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Problems and Prospects of the Russian Financial Market in the Context of Structural Changes in the World Economy

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ABSTRACT

The article is based on the author's report "On the root causes of the growing chaos and measures to overcome the economic crisis"*. The **aim** of the article is to analyze the problems of the modern financial market system in the world and in Russia and to give practical recommendations on how to overcome them. The **framework** of the study was the statistical data of foreign and Russian agencies and financial organizations. The article employed general scientific **methods** of cognition: analysis, synthesis, system approach, and comparison. As a **result,** the paper provides a complete picture of the systemic economic crisis unfolding against the backdrop of the coronavirus pandemic in the world and in Russia. The author indicates its causes and consequences. The work presents concrete recommendations to overcome the crisis. The author **concludes** that even in the worst-case scenarios of the global crisis, Russia will be able to improve its position in the world economy by pursuing policies to its own advantage.

Keywords: world economy; recession; pandemic; financial markets; economic crisis; currency regulation; financial system.

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INTRODUCTION

The world economic system has entered a steep peak: it is not even a blow-up regime when multinational banks and corporations driven by a desire to write off or minimize their obligations provoke global financial vortices. This is the chaos of the hybrid war.

The world economy is collapsing under a new means of mass destruction and cognitive suppression — the pandemic of humanity's fear of coronavirus. Under the cover of sanitary force-majeure circumstances, the world economy was not only navigated into recession, but a new economic reality was created. There is a profound restructuring of the entire system of economic ties and relations. To understand the logic of the catastrophic events that shock Russia and the world today, and to forecast their further development, it is necessary to understand the long-term patterns of economic development.

PROBLEMS OF THE MODERN SYSTEM OF FINANCIAL MARKETS

Many observers consider that leading oligarchic clans, who aim to sterilize the excess money supply and redistribute assets in their favor, manage the unfolding financial crisis. However, its scale may exceed the stabilization capacities of the American monetary authorities (*Fig. 1*).

As can be seen from the forecast, the US budget deficit may be much higher than that of the 1930s (when the dollar was tied to gold), twice as high as of 2009 and consistent with the level of World War II. Doubling the Fed's balance in one year has never happened in history, so the consequences of such monetary pumping can be very bad. This scenario has the risk of a quick transition to hyperinflation (patterned after Germany in the early 1920s or Russia in 1992).

Accelerating the already unprecedented money issue of the last decade may cause the spread of galloping inflation from the financial to the consumer markets. The collapse of the incredibly inflated financial bubbles of derivatives, which became even larger after the 2008 global financial crisis, will lead to the bankruptcy of many funds and banks that could paralyze the banking system and, probably, stop investments (*Fig. 2*).

Fig. 1. **Forecasts of the budget deficit and the balance of the Federal Reserve System (FRS)**

Source: Chetan Ahya, Morgan Stanley chief economist.

Modern IT system of financial markets is based on automatic algorithms performed by robots, whose operations are programmed by certain rules. Applying these rules is tough and generates cyclical financial market failures (*Fig. 3*).

Over the past decade, the dollar monetary base has grown almost fivefold. At the same time, the bulk of the money increment is held in financial markets and forms a money overhang, which inevitably should have collapsed (*Fig. 4*).

The coronavirus pandemic has become the reason for key players manipulating the US financial market to start collapsing inflated financial bubbles. Due to the "coordinated" work of financial robots by established decision-making algorithms for securities sales, the market crash quickly acquired an avalanche-like and uncon-

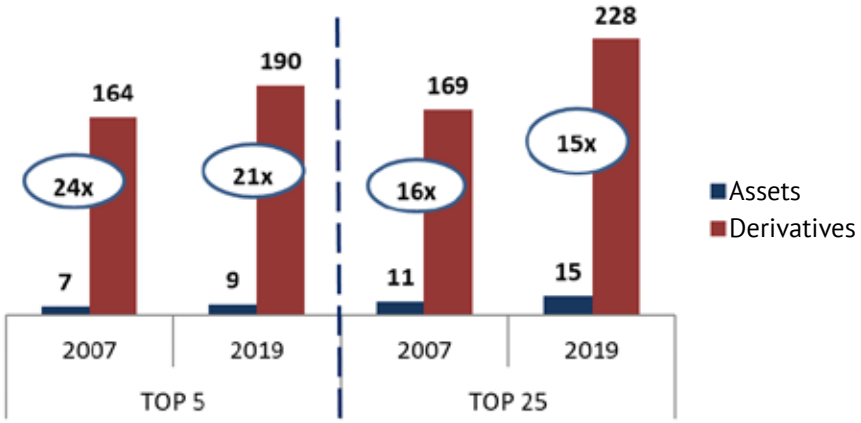

Fig. 2. **Largest (top-5 and top-25) American financial holdings – holders of derivatives: size of derivatives, assets (trillion dollars) and their ratio (times)**

Source: Ershov M. [8]; according to the Office of the Comptroller of the Currency.

