, 220 local MICs had begun work, united in 33 provincial structures [18]. Their work was led by the Central Military and Industrial Complex, located in the capital. Congresses of representatives of the MIC were held in Petrograd. In 1915–1918, its printed edition,— "Proceedings of the Central Military Committee", was published.

The Military-Industrial Committees, financed by the treasury, remained unaccountable to the authorities. They formed their own governing bodies and recruited employees to work for them. The committees were public structures [19]. They were responsible for mediation between the treasury and industry, distribution of military orders, regulation of the raw materials market and supply of enterprises with raw materials, rationing prices for raw materials, regulation of foreign trade (procurement), labour market and transport.

The MIC was originated by liberal social activists who believed that "the mobilisation of industry

should be organised by industrialists themselves",[2] and the new organisation could become a nationwide structure for the coordination of industry without the involvement of the authorities. Some of them went further. They saw the committees as essential elements of civil society, as one of possible mechanisms for regulating the economy in the post-war period. Quite often, the leaders of the MIC took an oppositional stance to politics in general and to the specific actions of the government, emphasising this at every opportunity. The contribution of the MIC to the solution of the tasks faced was quite insignificant. By the beginning of 1917, according to the estimates of some researchers, they accounted for 2–3% of the total value of military orders, of which only 50% were fulfilled, and according to other researchers — 17% and 11% correspondingly. [20].

The existence and expansion of the functions of public organisations led to ambiguous attitudes towards them. Negative reactions came from right-wing parties, parts of the government and members of the ruling family. There was clear opposition between civic and state institutions.

On 31 March 1918 the Central Military-Industrial Committee was renamed to become the Central People's Industrial Committee and then abolished on 24 July 1918.

The management structure during the war years was in constant flux. The search was on for the most appropriate managerial model for the current situation and an acceptable organisational form for dealing with emerging problems. The fall in prestige of the Special Defence Conference led to the establishment in December 1915 of the "Council of Five". The "Council of Five" consisted of the leading ministries (Military, Internal Affairs, Trade and Industry, Agriculture and Railways), which was to concentrate on solving current issues, including: deliveries of food and fuel to industrial centres; increasing productivity in coal mines and excavating plants; speeding up the circulation of wagons, etc. However, due to interdepartmental conflicts, the "Council of Five" was abolished in March 1916.

MILITARY MOBILISATION ECONOMY. ECONOMIC OUTPUT BY FEBRUARY 1917

Despite the illusions at the beginning of the war, the logic of development forced the authorities to start shifting the national economy to a military-mobilisation track and to embark on a mobilisation policy. A change in the trajectory of economic development inevitably led to the reform of the former administrative bodies, filling them with new content, and the establishment of new institutions.

The new management structures were elements of a military-mobilisation, emergency economic model based on coercion, state regulation and control. It involved the coercive use of economic and non-economic instruments and methods for the state's purposes. Its effectiveness was determined by the state's ability to make maximum use of all existing production capacities to meet the needs of the army and the population during the war period.

The new institutions sought to be guided by the following principles in their activities:

1. Simplicity, accessibility of plans and solutions, avoiding incomplete information or misinformation.
2. The planning, consistency and coherence of the decisions made and their prompt implementation.
3. Accurate fulfilment of tasks by those who set and perform them.
4. Flexibility, ability to quickly rearrange as new tasks and "inputs" arrive, etc.

The main tools of economic restructuring were restrictive, administrative, and anti-market measures; the use of coercion and control of business activities; the concentration of considerable administrative powers, enshrined in laws, in the hands of state institutions; actions aimed at expanding the public sector in the economy, serving the demands of the army and industry, working for the front and the victory, etc.

[2] Organisation of the Military-Industrial Committees. Pg.: Printing-office by P.P. Gershunin; 1915. 289 p.

Under the conditions of the emerging military-mobilisation economy several economic policies can be distinguished. The government used militarisation and requisitioning of labour. A special labour regime was introduced in state military enterprises, i.e., workers were prohibited from transferring from one enterprise to another, strikes were banned; soldiers were seconded to industrial enterprises; forced forms of labour were spread, night work and overtime were widely used, etc.

Machines, equipment, entire factories, land, and premises were requisitioned for use by enterprises fulfilling military orders. Forced associations of industrial enterprises were carried out. An example of this was the "organisation of S.N. Vankov".

In 1915–1916, 94 major industrial enterprises were sequestrated (effectively nationalised). Even profitable enterprises working for the defence were subjected to this measure.

The war economy required planning, forecasting and precise calculations. The production of shells, gunpowder, rifles, and explosives was planned, followed by railway transportation and the procurement of food supplies. In 1916 a plan to transform the entire national economy into a single planning system was even discussed.

In foreign trade, the government established a monopoly on foreign trade. In February 1916. The Special Conference on Defence forbade private entrepreneurs and business organisations to manufacture orders abroad. They could do so only through an ombudsman of the Special Meeting. All currency for foreign purchases was concentrated in his hands.

In 1916 a card system for the distribution of bread, meat and sugar was introduced in a number of large cities. Prior to the February Revolution, this system had only been introduced in 18 cities, including Moscow. At the end of November 1916, Minister of Agriculture A.A. Rittich introduced bread distribution. In 31 provinces about 700 million poods of bread were to be procured by such means. Thus, by 1917 the foundations of a war-mobilisation economy had been laid in the country, the most important features of which were:

5. The existence of an authorised body vested with supreme state authority and closely connected to the military high command.

6. The existence of a national economic plan, including estimates of state income and expenditure. The plan had to be consistent with strategic military planning.

7. Consistent implementation of the plan, associated not only with the need for internal organisational and technical changes in the elements to be mobilised, but also with the formation of a system of bodies subordinated to a higher centre (military organisation of the national economy, militarised national economy).

8. The legislative (legal) forms of economic mobilisation could be very different, ranging from "free involvement" ("free" coercion) to various coercive measures (legal conscription, nationalisation and militarisation, subordination to military bodies and discipline) [21].

The result of all these efforts was the reorganisation and adaptation of the peacetime economy to the needs of the war economy. During 1915–1917 the state and the public succeeded in increasing industrial production. In 1916, gross industrial output in the country rose by 21.5% compared to the pre-war level. At the same time, the volume of mechanical engineering production had increased by more than 4 times in comparison with 1913 — from 200.2 to 954.6 million roubles. Despite all the difficulties of wartime, the technical equipment of enterprises increased significantly. By the summer of 1916, 39 large machine-building plants purchased additional equipment which cost 130 million roubles. The total cost of equipment of all private plants associated with the defense, which had not exceeded 100 million roubles before the war, approached 1 billion roubles. [22].

At the end of 1916, 1,800 out of 2,290 enterprises (81%) were reoriented towards military production. Of the 2.4 million workers employed in industry, 2 million (86%) worked at enterprises serving the needs of the front [15]. Armament production grew at a very high rate. In August 1916 the number of rifles that were produced was 1100%

more than in August 1914. Cannon production between January 1916 and January 1917 increased by more than 1000% and 76mm shells production increased by 2000%. Production of gunpowder and explosives increased by 250–300% [22].

For all the miscalculations and mistakes, the outcome of the economic mobilisation was impressive. Contemporaries of the events wrote of this: "When the defence work was unfolding in 1915, those who were intimately acquainted with the available means and working conditions of our industry and technology found it difficult to believe that such results could have been achieved as could have been established at the end of 1916. An impartial historian will subsequently be forced to admit that, by and large, Russian machinery coped with the situation and did much more widely and much sooner what the national defence had the right to demand from it". [23].

CONCLUSIONS

At the beginning of the war, the government and military leadership showed a lack of understanding of the situation, the scale and depth of the problems. Patriotism and sacrifice were not enough for victory. The ineffective system of state organisation caused problems in supplying the army with arms, food, ammunition, communication facilities and medical equipment.

What was needed was not only an awareness of the problems facing society, but also the political willpower to resolve them. Gradually the reorganisation of the governing institutions began. Unfortunately, the state institutions of the new mobilisation economy appeared very late and were not always effective, which had an impact at the fronts.

The history of the First World War has shown that successful warfare requires well thought-out mobilisation plans, which are difficult to reconcile with the principles of a market economy and the interests of enterprise. Russia lacked the most important condition of industrial age warfare — competent economic planning aimed at a balanced development of the entire national economic complex. As a result, by 1917 non-military industries had sharply reduced the volume of production, embittering, and enraging the suffering population.

However, despite the great difficulties, the government did not undertake a total mobilisation of the economy. In the shortest possible time the country underwent revolutionary changes in industry and technology, in the field of mass communication, in the organisation of the economic life of the country and in the system of internal social relations.

In 1916 the country made considerable economic progress. Many of the programmes and solutions prepared by the tsarist government would later be used by the Bolsheviks in the years of "war communism" and the new economic policy.

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Change of the Economic Model of Russia's Development as a Response to the New Geo-Economic Reality

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ABSTRACT

The sanctions war against Russia unleashed by Western countries led by the United States forms a new geopolitical reality for the country. In fact, an economic war has been declared against Russia, the main instruments of which are the country's cut off from the global financial system, the closure of the most important markets for the Russian main export products and the embargo on the machinery and equipment import to the country, which is essential for various sectors of the Russian economy. The sanctions imposed on the country pose both short-term and long-term threats. The first ones are associated with the degradation of the current economic situation, but can be overcome within a few years. The other ones may have delayed but deeper negative consequences for the economy, as they are aimed at undermining its technological competitiveness and investment process, thus increasing the threat of the prolonged stagnation of the national economy. Overcoming such threats takes a long time and transformation of the country's export-oriented raw material model of the economy based on the activation of structural, scientific, technological and investment policy. The article discusses possible approaches to the implementation of such a transition.

Keywords: sanctions; systemic threats; scenarios of socio-economic development; structural priorities; credit issue

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INTRODUCTION

Following Russia's recognition and declaration of the independence of the DNR and the LNR on 21 March 2022 and the launch of a special military operation (SMO) in the Ukraine on 24 February 2022, the US, the EU, and several other countries imposed a new package of economic sanctions, continuing the sanctions policy initiated in 2014 in connection with the return of Crimea to Russia.

The new sanctions have affected the financial sector, foreign trade operations, scientific and technological cooperation, and a number of foreign companies have ceased or suspended their activities in Russia. The sanctions have been introduced in portions (or packages), successively expanding the sub-sanctioned activities, the number of organisations and the range of individuals subject to certain restrictions. The main centres of sanctions activity are the US, the UK, the EU, supported by Australia, Canada, Japan, and South Korea.

A tenth package of sanctions and restrictions is now on the way, covering: Russian sovereign debt; the Russian Direct Investment Fund (RDIF); the Bank of Russia and systemically important banks; the Russian oil and gas sector; exports to Russia of dual-use technologies and goods, high-tech products, machinery and equipment for investment purposes; transport; exports from Russia of oil and petrochemical products and natural gas, including ceiling export price restrictions, chemical and metallurgical products; termination or suspension of foreign companies' activities in the Russian Federation in various sectors of the domestic economy; restrictions on links in the fields of culture, science and sports.

In essence, therefore, this could be an attempt to impose a full-scale blockade of the Russian economy by the US, the EU, Japan, Australia, South Korea and other countries with a pro-Western attitude. The purpose of such pressure is to destabilise the economic and domestic political situation in the country, stimulate the growing dissatisfaction of Russian citizens with the sovereign foreign policy course pursued and bring to power a pro-Western oriented leadership. At the same time, despite the fact that the Russian economy seems to have coped with the financial and technological blitzkrieg from the alliance of the Western countries in 2022, a large-scale sanctions attack on it **contains a whole system of risks and threats of a rather long-term nature, forming a new geo-economic reality for the country.**

SANCTIONS RISKS AND THREATS

First of all, **the threat of prolonged stagnation of the Russian economy** should be noted. Despite the fact that in the previous year of 2022 the economic recession is estimated at only 2.5% of GDP (which is much lower than the 8–12% expected by experts last March), the ruble has remained stable and inflation, although approaching 12%, has been much lower than forecasted, one should not count on a rapid recovery of economic dynamics.

The threat of stagnation of the Russian economy in the medium term (until 2025) is predetermined by the nature of the recession. It is linked not to a cyclical crisis caused by a strengthening of internal structural imbalances, but to external shocks (total sanctions), which are likely to be of a long-term nature. In the medium term, economic stagnation will be influenced by a number of factors.

First, as the sanctions crisis is caused by external geopolitical motives, economic uncertainty will remain high until they are depleted. However, in the current geopolitical realities, it is difficult to imagine that this is possible before 2024. **Moreover, the end of the military phase of the conflict in the Ukraine will not automatically lead to the lifting or serious easing of the economic sanctions. Therefore, it would be more realistic to assume that the economic sanctions against Russia will remain in place for quite a long time, which means that the reasons that gave rise to the crisis may also become protracted.**

Secondly, the relatively favourable economic results for Russia last year were caused not only by adequate measures taken by the Central Bank and the government, but also by a favourable pricing environment for energy resources exported from Russia. **Most likely, the conjuncture and conditions may already worsen this year due to the high probability of a slowdown of economic dynamics in the world, primarily in the EU, the USA and China, which will restrain the price dynamics of exported energy resources and other commodities and raw materials as well.**

Thirdly, the most sensitive sanctions (primarily the rejection of Russian energy imports) are only just beginning to be implemented. Even if the geopolitical situation improves, one should not expect this increasing trend to change. **It should probably be understood that Russia is losing the European gas market (around 100 billion cubic meters) and that re-orientation towards Eastern markets will take time and require significant investments.**

Fourth, oil and gas revenues, which accounted for 25.7% of the federal budget in 2020, will decrease due to the reduction of revenues from energy exports, while oil and gas revenues themselves decreased by

2.8 trillion RUB compared with 2019.[1] At the same time, the reduction in budget revenues will take place against a backdrop of the need to increase spending related to the SMO, the reconstruction and integration into the Russian space of a number of former Ukrainian regions. In turn, this will limit the resource opportunities for financing budget expenditure items (related to the fulfilment of social obligations of the state), which will constrain the growth rate of real household incomes and, consequently, limit demand from households and the possibility to stimulate economic growth by increasing consumer demand through intensive lending to the population (as was the case in Russia in previous years). As a result, public investment, including in transport and other infrastructure, will remain the main factor supporting demand.

Fifth, restrictions on exports of technological investment equipment to Russia **will restrain the dynamics of investment in fixed capital and impede the technological modernisation of the national economy.** According to estimates by the Centre for Macroeconomic Analysis and Short-Term Forecasting (CMASTF), the share of imports from the countries that have announced restrictive measures (the US, the EU countries, Canada, the UK, Japan, South Korea, etc.) in Russia's total final consumption of goods and services is 3.9%. The pharmaceutical industry is likely to be most affected by the sanctions: the share of pharmaceuticals from the countries that have imposed restrictions accounts for almost half of Russia's total final consumption of pharmaceutical products (48.2%). In second place — is the chemicals and chemical products sector (44.7% of final consumption hit by the sanctions), and in third place — is the production of aircraft, ships and railway locomotives (32.2%). Significant dependence on imports from sanctioned countries is also observed in the automotive industry (27%), the manufacture of rubber and plastic products (26.8%), paper production (19.9%) and electrical equipment (19.4%). The situation is aggravated by the transport blockade, which affects Russian maritime, aviation and road transport.[2]

In the short term, the most severe impact of the sanctions is the reduction of critical imports — electronic components, pharmaceuticals, intermediate products for the automotive and aircraft industries. A reduction in the supply of such products poses the threat of a sharp decline in output and, in some cases,— of production stoppages, which ultimately affects the GDP, employment and household incomes alike. In addition, this situation provokes a surplus of demand over supply and hence an increase in prices.

In the medium term (but with long-term consequences), restrictions on the supply of investment equipment and technology for a fairly wide range of sectors of the Russian economy will begin to have a significant impact. Sanctions pressure in the technological sphere is mainly manifested in the form of limiting Russia's access to imports of high-tech goods and technologies (more than 50% of imports from non-CIS countries), blocking the activities of major Russian enterprises, the withdrawal of foreign high-tech companies from the country, the suspension of scientific and technological cooperation on international projects and Russia's membership in a number of international companies.

The purpose of these sanctions is to undermine the country's technological strength, reduce the competitiveness of the

[1] URL: https://minfin.gov.ru/common/upload/library/2019/12/main/Budzhet_dlya_grazhdan_2020–2022.pdf

[2] The calculation was based on FCS data on imports into Russia and the Rosstat inter-sectoral balance sheet for 2019 (goods and services usage tables). URL: https://www.rbc.ru/newspaper/2022/03/21/623323de9a79475581a199ea

domestic economy, strike a blow to strategic industries (including the development of the defense industry, the aerospace industry, and the shipbuilding complex), and slow down the development of sixth-technology paradigm — artificial intelligence, quantum computing, etc. The sanction measures are intensifying the threat of Russia's technological isolation and are fraught with an outflow of highly qualified personnel and scientists, undermining the potential for increased competitiveness.

In addition, a trade embargo, combined with the loss of access to global financial markets, would limit access to investment resources. It is not so much a question of financial resources as of the material and technological content of the investment process. The degradation of industrial potential in the post-Soviet period has led to a high dependence (70–80%) of the investment process on imported equipment, the scale of which was estimated at RUR 5.6 trillion for 2020, while the output of investment products [machinery and equipment, electrical equipment, transport vehicles and equipment (except for automobiles)] barely exceeded RUR 4.7 trillion.[3] Such dependence on imported machinery and equipment means that the reproduction process is closed to foreign markets in terms of obtaining the necessary means of production and maintaining them in working order through imports. The embargo on supplies of this equipment to Russia, which in the atmosphere of anti-Russian psychosis quickly spread not only to the circle of sub-sanctioned (oil and gas sector, energy, defense industry), but also to other sectors, already in the next one or two years may start generating problems associated with the lack of real resources to effectively operate such equipment and maintain pre-sanctioned production volumes. All this will have a negative impact on the pace of economic dynamism in various sectors.

Neither should high expectations be placed on the so-called parallel imports. The operation of sophisticated investment equipment requires technological support (advice), quality repairs, and reliable access to spare parts, which is difficult to ensure with bypassed supply schemes. A shortage of imported components or their replacement with less productive domestic products inevitably raises unit costs for enterprises.

Thus, the economic sanctions imposed by Western countries in the technological sphere are the most painful for Russia, as they may have a long-term negative effect, increasing the threat of technological degradation of production capacity and a decline in the competitiveness of manufactured products. Many sectors that have lost access to technological innovation and high-performance machinery will inevitably experience a drop in efficiency and productivity, which, against the background of demographic constraints, may again constrain economic growth potential.

However, it should be borne in mind that, in fact, the above-mentioned sanctions risks and threats are a consequence (aggravation) of the risks and threats generated by the raw materials export-oriented economic model that emerged in the 2000s and still operates in Russia. It is characterised by low rates of economic dynamics, a flawed economic structure and technological dependence of its civil industries, weak investment, and innovation activity, as well as an open financial system that contributes to a steady outflow of capital from the country [1].

The openness of the Russian financial system was a necessary prerequisite for an export-oriented economic model built on the basic principles of the Washington Consensus. Such openness had multidirectional consequences for the development of the

[3] Estimates are based on data from "Investment in Russia 2021"; "Russian Statistical Yearbook 2021".

domestic economy. On the one hand, the introduction of internal convertibility of the national currency in 1992 was seen as the most important instrument for ensuring openness of the economy and attracting foreign investments into it. Foreign investments actively entered a number of highly profitable sectors of the Russian economy — oil extraction, food industry, automotive industry, trade, consulting and insurance, banking, etc. At the same time, convertibility, which was not based on increased competitiveness of the national economy, meant a change in the Central Bank's emission policy. While in the Soviet period the size of emission was linked to the scale of economic turnover and was provided by all resources involved in it, then convertibility implies a strict linkage of the emission scale to the dynamics of currency revenues in the economy and depends on the size of exports and external lending to the economy through commercial loans and financial markets. Since the openness of the Russian economy was not based on the growth of its competitiveness as a result of structural and technological modernisation, the emission was based on the export capacity of a narrow group of industries: fuel and energy, metallurgy, basic chemistry, as well as currency inflows to the financial market from external investors. Strictly speaking, the country's financial system was "hooked" on a "currency needle", generating its high vulnerability to external shocks and chronic monetary anemia in the whole economy with a significant scale of capital export from the country, the volume of which, according to some estimates, could reach USD 200 billion in 2022. If one assesses the real results of Russia's thirty years of functioning in the global financial system, it is likely to have had a negative impact, preserving, and deepening the structural disproportions of the Soviet economy that were formed by the early 1990s and further complicating conditions for adapting the national economy to the new realities of global competition. The sanctions introduced in 2022 against Russia's financial sector essentially push the country out of the global financial system based on the US dollar and the international financial institutions under their control, which is an additional serious challenge for Russia, which requires an adequate response in the form of the formation of a sovereign monetary system of the country.

SCENARIO OPTIONS AND DEVELOPMENT CONDITIONS

At present, it is still difficult to make predictions about the timing of the end of the Russia-Ukraine conflict and its consequences for the Russian economy. The duration and depth of the sanctions-induced recession of the Russian economy will depend on the duration and ferocity of the military phase of the conflict itself and the format of its conclusion. One should not exclude the possibility of its extension beyond 2023 and even expansion through the involvement of new participants from the neighbouring NATO countries with increased logistical support from the leading countries of the alliance — the US, England, Germany, and others. In this case, the country may face the task of expanding the mobilisation tools in the economy in order to increase the scale of centralisation of resources for the continuation of military confrontation.[4]

[4] Economic mobilization (from Fr. Mobilizer — to set in motion) — a set of measures to ensure the transfer of available economic resources to a special mode of functioning, usually associated with wartime. Essentially, the mechanisms of mobilization economy mean limitation of free distribution (movement) of economic resources on the basis of market mechanisms and strengthening of administrative tools of distribution of material, labour, financial and currency resources in order to increase military potential. In a broader sense, economic mobilization can mean the formation of mechanisms for the concentration of economic resources for the early achievement of other (nonmilitary) priorities of economic policy, associated with the acceleration of economic dynamics, structural and technological modernization of the national economy, overcoming other threats to national development.

Another possible scenario would be the fading of the acute phase of the military conflict by 2024 and reaching agreements with the West on recognising the status quo that satisfied Russia at that time, formally retaining the main sanctions restrictions, their subsequent gradual "erosion" and the return of the Russian economy to the economic dynamics trend that existed before the aggravation of the Ukrainian crisis. In essence, we are talking about the restoration or continuation of the Russian economy in the format of the existing pre-crisis raw materials model with the replacement of European foreign economic partners by Eastern ones, but with the preservation of a number of economic challenges and threats, which had been formed before the conflict escalated and will not disappear by themselves with the end of the military phase of confrontation in the Ukraine.

Thus, a return to the inertial scenario would most likely mean that the existing structure of the Russian economy would be preserved in the long run, as well as a lower contribution of technological progress to GDP growth than the 2000–2019 average. In addition, negative demographic trends must be taken into account, which will not be compensated by productivity growth. Such processes, especially under conditions of external economic constraints, will probably not accelerate the pace of economic dynamics or improve the level of competitiveness of the Russian economy.

If we assess the longer-term outlook beyond 2025, a return to the inertial scenario of economic development would probably lead to a further faltering of the economic dynamics of the Russian economy. According to estimates of the Institute of Economic Problems of Russia of Russian Academy of Sciences, under the inertial scenario of Russia's economic development the average annual growth rate of GDP may decline in 2021–2025 from almost 2% to 1.2%; in 2026–2030 it will not exceed 1.7%, and in 2031–2040 it will decline to 1.6% [2]. Such dynamics can hardly be assessed as acceptable against the background of the economic growth rates of Russia's new major economic partners in the East — China and India, which are likely to remain much higher (4–6% of annual GDP growth) in the long term. Consequently, Russia needs to focus on similar rates of economic growth to maintain its relative economic strength.

AN ECONOMIC MODEL FOR THE NEW REALITY

In order to accelerate the average annual rate of economic dynamics (GDP growth) to at least 3–4% of the global average after the end of the acute phase of the conflict, the Russian economy will have to be placed on a qualitatively new trend of socio-economic development based on its large-scale structural and technological modernisation, and measures to overcome the existing structural imbalances, which form the main risks and threats to the dynamic socio-economic development of the country, will be intensified. In its turn, this requires a significant increase in the efficiency of the investment framework of the economy. This improvement should affect the process of formation of structural and technological priorities of investment activity and the system of incentives for its activation of economic entities, as well as financial mechanisms of its provision [3]. Despite the fact that the need to change the existing model of national economy functioning has been noted in the scientific and analytical community for quite a long time, the consensus positions necessary for the practical implementation of its long overdue transformation have not been formed on many issues [4–6].

First of all, there is still no "image of the future" for Russia, on the basis of which it is possible to specify the targets of the structural

turnaround of the Russian economy (taking into account our country's place in the Eurasian system of labor division and the prospects of forming new reproduction chains in the eastern direction) and identify key foreign economic partners and resources. The most important tool in this process should be the *elaboration of a long-term Strategy for socio-economic development of the Russian Federation for the period up to 2035*, which should outline the main directions and strategic approaches to socio-economic development of the country in the new geopolitical and geo-economic realities. In order to achieve the goals of such a Strategy, it is necessary to implement programmes that include a set of tools for public policy in priority areas and sectors of the economy, as envisaged in the Federal Law No. 172 "On Strategic Planning in the Russian Federation", which was adopted back in 2014 but has never been applied in practice. The implementation of the Law will improve the quality of *strategic management* of economic development based on the formation of a well-functioning effective system of planning and forecasting, including risk assessment (consequences of implementation) of project decisions, as well as a mechanism for the coordination of sectoral, private, and regional interests, subordinated to the interests of the development of the country as a whole.

It should be noted that in the emerging new geo-economic reality the main directions of structural modernisation of the Russian economy that have been repeatedly announced — remain relevant. First, it is the formation of the core industries of a new promising technological mode on the basis of nano-, bio-, information and cognitive technologies (NBIC-technologies) as the basis for maintaining the necessary level of defense capability and geopolitical sovereignty of the country, as well as its positioning in new promising product markets [7]. The large-scale digitalization of various spheres of activity that is unfolding in the country affects only one of the basic areas of transition to the new technological mode, which includes a broader set of basic technologies. In addition, the scale of digitalisation in Russia will be constrained by the high dependence on imported software solutions and IT equipment. Moreover, digitalisation in the manufacturing sector of the Russian economy may be constrained by a high dependence on imported technological equipment and technologies with appropriate software [8].

Secondly, it is large-scale import substitution in the production of machinery and technological equipment for the main sectors of the national economy in order to ensure technological sovereignty and reproduction process on its own technological basis [9]. Finally, it is an increase in the depth of processing of exported fuel and energy and raw materials to improve export efficiency.

If the investment process is significantly intensified and the share of investment in non-financial assets (primarily in the fixed capital of the manufacturing sector) is increased, the task of large-scale structural modernization of the Russian economy will take quite a long time (it is unlikely to be less than a decade). As a reminder, presidential decree No. 474 of 21.07.2020 "On the national development goals of the Russian Federation for the period until 2030" provided for an increase in capital investment by 2030 by 1.7 times, or by RUB 14.7 trillion in current prices. In terms of annual averages, this implies an annual increase in investment during the decade of not less than 5.5%, or 1.5 trillion RUB per year. Such dynamics is, of course, difficult to be seen as an investment boom, although it implies a one-and-a-half-fold increase compared to 2010–2020 (RUB 1.01 trillion.).[5]

[5] Calculated based on data from «Russia Investments 2021». URL: https://gks.ru/bgd/regl/b21_56/Main.htm

It is important to pay attention to the sectoral structure of investment in fixed capital by type of activity. Thus, in 2020, investments in manufacturing accounted for only 14.6% (RUB 2.94 trillion) of total investments in fixed capital (having increased by 35% in current prices from 2015), while total investments in non-financial assets increased by 44.7% over the same period.

If we consider the dynamics of investment in the breakdown of the activities forming modern civil engineering and machine building and equipment and instrument-making, they increased by only 5%, from 405.5 to 429 billion roubles, and their share in total investment in industry decreased from 8.9% to 6.9% over the period 2015–2020. At the same time, investment in machinery and equipment production has steadily declined since 2015 in current prices, from RUB 82.1 billion to RUB 60.8 billion over the entire period. Accordingly, their share of total investment in Russian industry fell from 1.8% to 0.97%.[6] A similar situation was observed in other technologically intensive activities — production of computers, electronic and optical products, electrical equipment and motor vehicles. With such investment activity, it is not surprising that the results of import substitution in civil machine building and instrument making since 2015 are more than modest.

The transition to a new economic development model for the Russian economy involves the creation of an effective ***system of incentives for innovation and investment by business entities***. The key objective of economic policy is to create an environment that motivates businesses to invest and innovate as the main tools for ensuring dynamic and sustainable growth of competitiveness and profits.

This should be facilitated by an effective system of tax incentives for investment and innovation costs and a targeted tax impact on the distribution ratio of profits allocated by producers for consumption and investment [10].

In our view, incentives for investment and innovation activities can be provided by introducing a special investment tax deduction (up to 50% of taxable income) while raising the nominal income tax rate to 28–30%. Thus, the real rate of profit taxation in the case of an investment deduction could be reduced to 14–15%. The investment deduction can be set aside in special investment accounts of business entities with their regulated use for investment purposes.

Transparency of the costs and results of economic activity and the withdrawal through taxation of excess profits of a rent-seeking nature, which are not related to the growth of the scale and efficiency of such activity, become important for the formation of a system of incentives for investment and innovation. A tool for ensuring such transparency could be an intensified pricing policy for products of the fuel and energy complex, as well as metallurgy, chemical industry, construction, and other materials that form costs in the manufacturing sector of the economy. For such products, "benchmark prices" could be determined taking into account real reproduction conditions (production cost plus economically justified profit), which do not replace market prices but are used to determine real volumes of taxable profit formed in the conditions of product sales at real market prices.

The establishment of such a principle of price formation for commodities and semi-finished goods will allow, based on the existing cost structure, to reduce the costs of manufacturing products and significantly increase their price competitiveness on domestic and world markets.

[6] Calculated based on data from «Russia Investments 2021». URL: https://gks.ru/bgd/regl/b21_56/Main.htm

A transition to a policy of active support for large-scale structural and technological modernisation of the Russian economy will require a drastic increase in fixed capital investment in the real sector, mobilisation of financial resources to finance expanded investment programmes.

The financial sanctions imposed on Russia and impeding obstacles to the possibility of normal functioning of its economy in the global financial system, dictate the need to build a sovereign monetary policy focused on financial support for structural and technological modernisation of the national economy, sustainable and dynamic rates of economic growth [11].

The scale of investment lending can be dramatically expanded within the framework of the *formation* of a special *investment financial framework on the basis of specialized state development institutions (in fact, specialised investment banks)*, which would finance large-scale investment projects in the priority areas of the national economy on the credit basis [12].

This could involve a significant increase (by trillions of roubles) of the scale of targeted lending for priority investment projects through specialised development institutions, as already practiced by the Bank for Development and Foreign Economic Affairs, the Industrial Development Fund, etc. Refinancing of such institutions could be carried out by the Central Bank by buying up debt bonds issued by them against government guarantees and crediting the volume of such issuance to the internal government debt, which would be serviced out of current federal budget revenues. Since the increase of domestic debt is funded by credit (repayable) resources, the mechanism of repayment of debt obligations of development institutions to the Central Bank is built into the lending scheme itself, and the overall scale of such a targeted credit issue must be limited to the size of real investment resources (equipment, raw materials, foreign exchange resources) available in the economy for the selected investment projects.

Financing of specific investment projects is based on joint participation (shared co-financing) of the state development institution and private investors. The development institutions in this scheme act as a qualified lender — an intermediary between the issuing centre and the private investors, and the debt obligations of the project eventually fall on the private investors, who become the owners of the created assets after all debt obligations are repaid.

In addition, it is necessary to implement a range of measures to ensure the transparency of cash flows, the formation of costs and results, and to limit currency speculation and capital flight abroad. All of the above-mentioned conditions should be formed within the framework of general transformation of the existing economic model in the direction of increasing the business interest in enhancing investment and innovation activities.

At the same time, in the medium term there is a growing urgency to establish an alternative parallel to dollar system of international settlements. In such a system, using national currencies of interested countries as exchange rate instruments, a basket of other hard currencies could be used, including IMF special borrowing facilities, gold, and a set of strategic raw commodities.

CONCLUSIONS

The large-scale economic sanctions imposed on the Russian Federation, covering the financial and foreign trade spheres, are creating a new geo-economic reality for the Russian economy, creating new and increasing previous threats to the socio-economic development of the country. In essence, we are faced with a choice problem. If we leave aside

the remaining probability of an extension or prolongation of the acute phase of open confrontation with NATO countries in the Ukraine and the need to shift the economy to mobilisation conditions, two scenarios for the development of the Russian economy remain. The first involves the reproduction of the established export-oriented raw materials model of the economy with a reorientation from Western partners to Eastern neighbours with the reproduction of all structural risks and threats associated with its functioning, including geopolitical ones.

The second scenario involves increasing the self-sufficiency of the country's economic development by overcoming structural imbalances and accelerating economic dynamics. Implementation of this long-overdue scenario envisages large-scale structural and technological modernisation of economic potential, as well as diversification of export potential into medium- and high-tech manufacturing products. In its turn, it will require transformation of the economic model established in the post-Soviet Russia by stimulating innovation and investment activity, expansion of the resource base for the implementation of the structural turnaround of the economy. The stimulation of innovation and investment activity in the manufacturing sector is proposed to be based on the reform of profit taxation and ensuring the transparency of the process of formation of costs and the results of economic activity. Material support for the process of structural transformation of the Russian economy is proposed to be provided by expanding the targeted credit emission to finance development institutions and priority investment projects of various sectoral profiles.

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Theory and Practice of Overcoming an Economic Crisis (on the Nobel Prize in Economics in 2022)

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ABSTRACT

The article analyzes the Nobel Prize winners in economics of the 2022's research results. The author explains the meaning of the terms which are necessary for the analysis: money multiplier, liquidity, mortgage, mortgage bonds. In addition, the psychological factor in the formation of critical situations in the banking sector is considered the way it was interpreted by the winners. The article analyzes the reasons which led to the lower position of the USSR's and modern Russia's money multiplier compared to the position of the multiplier of the countries with developed market economies including, first of all, the USA. The paper also discusses the role which the "real bills doctrine" played in the activity of the US Federal Reserve System and Ben Bernank personally. Ben Bernank's cautious line of behavior during the overcoming the 2008 crisis is described. The model of liquidity dynamics which belongs to the laureates and that is vividly discussed in the scientific community is considered in detail.

Keywords: global crisis; Chicago school of political economy; government intervention; banking functions; mortgage

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INTRODUCTION

The Nobel Prize in Economics in 2022 was awarded to the three US professors, which is hardly unusual. In recent times, economists from other countries have only received prizes in 2014 and 2009. The prize went to Ben Bernanke, Douglas Diamond and Philip Dybvig with the wording "they have significantly improved our understanding of the role of banks in the economy, especially during financial crises".

So, who are they?

Ben Shalom Bernanke comes from Georgia. His father, along with his brother, owned a small pharmaceutical firm. Perhaps a little insight into the psychology of the laureate can be gained with this touch: Ben Bernanke's grandfather did not gift but sold his sons a stake in the business he had created. He immigrated to the US from Boryspil (now Ukraine, then Austria-Hungary). The immigrant was 30 years old and started a new life from scratch, believing that his sons should be as good as he was. It was only natural, therefore, that as a teenager Ben earned his own money: as a construction worker, a waiter in a restaurant and a shop assistant.

Ben Bernanke received a very high-quality education: he studied at Harvard University for a BA in economics and at the Massachusetts Institute of Technology, where he was awarded a PhD in economics. In 1979, he defended his thesis on "Long-Term Liabilities, Dynamic Optimisation and the Business Cycle". Bernanke's thesis supervisor was Stanley Fischer, future Governor of the Bank of Israel, and his reviewers were Robert Solow[1] and Peter Diamond.[2]

After that he taught macroeconomics at leading US universities. He did not stay long anywhere, except for Princeton University, where he was the Dean of the Economics Department for 6 years. Ben Bernanke headed the US Federal Reserve (the Fed) from 2006 to 2014. He was named Man of the Year by Time magazine in 2009.

Douglas Warren Diamond — a distinguished Professor of Finance at the University of Chicago (Booth School of Business). He was born in the Chicago suburbs to a family of doctors.

In 1975 he received a Bachelor of Arts degree from the prestigious private Brown University (Providence, Rhode Island). He received his Master of Arts degree from Yale University in 1977 and his PhD in Economics — in 1980. Until 1986, he taught at the same Yale University, where he became a professor. He is now a professor at the University of Chicago.

In addition, as a visiting professor, Diamond has taught at Brown University and at Hong Kong University of Science and Technology. Overall, of the three laureates, he most closely resembles the typical American professor at a leading US university.

Philip Dybvig is another case in point. He received two bachelor's degrees (in mathematics and physics) from Indiana University. After that he studied first at the University of Pennsylvania and then at Yale University, where he received his PhD in economics in 1979. He then spent another year at Princeton University. A person who has studied at four universities in three different fields can already be considered extraordinary.

P. Dybvig began teaching at the University of Washington, then worked briefly in China, at the Southeastern University of Finance and Economics in Chengdu. At the time of the award, he was working at the University of Massachusetts.

In contrast to the standard portrayal of an American professor, **Philip Dybvig** is also a person who enjoys playing several instruments in the university's student ensemble, writes his own music compositions, and is interested in Chinese gymnastics and martial arts. He also has a wider range of interests than that of the average US university professor, who tends not

[1] Robert Merton Solow — Professor at the Massachusetts Institute of Technology, winner of the 1987 Nobel Prize "for fundamental research in the theory of economic growth".

[2] Peter Arthur Diamond — Professor at the Massachusetts Institute of Technology, winner of the 2010 Nobel Prize in Economics "for his research on markets with search distortions".

to focus on one or two research topics. Some of our economists would probably say to him: "He spreads himself thin!".

THE MONEY AND CREDIT MULTIPLIER

Without an explanation of what "liquidity" means, it is difficult to tell what the achievements of the awardees are. The liquidity of goods and services — is the demand for them on the market (this also includes financial services). At a second level — is the liquidity of the companies that sell these goods or services. On a national economic scale, liquidity — is the intensity of monetary circulation. If the monetary and credit means in an economy are active, its liquidity can be considered high. If money is "hanging around" now and then, the liquidity of the economy is low. In fact, all definitions of the liquidity of the economy can be reduced to this explanation.

The next obligatory category for the presentation of the topic is the "monetary and credit multiplier". It shows the ratio of the amount of funds held by a commercial bank (deposits and central bank loans) to those loans that the bank extends to its customers. The multiplier effect is achieved by the fact that the amount of loans made by a commercial bank is always greater than the amount it has received from the central bank. The term "multiplier" was first used by British economist R. Kahn in 1931.[3]

In the US during the Great Depression (in 1929) the multiplier was eight. Before the crisis in 2008, it reached nine. Then the money multiplier started to decline and by 2014 it was only three.

In our country, loans issued have always exceeded the capacity of banks by 2.5–3 times, at most. The risk aversion of banks can be explained by the fact that in the absence of real owners, financial structures behave as part of the state apparatus, carrying out instructions and not taking the initiative to externally control the situation.

For advanced market economies, a low monetary and credit figure or indicator means an acute shortage of credit. But the economies of the Soviet Union and post-Soviet Russia have existed under such conditions. The reason for this resilience can be explained in different ways. In the USSR, national economic planning and determinable linkages between enterprises reduced the need for credit. In post-Soviet Russia, the shortage of credit has led to a drastic reduction in expenditure on science, production modernisation and new developments in science and technology, which has also reduced the need for credit funds.

In the 1990s, thanks to "wise" foreign advisers pointing out the threat of inflation, the multiplier got even lower, leading to a default crisis. The problem was that the impact on management and managers was intensified: at the top level the threat of inflation was exaggerated, while at the lower levels — the threat of a particular loan not being repaid was exaggerated.

The psychological unpreparedness of the participants for the risk mitigation system played a determining role in the formation of this total anxiety. This, in turn, was due to a lack of tradition and a lack of familiarity with the use of different forms of credit.

In the sphere of interest of the laureates is the doctrine of the real bills of exchange. The term itself was proposed in 1945 by Professor Lloyd Mintz of Chicago in a book on the history of banking [1]. Before that the doctrine was called the "theory of commercial credit in banking". The essence of the doctrine is that if credit is given against short-term (up to 90 days) securities, behind which are the goods not yet produced, but that are already in the process of production, then the money received on credit may well be used to produce and sell them. Then the volume of production in monetary terms would correspond to the amount of credit issued,

[3] It has since been used in the works on macroeconomics. In studies relating to microeconomics and on a bank-by-bank basis, the indicator takes into account deposits, depositors' funds. Sometimes the deposit-credit indicator — the ratio of deposits to loans issued — is used as a stand-alone indicator in the analysis.

and the interest on the credit would not cause an increase in prices. Accordingly, if the commercial bank lends by observing the doctrine of real bills of exchange, then the central bank can grant it preferential loans, and the monetary and credit system will be sustainable.

By its first name, the doctrine goes back to the famous John Law[4] and the classicist Adam Smith [2]. The latter believed that only land as a source of future agricultural production could be a reliable security for any credit.

The new life of the real bills of exchange doctrine began after an article by T. Sargent[5] and N. Wallace, published in the early 1980s. [3]. In it the doctrine of real bills of exchange was opposed to the quantitative theory of money.

Two lines of monetary policy derive from this divergence. In the quantitative theory of money, the real money is separated from credit (credit money). It therefore focuses policy on the regulation of the money supply in circulation. In the doctrine of real bills of exchange, the obstacles to mutual lending to private companies are removed as much as possible, and central bank actions are aimed at enhancing and making such intermediation more effective. The winners of the 2022 award have explicitly pursued a policy which is derived from the doctrine of real bills of exchange.

According to this doctrine the Fed should take into account the needs of the economy to raise or lower liquidity in order to ensure financial and economic stability. When business activity rises, the Fed should take into account the demand for credit by increasing bank liquidity, and when business activity falls,— it should do the opposite.

According to quantitative money theory, it is not the Fed but the US Treasury[6] that should increase the mass of money in circulation when business activity increases and reduce it when activity shrinks.

The main advantage of the regulation of monetary and credit circulation in an American-type economy is the ability to use two methods. The first — is the reserve currency, the function of which in the US is performed by treasury bonds. If the economy is in deficit, the government buys treasury bonds and if it has a surplus, it sells them. The second method — is loans when the monetary and credit multiplier is high.

Now let us get back to the doctrine of real bills, but already in the context of the actions of one of the laureates. Ben Bernanke, who has just taken up his duties at the Fed, referred to the doctrine at the ECB European Central Bank conference in Germany in 2006. [4]. In doing so, he described the risks that the Fed would assess in determining an appropriate level of interest rates. He, as someone who had carefully studied the history of the Great Depression of the 1930s, had a quite instructive negative example. In his speech B. Bernanke mentioned it with reference to an article [5]. In 2019, the authors of that article, Thomas Humphrey[7] and Richard Timberlake,[8] elaborated in their book on the accusations of stimulating the 2008 crisis to a specific person [6].

The book identifies Adolf Miller,[9] a member of the Board of Governors of the Fed at the time, as the main culprit of the Great Depression. His adherence to the real-bill doctrine (or promissory

[4] John Law (1671–1729) — Scottish economist, in 1705 published a treatise "Considerations on cash and trade". In 1716 he founded a private general bank (Banque Generale) in Paris, which began issuing paper money (banknotes). They could be converted into silver coins at any time by presenting them to the bank. In 1718. The General Bank was nationalised and became the Royal Bank. John Law's reputation was damaged by his subsequent venture with the so-called Mississippi Company, which represented one of the first financial bubbles in history.

[5] Winner of the 2011 Nobel Prize in Economics.

[6] Let me remind you of the difference: The Fed is made up of 12 reserve banks (private), while the Treasury is the main government body regulating money circulation.

[7] Thomas McGillivray Humphrey — is a senior economist at the Federal Reserve Bank (Richmond) and editor of the bank's magazine The Economic Quarterly.

[8] Richard Henry Timberlake (1922–2020) — was a professor at the University of Georgia. Famous for his review of US Supreme Court monetary decisions.

[9] Adolf Caspar Miller (1866–1953) — Professor at the University of California, Berkeley, one of the first Fed governors (1914–1936).

notes) led him to write a letter and send it to all the Fed member banks. It suggested that loans should only be made against real projects. Each bank was required to prove that it had never made or intended to make "speculative" loans, in particular to play the stock market, if it wanted financial support from the FRS. It was also recommended to report evidence of "direct pressure" on the bank by borrowers, as well as forced "direct pressure" by the bank on potential borrowers. All agreements between the bank and the borrower should be reached by mutual agreement. Such a wish would be understandable if it were not coming from a member of the Board of Governors of the Federal Reserve System.

The heads of most of the banks that received the "direct pressure" letter decided not to report to A. Miller (thinking that what if the investigation unearths or reveals something?) and refused to apply for financial support from the Fed, having decided that they too would not engage in lending, including to private banks — not members of the Fed. As a result, without the support of the Fed and its members, the monetary and credit supply shrank by a third in a short period of time, leading to the bankruptcy of 9,000 banks. The Great Depression was inevitable.

From this both the authors of the book and Ben Bernanke followed them in concluding that the doctrine of real bills of exchange is "metastable". It can lead the economy to either massive non-repayment of credit or massive non-issuance of credit. The most important achievement of Ben Bernanke, in my opinion, is that he did not commit a rash act like Alfred Miller did, but the fact that he was managing the Fed during the events of 2008 very carefully, knowing full well that the 'chasm' was both to the right and to the left.

But it is not just Alfred Miller,— long before him, the British financier Henry Thornton[10] had criticised the doctrine of real bills, noting that actions under it link the money supply not to real output but to the ratio of price to that output. The result of it is a positive feedback loop: when interest is set below the rate of return, it accelerates inflation.