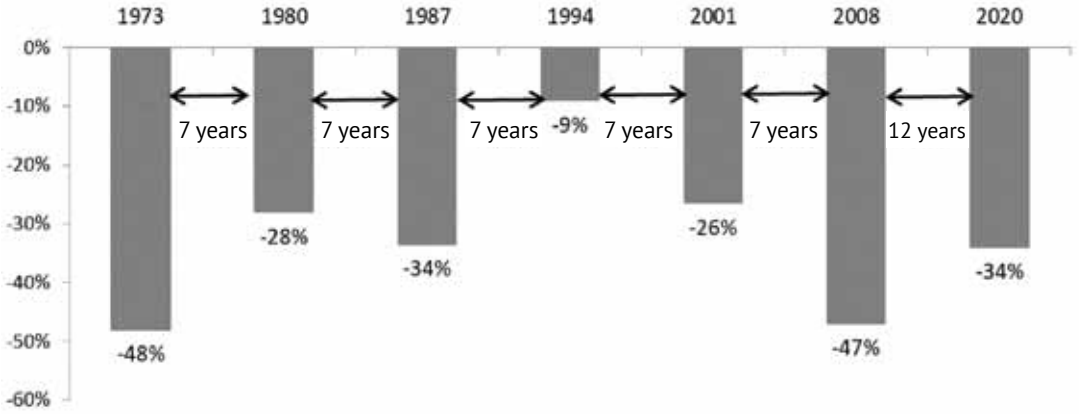

Fig. 3. **Cycle of Failure (dynamics of the S&P 500 Index, %)**

Source: Ershov M. [8]; Bloomberg.

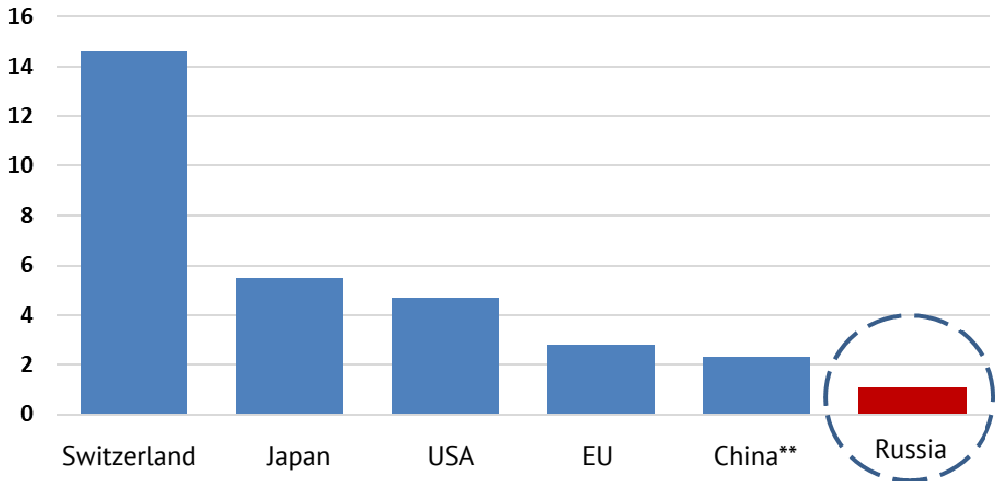

Fig. 4. **The increment in the monetary base of a number of currencies (2007 - March 2020), times***

Source: Ershov M. [8]; based on the central bank data of the respective countries.

Note: * calculated in US dollars at the corresponding rate. ** calculated by M0.

trolled nature, intensified by the chain reaction of margin calls over bank credit networks.

The most severe collapse of the global financial market always occurs on its periphery, in the so-called "newly emerged markets" with free floating of capital, including the Russian one. According to automatically operating algorithms, in the event of a collapse in the US securities exchange rate, financial robots first dump the assets of these markets and collect liquidity to keep the main assets in the center of the global financial system.

Unlike Russian regulators, biased by the virus of the Washington Consensus, China and other countries that are forming institutions of a new world economy have active constraints on capital export, which protect them from the spasms of the global financial system. They work on the nipple principle — they let in foreign investments with no limits, and release them according to certain rules, blocking speculative attacks against the national monetary and financial market. These countries do not care about the US financial storm. Against the one and a half-time decline in the US stock market and almost double decline in Russia, the Chinese market is low by 10%.

No doubt that the Chinese economic reproduction system will come out of the recession even stronger. Its monetary authorities took advantage of the decapitalization of the financial market to consolidate national control over segments of the Chinese economy dependent on foreign shareholders. It will undoubtedly become even more effective due to the fall in energy and commodity prices, as well as more attractive for foreign investment. Although the decline in production due to the shutdown of enterprises during the epidemic is estimated at 50–70 billion dollars, it will recover quickly, while the US and the EU have yet to survive it. At the same time, China managed to avoid bankruptcies of systemic banks and companies owned and supported by the state, which fully controls the country's banking system, its transport, energy and social infrastructure.

According to the Basel III requirements, leading European, American and Japanese banks could have been closed even before the current crisis due to insufficient or negative value of equity. They were keeping up and could only service their obligations due to gigantic money issue. If financial bubbles, even bigger than in the 2008 global financial crisis, collapse, the covenants of most of their corporate borrowers will be broken and the snowball of non-payments will make the banking system go through insolvency. To prevent this, the US Federal Reserve decided to inject $2.5–3 trillion, along with $2.2 trillion to support the households by the US government. Most of these funds will be concentrated in the financial sector and will be used not to maintain production, but to pump financial bubbles. Thus, a one and a half, unsecured increment in the monetary base will not be associated with the growth of commodity production and, according to traditional monetarist ideas, should inevitably cause macroeconomic destabilization.

To stop the negative consequences of the previous, 2008 global financial crisis, unprecedented measures were taken to save systemic banks. According to the Congressional Committee, the US Federal Reserve issued $16 trillion injected into twenty American and European banks [1]. To prevent the bankruptcy of European countries, the rest of the G20 countries have chipped in the amount of $430 billion transferred to the IMF to finance the anti-crisis program.