MORTGAGE, MORTGAGE CERTIFICATE (ENCUMBRANCE), MORTGAGE BOND

The next step in explaining the achievements of the laureates requires defining several concepts related to mortgage lending. If you buy something with a mortgage (a flat or a house), the bank will require you to pledge the object of the mortgage in addition to the mortgage payments in order to prevent possible default on the loan. The document (paper or electronic) that certifies the bank's right to take possession of the flat or house in a critical case is called a "zakladnaya" (encumbrance) in Russian. The term derives from the obsolete word "zaklad" (pledge or bet) referring to the phrase "bitsa ob zaklad" (to bet anything), i.e., to dispute a pre-agreed amount or an object.[11] If we stick to the Russian tradition, we are dealing with a bet. The borrower says: "I'll build it", and the bank offers to bet: "I bet you won't build it". The encumbrance shows that this bet has been made. It is convenient in many ways, above all when the betting rights are assigned. Once the mortgage is registered, the bank becomes the legal owner of the encumbrance and the rights recorded therein.

The next two steps turn mortgage certificates (encumbrances) into securities (mortgage bonds). The first step is to allow multiple mortgage certificates to be bundled together into one package, which is known as a "pool". The second step is to depersonalise the rights of the holder of a mortgage certificates' pool — the rights are no longer linked to a specific flat or house, but to all of the obligations of mortgage borrowers. Mortgage bonds become part of the bank's assets, allowing the bank to increase its lending.

[10] Henry Thornton (1760–1815) — British economist, member of the British Parliament, evangelist, actively fought against slavery in Africa.

[11] The word "bitsa" (fight) in this passage means that the dispute was originally resolved by fist fighting.

THE PSYCHOLOGY OF THE FINANCIAL CRISIS

Nobel Prize laureates of 2022 attached extreme importance to the psychology of financial market participants.

Two articles by Nobel laureates B. Holmstrom and J. Tyrol, published in the late 1990s, played a major role here. [7]. They discussed the possible effects of high mutual indebtedness given the different projections and the problems of psychological perception of events during the financial crises. The theme raised by them was continued in the works of the laureates of the 2022 Prize. Especially it concerns the mechanism of formation of anxiety, which is translated into panic on the financial markets.

The English expression *bank runs* is difficult to translate into Russian. It refers to a mass withdrawal by depositors of their money from banks (the Russian literal translation as "bank raid" is highly inaccurate). It is a situation where customers find out that the bank is insolvent, and the bank has to stop lending to many projects in order to meet its obligations to them and begins to sell its assets urgently.

On the other hand, government agencies can do something to reduce panic moods. Government deposit insurance, according to the laureates, can reinforce the belief that deposits are sure to be returned. But insurance is not the only way to achieve this. D. Diamond and Ph. Dybvig proposed what was later practically realised by B. Bernanke: The Fed could buy assets of banks, and it would increase the confidence of banks themselves, not just the depositors. But this model had the same result as in case with the state insurance.

Thanks to the Diamond-Dybvig (DD) model, global economic science has gained several concepts that have facilitated the study of an uncertain future. Chief among them is — "aggregate uncertainty". It is composed of several components. Suppose there are three market participants: a depositor, a bank, and a borrower, and each has a different uncertainty about the future. When one of them makes a decision, he overcomes his own uncertainty. But for the other two, to their own uncertainty of the future the uncertainty of which decision that market participant has settled on — is added. Aggregate market uncertainty with aggregate personal uncertainty.

This category then spread from the DD model to a large area of economic research in which justifications for tax cuts or financial support are provided.

"HELICOPTER BEN" AS THE LEGEND AND OTHER SUBTLETIES OF THE FED'S FIGHT AGAINST THE CRISIS

Let us now address a term that is attracted to the theme of the 2022 prize completely undeservingly — "helicopter money". It is commonly referred to as the money that is poured into a country's economy for the sake of increasing the money supply. This money is handed out not for the results of one's performance, but as part of the state's concern for its citizens: benefits for the disabled, large families, labour veterans, scholarships for university students and high school students, financial aid for victims of natural disasters, the homeless, etc.

Ben Bernanke was doing a very different thing: the Nobel Committee noted in its rationale that "the bank does not create money out of thin air, but from the long-term investment projects that it lends out to finance". In a special explanation, the Swedish Academy of Sciences noted that he analysed the Great Depression of the 1930s and proved that the crisis became so deep and prolonged precisely because of the collapse of the banks.

Ben Bernanke increased the transparency of the Fed's decisions by holding quarterly press conferences to explain the decisions of the Federal Open Market Committee (part of the Fed) and to actively prepare public opinion for future monetary policy measures. He assumed that any crisis is always in some way associated with a loss of faith in a prosperous future.

For the same reason, Ben Bernanke believed that people should never be warned about a crisis. Such warnings can themselves be a factor in the crisis, an activator of future panic. But another Nobel laureate, Paul Krugman, often published such warnings in the open press. Those were totally different styles of behaviour!

What was their common position? It was that mismanagement of banks does not in itself cause undesirable crisis manifestations. Therefore, nobody cares whether there is a warning or not. No matter how hard the management of a particular bank tries to change the situation, it cannot stop or reverse the processes associated with social (mass) psychology [8]. The same observation can be applied to the Fed: the banks belonging to it are not able to reduce the anxiety of the masses if the anxiety has already developed.

The Nobel Committee made special mention of Bernanke's work "The non-monetary effects of the financial crisis that grew into the Great Depression", written 40 years ago [9]. Before that it was thought that it could have been prevented by printing (issuing) more money. Bernanke, however, showed that the severity of the Great Depression was due to the banks' reduced ability to lend to the economy, and that this negative effect could not be offset by money emission. In 2010 he explained to the US Congress that the Fed as "lender of last resort" was providing the banking system with short-term liquidity. Under his supervision the Fed launched a programme of securities purchases from banks which allowed them to continue lending at low (acceptable) rates.

The article, which B. Bernanke published after he left the Fed, contains a fundamental analysis of the role of the central bank, the function of which in the U.S. is performed by the Fed. And here we encounter a tradition that allows us to write the name of Ben Bernanke not only in the history of crises, but also in the history of economic thought.

THE FED IN THE GENERAL RANKS

When the Nobel Committee included Ben Bernanke in the group of 2022 laureates, an exaggeration of the Fed's role in overcoming the 2008 crisis and mitigating its effects was imminent. However, the Fed was only part of the many structures involved in designing and implementing the crisis response.

A much more important role was played by the US Treasury. However, this is only a suspicion. The fact is that the Fed conducted some of its operations in secret, never disclosing the list of those who receive financial assistance. In April 2009, B. Bernanke made a speech saying that disclosure of the names of borrowers "may lead participants to believe that the market has weakened". Bloomberg News Agency sued the Fed for two years, demanding the disclosure of the names, but the US Supreme Court rejected the claim. Nevertheless, Congress voted for a partial audit of the Fed's actions from late 2007 to mid-2010, which showed that the Fed had increased lending to US and foreign banks by $ 16 trillion.

Until now nobody knows the full extent of the actions taken by the Fed from 2007 to 2010. Particularly, it is not known what role the Fed played in the artificial devaluation of the USD as part of the fight against the US crisis. This measure has been condemned worldwide (especially by China, the main US debt holder) because it has reduced US foreign debt. The Fed was undoubtedly involved, but it is unlikely to have been able to implement it in isolation from the executive and legislative branches. Russian commentators have interpreted this action as a personal decision by Ben Bernanke [10]. It is now very interesting to re-read this.

The support of the top 10 banks through the Fed was just one of many measures to address the crisis. The US Treasury implemented the bank salvation programme — Troubled Asset Relief Program (TARP), which bought back toxic assets from 700 banks and other credit institutions. The TARP programme was overseen

by the US Treasury Department's Financial Stability Oversight Council (FSOC), which included Ben Bernanke as one of its heads [11].

The programme, originally set to run until 2014, had a budget of $ 700bn, but this was later reduced to $ 475bn. Part of this money was then returned to the state in the form of dividends on the shares of the rescued banks.

Under the Emergency Economic Stabilisation Act (EESA) of 2008, the Treasury bought doubtful assets for shares, either for the right to repurchase them at a fixed price (equity warrants) or (for non-public companies) for the right to repay senior debt securities. Only preference shares, i.e. non-voting shares, were purchased in order to prevent companies from being taken over by the state. In addition, restrictions were imposed on participation in TARP in order to prevent bank executives from enriching themselves unduly at the expense of state support. One of the objectives of TARP was to encourage banks to channel funds into circulation — to lend to consumers and businesses — rather than to accumulate them as insurance against future losses. Loan defaults were to lead to re-lending, replacing existing loans with others on new terms.

Thus, along with the actions of the Fed led by B. Bernanke, the anti-crisis measures of 2008 were carried out within the framework of the TARP program and relatively independent actions of the U.S. Treasury.

To appreciate the role of the Fed and personally Ben Bernanke in the dramatic fight against the crisis in 2008 "live" you can see a feature film "Too big to fail", released in 2011. The plot is as close to the actual events as possible. The Russian version was released 6 years later and is called "Too cool to not succeed" (literal Russian translation). In the foreground of the film is the US Treasury Secretary Henry Paulson and Treasury Chief Timothy Geithner. Ben Bernanke is portrayed in the film in a third role as a "grey cardinal" theorist. This may well have been the case in real life.

CRISES AND CYCLES. "THE CHICAGO SCHOOL'S 'U-TURN'.

Ben Bernanke made a fundamentally important contribution to the study of banking history. He focused all of his attention on the formation of central banking [12]. The idea that cycles should be taken into account in the activities of the Fed was also presented in a book by Milton Friedman and Anne Schwartz [13], although in a slightly different context, which seems more important than any results that can be awarded by a single Nobel Prize.

Many Nobel prize-winning economists have discussed the problems of state intervention in the economy. How permissible is it and is it permissible at all?

For the first time in the writings of Nobel laureates this problem has been completely put aside and not discussed at all. Moreover, the studies of the 2022 laureates showed that the economy could not survive without state intervention. They themselves worked at the 'cutting edge' or even forefront of such intervention.

In Russian economic science, as a Soviet legacy, the notion of the laws of social development and the patterns of economic development persists. The 2022 Prize shows that the extremes are converging. The laureates have proved with their research that state intervention which does not take into account the regularities of development, and in particular the cycles in the economy, leads only to a worsening of the situation. They have also confirmed another thesis: if state intervention takes into account the regularities of economic development, then it proves to be useful [14].

It is considered good form and style (and not only in Russia) to criticise the Chicago School. But, to be fair, it should be noted that it was in the framework of the Chicago School that in the 1960s a new approach to the study of industrial organisation was proposed. The Chicago school researchers made an analysis of how the presence of big companies in the market restricts

competition and how they use their profits. It was shown that in many particular cases it was used to promote competition and support small firms. The Chicago School's study of industrial organisation was a transition from direct cost-benefit matching to a modern approach.

The 2022 prize showed something different, namely that the Chicago School is not liberal at all and that its representatives are not market-oriented at all.

Ben Bernanke's work, written 10 years before the crisis, very clearly linked the theory of economic cycles, the permissibility and necessity of government intervention with this theory [15].

After re-reading M. Friedman and A. Schwartz's "Monetary History of the United States",— a kind of bible of the Chicago School, the author believes that this school provides no defence of the free market and restrictions on government intervention in the economy. It is also incongruous to associate this school with both the liberal reforms introduced in Chile, the United States (Reagan), Britain (Margaret Thatcher) and the reforms in the former Soviet Union and Eastern Europe. The school was probably only flawed in the negative income tax and other elements of social welfare [16]. But now, because of attracting public attention of the Nobel Committee to theoretical works and practical actions of followers of Milton Friedman, another thing became obvious: while reading the appropriate works it seems that Friedman and the laureates of 2022 following him seem to be persuading state officials: "Ok, once we cannot do without you, then at least do it wisely".

"The 'U-turn' of the Chicago School is not a change in the positions of its proponents, but a new understanding of its place in the history of economic thought. The process is not yet complete and will continue, especially since the intervention was not direct, but through the Fed. But this indirect action was closely linked to other measures taken by the legislative and executive branches of the government.

MODEL DD (DIAMOND-DYBVIG)

In 1983 there appeared an article by the two laureates describing a model for the formation of liquidity generated by banks [17].

The model was constructed under three assumptions that substantially limit its direct practical application:

1. Long-term investments generate more income than short-term investments.

2. The need for money among depositors is random and individual, and each one is different.

3. information on the money needs of the individual depositor is known only to him and is not publicly available.

The model is based on the division of investors (in this case, depositors) into two categories: the so-called "runners" and the "riders" ("impatient" and "patient"). The former often withdraw money from the account and rush to buy something, while the latter quietly count the interest accrued and hope to increase the deposit or, having saved the necessary amount, make a large purchase. The authors of the DD model assume that the main role of banks is to increase liquidity in the economy. On the one hand, if one does not have the money to buy something, one can take out a loan. On the other hand, bank deposits are more liquid than investments in securities, real estate, or intellectual property.

Both buyers and investors are interested in having money at their fingertips because of the usual market uncertainty: what if an opportunity arises to buy or sell something? And those who are saving for an expensive purchase are less likely to withdraw their money in the near future than those who need it for current needs.

In addition, owners of property in the form of securities always feel the probable risk of a significant reduction in the value of what they hold. The ratios of the numbers of these categories of depositors determine the current liquidity of the bank. In order to relate the model to reality, it is necessary to know the quantitative composition of the

different categories of depositors and the amount of their deposits at the bank. Initially this problem was solved very simply — if there is a demand deposit, its holder belongs to the category of "impatient" or "runners" — but then it became a problem of mathematical statistics: for the sake of approximation of the model to reality it was necessary to develop the methods of estimating the share of each category of depositors on the actual basis, i.e. on accumulated statistics. Specialists are still grappling with this problem [18].

The DD model is agent-oriented, as it maps the behaviour of the bank's clients from different categories. The time in the model is discrete — it is divided into three periods "0", "1" and "2".

During the "0" period, agents make deposits. For simplicity, the deposit equals 1. That is, everyone's income is equal to –1. During this period, all agents are of the same type. In period "1" agents either receive nothing (type A) or take back their contribution (type B), i.e., they choose between "0" and "1". In period "2" agents either receive income (interest) of R amount (type AC) or leave the deposit as it is, i.e., receive 0 (type AD).

There should be many agents, ideally a continuum. Then, the share of types at period repetition becomes divisible, and Nash equilibrium conditions are calculated in the model, depending on the distribution of agents by type [19].

"Bank" in the DD model differs markedly from a real bank not only in that it is more like a mutual (investment, share or unit investment) fund, but also in the instant fulfilment of its obligations. In the model, demand deposits are arranged in a special way [20]. Under the terms of the model, depositors in this category are treated as residual claimants, i.e., the money is given to them last, even if there is no panic. In addition, the model bank does not invest in securities. Instead, each deposit is a hybrid of money and securities. The bank's refusal to act independently in the stock market — is a significant simplification of reality by tying these transactions directly to depositors.

The authors of the DD model argue that this move is legitimate because there are many so-called "capitalists" among the depositors, who manage their own contributions. Separating them from "passive" depositors would complicate the model dramatically.

A separate part of the model is deposit insurance, and state insurance is excluded because this exogenous parameter cannot be predicted. This also distances the DD model from reality. For the state deposit insurance to work in the model, we need to know what the state intervention in period "1" is, which would increase the share of "patient" depositors.

There are two ways. The first — is to ignore state insurance. The second is to introduce compulsory insurance as a certain tax on deposits. This is what has been implemented in subsequent versions of the DD model. Such a "tax" leads to a redistribution of income between the "patient" and the "impatient" in the period "1".

The authors of the DD model themselves pointed out that insurance might be no better than no insurance at all. This conclusion could be explained by the fact that the model included the assumption of insurance as the only way for investors to escape risk. They pointed out that this assumption ignores the well-known problem of moral hazard (participant bad faith and dishonesty) that confronts any attempt to make the financial system safer.

In addition to introducing uncertainty, such behaviour drastically reduces the effectiveness of deposit insurance. Each country has its own idea of what counts as depositor misconduct. In Russia, for example, in 2015–2016, the Supreme Court of the Russian Federation defined it as "regularly occurring large transactions with an ambiguous or unobvious economic sense" [21].

Attempts to incorporate depositor probable bad faith or dishonest behaviour into the DD model have been made by many researchers

[22], but so far these attempts are limited to recommendations. And without this it only sketches the direction of modelling but is not quite suitable for predicting massive deposit withdrawals.

In a broader context, the DD model is actually "dedicated" not only to bank deposits, but also to the role of investments in an environment where liquidity enhancement technology is used. It shows that insurance does little to increase liquidity and that the investment portfolio of a credit institution can be considered identical to the savings of someone in an autarkic environment i.e., economic self-sufficiency

The DD model does not analyse the impact of panic and bank runs on banks' behaviour. However, it does not assume that by investing money in a bank one does not expect a panic and a mass withdrawal of deposits to occur in which one would have to participate.

It follows from the model that if the probability of a mass withdrawal becomes high, the optimal contracts can prevent it. In turn, the banks react to the same situation by changing the composition of their investments [23]. It is true, though, that some conventionality of such conclusions has been noted earlier due to the assumptions of the model.

CONCLUSIONS

The eminent psychologist Kurt Lewin once said: "Nothing is more practical than good theory". This phrase undoubtedly applies to the work of the awardees of the 2022 Nobel Prize in Economics.

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Assessing the Impact of Pension Institutions on the Development of Global Finance

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ABSTRACT

The novelty of the research lies in the conception of pension institutions as correctors of global financial development. These institutes do not only stimulate, but also slow down the positive change due to the particular assets allocation by largest pools, which are in fact represent a concentration of risks. This issue has not been taken under any comprehensive consideration at the global level yet. Thus, the aim of the research is to assess the pension institutions impact on long-term global financial development. The research concerns various problems: from specifying the position of pension institutions within the global finance hierarchy and "clusters of influence" allocation to empiric assessment of their impact on multiple indicators of global financial development; conclusions and prospects are formulated in the article as well. The article shows that pension institutions are the largest global investors with the core of the USA pension funds' assets concentrated in the domestic stock market. The paper outlines the ways of the slowdown in the global financial development through to the pension funds in case of market and country risk realization.

Keywords: pension institutions; pension assets; pension funds; financial development indicators; Granger causality test; regression coefficient

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INTRODUCTION

Traditionally, pension institutions have been perceived as a positive force driving financialization and financial innovation [1]. Until 2008, their direct impact on a number of financial variables (capitalization, volume of debt securities, information efficiency) and indirect impact on economic growth through more efficient channels of redistribution of financial resources were confirmed [2].

The focus of research has been predominantly on autonomous pension funds (hereinafter referred to as pension funds). It has been argued empirically that the size of pension funds is highly likely to explain differences in the rate of economic growth between countries [3] and has a positive impact on savings [4, 5].

The term 'Pension fund capitalism' was coined in the American literature, associated with the large participation of pension funds in corporate governance, with increased disclosure requirements and with the growth of market efficiency [6].

Since the 2000s, the hypothesis about the positive impact of pension funds has been reconsidered. Its conditions are outlined: mandatory participation in funded schemes [7–10] and the presence of large funds [11].

It has been argued that the impact of pension funds is higher in countries with the case (precedent) law (UK, USA, Australia, Canada). Solidarity systems have no impact on financial development but can be supported by reforms to consolidate pension funds [12].

The year 2008 was a turning point regarding the impact of pension institutions: the dependence of pension systems on global dynamics increased and the opinion that pension reforms are likely to have

a negative effect given the cyclical nature of the global economy was confirmed [13–15].

During the first wave of reforms from 1994 to 2008, with the transition to private pension schemes, the number and the size of assets of pension funds increased manifold [16]. After 2008, it has been suggested that they offer excess demand for certain financial products (high return, law risk), leading to lower returns and speculative bubbles [13].

Many empirical studies assessing the impact of pension funds on the development of capital markets have been conducted between 2000 and 2010 [2]. The conclusions were drawn for a single country or a group of countries, the fact of influence was recorded without analyzing the causes and mechanisms that triggers them; the focus was mainly on the equity market. There have been no major studies in this area since 2010.

Thus, the purpose of this paper is to determine the place of pension institutions in global finance; to conduct a large-scale structural analysis to identify large pools of pension assets; to assess the mutual influence of their dynamics with the dynamics of financial development indicators; and to draw conclusions about the direction and nature of this influence, including the future prospects.

To solve these tasks and achieve the objectives, the full potential of the databases of the following organizations has been utilized: the OECD, World Bank, Securities Industry and Financial Markets Association (SIFMA), U.S. Federal Reserve as well as electronic platforms: Global Sovereign Funds (Global SWF.com), Hedge Fund Research (HFR.com), Information Agency on Exchange-Traded Funds ETFGI (Etfgi.com).

MATERIALS AND METHODS

The study uses the OECD terminology and classification of organizational forms of pension assets [17]. A set of methods within the framework of systems analysis methodology is applied (*Fig. 1*).

1. *Defining the place of pension institutions in global finance*

1.1. The share of pension institutions in global finance (PI) is determined according to the formulas:

$$PI_{gfm} = \frac{PA}{GFM} \times 100\%, \quad (1)$$

$$PI_{gcm} = \frac{PA}{GM} \times 100\%, \quad (2)$$

$$PA = RSP + PPRF, \quad (3)^1$$

$$GFM = MCAP + GFIMO + FSD, \quad (4)$$

$$GCM = MCAP + GFIMO, \quad (5)$$

where PI_{gfm} (Pension Institutes in GFM) — is share of pension institutions in the global financial market;

PI_{gcm} (Pension Institutes in GCM) — is share of pension institutions in the global capital market;

PA (Pension Assets) — assets of pension institutions;

GFM (Global Financial Market) — Global Financial Market;

GCM (Global Capital Market) — Global Capital Market;

RSP (Retirement Savings Plans) — assets in retirement savings plans;

PPRF (Public Pension Reserve Funds) — assets in state pension reserve funds;

MCAP (Market Capitalization) — equity market capitalization;

GFIMO (Global Fixed Income Markets Outstanding) — market value of bonds outstanding;

FSD (Financial System Deposits) — deposits in the financial system.

1.2. The place of pension institutions among other institutional investors is determined according to the formula:

$$PI_{in} = \frac{PA}{(IFA + PA + ICA + SWF + HDG + ETF)} \times 100\%, \quad (6)$$

where PI_{in} (Pension Institutes in Institutional Investors Assets) — share of pension assets in assets of institutional investors;

[1] Государственные пенсионные схемы с текущим методом поступлений и выплат не включаются.