Today the situation has changed. First, the scale of financial bubbles is much larger than the pyramids of derivatives that collapsed in 2008. Over the past period, the monetary base of dollars, euros and pounds has increased five-fold and most of this issue (with money and credit multipliers) was spent on inflating financial bubbles. Pyramids of derivatives became 30–50% bigger. Therefore, financial market downdraft will be bigger. Today, its capitalization has fallen by more than a third, and the scope of unfulfillable obligations is estimated at $15 trillion, which is 70% of the US money supply.

Second, one should not expect the same international solidarity in the fight against the financial crisis, as was experienced when creating the G20. Today, it is already clear that the G20 is being manipulated by Washington, since all its decisions are prepared by American experts, and

officials from other countries follow them and convince their political leadership to follow in the wake of the United States. The promised IMF reform actually turned into an imitation. Established at the suggestion of the G7 countries, the Financial Stability Board essentially provides oversight of the financial authorities of other countries and controls the free flow of their money. It is unlikely that plundered last time by the United States and its allies, the PRC, Russia, Argentina, India, and other countries will again agree to be the donors in the context of the hybrid war launched against them by Washington.

The collapse of the dollar financial system is highly probable. The USA are waging the hybrid war against China, Russia, Iran and other countries who already take measures to reduce their dependence on the dollar.

Third, the US financial sanctions discredited the dollar as a world currency. For Russia, Iran, Venezuela, China and many other countries affected by these sanctions, the US dollar has become a toxic currency; all transactions in the dollar have acquired increased risk. The measures to de-dollarize foreign exchange reserves and mutual trade provoke an escape from the dollar, which may acquire an avalanche-like nature and drastically narrow the financial base for servicing the US public debt. In this case, the inevitable decline in external demand for their treasury obligations will have to be replaced by money issue that may introduce growing the US public debt into a blow-up regime, where the system loses stability and falls into a spin. The prerequisites were created by the previous US state debt accumulation period (today it amounts to $23.6 trillion), which has long been serviced on the principle of pyramid scheme due to unlimited money issue.

Fourth, there is a high probability of galloping inflation flowing from the US financial market to the real sector and to the consumer market. Amid the disorganization of the financial market, the money remaining after the collapse of financial bubbles can flow to consumption of material goods. On the one hand, this will contribute to the growth of investments and economic recovery. On the other hand, their volume is so much greater than the issue capacity that it will inevitably cause inflation and disorganization of the reproduction of the economy.

Thus, the collapse of the dollar financial system is highly probable. The USA are waging the hybrid war against China, Russia, Iran and other countries who already take measures to reduce their dependence on the dollar. They build their interbank information exchange networks that replace SWIFT, switch to settlements in national currencies, diversify foreign exchange reserves, and exchange currency-credit swaps. Thus, they protect themselves from the consequences of an uncontrolled deployment of the financial crisis, which draws liquidity into the center of the American financial system. In any case, the American financial system will weaken, and an alternative formed in the Asian cycle of capital accumulation will develop. This means, the US financial capabilities will inevitably squeeze and non-equivalent international economic exchange will reduce in their favor. This, in turn, will entail a sharp decline in the military and political power of the United States, which will have to reduce grossly bloated military expenses and form an enormous state budget deficit.

Further development of the global financial crisis will be objectively accompanied by China's reinforcement and the US weakening. Countries on the periphery of the US-centered financial system, including the EU and Russia, will also suffer significantly. The issue is only about the scale of these changes.

Lasting for more than a decade, the Great Stagnation of the Western economies will at best continue for a few more years until the capital remaining after the collapse of financial bubbles is invested in the production of a new technological structure and can "ride" a new long Kondratieff wave.

In the worst-case scenario, the monetary pumping of the financial system will result in

galloping inflation, followed by disorganization of the reproduction of the economy, a drop in the living standard of the population and a political crisis. The United States ruling elite will then have two options: to put up with the loss of global dominance and participate in developing a new world economic structure or to escalate the world hybrid war that they have been waging. Although objectively they will not be able to win this war, they may cause catastrophic, even fatal, damage to humanity.

However, no tactical moves will ensure the United States victory in economic competition with the PRC and other countries of Southeast Asia. Trump's aggressive policy only strengthens the desire of the PRC and other countries to get rid of monetary and technological dependence on the United States, stimulating them to force the development of a new world economic order and key industries of a new technological order. They manage to do this much more efficiently and faster than the United States, whose ruling elite resists institutional changes.

Thus, the events in the USA head to the worst-case scenario. Coronavirus psychosis reinforces this trend, as it creates the conditions for consolidation of power by law enforcement agencies. As soon as Trump's simple methods of scattering money to those in need show their inefficiency, panic and discontent among the population can provoke a political crisis, which will increase the aggressiveness of the American ruling elite.

It is possible that financial oligarchy, transferred from securities to gold, will have to sit on this gold for a long time: the financial market will not recover, familiar assets will depreciate, investment funds and banks will burst. Instead of establishing a long-awaited world government, it will have to agree, same as in the 19th century, with national states on the conditions for capital investments.

NEW ARCHITECTURE OF INTERNATIONAL MONETARY AND FINANCIAL RELATIONS

The financial market collapse may become systemic due to the countries fencing off from each other, which will affect the financial system. Going beyond financial stability due to increasing budget deficits, sovereign states will rely on the creation of domestic sources of credit and protect their markets from raids by financial speculators and capital outflows. Restoring restrictions on cross-border capital transactions will break the economic reproductive circuit of the American capital accumulation cycle. Already torn by the hybrid war, the legal circuit will not protect it from the avalanche of nationalization of American assets in countries affected by US aggression. Their refusal to use the dollar will provoke the collapse of the financial pyramid of the US public debt, which will entail reducing their military expenses and destructing the political reproductive contour of their global dominance. Destructing the reproductive system of the American cycle of capital accumulation will accelerate as the US-exploited countries get out of their control.