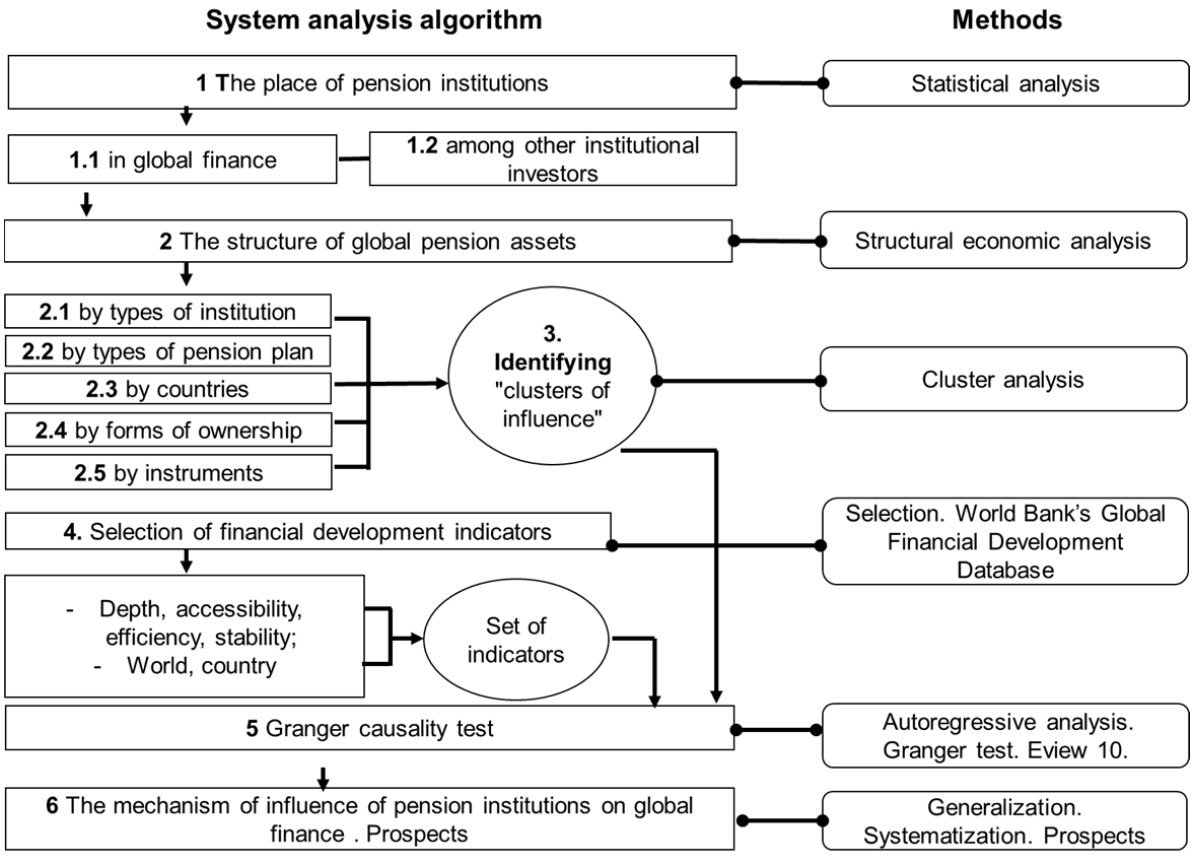

Fig. 1. **General research strategy and research methods**

Source: compiled by the author.

PA (Pension Assets) — assets of pension institutions, formula (3);

IFA (Investment Funds Assets) — Investment Funds Assets;

ICA (Insurance Corporations Assets) — Insurance Corporations Assets;

SWF (Sovereign Wealth Fund) — sovereign wealth fund assets;

HDG (Hedge Funds) — hedge fund assets;

ETF (Exchange Traded Fund) — ETF fund assets.

2. Analysis of the structure of global pension assets

2.1. The structure of global pension assets by types of institution [17] is determined according to the following formula:

$$PA(100\%) = PIC + APF + OTH + BR + PPRF, \quad (7)$$

where PA — Pension Assets;

PIC — Pension Insurance Contract;

APF (Autonomous Pension Funds) — pension funds;

OTH (Other) — other mechanisms;

BR (Book Reserves) — book reserves for pension liabilities;

PPRF (Public Pension Reserve Funds) — assets in public pension reserve funds.

2.2. The structure of pension institutions by countries is determined by the following formula:

$$PA_{AIF}(100\%) = C1_{AIF} + \ldots + C7_{AIF} \ldots 31OECD \ldots + Oth_{AIF}, \quad (8)$$

where PA (Pension Assets) — Pension Assets, formula (3);

C1 – C7 — shares of pension funds assets in the top 7 OECD countries by asset size;

31 OECD — share of pension fund assets in the rest of OECD countries;

Oth_{AIF} — share of pension fund assets in non-OECD countries.

2.3. The asset structure of pension funds by types of pension plan [17] is determined according to the following formula:

$$PA_{AIF} = DC_{AIF} + DB_{AIF} + PPP_{AIF}, \quad (9)$$

where PA_{AIF} Pension Assets

DC_{AIF} (Defined Contributions Autonomous Pension Funds) — assets in pension funds' defined contribution pension plans;

DB_{AIF} (Defined benefits. Autonomous Pension Funds) — assets in pension funds' defined benefit pension plans;

PPP_{AIF} Personal Pension Plans

2.4. The asset structure of pension funds by forms of ownership is determined by the following formula:

$$PA_{AIF} = GLPF + FPF + PRPF, \quad (10)$$

where PA_{AIF} Pension Assets;

GLPF (Government and Local Pension Funds) — assets in government and local pension funds;

FPF (Federal Pension Funds) — assets in federal pension funds;

PRFP (Private Pension Funds) — assets in private pension funds.

2.5. The asset structure of pension funds by instruments is determined according to the following formula:

$$PA_{AIF} = SH_{AIF} + CB_{AIF} + G\&MB_{AIF} + MF_{AIF} + L_{AIF} + C\&D_{AIF} + Repo_{AIF} + Others, \quad (11)$$

where PA_{AIF} (Pension Assets);

SH (Shares) — pension assets invested in shares;

CB (Corporate Bonds) —pension assets invested in corporate bonds;

G&MB (Government Bonds) — pension assets invested in state and municipal bonds;

MF (Mutual Funds) —pension assets invested in mutual investment funds,

L (loans) —pension assets in the form of loans issued;

C&D (Cash and Deposits) — pension assets in currencies and deposits;

Repo —pension assets in repurchase agreements.

OTH —pension assets in other instruments.

3. Identifying "clusters of influence" of pension institutions

Based on the results of the structural analysis (item 2 of *Fig. 1*), the largest pools of pension assets are identified using the hierarchical clustering method. Three levels of hierarchy, 5 groups, 58 objects are considered (*Fig. 2*).

The maximum object selection function is used (F_{max}).

$$x_z = F_{max} \sum_{i=1960}^{2020} O_{ji}, \quad (12)$$

where: x_z — "cluster of influence", the largest asset size facility in the group over the observation period;

O_j — object in the group with order number j (pension asset pool).

Features of the function:

- is applied sequentially to each object (O_j) (index j denotes the ordinal number of the object in the group);
- the object is considered in the dynamics of the available period no later than from 2004 and no earlier than 2018, index i denotes year $i > 15$;
- the result of the function implementation (F_{max}) is the selection of the object with the maximum value in the group by the sum of years for the period under consideration (x_z), index z denotes the group number (*Fig. 2*);
- x_z is deemed insignificant for the analysis if the share of this object ($O_{j\,max}$) in the total assets of the group (z) for the whole period is less than 30%.

4. Selection of financial development indicators

The World Bank's Global Financial Development Indicators Database is used. As of mid-2022, it included 217 countries and 114 indicators from 1960 (later in some respects) to 2020.

The World Bank uses a 4 × 2 "indicator matrix". These are 4 areas of assessment

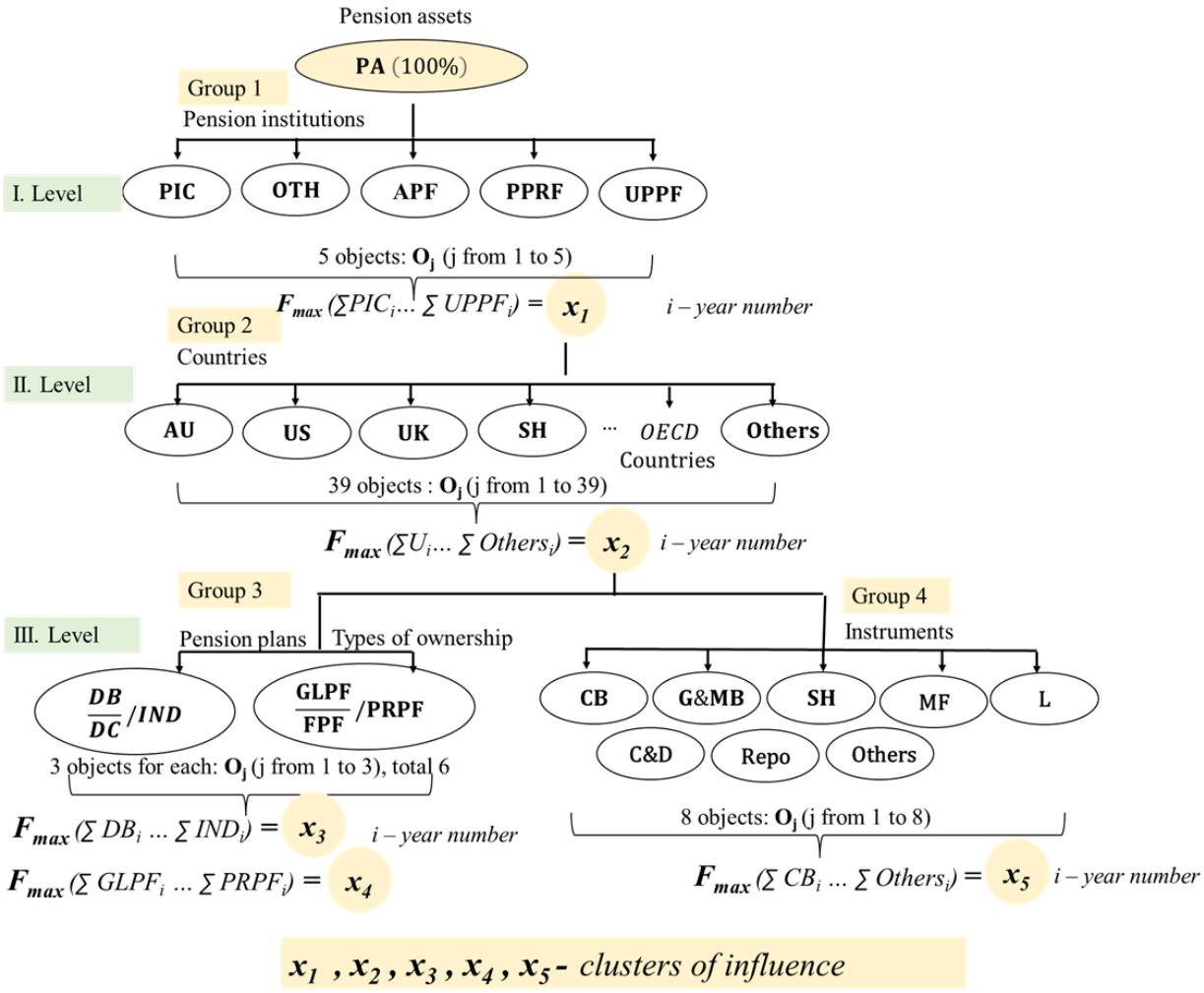

Fig. 2. **Algorithm of the cluster analysis***

Source: compiled by the author.

* *Note:* the symbols from the formulas apply (5)–(8).

(financial depth, accessibility, efficiency, and stability) and 2 blocks (financial institutions and markets) [18]. The areas of assessment are not interlinked: financial depth of the systems does not mean accessibility of financial services, and market efficiency does not guarantee greater stability [18].

In each quadrant of the matrix, key indicators — benchmarks — are highlighted. The quantitative distribution of indicators across the matrix (highlighting the benchmarks) is presented in *Table 1* [19].

The selection of indicators from the database is determined by:

a) coverage of indicators across the 4 quadrants of the matrix, with the mandatory presence of benchmarks highlighted by World Bank;

b) inclusion of indicators covering a wide range of financial institutions;

c) the duration and continuity of the series: beginning — no later than 2004, ending — no earlier than 2018.

For each of the selected indicators, following the formula (13) country indicators are aggregated into global ones.

$$I_{\text{world}(i)} = \frac{\sum_{s=1}^{n} I_{s(i)} \times \text{GDP}_{s(i)}}{\sum_{s=1}^{n} \text{GDP}_{s(i)}}, \qquad (13)$$

where $I_{\text{world}(i)}$ — the calculated value of the indicator for the world as a whole in year *i*;

$I_{s(i)}$ — indicator value for country *s* in year *i*;

$\text{GDP}_{s(i)}$ — the GDP value of country s in year *i*.

5. Autoregression analysis. Granger test.

The impact of the "clusters of influence" (item 3 of *Fig. 1*) on the financial development indicators (item 4 of *Fig. 1*) is investigated by a time series autoregressive analysis using the Granger causality test. The software product is — EViews 10.

Granger test has been used by the IMF and the World Bank to analyze the relationship between economic efficiency and economic growth [20], the dynamics of wheat prices and credit volumes to the private sector [21], the components of the money supply and inflation.

The time series analysis algorithm is shown in *Fig. 3* [19].

6. Drawing conclusions and forecasting the impact of pension institutions on global finance.

Based on the results of the analysis (pp. 1–5 of *Fig. 1*), the conclusions are arrived upon, the mechanism of influence of pension institutions on global finance is formulated, and the prospects for global financial development under the influence of the pension industry in a deteriorating economic environment are outlined.

RESULTS AND DISCUSSION

1.1. Pension institutions with $ 63.2 trillion in assets, formula (3) represent 1/5 of the global financial market, formula (1) and 1/3 of the global capital market, formula (2) [17].

The core of pension assets are the retirement savings plans (RSPs). Out of the $ 56.4 trillion of RSPs, $ 54.1 trillion (97%) — are accumulated in OECD countries, while in 54 non-OECD countries,— only $ 2.3 trillion (*Table 1*).

1.2. Pension institutions, with $ 63.2 trillion in assets in 2020, were the largest group of institutional investors (36%) (*Table 1*).

Without the Public Pension Reserve Funds (PPRFs), they would account for 31–33% of institutional investors' assets.

In 2nd place are assets of investment funds ($ 60 trillion (34.5%)), followed by assets of insurance companies — $ 33 trillion (19%) and sovereign wealth funds — $ 10 trillion (5.7%).

The dynamics since 2008 show a stable position of pension institutions and sovereign wealth funds, with a mirrored rapid (since 2011) decline in the share of insurance companies and growth of investment funds' assets.

Hedge funds and ETFs have been actively growing since 2011, but their share is relatively small (*Table 1*). [17].

2.1. 64% of pension savings plan assets, formula (3), in OECD countries are accounted for by pension funds and 24% — by "other vehicles" (*Table 2*).

In 48 non-OECD countries, 95% of assets are represented by pension funds. In the OECD, 13 out of 38 countries have "other vehicles". 90% of their assets are represented by the U.S. market and 8% — by the Canadian market [17].

Pension insurance contracts are in third place (12%) (*Table 2*). There is considerable variation from country to country: in France, they account for 79 per cent, in Sweden — 84 per cent, in Denmark — 66 per cent, in Belgium — 64 per cent, in Korea — 52 per cent and in Portugal — 42 per cent.[2]

In 4th place (1%) — are balance sheet reserves (*Table 2*). They are available in Canada (7%), Japan (17.7%), Spain (4.2%) and Sweden (9.2%).

Under the influence of the United States [17], the share of pension funds assets in the dynamics is decreasing (in OECD countries: from 71 per cent in 1995 to 64 per cent in 2020), and the share of "other mechanisms" is growing (from 16 to 24 per cent) (Table 2).

In the USA, the share of pension funds decreased from 79 to 57 per cent over the period from 1981 to 2020, the share of pension insurance agreements decreased from 18 to 10 per cent, and the share of other mechanisms increased 10 times from 3.2 to 32 per cent. Without the United States, the decline in the share of pension funds assets in

[2] The OECD statistics are given as the share of private pension plans. Terminology commentary is available on an external resource [17].

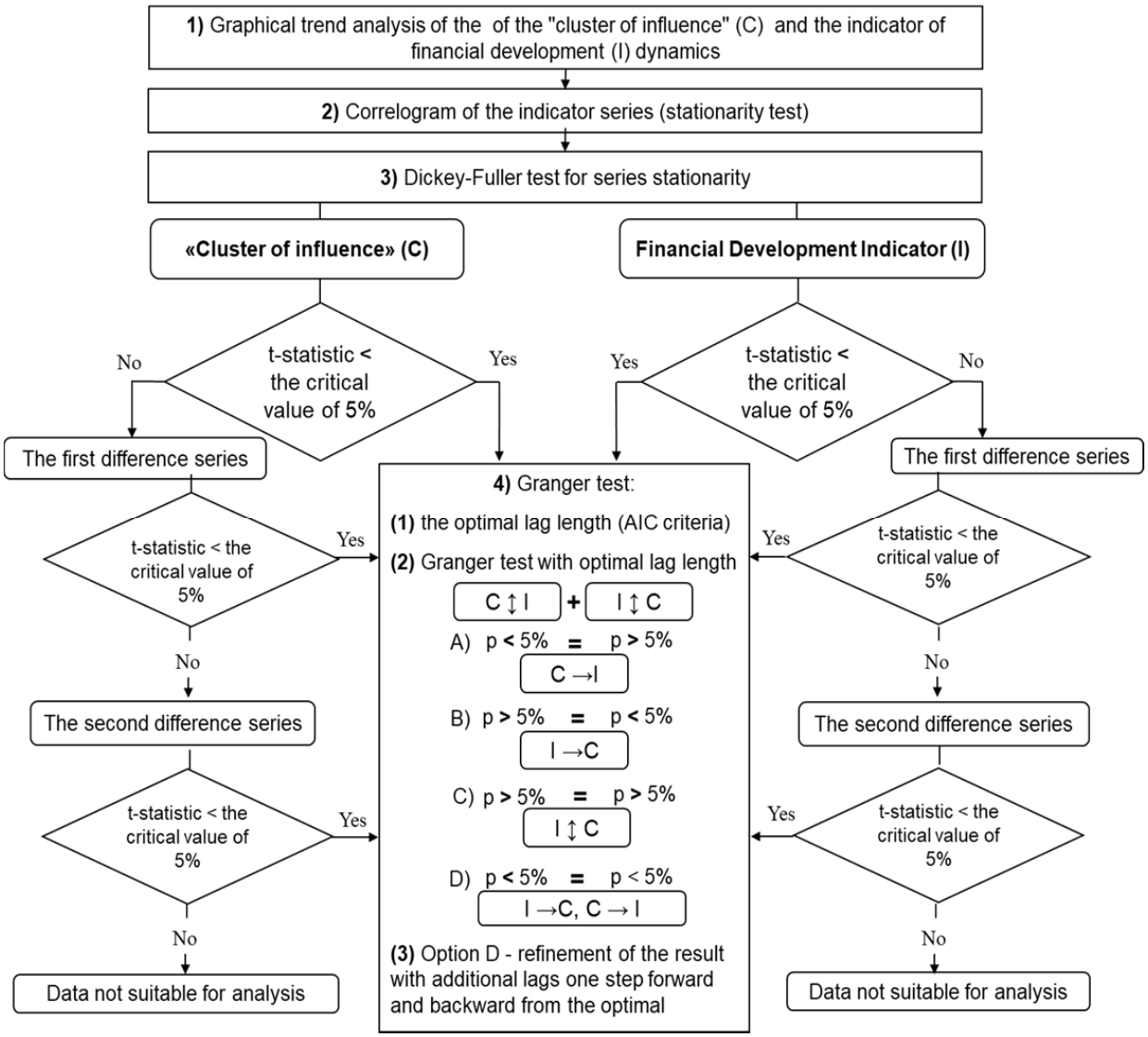

Fig.3. **Algorithm of Granger causality test conduction**

Source: compiled by the author.

other countries was accompanied by the growth of the share of pension insurance contracts (not "other mechanisms") [17].

The analysis, formula (7), allows to identify one cluster of influence — these are the pension funds of OECD countries with $ 34.5 trillion in assets (60% — are under the U.S. legislation) (hereinafter — Cluster 1).

A significant portion of pension assets — $ 12.8 trillion (90% under the U.S. law) — is represented by "other vehicles" in the form of funds (accounts) managed by banks and investment companies. They are not singled out as a separate cluster due to the significantly smaller size of pension fund assets over the history of observation. The shift in favour of the "other vehicles" ratio of pension assets lays down a long-term projection trend for the future impact of pension institutions on global finances.

2.2. In Cluster 1, there is a high concentration of assets (92%) in the first seven countries by 2020: the USA (59%), the UK (10%), the Netherlands (6%), Australia (5%), Canada (5%), Switzerland (4%), Japan (3%). Over the past 20 years, their share fell from 95% to 91% in 2001–2003, and has remained at 92% in 2007–2009 and beyond. The assets of

Table 1

Pension assets and other institutional investors' assets, trillion of dollars*

No.	Investors	2008	2010	2012	2014	2016	2018	2020
1	Pension institutions (PA)	27.9	34.9	39.2	42.5	45.5	50.6	63.2
	Of these: Retirement savings plans (RSP)	23.6	30.1	34.0	38.8	40.1	44.6	56.4
	Including OECD	23.0	29.1	32.8	37.3	38.4	42.7	54.1
	Public pension reserve funds (PPRF)**	4.3	4.8	5.1 (2011)	5.3 (2013)	5.4 (2015)	6.0	6.8
2	Investment funds (1)	20.4	25.7	34.4	40.3	41.1	46.8	59.6***
3	Insurance companies (ICA) (1)	22.1	25.8	25.8	27.8	27.2	28.8	33.0
4	Sovereign wealth funds (SWF)	4.0	4.8	6.1	7.4	7.5	8.4	9.9
5	Hedge funds	1.5	1.4	1.5	2.0	2.4	2.9	3.8
6	ETF	0.5	1.0	1.3	2.0	2.5	3.4	5.5
7	Total	76.4	93.6	107.0	122.0	124.5	139.0	175
8	Share of pension institutions (PA), %	36.5	37.3	36.6	36.1	36.5	36.4	36.1

Source: Pension market in focus OECD, 2021; Pension market in focus: preliminary 2021 data on pension funds, OECD, 2022; Pension at a Glance, OECD, 2013, 2015, 2017, 2019; Global SWF, HFR, ETFGI.

*Note:** abbreviated; ** for 38 OECD countries; *** preliminary data. For Australia, Chile, Latvia, the Netherlands, Norway, Poland, Portugal, Slovakia, the UK — it is calculated as the 2019 value multiplied by the GDP growth rate for 2020.

Table 2

Allocation of assets in Retirement Savings Plans by pension institutes in dynamics (OECD), % *

Year	Autonomous Funds (AIF). Cluster 1	Book Reserves (BR)	Pension insurance contracts (PIC)	Others (OTH)	Total
1995	71.2	0.0	12.7	16.2	100
2000	71.0	0.7	11.0	17.3	100
2005	70.1	0.9	11.9	17.1	100
2010	68.7	0.8	11.6	18.9	100
2015	66.2	0.5	11.8	21.6	100
2020	63.7	1.0	11.7	23.6	100

Source: Pension indicators database.

Note: * abbreviated.

the other countries' pension funds (after the first seven) individually represent less than 1% [17].

The BRICS group of countries stands out, as do Singapore and Hong Kong, (China): from 2001 to 2020, their pension funds were among the top 25 countries in terms of assets. The leaders in growth are the pension funds of India (87 times the size of assets since 2013) and China (6 times). However, in absolute terms, they are 80 times smaller than the assets of the U.S. pension funds [17].

Table 3

Structure of U.S. pension funds (Cluster 2) according to the retirement savings plan, formula (9)*

	Indicator	1981	1985	1990	1995	2000	2005	2010	2015	2020
1	Assets in DC plans as a% of occupational plans assets	20.7	23.6	26.9	30.3	36.2	38.0	40.8	43.4	47.5
2	Assets in DB plans as a% of occupational plans assets	79.3	76.4	73.1	69.7	63.8	62.0	59.2	56.6	52.5
3	Assets in occupational plans, including	0.9	1.8	2.7	4.8	8.0	9.7	11.0	14.2	20.2
4	Assets in DC plans, trillion USD. [1/100 × 3]	0.2	0.4	0.7	1.5	2.9	3.7	4.5	6.2	9.6
5	Assets in DB plans, trillion USD. [2/100 × 3]	0.7	1.4	2.0	3.4	5.1	6.0	6.5	8.0	10.6
6	Individual plans, trillion USD, including:	0.2	0.7	1.7	3.0	5.1	6.8	9.2	12.7	19.1
6.1	Individual plans (managed by insurance companies), trillion USD.	0.1	0.3	0.6	0.9	1.4	1.9	2.3	2.9	3.8
6.2	Individual plans (as part of other mechanisms), trillion USD.	0.1	0.5	1.2	2.1	3.7	4.9	6.9	9.8	15.3

Source: Pension indicators database.

*Note:** abbreviated.

The U.S. investment funds — the cluster of influence of pension institutions on the global financial market with the size of assets of 20.2 trillion dollars (hereinafter — the Cluster 2) that has been operating throughout the history of observation.

2.3. Pension funds in the United States, like those in most OECD countries, serve occupational pension plans, which are divided into defined benefit (DB) and defined contribution (DC) plans [17]. Individual pension plans are implemented by insurance companies and "other mechanisms", they are not subdivided into DC and DB plans.

The asset share of DC plans is growing in momentum. By 2020, parity has been reached between the two (*Table 3*). Historically, DB plans may have had a greater impact on global financial market development (the sum of assets over 1981–2020 is greater than that of DC plans).

It is not appropriate to distinguish a separate Cluster of influence within DC- or DB-plans. The reallocation of the U.S. pension fund assets to DC plans forms a long-term projection trend.

2.4. The structure of Cluster 2 (US pension funds) by private and public[3] funds, formula (10), also confirms the equal asset allocation between them (*Table 4*). The transition of assets from public funds continues: 58.1% (1945) — to 40.9% (2021) — to private funds: 41.9% (1945) — to 59.1% (2021).

Legislative regulation of private and public pension fund investments in the U.S. is similar. Portfolio investment limits and management principles for private funds are set by the Employee Retirement Income Security Act of 1974 (ERISA), and for state and municipal funds by laws and regulations that are often based on ERISA. It is not appropriate to separate the Cluster as part of public or private funds.

2.5. The main asset class used for investment of U.S. pension funds (Cluster 2) — is equity. The share of equities (asset-weighted average) for

[3] Including federal, state, and local funds.

Table 4

U.S. pension funds' assets allocation by public and private institutions*

	Federal pension funds (FPF)a	State and local pension funds b	Private pension funds (PRPF)	Total assetsc	Assets according to OECD data (reference)	FPF share,% [2/5]	GLPF share,% [3/5]	PRPF share,% [4/5]	Share of public funds (total),% [7+8]
	1	2	3	4	5	6	7	8	9
1945	2.9	2.5	3.9	9.3	-	31.2	26.9	41.9	58.1
1955	10	10.9	19.3	40.2	-	24.9	27.1	48.0	52
1965	19.7	34.0	79.0	132.7	-	14.8	25.6	59.5	40.5
1975	42.1	104.0	240.8	386.9	-	10.9	26.9	62.2	37.8
1985	172.1	413.1	1196.8	1782.0	1828.1	9.7	23.2	67.2	32.8
1995	532.5	1369.0	2770.8	4672.3	4833.0	11.4	29.3	59.3	40.7
2005	1072.1	3129.4	5383.1	9584.6	9664.4	11.2	32.7	56.2	43.8
2015	1976.2	4017.4	7798.4	13792.0	14173.7	14.3	29.1	56.5	43.5
2020	2744.8	5494.9	11806.2	20045.9	20229.6	13.7	27.4	58.9	41.1
2021	2819.3	5929.5	12618.5	21367.3	-	13.2	27.8	59.1	40.9

Source: Reports Z1 ФРС (Historical Annual Tables. L 118, L 119, L.120); Pension indicators database.

Note: * abbreviated; a, b Assets of U.S. pension funds as reported by the Fed (all assets, that are before 2014, are accounted for on an operational-accounting basis, all assets after 2014 — are accounted for on an actuarially based method, net of claims on contributions not yet received); c The amount of the U.S. pension funds' assets according to OECD data (including the amount of contribution-financed investments). The difference (columns 4 and 5) is due to accounting systems.

1945–2021 — was 36%, mutual funds — 22%, state, municipal (and foreign) bonds — 16%, other instruments — 10% [17].

US pension funds are increasing their appetite for risk. From 1.5% (1951), the share of investments in equities rose to 44% (1972) and remained at 35–42% until 2021. The share of investments in mutual funds increased continuously: from 0.2% (1962) to 28% (2017) and remained at 27% thereafter. Investments in other assets have been growing rapidly since 1985, most of them are alternative instruments [17].

Against this background, investments in government and municipal bonds have fallen from 78.5% (1945) to 14.5% (1972) and further to 13–23%) and, since 1974, investments in corporate bonds fell from 30% in 1974 to 6% in 2004 and further to 10%.

Public pension funds hold most of their assets in equities (40%). Excluding federal funds (30% of all public funds by asset size) — there are traditionally a lot of volunteers to invest heavily in domestic government bonds — the share of investments in equities would rise to 52% (asset-weighted average for 1945–2001). [17].

By comparison, *private pension funds had* 84% of all assets that were riskier. Investments in equities were 36 per cent, investments in mutual funds — 33 per cent and other instruments — 15 per cent [17].

The U.S. pension legislation does not limit foreign investments of pension funds [22], but, according to the World Bank, their share is low — about only 10% of assets [23]. In the United Kingdom, 20–25% of pension funds' assets were invested in foreign instruments until 2015, afterwards — only 13% (2020); in the Netherlands — 80–90%, in Canada — 22–35%; in Switzerland — 4.5–8% until 2008, further — up to 41% (2020).[4]

US pension funds hold a greater share of assets in domestic equities than other countries: 85% (2001), 77% (2005), 70% (2009), 63% (2014), 60.1%

[4] OECD. Funded Pension Statistics: Pension fund foreign investments.

(2020), 63% (2021). For the next six countries following the US, the figure was: 55% (2001), 51% (2009), 34% (2020). For the U.S. domestic fixed income instruments, this share is even higher: 100% in 2001 and 86.6 in 2021.

The U.S. financial market is large and offers a lot of opportunities for asset diversification, but the concentration on one type of instrument in one national market results in increased country risk.

US equities act as the main overseas investment for pension funds of other OECD countries: 60% in 2001, 54% in 2005, 52% in 2009, 49% in 2014 and 46% in 2020 (for bonds, respectively, 13, 11, 39, 37, 34%).[5] The share of alternative instruments (for pension funds of the seven first countries in terms of pension assets), although increasing from 5% in 2021 to 27% in 2016, has returned to 19% by 2021 (as in 2011).[6]

U.S. pension funds demonstrate long-lasting super-concentration of pension assets (hereafter Cluster 3, the impact of which is important to investigate at both the global and national levels).

3. The following clusters of influence are identified based on the results of the structural analysis (paragraphs 2.1–2.5):

- Cluster 1. "Pension funds of OECD countries". [$ 34.5 trillion (2020)], 60% of them under the U.S. legislation);
- Cluster 2. "US pension funds". [$ 20.2 trillion (2020)];
- Cluster 3. "US pension funds' equity investments" [$ 6.7 trillion (2020)].

Two levels of their impact are identified — global and national (US).

4. To analyze the impact of pension institutions on the global financial market, 20 financial development indicators were selected from the World Bank Database according to the criteria specified in clause 4. [19]. Each indicator is considered at the global, formula (13), and national levels.

5. An autoregression analysis carried out according to the methodology (item 5) reveals the impact of the dynamics of the U.S. pension funds' assets (including those invested in equities) on 10 of 20 financial development indicators (at the global and national levels) in four areas: depth (5 of 8 indicators), affordability, efficiency, and stability (2 of 4 indicators in each) (*Table 5*) [19].

Table 5 shows that the main sphere of influence is the equity market (value, yield, volatility, turnover, followed by the value of the international public and private debt markets. The impact through institutions is represented by a smaller number of indicators, but they are linked to service availability benchmarks [19].

Data from regression analysis (regression coefficients) show that the asset dynamics of the U.S. pension funds have a stronger effect on the ratio of stock market total value traded to GDP. On average over the period, a 1% increase in pension funds' assets leads to a 0.44% increase in the value of equities.

The situation is complicated by the existence of a reverse impact channel. A 1% increase in the value of equities on the global stock market leads to an 0.86% increase in the assets of the U.S. pension funds.

A 1% increase in pension funds' assets would cause the stock market turnover ratio to rise by 0.38% and would cause capitalization to rise by 0.28%.

The value of outstanding international private debt securities is less affected. A 1% increase in assets leads to an 0.14% increase in A.M.1. For the same indicator in public debt securities — the impact is even less: a 1% increase leads to an increase of 0.008–0.009%. The impact of changes in U.S. pension funds' assets on stock price volatility is insignificant — only 0.02–0.45% for a 1% increase in assets. The exception is the U.S. pension funds' assets in equities. A 1% increase in equity investments would result in an average increase in volatility of 1.3%.

[5] OECD. Funded Pension Statistics: Pension fund foreign investments. Weighted average formula.

[6] Gilbert M. Pension Funds Would Benefit From Overseas Adventures. URL: https://www.bloomberg.com/opinion/articles/2022–02–23/pension-funds-would-benefit-from-overseas-adventures (accessed on 30.08.2022).

Table 5

World Bank global financial development indicators influenced by U.S. pension funds dynamics

A. depth		**M — markets**				
	A.M.1	Outstanding international private debt securities to GDP (%)	World	USA	Regression coefficient (world)	Regression coefficient (USA)
		U.S. pension fund assets	Yes	Yes	0.0017	0.0014
		U.S. pension fund assets in equities	Yes	Yes	0.005	0.0041
	A.M.2	Outstanding international public debt securities to GDP (%)	World	USA		
		U.S pension fund assets	Yes	No	0.0001	-
		U.S pension fund assets in equities	Yes	No	0.0003	-
	A.M.4	Stock market total value traded to GDP (%)	World	USA		
		U.S. pension fund assets	Yes *	Yes *	0.0068	0.0151
		U.S. pension fund assets in equities	Yes *	Yes *	0.02	0.0437
	A.M.5	Stock market capitalization to GDP (%)	World	USA		
		U.S. pension fund assets	Yes	No	0.0044	-
		U.S. pension fund assets in equities	Yes	No	0.013	-
B. access		**I — institutions**				
	B.I.1	Bank accounts per 1,000 adults	World	USA		
		U.S. pension fund assets	Yes	Yes *	0.0051	0.0076
		U.S. pension fund assets in equities	Yes	Yes *	0.0135	0.0223
	B.I.2	Bank branches per 100,000 adults	World	USA		
		U.S. pension fund assets	Yes	Yes	–0.001	–0.0005
		U.S. pension fund assets in equities	No	Yes	–	–0.0017
C. efficiency		**M — markets**				
	C.M.1	Stock market turnover ratio (%)	World	USA		
		U.S. pension fund assets	Yes	Yes	0.0057	0.0089
		U.S. pension fund assets in equities	Yes	Yes	0.0162	0.025
	C.M.2	Stock market return (%, year-on-year)	World	USA		
		U.S. pension fund assets	Yes	Yes	–0.0011	–
		U.S. pension fund assets in equities	Yes	Yes	–0.003	–

Table 5 (continued)

		I — institutions				
D. stability	D.I.2	Bank capital to total assets (%)	World	USA		
		U.S. pension fund assets	No	Yes	0.0005	0.0007
		U.S. pension fund assets in equities	No	Yes	0.0017	0.0023
		M — markets				
	D.M.1	Stock price volatility	World	USA		
		U.S. pension fund assets	Yes	Yes	0.0002	0.0003
		U.S. pension fund assets in equities	Yes	Yes	0.0007	0.001

Source: [19].

Note: * bilateral influence.

The weakest impact is on the Institutional Development Indicators (B.I.1) with an increase of only 0.33–0.88 accounts per 1000 population.

Demand for equities from U.S. pension funds contributes to lower equity market returns, but it is not possible to quantify the impact reliably in this case.

CONCLUSIONS AND RECOMMENDATIONS

Pension institutions are the largest investors in the global financial market, with a core of U.S. pension funds: $ 20.2 trillion.

Their peculiarity is the significance of investments in domestic equities, which are not replaced by investments in mutual funds and alternative instruments (the share of the latter is growing at the expense of a declining share of corporate and government bonds).

The trend of asset transfers from the U.S. pension fund pool (57% of pension assets in 2020) towards the pool of Individual Retirement Accounts (IRAs) (32% of assets) has not yet gained sufficient weight to change the situation. IRAs' investments in the U.S. domestic equities are on a par with those of U.S. pension funds, i.e., equities have a greater weight in the portfolio structure.[7]

[7] Data from the Investment Company Institute: Investment Company Institute. URL: https://www.ici.org/faqs/faq/iras/faqs_iras (accessed on 06.09.2022).

Autoregression analysis, including the Granger causality test, confirmed the impact of the U.S. pension fund asset dynamics on 50% of selected global financial development indicators. These indicators cover equity and bond markets and, to a lesser extent,— the banks.

The following mechanism of influence can be identified: an increase in the total value of exchange traded equities leads to an increase in the U.S. pension funds' assets. This effect is multiplied by the inverse effect of the pension funds' dynamics on this indicator. This is followed by an increase in equity market capitalization and the value of traded private debt securities with a small loss of multiplier effect.

A 1% change in the value of globally traded equities would also result in a 1% change in the size of pension assets (taking into account the multiplier effect). If pension assets decline, the turnover rate of the equity market slows down more quickly and the capitalization and value of the private bond market declines. To a lesser extent, the negative impact applies to government bonds.

Against the background of sustained and deep declines in indices (by a factor of 1.5 or more), the participation of pension funds in declining equity market returns and rising equity price volatility will be noticeable. This is the way to reduce the investment qualities of financial instruments.

A smaller, but noticeable (in a deep recession) contribution will be made to a reduction in the stability of the banking system and the availability of banking services.

Market risks in equities and the U.S. country risks are super-concentrated in the established mechanism of global influence of pension funds. Collapsing stock markets, deteriorating economic conditions and changes in the U.S. pension and tax laws — are all important reasons for the decline in pension funds' assets. In the medium term, the active participation of pension institutions in the global financial slowdown looks almost inevitable.

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Reassessment of the Role and Functions of the Russian Financial Market in the Context of Structural Transformation of the Economy

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ABSTRACT

A well-developed financial market has a central role in the savings management and investments in the economy and accelerates the economic growth. Geopolitical events in Ukraine, in which Russia got involved in February of 2022, fundamentally changed Russia's foreign trade policy in terms of export-import payments. A large number of external and internal restrictions left a considerable impact on the effectiveness of the previous model of the Russian financial market. Today our country faces the need to carry out radical structural changes in its economy. Due to this fact there is an evident increase in the importance of the problems identification in the Russian financial market as well as in the development of optimal solutions of the issue. The purpose of this article is to assess the role and dynamics of the financial market's development before and after the February events of 2022. Moreover, the article makes an emphasis on the change in the functions performance quality of the financial market.

***Keywords**:* financial market; sanctions; structural transformation of the economy; economic growth; ruble exchange rate; international payments

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INTRODUCTION

Like any other market, the financial market is formed on the basis of economic relations between its participants. The only problem is that the object of this relationship is not real assets (real estate, foodstuff, cars, etc.) but financial resources. In most cases, the financial market is structurally represented as a set of backbone segments: currency, credit, insurance markets, as well as securities market [1, 2].

A well-developed financial market plays a central role in the management of savings and investment in the economy. By qualitatively fulfilling its functions, it contributes to accelerating economic growth [3–7]. One of the most representative signs of financial market sophistication is the ratio of equity market capitalisation to a country's GDP (*Table 1*). The value of this indicator compared with the level of 100%, indicators of other countries and historical extremes characterises the demand for and willingness to invest in the equity market of a particular country. The higher this indicator, the greater the outlook for investors and vice versa.

In countries such as the US, Japan, the Netherlands, Singapore, South Africa and Hong Kong the stock market capitalisation is more than one and a half times the size of their GDP. In many cases this is due to a trade surplus, current benefits from commodity markets, the status of an international financial centre and other competitive advantages of individual economies. In other words, with a strong economy and a good financial infrastructure, such as in the US. Investors, for one reason or another, are keen to buy shares in that country and the amount of money invested is quite substantial compared to the level of its GDP. On the one hand, this may indicate that there is great scope for corporates to raise financial resources in the financial market because its level of monetisation is quite high and, consequently, the conditions are very favourable for them. On the other hand, such high figures may indicate a lagging denominator, i.e., a stagnant economy, high unemployment, etc. while the stock market remains upward, as for example in South Africa and Japan after 2010. Stimulative monetary policy and the desire of domestic investors to save their savings from accelerating inflation can result in financial bubbles. The South African equity market situation is very similar to that of our country in 2020–2022, when the Bank of Russia began to gradually raise interest rates from a record low base. Emerging economies with commodity specific economies (Russia, Brazil, Mexico, South Africa, etc.) can have very different ranges and current equity market-to-GDP ratios. In this context, the Russian equity market continues to have a "black streak" today, as the level of equity market monetisation was low at the start of 2022 and has declined dramatically since the events of 2022. The role of the financial market for the development of the Russian economy has increased as it is now the only available funding platform for most participants. Many have been affected by the imposition of sanctions and the inability to raise capital in the euro-dollar segment of the global financial market, while other funding channels (financial markets of friendly countries) are still underdeveloped in terms of available financial instruments and financial infrastructure. As the Russian financial market has not recovered so far, there are objective obstacles to achieving the indicators set out in the Russian Federation's national development goals.

MATERIALS AND METHODS

Data from the Bank of Russia and Moscow Stock Exchange were used to analyse the dynamics of the Russian financial market. In comparing them, we took into account the relative indicators of the volume of assets

Table 1

Equity market capitalization in advanced and emerging economies as of mid-2022

Country	Economy type	GDP (trillion USD)	Market capitalisation to GDP on current date, %	Historical minimum, %	Historical maximum, %	Length of observation, years	Name of country ETF
USA	DM*	24.39	161.9	32.7	202.5	52	SPY
China	EM**	16.68	56.87	0.23	156.87	32	MCHI
Japan	DM	3.98	147.08	31.06	156.26	42	EWJ
Germany	DM	3.65	52.9	18.46	76.61	35	EWG
India	EM	2.96	89.17	21.34	156.25	25	INDA
United Kingdom	DM	2.78	99.54	46.15	177.37	38	EWU
France	DM	2.54	110.13	27.63	130.51	32	EWQ
Russia	EM	**2.25**	**25.7**	**7.53**	**123.55**	**25**	ERUS
Canada	DM	1.93	138.25	7.83	211.54	42	EWC
Italy	DM	1.81	23.72	15.5	77.28	25	EWI
Brazil	EM	1.58	47.9	19.28	101.95	25	EWZ
Korea	DM	1.57	90.43	11.38	132.58	26	EWY
Australia	DM	1.51	101.02	43.83	153.98	30	EWA
Mexico	EM	1.28	32.67	13.43	45.09	31	EWW
Spain	DM	1.23	50.21	25.05	126.48	29	EWP
Indonesia	EM	1.13	46.86	4.51	57.15	32	EIDO
Netherlands	DM	0.88	139.82	39	178.8	30	EWN
Switzerland	DM	0.77	253.71	54.62	298.52	32	EWL
Sweden	DM	0.52	162.79	25.21	217.38	32	EWD
Belgium	DM	0.52	64.18	31.76	103.75	31	EWK
Turkey	EM	0.4	33.28	5.5	76.55	30	TUR
Singapore	DM	0.38	175.06	64.91	354.46	35	EWS
South Africa	EM	0.37	292.88	94.79	340.2	27	EZA
Hong Kong	DM	0.37	976.85	104.82	1525.57	36	EWH
Egypt	EM	0.34	7.44	7.39	123.99	24	EGPT
Pakistan	EM	0.21	17.1	5.82	49.63	25	PAK
Maximum	-	24.39	976.85	104.82	1525.57	-	-
Mediana	-	1.40	89.80	23.20	143.28	-	-
Average	-	2.92	130.67	29.22	205.95	-	-
Average for DM	-	3.05	171.72	36.24	257.72	-	-
Average for EM	-	2.72	64.99	17.98	123.12	-	-
Minimum	-	0.21	7.44	0.23	45.09	-	-

Source: compiled by the author based on: https://www.gurufocus.com/global-market-valuation.php

Note: ETF — exchange traded investment fund, in this case allowing investment in the broad equity market of a single country; DM — developed economies; EM — emerging economies.

and trading as a percentage of GDP. In order to assess changes in the shares of a particular market, the dynamics of financial indicators of these markets were considered.

The analysis of the current state of the financial market was carried out by means of expert assessments based on publicly available data from official sources. Each financial market function was assessed on a 10-point scale, where "0" — was the lowest score and "10" — was the highest score. The current assessments of the quality of the financial market's functions are given as ranges, taking into account that attempts have been made in recent months to structurally transform it and create new opportunities for access to Asian international financial centres.

RESULTS

Analysis of Russian financial market development and its role in the functioning of the Russian economy until February 2022.

During the first twenty years of this century, the Russian financial market was effectively embedded in the global financial system and became an integral part of it [8]. Russia sold raw materials for US dollars, which, together with global speculative capital, moved freely across the border. After 2008, the Russian economic model developed in the context of a stable trade surplus and chronic capital outflows.[1] Paradoxically, with more than 20 years of history of the modern Russian financial market, given the distinctly commodity-specific nature of the Russian economy, the commodities market of Moscow Stock Exchange is still underdeveloped, low-liquidity and insufficiently deep compared to other segments [2]. This is largely due to the fact that the commodities that Russia produces, and exports are traded in foreign currencies and predominantly in foreign markets.

The depth of the Russian financial market in 2022 — is small to fully serve the needs of the economy, including large Russian borrowers. Specifically, Russia lags behind many developed economies in terms of bank lending to the private sector relative to GDP (59.9% versus 158.5% in OECD countries, 94.8% — in the Eurozone in 2020). That said, the credit market is comparable to some emerging economies (70.2% — for Brazil and 55.3% — for India). Russia's ratio of bonds issued by non-financial institutions to GDP is also below the level of OECD countries (8.1% versus 24.2% in 2020), as well as China (30.7%), while being close to Brazil (7%).[2]

The equity financing segment of the capital market has not yet become a significant source of financial resources for Russian companies. Between 2014 and 2022, about two dozen initial public offerings took place in the Russian financial market. The financial results of investor participation in Russian IPOs, as of mid-2022, do not look very encouraging.[3] At the same time on the US primary market, which is one of the deepest and most liquid in the world, a comparable number of placements take place within 1–2 months and many of the issues enable investors to earn hundreds of percent of net returns.[4]

Given the lack of depth in the Russian financial market and the limited availability of long-term financing, the role of enterprises' own funds in financing

[1] Bank of Russia. External sector statistics.URL: https://cbr.ru/statistics/macro_itm/svs/ (accessed on 25.08.2022).