The main objectives of American aggression are China, which has become the world leader in the emerging new world economy, and Russia, which leverages the US military and political advantages with its nuclear missile shield. The strategic partnership between Russia and China is an insurmountable obstacle for the American ruling elite to establish world dominance of the financial oligarchy. The US power is based on the issue of world money, whose capabilities are limited by the political will of sovereign states able to create and use their national currencies in international cooperation. If China and Russia can create a monetary and financial system independent of the dollar, at least for the SCO, the outcome of the world hybrid war will be a foregone conclusion. Without fueling its balance of payments by the endless issue of world currency, the American empire will quickly lose its military and political power.

A feature of noonomy is the leading role of knowledge in the management of socio-economic development at the national and global level [2]. As soon as the mechanism for issuing world money is no longer a secret for the national monetary authorities of sovereign states, the dominance of US-European oligarchic clans in the global financial market will end. The weakness of their position lies in the fiat (fiduciary)

nature of modern money, whose purchasing power is based on trust formed by state power. Trust in the dollar is based on the US military, political, and economic power, which erodes quickly as the hybrid war unfolds. Each act of American aggression, although it brings short-term political dividends, but worsens the situation of the United States in the long and even medium term. Due to a higher efficiency of the economic development management system of China, the United States is doomed to defeat in the Trump-led trade war. Financial sanctions against Russia shake faith in the dollar as a world currency. Another collapse of the US financial market destroys the American capital accumulation center.

Ceasing American aggression and creating an economic security zone in Eurasia should become the top priority. The easiest way to do so is by de-dollarizing mutual trade and joint investments, which will lead to the collapse of the dollar financial pyramid and the US military and political power based on the issue of world money. In the future, this will lead to the creation of a new international monetary and financial architecture based on the principles of mutual benefit, justice and respect for national sovereignty.

The new architecture of international monetary and financial relations should be formed on a contractual basis. The countries issuing world reserve currencies must guarantee their stability by observing certain constraints on the amount of government debt and the deficit of payment and trade balance. Besides, they should comply with the requirements established by international law for the transparency of their mechanisms to ensure the issuance of their currencies and enabling their unhindered trade of financial assets across their borders.

It is worth classifying national currencies that claim the role of world or regional reserve currencies, by categories depending on compliance by their issuers with the requirements established in the international agreement. The new monetary and financial architecture should also cover calculations in digital currency instruments using blockchain, which implies introducing relevant requirements to ensure their transparency and identification of participants, as well as the harmonization of national regulatory standards. In the future, it is possible to issue world settlement currency in digital form, tied to a basket of national currencies of coalition members, gold prices and major exchange commodities.

Forming a new architecture of international monetary and financial relations resonates with all countries at risk of a hybrid war from the United States and issuers of other world currencies, as well as those who want to get rid of colonial dependence and nonequivalence of foreign economic exchange.

To join the emerging core of the new world economic structure of Russia, it is necessary to break out of the peripheral state and dependence on the American-centered monetary and economic system [3]. However, the current Russia's position is worsening in the context of the ongoing structural changes in the world economy, and the prospects for its further development remain uncertain.

PROSPECTS OF RUSSIAN ECONOMIC DEVELOPMENT IN THE CONTEXT OF STRUCTURAL CHANGES IN THE WORLD ECONOMY

The government announced a bailout package, which includes introducing a support vehicle for interest rates on credits to trade organizations for food and essential commodity stocks, as well as to developers under project financing; providing credit organizations with the possibility of temporary non-deterioration in assessing the quality of debt service; granting tax deferral to industries affected by the worsening situation; expanding the program for subsidizing access of small and medium-sized businesses to borrowed funds and the possibility of restructuring previously issued credits, etc.

In all reasonableness and, possibly, effectiveness for some sectors of the economy, these measures do not affect the fundamental reasons for Russia's vulnerability to the global crisis and American aggression. The main reason is that the Russian financial system is completely open to attacks by currency speculators and the monetary policy is subordinate to their interests. If the Bank

of Russia policy does not comply line with national security requirements, constitutional obligations ensuring the stability of the rouble, and the goals of accelerating economic development, the efforts of the President and Government will be lost.

VULNERABILITY OF THE RUSSIAN ECONOMY IN A CRISIS

The vulnerability of the Russian economy to external threats is determined by its peripheral position in the global financial and trading system. Following the IMF recommendations, Russian monetary authorities keep the national financial market open to international speculators and closed to the real sector of the economy. Holding the key rate above the average profitability of the real sector of the economy and limiting its operations solely to raising money from commercial banks, the Bank of Russia blocks lending to manufacturing enterprises. At the same time, the monetary authorities artificially keep the money supply in speculative circulation, in fact subsidizing the involvement of foreign speculators at the expense of the state by overestimating the yield of government debt obligations, which is three times higher than the market risk assessment. Borrowing dollars, pounds and euros at quasi-zero interest rates, international speculators are investing in much more profitable Russian obligations. This practice of "carry trade", well known for its negative consequences, works like a pump drawing off Russian national income abroad. The annual volume of such "state subsidies" to speculators is 2–3% of GDP.