[2] Bank of Russia. Main directions of development of the financial market of the Russian Federation for 2022 and the period 2023 and 2024. URL: https://www.cbr.ru/Content/Document/File/131935/onrfr_2021–12–24.pdf (accessed on 25.07.2022).

[3] Otkrytie Broker. Key results of past IPOs for companies and investors. URL: https://journal.open-broker.ru/investments/7-kompanij-kotorye-proveli-ipo-na-mosbirzhe-v-2021-godu/ (accessed on 25.07.2022).

[4] IPO calendar on the official Nasdaq Stock Exchange website. URL: https://www.nasdaq.com/market-activity/ipos (accessed on 25.07.2022).

Table 2

Statistical indicators of the banking sector of the Russian Federation

No.	Indicator	2017	2018	2019	2020	2021	Average annual growth rate, %
1	Banking sector assets, RUB billion	77961	86232	88796	103842	120310	13.6
	in % of GDP	84.9	83.0	81.0	96.8	92.0	1.8
2	Corporate and retail loans, including arrears, RUB billion.	45994	52912	56654	64804	74949	15.7
	in % of GDP	50.1	50.9	51.7	60.4	57.3	1.8
3	Investments in securities, RUB billion	10564	11484	12012	16151	17289	15.9
	in % of GDP	11.5	11.1	11.0	15.0	13.2	0.4
4	Deposits of individuals, RUB billion	25987	28459	30412	32834	34695	8.4
	in % of GDP	28.3	27.4	27.7	30.6	26.5	–0.4
5	Deposits and balances from corporate customers, RUB billion	24843	28005	28146	34067	39885	15.1
	in % of GDP	27.0	27.0	25.7	31.7	30.5	0.9

Source: compiled by the author based on: URL: https://cbr.ru/statistics/bank_sector/review/

investment in fixed assets continues to grow. Their share in total investment financing sources has increased from 53% in 2018 to 55.2% in 2020. The relatively low level of financial literacy among the population and lack of confidence among domestic investors create a not very fertile ground for the normal functioning of the equity segment of the Russian financial market. On the other hand, the pace of its development allows us to talk about competitive advantages in the global financial market.[5]

According to Bank of Russia statistics, corporate loans and loans to the household sector are on average growing faster than the Russian economy by 5 percentage points per year (*Table 2*).

To clearly compare the role of the banking sector and the credit market with the stock, currency, futures and commodity markets, let us look at the statistical indicators of the main markets of the Moscow Stock Exchange (*Table 3*).

According to *Tables 2* and *3* we see that individual savings in bank deposits (about 34 trillion roubles as of the end of 2021) are sufficient to buy out the entire Russian stock market (about 30 trillion roubles as of the end of 2021), which is traded on the Moscow Stock Exchange. If we add deposits of corporate clients in the banking sector (about RUR 40 trillion at the end of 2021) to individual deposits, this would be more than enough to

[5] Moscow Stock Exchange. Annual reports and Related Party Transaction Reports. URL: https://www.moex.com/s1346 (accessed on 25.07.2022).

Table 3

Statistical indicators of the segments of the financial market, which are served by the Moscow Exchange, trading volumes in billion rubles

Moscow Stock Exchange market segment	2017	2018	2019	2020	2021	Average annual growth rate, %
Stock market	35413	40671	40662	54522	52430	12.0
in % of GDP	38.6%	39.2%	37.1%	50.8%	40.1%	0.4
The market for shares and unit investments	9185	10830	12443	23905	29997	56.6
Bond market	26228	29841	28219	30617	22433	–3.6
Money market	419750	381781	366452	433176	476352	3.4
in % of GDP	457.0%	367.6%	334.3%	403.6%	364.2%	–23.2
Foreign exchange market	347755	349198	308579	329460	322033	–1.8
in % of GDP	378.6%	336.2%	281.5%	307.0%	246.2%	–33.1
Derivatives market	84522	89317	82479	129953	158530	21.9
in % of GDP	92.0%	86.0%	75.2%	121.1%	121.2%	7.3
Commodity market	128	152	85	78	224	18.8
in % of GDP	0.1%	0.1%	0.1%	0.1%	0.2%	0.0

Source: compiled by the author based on: URL: https://www.moex.com/ru/ir/interactive-analysis.aspx

buy back all issued shares on the Russian stock market, the market capitalisation of which was about RUR 63 trillion at the end of 2021.[6]

Stock market turnover averaged around 40% of GDP over the period 2017–2021. At the same time, corporate and retail lending, including arrears, hovered around 55–60% of GDP. Thus, the key role in financing the economy is played not by the stock market but by the credit market. The currency and money markets far outnumber the stock market in terms of trading volume on the Moscow Stock Exchange. In the money market, almost all trading volume takes place in the REPO segment, which involves lending against various securities with or without the participation of a central counterparty, as well as in other formats. Moscow Stock Exchange's derivatives market developed at the fastest pace compared to other segments of the financial market. The futures market can be considered the most dynamic, with a very significant trading volume among the others (about 120% of GDP).

Assessment of the current state of the financial market after the events of February 2022

The transformation that happened to the financial market in 2022 is colossal in its scale and implications for the development of the Russian economy. Our financial system has become partially disconnected from the international financial infrastructure. The disconnection of the banking system from Swift, the withdrawal of credit ratings from international rating agencies, the demarche of the Big Four auditors and other events have

[6] Moscow Stock Exchange. Market capitalisation. URL: https://www.moex.com/s26 (accessed on 25.07.2022).

changed the investment status of the Russian financial market. It has lost a significant share of foreign liquidity from non-residents, whose share was between 15% and 35% in different segments. At the same time, some foreign capital was locked up inside the Russian financial system for an indefinite period of time, which was a response to the blocking and confiscation of Russian state gold and foreign currency and exchange reserves, financial assets and property abroad. As a result, the Russian financial market was deprived of external sources of funding and left alone with itself and the resources of the domestic investors (residents).

The large number of internal restrictions that have been imposed by the regulator to stabilise the Russian financial market have also had an impact on the quality of its performance. For example, the introduction of compulsory foreign currency sales commissions in February 2022, the abolition of the budget rule, sanctions against the Central Bank of the Russian Federation, and the almost total blockage of cross-border capital flows have resulted in a monstrous imbalance of supply and demand for foreign currency in the Russian foreign exchange market, given the current level of hydrocarbon prices. Although the exchange rate has been described for several months as entirely market-based,[7] it has certainly been so with serious reservations. Administrative regulation of the financial market and a ban on capital outflows out of Russia have done their job in a few months, strengthening the exchange rate to absurd levels. Another significant argument in favour of the thesis of existing imbalances in the Russian financial market is the large skew in the cost of comparable imported goods in Russia and abroad. The difference in prices of similar imported goods sold in Russia and abroad was as high as 30% by mid-2022. Even the removal of most of the restrictions in early autumn 2022 did not help to restore the rouble exchange rate to the level of the beginning of the year. In fact, the old "version" of the financial market was liquidated in February 2022, and since then its new model has been born.

Table 4 shows the results of the analysis of the quality of the financial market's functions as of January and September 2022. The situation is now improving on most fronts, but still, it remains much worse than at the beginning of 2022.

DISCUSSION

In our analysis of Russian financial market development priorities and principles for the medium term, we assume that the sanctions and trade restrictions imposed against Russia will have long-term consequences. During the active phase of the special military operation, which may last longer than expected, not only are the current sanctions likely to remain in place, but the new ones are also likely to be introduced. Most likely, the external environment will remain unfavourable for the Russian financial market for quite a long time (at least 2 presidential cycles).

Certainly, in order to develop the domestic financial market, the Bank of Russia should move in the same directions as it did in early 2022, which include: improving the protection of consumers of financial services; promoting digitalisation; improving accessibility of financial services; developing competition in the financial market; ensuring financial stability; promoting sustainable development goals and continuing ESG transformation of Russian businesses; developing the capital and long-term financing market.[8] However, it

[7] RBC: Maksim Oreshkin calls rouble exchange rate absolutely market-based. URL: https://quote.rbc.ru/news/article/62860ea49a7947ce2565ecdb (accessed on 01.09.2022).

[8] Bank of Russia. Main directions of development of the financial market of the Russian Federation for 2022 and the period 2023 and 2024. URL: https://www.cbr.ru/Content/Document/File/131935/onrfr_2021–12–24.pdf (accessed on 01.08.2022).

Table 4

Results of analysis of the functions performance quality of the financial market as of January and September 2022 and quantitative assessments on a scale from 0 to 10

The function of the financial market	01 Jan. 2022	01 Sept. 2022	Notes
Redistributive	10	6–7	Following infrastructure restrictions, blockages of foreign securities, the demarche of two international payment system operators, restrictions on cross-border capital flows, a ban on cash withdrawals of foreign currency and the introduction of foreign currency storage fees from unfriendly countries at Russian financial institutions, this function has been performing noticeably worse than it was at the beginning of the year. At the same time, part of the financial infrastructure continues to work, domestic payment systems are involved, and attempts are being made to expand their coverage in foreign countries
Savings (investment)	10	5–6	Sanctions and restrictions imposed by unfriendly countries, as well as retaliatory sanctions and regulatory restrictions by Russia, have reduced the opportunities for investing in foreign securities and financial assets to a minimum. The domestic financial market remains insufficiently deep and is undergoing painful restructuring. At the moment, there are not many investment opportunities for investors and most of them do not allow them to outperform inflation. In the future, financial markets in friendly countries (Hong Kong, China, India, Turkey, etc.) may be open to the retail investor. At the same time, the Bank of Russia is tightening the qualification requirements for investors, thereby cutting off opportunities for most of them to invest in something. The list of investment strategies for sovereign fund reserves and Russia's gold reserves, which include foreign financial assets, has been reduced to almost zero. There is still no new budget rule, as it is simply not clear where one can safely invest in order not to face another blockage of reserves. The St Petersburg Stock Exchange, which was an intermediary for Russian retail investors to invest in foreign securities, has effectively been put out of business entirely by the blocking of Western infrastructure and now has to completely refocus to Asian markets
Mobilisation of capital	7	4–5	At the beginning of the year, the key rate of the Central Bank of the Russian Federation was already in a steady upward trend, which severely worsened the borrowing and capital-raising environment in the market. In March 2022 the Bank of Russia introduced a prohibitive key rate of 20%. The Russian financial system was largely disconnected from SWIFT. Sanctions were imposed on Russia's debt market. Major Russian banks were placed on the SDN list. Even those who were not sanctioned had problems servicing their debt securities due to the inability to make payments on them. In fact, the Russian financial market was cut off from the global financial system. As of March-April, the Russian financial market was barely fulfilling this function (0–1 point). Following a rapid reduction in the CBR's key rate in the second quarter of 2022, the situation in the financial market has improved and credits have become more accessible. The Russian Finance Ministry said it plans to return to the OFZ (federal loan bond) market ahead of schedule this year. However, most of the external and internal constraints remained in place, so this function is being performed by the market significantly worse than at the beginning of the year. At the moment it is not possible to raise capital through the Russian equity market by means of open subscription. Due to the withdrawal of foreign ratings, financial resources from foreign institutional investors and large funds are not coming in
Protection against risks	8	3–4	The main problem at the beginning of this year was the low depth and liquidity of the financial market and its derivatives section. As of mid-2022, this problem has become many times greater. The Russian financial market does not allow for sufficient protection against currency risk, as this service is prohibitively expensive for most participants, both on the spot market because of the fees and restrictions imposed, and on the derivatives market because of low liquidity and high collateral requirements. The main problem in terms of this function is the reduction in liquidity and market depth. For the retail investor, hedging services are expensive and for institutional investors there is a lack of liquidity in the market. In addition, the list of instruments, including «non-toxic» foreign currencies, available for investment has shrunk substantially. Consequently, opportunities for investment portfolio diversification have also deteriorated significantly

Table 4 (continued)

The function of the financial market	01 Jan. 2022	01 Sept. 2022	Notes
Pricing	10	3–4	Many restrictions were imposed on the financial market by unfriendly countries. Russian regulators have used a large amount of direct administrative market regulation, including bans on selling assets, on non-residents exiting the market, on buying foreign assets, on publishing financial statements, etc. The consequence of these measures has been to lock the market to domestic investors who are disoriented and are unable to form an adequate fundamental assessment of the financial assets circulating on the Russian stock market. In our view, it is impossible to argue that current market prices are efficient because of the inoperability of inter-market arbitrageurs due to the blockage of cross-border capital flows
Informative	10	7–8	This is probably the function that the market continues to perform better than others. The analysis of indicators on the domestic and foreign financial markets makes it possible to assess various processes in the economy. However, reduced liquidity and the temporary suspension of some financial market segments (e.g. the OFZ (federal loan bond) market with maturity up to one year or the Swiss franc exchange market on the currency section of Moscow Exchange) reduce to a certain extent the informativeness of the Russian financial market
The average value	9,2	4,7–5,7	-

Source: compiled by the author.

is clear that the trajectories in these directions will have to change to a greater or lesser extent, depending on the involvement of foreign technology and infrastructure.

The general trend in the coming decade will be for Russia to turn eastwards, towards Chinese financial infrastructure and markets. In the author's opinion, for the time being only the Yuan can become a substitute for Western reserve currencies as world money, since imports from China account for over a quarter of the total, whereas from India, Turkey, Vietnam, etc. it does not exceed 2% for each country.[9] Unfortunately, this would be an insufficient substitute for the Eurodollar currency system, since the Chinese financial market, like the Russian one, is an emerging market and contains many risks for external investors [9].

The development of financial infrastructure within the EurAsEC can also mitigate the negative impact of foreign sanctions on the Russian financial market and economy [10–13]. However, it is clear that the member states of the Eurasian community will try to avoid the risks of falling under secondary US sanctions, so Russia will have to be "creative" to successfully meet this challenge. Given the heavy dependence of the Western world on Russia's raw material resources, the US is not expected to impede this.

The main investors in the Russian economy over the next 10 years should be residents and the state. It makes sense to introduce financial literacy programmes to attract more investors, while ensuring that they receive the necessary level of protection from the mega-regulator [14–16]. Financial literacy lessons in schools seem justified in this context.[10]

Obviously, the experience gained should force Russia to develop financial instruments that allow domestic investors to invest in the real economy of Russia on a long-term basis. This includes Russia's international reserves, which today are extremely difficult to invest in foreign financial assets at minimal yields.

A promising direction is the initiative to develop a settlement system and service infrastructure in national currencies. It requires a switch to pricing Russian exports in roubles,

[9] Structure of imports to Russia from different countries of the world. URL: https://tradingeconomics.com/russia/imports-by-country (accessed on 01.09.2022).

[10] RBC. Russian schoolchildren to be taught financial literacy on a compulsory basis. URL: https://www.rbc.ru/finances/08/07/2021/60e6d86b9a7947f1088532bf

which in the long term will increase the number of foreign participants in the Russian financial market and partially solve the problem of its lack of depth and liquidity. It would be advisable to develop this area precisely as part of a two-loop currency system in which the internal rouble would be a managed currency and the external rouble would be a market currency. The use of digital currencies for international settlements also seems rational. It should be noted that for the development of the domestic economy our country does not benefit from a strong exchange rate, because it does not stimulate domestic production and development of innovations and makes all factors of production very expensive compared to their foreign counterparts. At the same time, a stable and strong external rouble could become one of the new world reserve currencies that are in demand by residents of friendly countries.

CONCLUSIONS

The changes that occurred to the Russian financial market in February-March 2022 are striking in their scope and implications. Russia's financial market has been cut off from the global market into which it has been very long and consistently embedded since the collapse of the USSR. Isolated from foreign investment, the Russian economy can now only rely on domestic investors and the financial resources of the Russian financial market.

According to various estimates, the current level of quality of the Russian financial market has fallen by about half, but the pace of recovery is fairly rapid. The role of the domestic financial market for the Russian economy has increased significantly, so more effort is needed to develop it than before. Clearly, it is not possible to return to the quality indicators at the beginning of the year under the prevailing circumstances. It is therefore necessary to rebuild not only the economy but also the relevant infrastructure of the Russian financial market in order to ensure that it at least partially regains its functions.

For the Russian financial market in the current circumstances there is a need to:

- develop in line with the previously adopted strategy, subject to a number of adjustments;
- to be oriented towards the East, predominantly towards the Shanghai and Hong Kong global financial centres;
- promote the role of the Yuan as a fiat currency for holding international reserves;
- develop infrastructure and accessibility of financial services for domestic investors;
- develop instruments for investing long money in the domestic financial market;
- to accelerate the transition of international settlements based on national currencies;
- assess the prospects of introducing a two-loop currency system in which the domestic rouble (non-strength and manageably devalued) would be designed for the development of the Russian economy, and the external (market-based, possibly based on the digital rouble) — for international settlements and reserves.

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Analysis of the Volatility of Cash Flows in the Field of Labor Relations for Monitoring the Sustainability of the Russian Economy

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ABSTRACT

The aim of this research paper is to assess the applicability of the payment system data provided by the Bank of Russia for a prompt monitoring of the labor relations situation. Considering the growth of precarization, the change in the dynamics of labor relations is considered in the article as an operational indicator of the onset of potential economic crises. Taking the Bank of Russia payment system data as a basis, it is possible to use the volatility of cash flows information in the field of labor relations to determine the state of the economy. A methodological approach to determining critical values of this indicator by applying the three-sigma rule is also given in the article. In addition, the research paper investigates the relationship between the emergence of non-standard practices of interaction between economic actors in the labor market and values of the cash flow in the field of labor relations.

Keywords: labor relations; critical values; volatility of cash flows; precarization; working conditions; remote employment; Bank of Russia payment system; economic security

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INTRODUCTION

According to Presidential Decree of the Russian Federation No. 400 of 02.07.2021 "On the National Security Strategy of the Russian Federation", the key national interest is "saving the people of Russia, developing human potential, improving the quality of life and well-being of citizens". To achieve this goal, it is necessary to create a system of indicators that would allow for operational monitoring of the economy and, consequently, the application of operational tools of influence.[1] An example of an operational labour market intervention tool used during the COVID-19 could be providing subsidies for the employers to hire the unemployed.[2] Implementing operational monitoring system requires high-frequency data available in payment systems.

The Bank of Russia Payment System (PS BR) receives information on cash flows in real time. A significant advantage of using data from the PS BR is the absence of negative effects of asymmetry of information and moral hazard [1]. The Bank of Russia can record the fact of payment without requesting the relevant information from the participants of PS BR. It is obvious that cash flows respond quickly to the changes in the direction of actions of economic actors, so that information about their volatility can be used to identify possible crisis phenomena at an early stage [2]. However, cash flows are heterogeneous and will be less volatile in the production sector than in financial markets due to the existence of speculative transactions. The latter determines the need to assess the applicability of cash flows in different areas to implement operational monitoring. A promising area is the analysis of cash flows in employment and recruitment (labour cash flow).

The field of labour relations depends on the current trends in the economy. Changes in the institutional environment and the possibility to work remotely lead to an increased precarisation effect [3],[3] which implies the emergence of unstable employment and earnings, as well as the likelihood of changes in the field of employment [4]. Therefore, labour market conditions are closely linked to the economic cycle [5]. Reduced employee protection and limited periods of employment contracts lead to an increased risk of job loss, which causes an increase in the volatility of the labour cash flow. Its reaching critical values is an indicator of crisis phenomena in the labour market.

THE DYNAMICS OF LABOUR REGULATION IN RUSSIA

Increased labour mobility is associated with the precarisation effect, which can be assessed by analysing various statistical indicators. Workers themselves are not interested in an unstable employment relationship leading to a reduced ability to plan income and a lower level of social security, as they must look for a new job after the project ends to regain their previous level of income. The latter has encouraged the emergence of various digital platforms, such as Talent Cloud in Canada.[4] This process is obviously accompanied by an increase in the volatility of the labour cash flow.

The extent of this process depends on the prevailing situation on the labour market. The level of precarisation of labour relations can be assessed by analysing the regulatory framework. Several stages in the development of labour relations regulation in Russia can be distinguished, including the period of the RSFSR/USSR, the transition from Soviet legislation to the modern system of labour

[1] Methodology Weekly activity index. URL: https://www.bundesbank.de/en/statistics/economic-activity-and-prices/weekly-activity-index/methodology-833982#tar-2

[2] URL: http://duma.gov.ru/news/51043/

[3] "Precarisation of employment — precarious employment, lack of job security related to protection against arbitrary dismissal, regulation of the hiring and firing process".

[4] URL: https://talent.canada.ca/en/talent-cloud/

relations regulation, and the modernisation of labour legislation during periods of crisis. An analysis of the focus of legal regulation since the creation of the RSFSR should be conducted from the perspective of the continuity of modern Russian labour relations legislation with the labour legislation of the 20th century.

Stage 1: Regulation of labour relations during the RSFSR/USSR period

Labour legislation developed considerably during the RSFSR/USSR period, when unified approaches to the labour regulation system were introduced. The Labour Code legislation (the Labour Code), adopted in 1918,[5] set out the requirements for labour organisation under the new conditions. It established universal labour conscription and the right to work from the age of 16 to 50. Labour became the duty of the individual. It was a priority for the state to ensure the employment of citizens.

The Labour Code of RSFSR of 1922[6] retained the basic approaches to labour conscription, but it adjusted the age groups. Labour duty was imposed on persons over 18 years of age and under 40 years of age — for women and under 45 — for men. The rules governing the employee-employer relationship were detailed. The contract of employment prescribed remuneration for labour and the complexity of the work was taken into consideration in determining the amount of remuneration. The Labour Code of 1922 increased workers' guarantees, including the right to terminate the contract of employment at their own request.

The Labour Code of the RSFSR of 1971[7] complicated the process of termination of the employment contract, in particular the term of provisional termination was increased from seven days to two months. Aspects related to special working conditions for persons combining work and study were included in the labour law. The penalties for breaches of labour law were increased.

The RSFSR thus established a well-developed system for regulating labour relations, which was characterised by the protection of workers' interests and thus minimised instability on the labour market. There was no precarisation effect.

Stage 2: Transition from USSR legislation to the modern system of labour regulation

The labour legislation of the Russian Federation until 2001 applied the provisions laid down in the Labour Code of the RSFSR. A distinctive feature of the new labour law was the abolition of conscription. Since it provided for the right to work (rather than an obligation), labour mobility increased, as the employer and the employee had more opportunities to change the terms and conditions of labour relations. The current version of the Russian Labour Code establishes special labour conditions for certain groups of workers, such as those working on a rotational, shift or seasonal basis. These conditions are aimed at providing targeted support for the employment of certain categories of citizens.

After the collapse of the USSR, the precarisation of labour relations in Russia has increased. Citizens are not obliged to work, but they have the right to work, which they can exercise at their own will. The latter affects the increased mobility of labour flows and, consequently, the increased volatility of money flows in labour relations.