In fact, the monetary policy in Russia serves the interests of financial speculators. The monetary authorities guarantee them super-profits and stimulate the money flow from the real to the financial sector, and further abroad. At the same time, the bulk (60% to 90%) of the turnover in the Russian currency and financial market is made by American hedge funds, as well as by the affiliated parties. After the Bank of Russia allowed the rouble for the free floating exchange rate, it is them who manipulate it and swing it to extract super-profits by depreciating rouble income and savings of Russian individuals and legal entities.

The general damage from the monetary policy pursued by the Bank of Russia since the implementation of the IMF recommendations on switching to the free float of the rouble and bloating the key rate in 2014 is estimated at 25 trillion roubles of under-manufactured products and more than 10 trillion roubles of not accomplished investments [4]. At the same time, by manipulating the rouble exchange rate, speculators were quids in dozens of billions of dollars, and the capital export during this period amounted to about $250 billion. The attack on the rouble alone in December 2014 brought its organizers a speculative profit of $15–20 billion. We can assume that the losses from the current attack of 2020 will be no less.

The Russian economy needs a substantial expansion of the money supply to restore the domestic market, increase innovation and investment activity in order to modernize and accelerate development.

Another consequence of this policy was the unprecedented offshoring and vulnerability of the Russian economy to financial sanctions. They achieve their goals easily, as was clearly demonstrated by establishing American control over Rusal. Given that more than half of the ownership rights to industrial enterprises are registered with non-residents from Anglo-Saxon offshore jurisdictions, American customers can absorb a significant part of the Russian economy. The Russian mega-regulator is not taking any measures to protect it from the hybrid war waged by the United States, thus, indulging the aggressor.

With no restrictions on cross-border speculative transactions, the Russian financial market will remain a mere toy in the hands of American speculators, profiting from its buildup. The ongoing unlimited issue of the dollar, euro, pound and yen (their volume in-

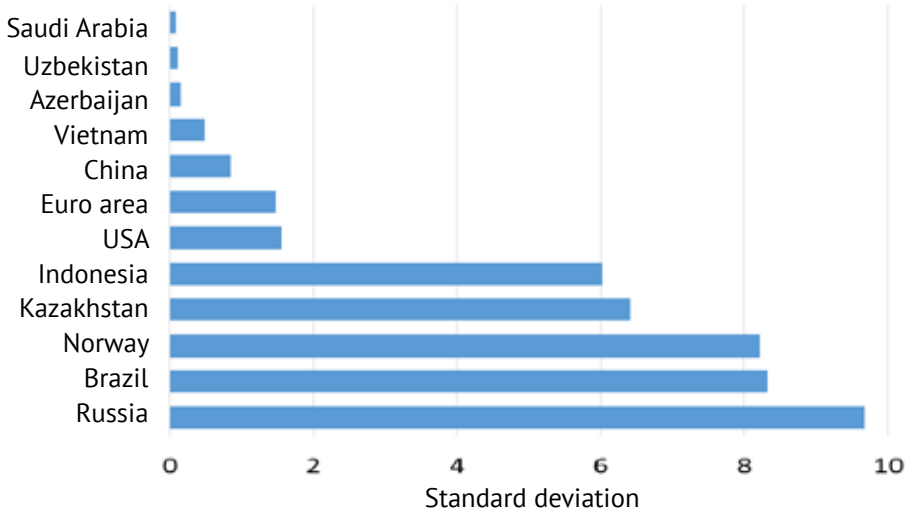

Fig. 5. **Exchange rate volatility of national currencies of oil-producing countries in January-March 2020**

Source: Bloomberg, ECE calculations.

Note: 1) standard deviation of the daily change in the exchange rate to the US dollar, calculated for the period from 01.01.2020 to 03.25.2020;

2) * US dollar index (DXY) shown for the USA.

creased by more than 5 times after the beginning of the 2008 global financial crisis, to almost $20 trillion) creates flows of speculative capital of gigantic power. Even a small flow of this capital into the Russian market will cause its destabilization, as well as create risks of hostile takeover of Russian assets that threaten national security.

Unfortunately, no conclusions were made from the negative experience of the 2008 and 2014 crises, when the Russian economy suffered much more than any of the G20 countries. Today, the monetary authorities make the same mistakes, whose consequences have negatively affected the stagnant economy for already 5 years. At the same time, the mechanism for a speculative attack on the Russian monetary and financial system remains the same and includes the following plan of action.

1. The introduction of the US and EU sanctions in order to close external sources of credit to Russian companies. Today they hit Rosneft, Gazprom, Rusal, Rostec, generating most currency earnings.

2. The stock value collapse of Russian enterprises aiming at depreciating collateral and early termination of credit agreements, launching a chain reaction of "margin calls" that provokes an avalanche of bankruptcy. Given the criminalization of the bankruptcy institution, this entails a long-term decline in the efficiency of the Russian economy and predetermines a decrease in its competitiveness.

3. The collapse of the national currency to reduce refinancing foreign debts of companies from rouble assets. The Central Bank's decision on switching to free floating exchange rate of the rouble in 2014 allowed speculators to lower the rouble exchange rate with no risk and to destabilize the macroeconomic situation. They are doing the same today. Both then and now, the depreciation of the rouble far exceeded the potential impact of lower oil prices. This is evidenced by the relative stability of the national currencies of other oil-producing countries (*Fig. 5*).

If we compare this graph with the distribution of countries according to exchange rate regulation regimes (*Fig. 6*), it becomes obvious that it is them who determine the volatility of national currencies, and not oil prices.

Russia, Brazil and Norway with free floating exchange rates are leading here. Four other oil producing countries — Saudi Arabia,

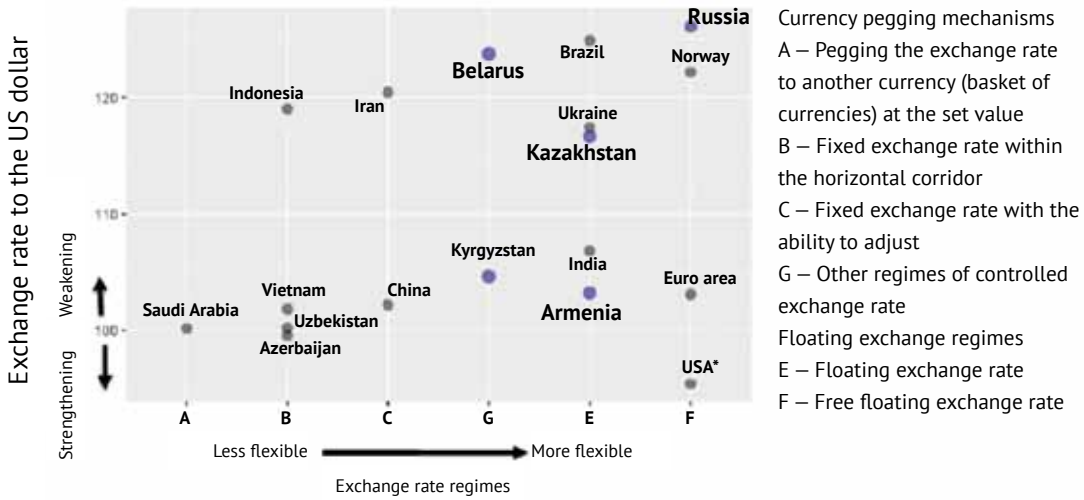

Fig. 6. **Change in currency exchange rates depending on their regimes**

Source: IMF AREAER 2018 (April 2019), Bloomberg, ECE calculations.

Note: 1) change in exchange rate calculated for the period from 01.01.2020 to 03.25.2020, where 01.01.2020 = 100;

2) exchange rate regime indicated for 2017 (the last available at the IMF AREAER 2018);

3) * US dollar index (DXY) shown for the USA.

Uzbekistan, Azerbaijan and Vietnam — have maintained the stability of their currencies, since they apply the regimes of pegging the exchange rate to another currency at the set value and a fixed exchange rate within the horizontal corridor.

In March 2020, the Bank of Russia stepped back providing exchange rates to speculators. They use oil price fluctuations as a natural link to the algorithms of financial robots operating in the market. Therefore, there is an illusion that the rouble is determined by oil prices. To think so is the same as to assume that the speedometer determines the speed of a car, and not the engine. Monetary authorities perceive market manipulation as the action of fundamental market forces, which indicates their incompetence or engagement.

In 2014, the destabilization of the Russian monetary and financial system was the result of a well-planned operation where the adversary used the Central Bank and MOEX as financial instruments for speculative attack to hurt the recovery mechanisms of the Russian economy. To do so, they changed the monetary policy target parameters in advance: contrary to the Constitution, they excluded the Central Bank's obligation to ensure the stability of the national currency and instilled the Russian Government with a false concept of "inflation targeting"[1].

The collapse of the rouble exchange rate in March 2020 was organized after the same pattern. International speculators who attack against the rouble have the full picture of the situation in the Russian currency and financial market, receiving the perfect information from the MOEX staff, knowing the Central Bank's algorithms, controlling depository and clearing centers and tracking online the flow of funds and securities on stock exchanges trading in Russian assets. The inactivity of the monetary authorities, who publicly renounced responsibility for the stability of the rouble, provides speculators with risk-free manipulation of the Russian currency and financial market.

We should remind that in 2014, the speculative attack resulted in colossal damage to the Russian economy: a $400 billion decrease in stock market capitalization; depreciation of savings; a trillion roubles loss by the banking sector; two-fold depreciation of the national currency and rising inflation; termination of lending to the manufacturing sector; drawing the economy into a stagflation trap [4]. The destruc-

[1] The main directions of the unified state monetary policy for 2009 and the period of 2010 and 2011.

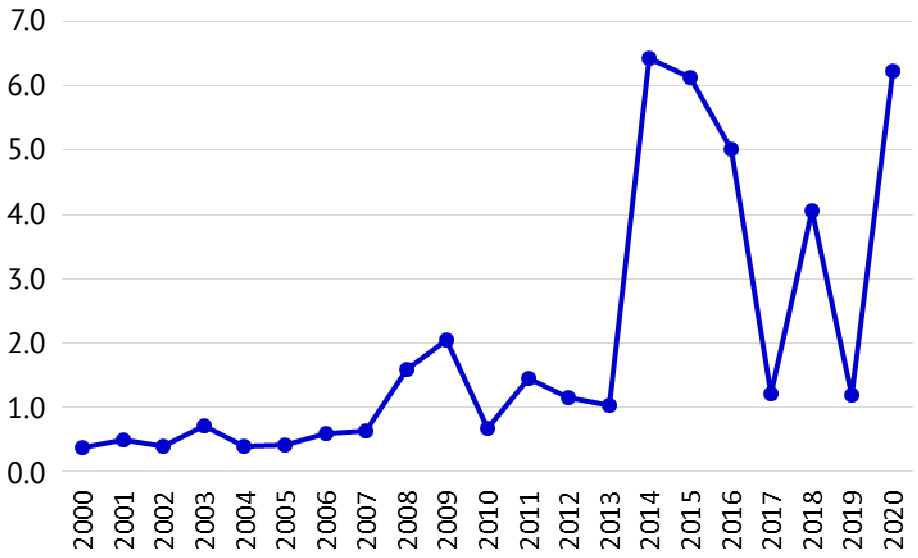

Fig. 7. **The volatility of the Russian rouble in the period 2000–2020**

Source: ECE calculations.