Stage 3: Modernising labour law in crisis

The COVID-19 pandemic has led to societal demand for labour market regulation in crisis. In particular, the practice of telecommuting, which was introduced into the system of legal regulation in 2013, became widespread. Distance working regulation was addressed

[5] Labour Code of 1918. URL: https://docs.cntd.ru/document/901889837

[6] Resolution of the All-Russian Central Executive Committee of 09.11.1922 "On the Enactment of the Code of Labour Laws of the R.S.F.S.R.", edited in 1922 (together with the "Code of Labour Laws of the R.S.F.S.R."). URL: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=ESU&n=3889#nRAeMYTM76Xj44hx

[7] Law of the RSFSR of 09.12.1971 "On Approval of the Labour Code of the RSFSR" (together with the Code). URL: http://www.consultant.ru/document/cons_doc_LAW_1035/

by the introduction of supplementary agreements to employment contracts. During the pandemic, the employer's authority to enable the employee to switch to telecommuting and to provide him or her with everything necessary to carry out the work [6] was expanded.

Thus, the field of labour regulation has become more adaptable to crisis phenomena. It seems relevant to develop an operational indicator of the state of the economy that considers the changes in labour relations through the analysis of cash flows.

DESCRIPTION OF DATA AND ASSESSMENT METHODOLOGY

For operational monitoring of labour relations to ensure economic security, it is advisable to use PS BR data. The Bank of Russia, as the operator of the PS BR, has access to high-frequency data on the volume of cash flows in various industries, grouping them in accordance with OKVED codes approved by Order No. 14-st of Rosstandart dated 31.01.2014. For operational monitoring, it is advisable to analyse cash flow in employment and recruitment. This activity involves accounting for operations related to maintenance of the list of vacancies, analysis of incoming applications and assistance in selecting applications to replenish human resources. An increase in the size of this cash flow reflects an increase in the demand of individuals and companies for job/employee search services.

In times of crisis, there is a need to look for new jobs and the mobility of labour flows increases. The latter is reflected in an increase in peak workloads for recruitment agencies and a corresponding increase in cash flows. Thus, information on cash flow in the PS BR will allow to identify the occurrence of non-standard interaction practices which allow to predict a high probability of a crisis in the Russian economy. Increased volatility of cash flows can be linked to both institutional and behavioural factors. Operational instruments should be used primarily to neutralise the sources of increased volatility related to behavioural factors.

To assess the volatility of cash flow, consider the period from 30 March — 3 April 2020 to 26–30 September 2022 and "changes in seasonally smoothed data of the average daily incoming financial flow per week by OKVED 2 classes for the country as a whole, as a% of the average daily incoming financial flow for 2019".[8] The average value for the period under review was 0.0026.

The three-sigma rule is used to determine the critical values of labour market cash flow, which involves estimating average values and standard deviations [7]. The critical values of the indicator will be calculated by adding and subtracting the two standard deviations. The outlier values (above the range) will reflect the fact of turbulent cash flow, characteristic of the panic actions of economic actors. It should be noted that the average and standard deviations were estimated separately for each year (*Table 1*). The average values of the cash flow in question demonstrate the presence of significant differences in the dynamics of its movement.

The breakdown by year is because labour relations in 2020 and 2022 were obviously different, making it impossible to apply a single range of critical values over the entire period. It is possible to calculate the exact range of maintaining structural conditions by applying fractal analysis. Combining the whole cash flow into one time series would not allow for the effects of the external environment, for example the COVID-19 pandemic, to be considered. Therefore, it is advisable to keep the range of calculated critical values on a certain time horizon.

[8] URL: https://www.cbr.ru/analytics/finflows/

Table 1

Ranges of critical values of the cash flow "employment and recruitment"

Indicator	2020	2021	2022
Average value	–0.061	–0.006	0.08
Standard deviation	0.098	0.137	0.12
Average plus two standard deviations	0.135	0.269	0.321
Average minus two standard deviations	–0.258	–0.280	–0.16

Source: compiled by the authors.

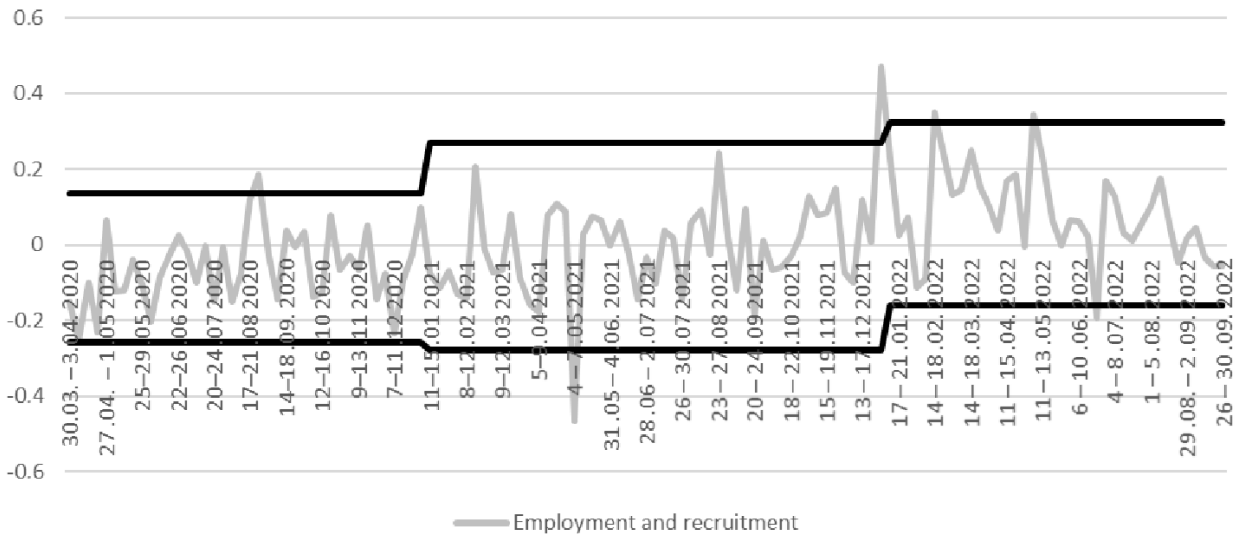

Fig 1. **Critical values for cash flow "employment and recruitment"**

Source: compiled by the authors.

INTERPRETATION OF THE OBTAINED RESULTS

The conducted analysis of cash-flow dynamics in labour relations has allowed us to identify critical values, the deviation from which the fact of abnormal situations in the labour market reflects (*Fig. 1*). It should be noted that the period in question is a crisis period due to the COVID-19 pandemic, but the comparison is still with 2019, which in turn is "sustainable".

The analysis of the critical range indicates an increase over the period, which is probably due to the increased demand from individuals to look for new jobs. The upper values of the indicator in question are characterised by faster growth than the lower range of critical values (*Fig. 2*).

Applying this information, a range of critical values can be established for subsequent periods. The R 2 values for the constructed trend lines were 0.826 for the upper critical level and 0.4664 — for the lower critical level.

By drawing the trend line, it is possible to predict further trends of its changes.[9] In this example, the trend line was predicted until the end of 2022 (*Table 2*).

[9] Given that trend lines are drawn for critical values and not for the time series in question, the indicated R 2 values are acceptable.

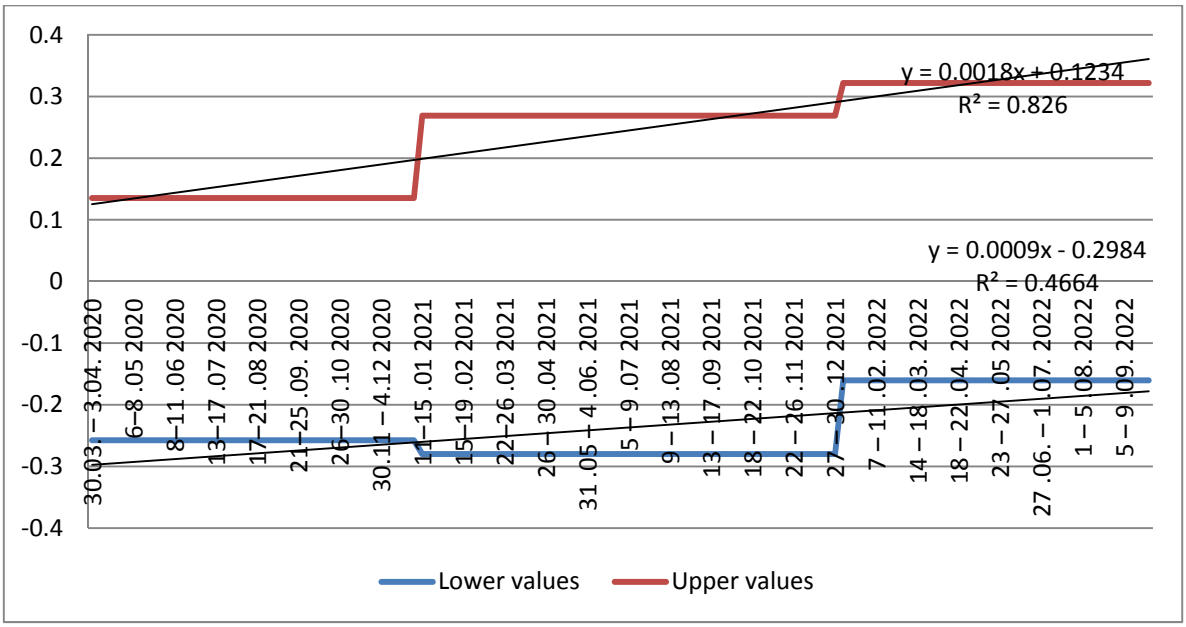

Fig 2. **Assessment of the range of critical values of the cash flow indicator "employment and recruitment"**

Source: compiled by the authors.

Table 2

Forecast of values for future periods

Period	Lower values	Upper values
3–7 October 2022	–0.1814	0.3574
10–14 October 2022	–0.1805	0.3592
17–21 October 2022	–0.1796	0.361
24–28 October 2022	–0.1787	0.3628
31–2 November 2022	–0.1778	0.3646
7–11 November 2022	–0.1769	0.3664
14–18 November 2022	–0.176	0.3682
21–25 November 2022	–0.1751	0.37
28 November – 2 December 2022	–0.1742	0.3718
5–9 December 2022	–0.1733	0.3736
12–16 December 2022	–0.1724	0.3754
19–23 December 2022	–0.1715	0.3772
26–30 December 2022	–0.1706	0.379
Average for the period in question	–0.176	0.3682

Source: compiled by the authors.

Table 3

Practical aspects of the development of an approach to the operational assessment of the state of the economy

Directions	Characteristics
Accounting for other sectors of the economy	An assessment of the operational economy can be made by analysing additional indicators based, among other things, on passenger traffic, electricity consumption, etc. The application of a system of operational indicators will make it possible to create a comprehensive index of the operational status of the economy
Forming a set of actors	The Bank of Russia may select target groups of entities to be analysed using the PS BR data. It is possible to analyse cash flows in labour relations for a specific region
Development of a classifier of operational impact tools	To apply policy interventions promptly, authorities should have a range of tools available to them when they identify an increase in cash flow volatility. The rapid application of leverage instruments contributes to the effectiveness of public policies to ensure sustainability
Developing platform solutions for labour relations	The development and implementation of platform solutions in the employment relationship will enable a rapid job search in the event of contract termination in previous employment. In this way, digital platforms act as a self-regulating infrastructure which allows to compensate for possible labour market failures

Source: compiled by the authors.

The average values of the lower and upper bounds are determined for the projected trend lines in the interests of national security [8].

To identify non-standard practices of interaction of economic agents in the labour market by the end of 2022, the following points should be considered:

• If the values of cash flow in labour relations fall within the range from –0.176 to 0.3682 inclusive, then this is characteristic of the period of standard practices of interaction between economic agents. The process of interaction between actors is normal.

• If the values of cash flow fall into the range from 0.3682 to –0.176, then we can talk about the emergence of non-standard practices of interaction between economic subjects. There is an increase in labour mobility in the labour market, which is reflected in an increase in the volatility of the cash flow in question.

When irregular engagement practices emerge, the likelihood of disrupting the sustainability of the national economy increases. Given the importance of stable employment in times of crisis, it is advisable to apply intervention mechanisms aimed at stabilising the economic situation using rapid intervention measures. Detailed elaboration of both the organisation of operational monitoring and the implementation of necessary state intervention tools is needed.

PRACTICAL SUGGESTIONS

The calculations show that it is possible to use labour-flow information to monitor the operational condition of the economy. However, several practical aspects needs to be taken into account (*Table 3*).

Accounting for other sectors of the economy. The focus of this study is on accounting for the dynamics of the money flows in labour relations. However, analysis of the sustainability of the economy also implies monitoring the condition and status of industrial and financial relations. It is possible to analyse monthly data on cash flows in systemically important organisations [9].

Forming a set of actors. The Bank of Russia can monitor the activities of a target group of economic entities. The list of subjects can be formed considering the needs of the authorities with the necessary competencies. The Bank of Russia can analyze the variability

of cash flow in a particular federal district, region [10]. If the data set is expanded, it is possible to analyze the dynamics of cash flow, including at the level of individual municipalities.

Development of a classifier of operational impact tools. In fact, it is a matter of restoring the continuity of interaction between economic agents. The Bank of Russia receives information on the emergence of non-standard interaction practices through a cash flow analysis and passes the information on to the relevant authority. For labour relations the Ministry of Labour and Social Protection of the Russian Federation is the relevant authority. Having received the said information, the authority must decide on promptly responding to the threat that has arisen. It is the speed of decision-making that directly affects the effectiveness of public policy, as was the case in the initial phase of the COVID-19 pandemic [11]. To enable a rapid response, instruments of intervention must be developed in advance, and the conditions under which they can be used must be defined. One example is the specialised refinancing instruments implemented by the Bank of Russia [12].

Developing platform solutions for labour relations. Various platform solutions have developed in international practice. By encouraging the development of digital platforms in the field of labour relations, the state can help to reduce the potential negative impact of precarisation in the labour market by reducing the transaction costs associated with finding new jobs.

The implementation of the aspects described above will make it possible to implement a comprehensive system of tools to identify the risk of irregular interaction practices at an early stage, and subsequently use effective means of intervention. The latter is necessary to ensure sustainable development of the national economy.

CONCLUSIONS

The study has demonstrated the possibility of using information on cash flows in the sphere of labour relations to carry out operational monitoring of the state of the economy. Thus, the data on the dynamics of interaction in labour relations is an indicator of the implementation of crisis phenomena in the economy. Given the current trend towards greater flexibility in labour relations, the importance of this indicator will increase. Further research should be aimed at elaborating a system of operational tools to ensure the sustainability of the national economic development.

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Simulation of Interest Coordination of Economic Subjects in Housing Construction

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ABSTRACT

In the present paper, the consequences of the introduction of project financing against the backdrop of crises in 2020 and 2022 are analyzed. The subject interactions in the course of housing construction under the conditions of project financing are considered. A multi-criteria economic-mathematical model for the interest coordination of economic subjects in housing construction has been proposed. The model permits to understand and evaluate the economic consequences of choosing the possible options from the standpoint of each of the economic subjectss. The numerical calculations of choosing two (in pairs), and all three (developer, bank and consumer) economic subjects were performed using the proposed multi-criteria model with the stated limitations. The MATLAB software was employed to solve optimization problems and plotting. The solutions acceptable to the subjects were chosen from a set of Pareto-optimal alternatives. Despite the fact that all subjects of housing construction are involved in the interaction, this interaction does not occur simultaneously, but in a complex subordinate manner: the bank took the dictating position in project financing, and the consumer pays for everything. The state should play a role of the subject, which should coordinate the interests of the developer, the bank and the population. The task of the state is to create such conditions in the housing construction market so that economic subjects are interested in coordination of their interests to find a compromise. This opens routes for further research.

Keywords: housing construction; project financing; escrow accounts; economic subjects; coordination of interests; economic-mathematical model; multi-criteria problem

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The last three years have brought a lot of chaos to the activities of actors in the residential or housing construction industry — especially to the activities of property development companies. Construction has traditionally been considered a highly fragmented industry with low profit margins and a high risk of failure due to the complex supply chain system [1].

Firstly, the introduction of project financing using escrow accounts has made it difficult to stay in the industry and has made it difficult for new participants to enter. The resulting stringent requirements on developers have contributed to the reduction and monopolisation of housing supply entities. Secondly, against the backdrop of the coronavirus crisis, accompanied by lockdowns, border closures and steep increases in building material prices, construction timelines have literally been frozen or significantly slowed down. The negative synergistic effect of these two phenomena can be summarised as follows:

- efficiency losses have been reflected in higher interest costs for bank financing of construction, higher wages due to labour shortages, and higher fixed costs due to longer construction periods;
- the disruption and recombination of the established relationships was accompanied by a dramatic change in the interaction between the developer and the home buyer, the developer and the employees, the developer and the suppliers of building materials;
- the weakening of control over the construction process was the result of the transfer of this function to the bank, while control over the use of working time was taken over by Rospotrebnadzor;
- the excessive management complexity and adaptation difficulties were caused by the bank's integration as the main actor in the construction process as well as by the increased requirements to the developer and the need to comply with "pandemic" requirements [2].

The result has been a reduction in the commissioning of housing, a sharp rise in costs and, consequently, in housing prices (from 12 to more than 20 per cent, by the end of 2020, depending on the region) [3]. State aid in the form of preferential mortgages enabled consumers to pay for them (i.e., to "swallow" the increased costs of the developers) and, thus, not to "freeze" the industry completely.

In 2021 there was a "recovery" from the coronavirus crisis with record housing commissioning due to the completion of the 2020 projects. The housing boom was stalled again in February 2022 due to a new spike in building material prices and a sharp rise in the key rate of the Central Bank of the Russian Federation. In April 2022 the annual inflation rate for the construction sector was 44% compared with the same period last year. The number of mortgage loans issued decreased by 14% in the primary market and by 43% in the secondary housing market. In terms of loan amounts (due to higher prices in the primary market), there was a 9% increase, while in the secondary market there was a 35% decrease.[1]

In spite of everything, project finance is becoming the main way of investing in housing construction year by year, replacing its archaic forms. Today, according to DOM.RF portal, there are 100.6 million m2 of flats under construction, including 87% that are built using escrow accounts (*Table 1*).

The increase in the number of developers during 2022 was about 15% and the number of commissioned square metres being built using escrow accounts — was 18.7%. At the same time, the number of developers and square metres being completed under shared construction contracts decreased by half, and the number of those being built with own funds — decreased by a quarter (*Table 2*).

[1] URL: https://www.xn — d1aqf.xn — p1ai/analytics/

Table 1

Distribution of housing under construction depending on the formation of financing for November 2022

Funding mechanism	Developers		Houses		Residential accommodation		Flats/ Apartments	
	units	%	units	%	thousand m^2	%	thousand units	%
Escrow accounts	3240	90	8252	86.8	87695	87.3	1766	87.1
DDU contract (trust agreement)	340	9.4	854	9	10177	10	206	10.2
Own (Equity) funds	92	2.6	405	4.2	2714	2.7	55	2.7
TOTAL	3672	100	9511	100	100586	100	2027	100

Source: calculated according to DOM.RF date.

Table 2

Change in share of use of housing finance in 2022

Funding mechanism	Developers, units		Houses, units		Residential accommodation, thousand m^2		Flats / Apartments, units	
	2021	growth, %	2021	growth, %	2021	growth, %	2021	growth, %
Escrow accounts	2807	+15.4	7180	+14.9	73869	+18.7	1479	+19.4
DDU contract (trust agreement)	697	–51.2	1798	–52.5	21067	–51.7	423	–51.3
Own (Equity) funds	141	–34.8	525	–22.8	3700	–26.6	73	–24.7
TOTAL	3475	+5.7	9503	+0.08	98636	+2	1975	+2.6

Source: calculated according to DOM.RF date.

Project financing in housing is a rather complex process involving the interaction of various economic actors, among which are the state, developers, banks and the public. There are many studies devoted to this topic [4–7]. The system of subject interaction in the process of housing construction under the conditions of project financing, operating in the Russian Federation, is shown in *Fig. 1*.

The relationships shown in *Fig. 1* are deciphered in *Table 3*.

In the process of interaction it is necessary to take into account the interests of each economic entity [9], which are radically different, forcing the participants to act in opposite directions. Even three years before

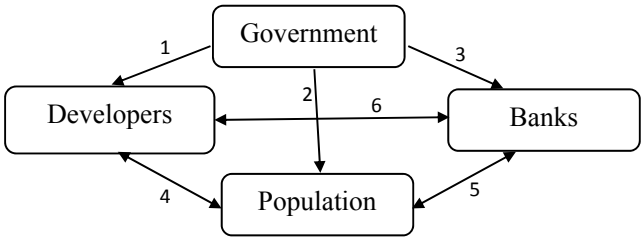

Fig. 1. **The system of subjective interactions in the process of housing construction in terms of project financing**

Source: [8].

the legitimization of escrow accounts in the Russian Federation, T. V. Svetnik and V. S. Vakhnovich noted in their article that "the following negative risks may arise for

Table 3

Interactions of economic entities in the construction process housing under project financing

Economic actors/ entities	Features of interaction
From the government's perspective	(1) The state creates a unified housing policy to regulate the activities of construction organisations, develops regulatory and legal documents with urban planning and technical content, and carries out state supervision and construction control. (2) The state enhances the opportunities for the population to purchase or build housing by offering various programmes (e.g., national project "Housing and Urban Environment"). (3) The state controls the banks and approves the list of those that can cooperate with real estate developers
From the developers' perspective	(4) Developers shape the supply of housing on the market. (6) Developers provide income as well as the repayment of the funds raised
From the banks' perspective	(5) Banks provide loans and mortgages to people to buy homes. Escrow accounts are opened at the bank for those who purchase housing under construction. (6) The banks generate cash flow for the housing project if necessary, thereby redistributing project implementation risks
From the perspective of the population	(4) The population creates the demand for housing and meets their housing needs. (5) The population pays interest to the bank for the use of borrowed money

Source: [8].

construction organizations as a result of the adoption of the bill: a sharp reduction in the number of developers who will meet the specified requirements; increase in developers' costs and higher construction costs due to the need to register changes in each contract feature with a corresponding payment of state duty". [10].

As V.V. Pukhova points out, the willingness of developers to switch to new terms of financing is determined by the ability, first, to withstand the additional credit load, and, second, to comply with all the requirements of the bank. On the contrary — unwillingness — can lead to an increase in the number of bankruptcies of construction companies and the withdrawal of some developers from the market [11]. In such circumstances, some developers openly proclaim that banks have "become the executioners" of developers. However, the banks themselves must meet certain requirements in order to be able to open and finance such projects. For example, in foreign practice an "independent engineer", who plays the role of a super-partner, is added to the classical participants of project financing, and is asked to give an opinion on the feasibility of the project, conduct a survey to evaluate it and act as a supervisor to protect the project and above all — those who put money into the financing. While the construction and engineering features of a project may be clear to the funders, this is often not the case with the lenders, who need a specialist who can assess the deal and decide whether to support and finance it or not [12].

Thus, the banking sector assessment will allow the formation of a pool of authorised banks implementing project finance using escrow accounts. Although the latter implies "conditional depositing" or escrow ("escrow" broadly refers to the suspension of not only uncertain but also certain as well as unavoidable actions and events) [13], an assessment of the possibility of phased disclosure of escrow accounts will allow conclusions to be drawn as to how the introduction of new financing conditions will affect the financial situation of developers and, consequently, potential consumers (citizens) [11].