Note: Y-axis standard deviation.

tive impact of the current monetary and financial crisis on the Russian economy has yet to be assessed. Currently, the stock market has fallen by $300 billion, the wave of inflation is seizing the consumer market, foreign trade is shrinking, and investments are declining.

It is evident that the Bank of Russia's inflation targeting policy is doomed to failure. Even if it manages to decrease inflation by reducing final demand, the stabilization period does not last long. Overstatement of interest rates and the unpredictability of the rouble exchange rate block investment and innovation activity. This entails an increasing technological lag and a competitive depreciation of the Russian economy, which inevitably, after a short period of time, leads to the devaluation of the rouble and a new inflationary wave. This period for the Russian economy lasts for about five years, which corresponds to the average duration of the scientific and production cycle.

If the Central Bank tries to stop the inflationary wave, which starts due to the devaluation of the rouble, by another increase in the key rate and a decrease in the money supply, then, we will obviously expect a repetition of the spasms of investment and business activity of 2014–2015 and 2008–2009. In a few years, this will lead to an even greater technological lag in our economy, its competitive depreciation and the next devaluation of the rouble (*Fig. 7*), followed by an inflationary wave. It is necessary to break this vicious circle of self-destruction of the Russian economy and finally place it in a trajectory of rapid development in the new technological mode by the proactive formation of institutions of a new world economic structure.

If the Central Bank introduced exchange controls to protect our financial system from external attacks after the United States had announced sanctions, the current collapse of the currency and financial market could have been prevented. However, dominant among the monetary authorities, the economic interests of speculators prevented this. Several major participants using insider information support the turbulence of the currency and financial market by manipulations. The Central Bank's inactivity guarantees them risk-free transactions to artificially devalue the rouble in order to extract speculative super-profits. This is done through chains of pre-planned foreign exchange trading transactions with a sequential decrease in the rouble exchange rate to a certain level. When the manipulators reach this level, they hold it until the accumulated currency is sold. Then, they invest the gained super-profits in the purchase of assets that have fallen in price many-fold, and

the rouble exchange rate rises to an equilibrium level. A few years later, they repeat these actions to fall the Russian national currency, using artificially inflated reasons: lowering oil prices, exacerbating international conflicts, announcing new sanctions, epidemics, etc. On each cycle, they extract hundreds of percent of profit from the impairment and subsequent purchase of Russian assets, whose significant part is redistributed in favor of foreign capital.

Swung in this way, the financial market loses touch with the real sector, its prices do not show the real value of assets, and it ceases to be a guide for bona fide investors. It is not the supply and demand of business entities, but the actions of automated algorithms performed by financial robots that determine the price and exchange rate in the modern currency and financial market. Well-integrated in the financial market regulation system, a group of major players manipulates it and extracts gigantic super-profits from the cyclical depreciation of the rouble. They use the bankruptcies arising from swinging the market to embezzle assets, including with the use of reorganization procedures and Central Bank credit support instruments.

As in 2008–2009, the Russian financial market is showing the deepest decline among the G20. The monetary authorities do not take the necessary measures to stabilize it and exacerbate the country's economic losses by ridiculous actions.

With every opportunity to keep the rouble exchange rate stable due to the volume of foreign exchange reserves exceeding the number of roubles in the financial market, the Bank of Russia let it collapse, and only then, it declared its readiness to conduct foreign exchange interventions. However, without declaring a clear goal to prevent the rouble from falling below a certain level, these interventions only help speculators plan an attack by revealing their plans and supplying them with currency.

Against the backdrop of the financial market collapse, a strange stock sale of Sberbank by the Central Bank to the government looks completely surreal. According to the Law on the Central Bank, all its property is federal property. Therefore, the state can operate it at its own discretion. In this case, it can adopt a normative act obliging the Bank of Russia to transfer the stocks to the Federal Agency for State Property Management free of charge, since it is nothing more than their nominal holder.

The ultimate sense of this deal is, on the one hand, to sterilize (liquidate) at least a quarter of 2.8 trillion roubles accumulated in the National Wealth Fund so to cover the losses of the Bank of Russia from its insane activity in raising funds from the financial market for deposits and bonds.

On the other hand, speculators able to manipulate the stocks of Sberbank may become hugely wealthy by buying them after depreciation and selling them at a higher price after the transaction is complete. We assume a secret privatization plan for these stocks, which are not registered in the balance sheet of the Federal Agency for State Property Management, but remain "on the balance sheet of the National Wealth Fund" (the latter is not a legal entity and does not have a balance, that is, stocks stay in the custody accounts of the Ministry of Finance).

Questionable transactions to manipulate the currency market and feigned transactions at the state expense exacerbate the already difficult situation of the state financial system after the collapse of oil prices. Declared in the media, the reasons for the collapse of Russia and OPEC oil cartel in order to bring American shale oil producers to bankruptcy amaze with insanity of this idea. After all, oil prices were maintained at a level many times higher than the equilibrium of real demand and supply due to financial speculators and this cartel agreement. After it collapsed, slumping oil prices may drag on for a long time.

Oil price fluctuations are subject to long-term patterns of change in technological modes. When the dominant technological structure reaches maturity, the economic growth rate falls along with the profits of leading corporations. To preserve the profits, monopolists raise prices. Best of all are corporations in the fuel and energy sector, which is characterized by maximum capital intensity and minimum price elasticity of demand. After the economic restructuring provoked by a spike in energy sources and based on a new technological mode is complete, and its

energy intensity is many-fold reduced, energy demand will inevitably decrease, and prices will fall [5].