Reconciling the multidirectional interests of the economic actors in housing is a non-trivial task. It is not just a calculation of different types of efficiency of one project [14],— it is a matter of setting an optimization problem of finding the best solution for all participants. In the works of domestic scientists there have been the attempts to reconcile the interests of economic subjects. In particular, R. I. Abdrazakov and E. G. Kravchenko built an economic and mathematical model that reconciles the interests of the population and the developer in low-rise housing construction [15]. O. I. Gorbaneva and A. D. Murzin describe a dynamic socio-environmental-economic model of synergistic development of individual economic entities, which helps to reconcile their common and private interests [16]. O. P. Smirnova, V. V. Shergin consider the sequence of solving the multi-criteria task of making investment decisions in housing construction [17]. D. A. Makarov and M. N. Yudenko systematically model economic interactions of the participants in housing construction [18]. Despite the significant number of works of theoretical and practical importance, there is a lack of a model that would allow us to understand and assess the economic consequences of choosing a combination of values of key indicators that characterize each housing project from the position of all economic actors, out of all possible options.

A number of issues related to considering the interests of economic actors in the construction of affordable housing (including the problems of introducing project financing in housing construction and its consequences for the development companies) need to be studied in detail. A distinctive feature of our model is that it specifically prescribes the optimization criteria for each economic entity and takes into account the admissible set. Solving the multi-criteria problem allows us to identify the options that arise in the interaction of entities.

MULTI-CRITERIA OPTIMISATION PROBLEM FOR THE COORDINATION OF INTERESTS OF HOUSING SUBJECTS

In the model, we consider one-, two-, three-, four- and more-bedroom flats on the primary market. We assume that each economic actor is pursuing his/her own interest. We take into account that the amount of housing to be built is limited "from below" by the difference between the need for housing and its availability in the housing stock; and is limited "from above" — by the planned indicator of housing commissioning and target housing supply. If the number of flats of a certain type available in the housing stock exceeds the need for housing of a certain type, there is no need for developers to make them. To formalize the task of coordinating the interests of the economic actors in housing construction, we introduce the following denotations.

Let us assume that $i = \overline{1,n}$ — is the number of the type of flats;

T — the construction period of apartment buildings;

t — year number in the construction timeframe, $t = \overline{1,T}$.

The values entered below will be considered in year t.

X_i — number of dwellings of type i, required to increase the housing stock (the required value in the optimisation problem) (in m^2);

V — planned housing commissioning (in m^2);

N_i — the number of type i flats available in the housing stock;

U_i — housing need of the i type by households (in flats);

S_i — the average floor area (residential accommodation) of dwellings of type i;

C — cost per m^2 of housing;

P_i — price for the consumer when buying 1 m^2 of flat of type i;

Table 4

Pareto-optimal solutions for harmonizing the interests of banks and the population

Index	Bank income, RUB.	Minimum average price of 1 m² of housing, RUB.	Residential accommodation of one-room flats, m²	Residential accommodation of two-room flats, m²	Residential accommodation of three-room flats, m²	Residential accommodation of four- and more -room flats, m²
1	–18 279 573 215	97 713	1 155 000	-	-	-
2	–17 961 166 276	94 766	763 189	-	-	391 811
3	–17 623 778 285	91 643	348 066	-	-	806 922
4	–17 341 207 005	89 025	-	-	-	1 155 000
5	–17 791 329 680	93 194	554 218	-	-	600 776
6	–17 500 977 069	90 780	232 855	-	-	920 187
7	–18 002 598 043	95 518	861 250	-	-	291 203
8	–18 216 486 152	97 130	1 077 494	-	-	77 505
9	–17 385 330 771	89 509	64 254	-	-	1 090 208
10	–17 925 773 424	94 439	719 742	-	-	435 251
11	–17 729 827 222	92 627	478 835	-	-	676 141
12	–17 884 200 521	94 054	668 512	-	-	486 484
13	–18 169 634 891	96 696	1 019 819	-	-	135 180
14	–17 870 448 289	93 927	651 722	-	-	503 266
15	–18 279 446 165	97 713	1 155 000	-	-	-
16	–17 712 571 355	92 540	467 049	-	-	687 416
17	–17 447 439 649	90 031	133 682	-	-	1 021 160
18	–18 085 718 122	95 919	916 520	-	-	238 479

Source: compiled by the authors.

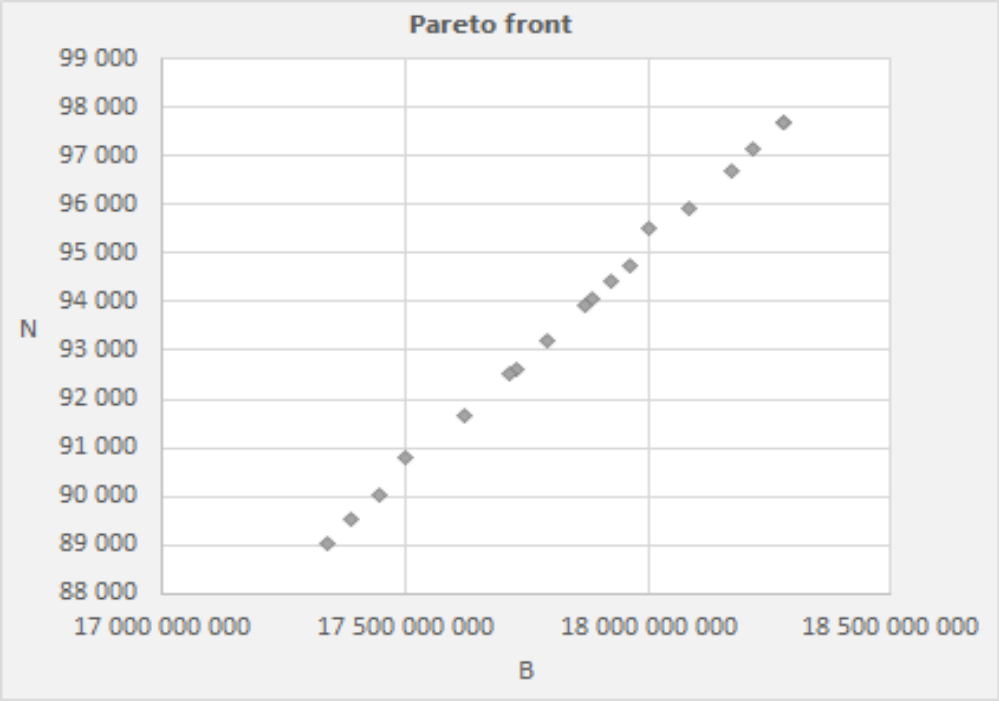

Fig. 2. **Pareto front for the problem of harmonizing the interests of the subjects "population" and "banks"**

Source: compiled by the authors.

β — the share of borrowed funds provided by the bank to the developers for the implementation of the projects;

r — interest rate for a property developer's loan;

γ — the proportion of money extended by the bank to households for the purchase of housing;

h — mortgage interest rate for private households.

In order to set up a multi-criteria economic-mathematical model, a vector of variables must be defined

$$X = (X_1, X_2, \ldots, X_n)$$

from the set of admissible solutions in which the value of the vector function of the vector argument reaches its extremum (maximum or minimum).

$$F(X) = \{B(X),\ S(X),\ N(X)\} \to exrt,$$

where $B(X), S(X), N(X)$ — are target functions that express:

maximising the banks' revenues

$$B = \sum_{i=1}^{n} r\beta X_i C + \sum_{i=1}^{n} h\gamma X_i P_i \to \max, \quad (1)$$

$$0 < \beta \le 0{,}9,\ 0 < \gamma \le 0{,}85;$$

maximising the developer's profits

$$S = \sum_{i=1}^{n} (P_i - C) X_i \to max; \quad (2)$$

minimising the average price of 1 m² for the consumer

$$N = \frac{\sum_{i=1}^{n} P_i X_i}{\sum_{i=1}^{n} X_i} \to min. \quad (3)$$

The set of acceptable solutions is given by the constraint on the number of dwellings to be built (4) and the non-negativity conditions:

Table 5

Pareto-optimal solutions to harmonize the interests of the developer and the population

Index	Bank income, RUB.	Minimum average price of 1 m² of housing, RUB.	Residential accommodation of one-room flats, m²	Residential accommodation of two-room flats, m²	Residential accommodation of three-room flats, m²	Residential accommodation of four- and more -room flats, m²
1	–55 620 187 237	97 713	1 155 000	0	0	0
2	–17 387 157 505	89 403	317	71 640	9913	354 485
3	–46 075 392 813	92 665	371 529	266 158	106 517	324 627
4	–42 659 148 314	91 845	244 090	285 042	130 713	348 927
5	–36 036 395 261	90 959	111 800	282 290	123 379	352 933
6	–34 043 996 113	90 979	108 225	275 661	85 786	352 214
7	–55 620 178 206	97 713	1 155 000	0	0	0
8	–44 809 692 705	92 581	353 425	253 283	103 523	331 282
9	–25 239 394 897	89 899	1146	235 951	35 236	353 303
10	–49 582 384 894	93 239	473 440	270 769	103 410	287 451
11	–54 684 541 565	96 972	1 034 398	71 623	29 143	18 147
12	–38 471 556 675	91 429	173 587	281 668	111 300	352 242
13	–53 493 341 707	96 026	880 852	162 811	66 247	41 252
14	–27 202 954 376	90 006	3006	280 475	36 311	352 740
15	–21 147 658 194	89 720	3129	149 362	20 776	353 284
16	–30 856 915 890	90 041	7899	280 502	120 701	353 095
17	–42 719 360 274	91 841	244 090	285 042	130 713	350 452
18	–51 528 114 377	94 272	642 444	182 098	86 611	241 203

Source: compiled by the authors.

$$\sum_{i=1}^{n}\left(U_i - N_i\right)\cdot S_i \le \sum_{i=1}^{n} X_i \le V, \quad (4)$$

$$X_i \ge 0. \quad (5)$$

Thus, we have obtained a model that allows us to see the multitude of options that arise in the interaction of economic actors in housing construction.

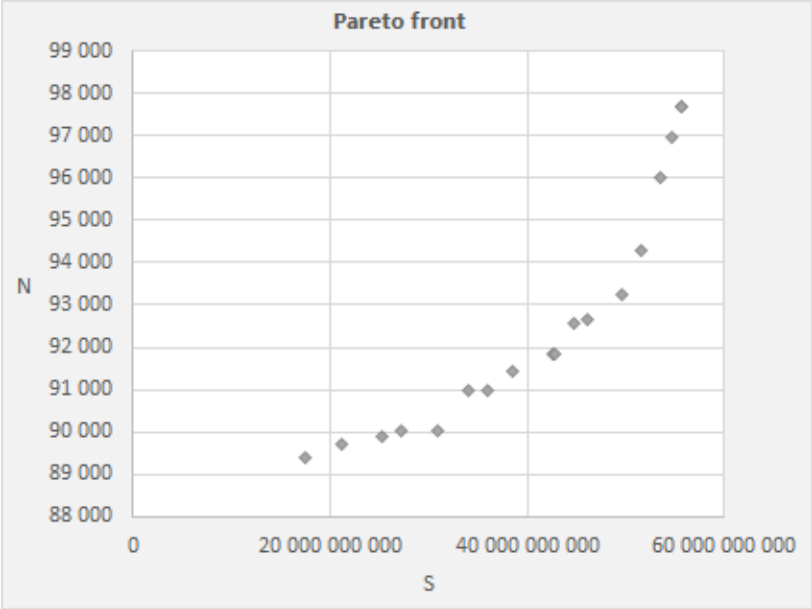

Fig. 3. **Pareto front for the problem of harmonizing the interests of the subjects "population" and "developer"**

Source: compiled by the authors.

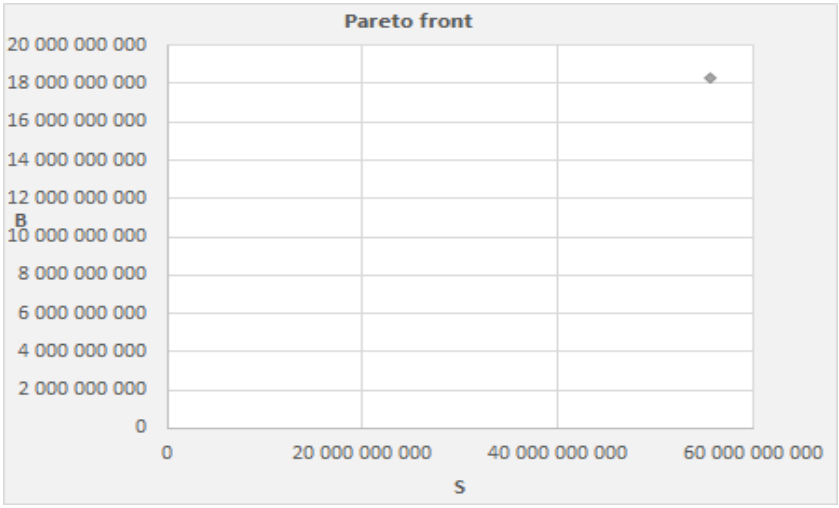

Fig. 4. **Pareto front for the task of harmonizing the interests of the subjects "banks" and "developer"**

Source: compiled by the authors.

In this problem, each of the subjects involved in the process is a decision maker.

It is shown in the theory of multi-criteria optimisation that one should look for solutions (in which the values of the target functions are acceptable for such subjects) only among the Pareto-optimal ones [19].

Let us define Pareto-optimal solutions of problem (1)—(3) with constraints (4), (5). Any set $X=(X_1,X_2,X_3,X_4)$, satisfying conditions (4), (5), will be called admissible. An admissible set X^* is Pareto-optimal if there is no other admissible set X', for which

$$B(X^*)<B(X'),\ S(X^*)<S(X'),\ N(X^*)\geq N(X')$$

or

$$B(X^*)\leq B(X'),\ S(X^*)\leq S(X'),\ N(X^*)>N(X')$$

or any other similar combinations.

Table 6

Pareto-optimal solutions for coordinating the interests of the subjects of the "bank", "developer" and "population"

Index	Bank income, RUB.	Minimum average price of 1 m² of housing, RUB.	Minimum average price for households, RUB	Residential accommodation of one-room flats, m²	Residential accommodation of two-room flats, m²	Residential accommodation of three-room flats, m²	Residential accommodation of four- and more -room flats, m²
1	–45 585 539 785	–17 341 207 454	89 025	0	0	0	1 155 000
2	–48 746 998 289	–17 636 803 876	91 762	278 742	291 751	131 964	452 543
3	–45 585 540 268	–17 341 207 321	89 025	0	0	0	1 155 000
4	–46 425 774 836	–17 419 545 071	89 753	74 078	77 822	35 323	967 757
5	–48 380 052 370	–17 601 748 111	91 447	246 374	258 827	117 478	532 255
6	–45 802 030 437	–17 361 449 180	89 212	19 088	19 979	9 037	1 106 897
7	–47 195 266 159	–17 490 857 252	90 421	141 982	149 418	67 968	795 556
8	–46 136 224 164	–17 392 111 728	89 504	48 409	51 987	23 898	1 030 654
9	–48 115 327 058	–17 576 921 212	91 218	223 100	234 286	106 338	591 203
10	–47 766 488 269	–17 544 806 185	90 914	192 416	201 282	91 042	670 233
11	–47 592 859 626	–17 528 016 700	90 766	177 074	186 020	84 480	707 349
12	–46 695 719 184	–17 444 416 342	89 988	97 921	103 049	46 876	907 103
13	–46 742 280 093	–17 419 064 968	90 120	119 113	83 570	55 955	893 687
14	–47 440 586 908	–17 514 361 746	90 632	163 485	171 775	77 888	741 826
15	–48 540 132 138	–17 614 044 433	91 594	263 037	268 092	122 982	500 586
16	–48 746 998 289	–17 636 803 876	91 762	278 742	291 751	131 964	452 543
17	–46 516 194 394	–17 428 087 130	89 831	82 108	85 891	38 849	948 140
18	–45 585 539 785	–17 341 207 454	89 025	0	0	0	1 155 000

Source: compiled by the authors.

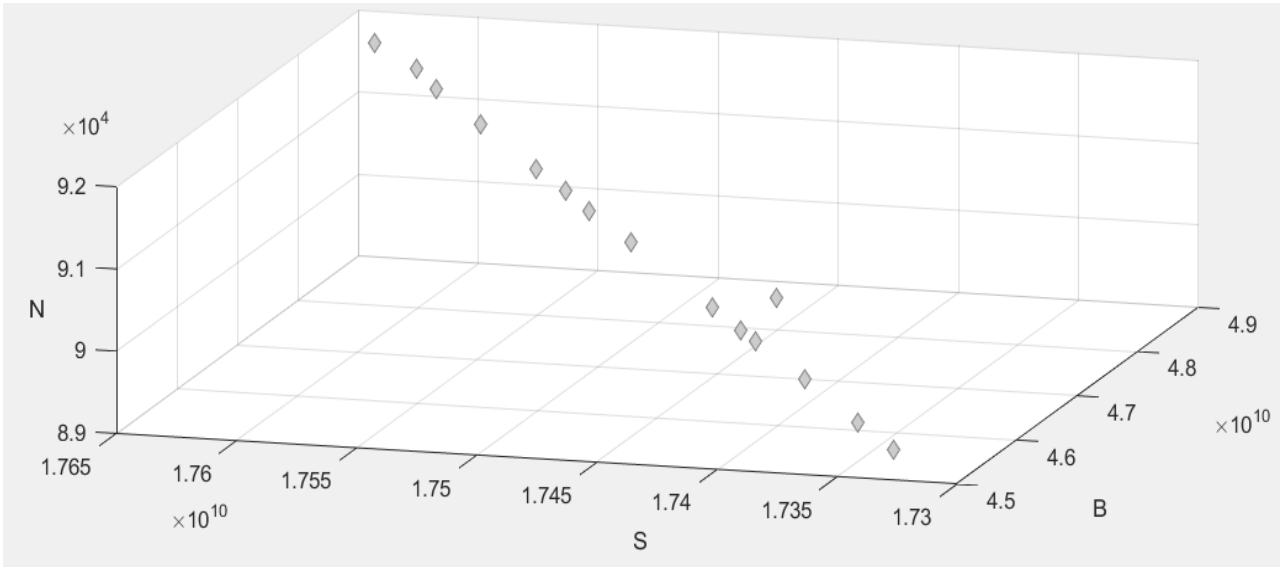

Fig. 5. **Pareto front for the task of harmonizing the interests of the subjects of the "bank", "developer" and "population"**

Source: compiled by the authors.

In other words, a solution X^* is Pareto-optimal if there is no other acceptable solution in which the value of at least one criterion was better and the others were not worse than in X^*.

To solve the problem (1)—(5) we use MATLAB application software package, which implements one of the methods of multi-criteria optimisation. The function gamultiobj is part of the Global Optimization package. It uses a supervised genetic algorithm with elitism in which there is a good compromise between computation time and the size of the desired solution [20]. The function gamultiobj generates a set of Pareto-optimal solutions by minimising the multidimensional objective function. Boundaries on the variables as well as linear inequalities and equations are allowed, but non-linear constraints are not acceptable. A controlled elitist genetic algorithm is used for minimisation.

The following data were chosen to find a numerical solution:

• Planned housing commissioning for 2021 (taken from the passport of the regional project "Housing" of the Irkutsk region).[2]

• Indicators of actual availability of flats in the housing stock of the Irkutsk region in 2021 (obtained on request from Irkutstat).

• The share of borrowed funds provided by banks to developers — for project implementation (we consider it to be 90%) and to the population — for housing purchases (mortgages) (85%).

• Loan rate for developers (consider it equal to 15%), mortgage rate (11%) — based on the Russian Federation Government Resolution No. 534 dated 31.03.2022 "On Amendments to the Resolution of the Government of the Russian Federation No. 629 dated 30 April 2020".

NUMERICAL SOLUTION TO THE PROBLEM OF HARMONISING THE INTERESTS OF HOUSING STAKEHOLDERS

Despite the fact that all the actors are involved in the interaction, it does not

[2] URL: https://irkobl.ru/sites/irkstroy/working/gilstroy/pasportj/

happen simultaneously, i.e., the consumer interacts with the bank either before choosing the object of purchase or after having already chosen it from the developer. It does not happen that all three entities meet and make a single decision — they do take into account other actors' opinions they but do not coordinate decisions with each other.

To solve the problem, we first coordinated the interests of the subjects in pairs and then — all three of them together. To do this, the three functions were created in MATLAB, which included two target functions representing the interests of the subjects involved in the problem, as well as the necessary numerical data. Using the built-in function gamultiobj, optimal solutions of these multicriteria problems were found.

The resulting solutions are presented in *Tables 4–6*. Graphical representations of the Pareto-Front for each problem are shown in *Fig. 2–5*.

The bank's income values f_1, given in *Table 4* are negative, as gamultiobj minimises the function. At the minimum average price of 89 to 97 thousand roubles per 1 m^2 the bank will receive 17 to 18 billion roubles. A compromise in the alignment of interests — is when the bank lends, and the population buys one- and four-bedroom flats. The relationship between f_1 and f_2, represented by the Pareto-front (*Fig. 2*), can be approximated by a linear function.

Table 5 shows that the developer's profit f_1 ranges from 17 to 55 billion roubles. The highest value of this indicator is achieved only in case of the sale of one-bedroom flats. If the developer has flats of all types, he loses considerably in profit. The defined eighteen Pareto-optimal points make it possible to find a compromise between the needs of the population and the developer's interest.

By reconciling the interests of the bank and the developer, a single solution is found that satisfies the interests of both entities. The bank's highest income — is 55,620,200,614 roubles and the developer's profit — is 18,279,453,191 roubles. In this situation, both the bank and the developer would prefer to build single-room flats with a total area of 1,550,000 m^2.

We coordinate the interests of all three subjects, initialise the necessary data and use the function gamultiobj as well as the function plot3 to construct a three-dimensional graph.

The results are shown in *Table 6* and *Fig. 5*.

The eighteen points represent the set of Pareto-optimal solutions for the three entities. And the bank will make a profit of f_1 between 45 and 48 billion roubles, depending on the range of types of flats sold. The developer will get a profit of f_2 about 17 billion roubles, and the minimum average price for the population f_3 will be about 90 thousand roubles per 1 m^2.

Which of the many Pareto-optimal solutions will be chosen — depends only on the decision maker.

If the actors themselves were trying to find optimal solutions to reconcile interests, it would make sense for them to go through only the Pareto optimal solutions, because in other cases the situation would be worse for some of them.

The actor whose role is to coordinate the interests of the developer, the bank and the population is the state, which must create such conditions in the housing market that the economic actors are interested in it. From our point of view, it is advisable to introduce a fourth target function into the constructed model, which would correspond to the state, for example:

$$\sum_{i=1}^{n}(U_i - X_i)^2 \to min.$$

This criterion differs in measurement units from criteria (1)—(3). An extended model with the introduction of the fourth actor is the further direction for our research.

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Authors' declared contribution:
N.N. Shelomentseva — identification of subject interactions in the process of housing construction in the conditions of project financing, development of a multi-criteria economic and mathematical model for coordinating the interests of economic entities in housing construction.
O.V. Grushina — development of the general concept of the article, analysis of the consequences of the introduction of project financing against the background of the crises of 2020 and 2022.
T.A. Krasnoshtanova — search and preparation of initial data for testing the model.

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