In the next decade, hydrocarbon prices will remain relatively low. This means a significant deterioration in the trade and balance of payments of Russia. It may be mitigated by measures aimed at to ceasing the outflow of capital and outstripping the development of non-resource exports, which, however, cannot be ensured within the framework of the current monetary policy, since it requires large-scale long-term lending to quite capital-intensive investments in the development of petrochemicals and other high-tech industries.

If the monetary policy is not changed fundamentally, one will have to survive the further devaluation of the rouble and the following inflationary wave. Against the backdrop of the state budget contraction, this will cause a noticeable drop in incomes. It will be greatly exacerbated by the continuous fight against inflation by reducing money supply and final demand. This, in turn, will cause mounting discontent among the population and promote socio-political tension. By 2024, it will reach a peak and significantly weaken the ability of state power to withstand American aggression.

By this time, China will become stronger, present a growing demand for Russian resources and invest in the Russian economic restructuring to suit its needs. Thus, the Russian economy will be on the periphery of both the old and new world economic structures. It will finally lose the ability to develop independently, and its economic space will become a rivalry between Western and Eastern corporations. This will create additional political tension, fraught with the loss of national sovereignty.

To avoid this double dependency trap, an immediate, fundamental change in economic policy is necessary. It should ensure the restoration of macroeconomic stability simultaneously with the withdrawal of the Russian economy on the trajectory of outstripping growth based on a new technological structure. This requires a forced transition to the formation of a new world economic structure with its typical strategic planning institutions, monetary policy subordinate

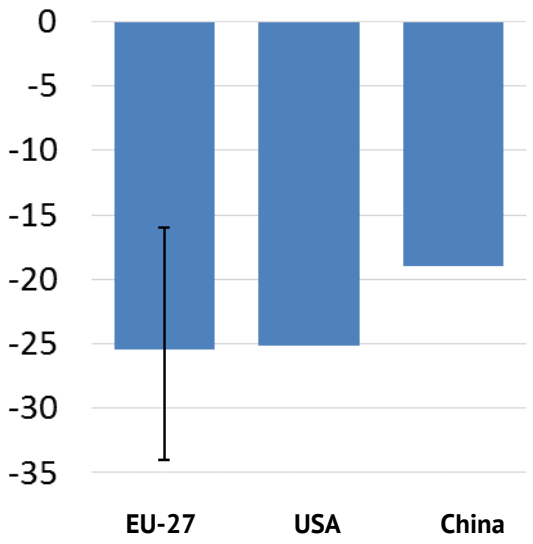

Fig. 8. **Economic activity affected by a partial or complete shutdown of production, % GDP**
Source: OECD.

to the tasks of increasing investment activity and public-private partnerships aimed at improving public welfare.

The forecasts for the development of the Russian economy, as well as the global one, are quite alarming. Almost 50% of the world's population (about 3.9 billion people) were affected by the quarantine and self-isolation. Maintaining strict measures of social distance costs 2% of GDP per month. In 2020, the global recession may reach 2%, and in the worst-case scenario — 4–6%. The decline of production in the most vulnerable sectors of the economy may be 40% to 90% (*Fig. 8*).

Anti-crisis measures will exacerbate the tense state budget due to fall in oil prices. They reduce its revenues and increase expenditures. This inevitably leads to a deficit, which the National Wealth Fund may not be sufficient to redeem. If the government borrows finance in the market, it will then reduce the scarce liquidity and narrow down the possibilities to maintain business activity. This is only the most obvious problem, which has no solution within the framework of the macroeconomic policy. If it goes on, it will put the Russian economy in a deeper crisis.

Based on the laws of the change of technological and world economic structures, we can assume that the world hybrid war is entering its

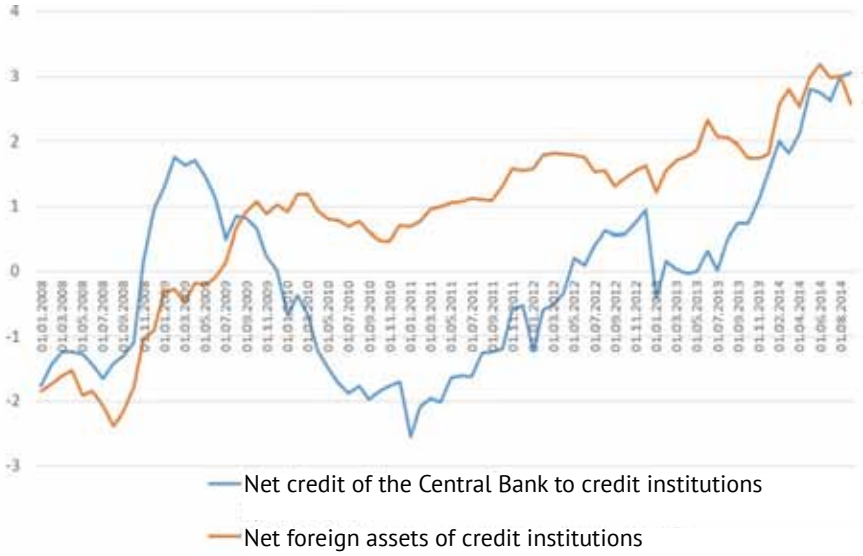

Fig. 9. **Dynamics of net foreign assets and net debt of credit institutions to the Central Bank of Russia (trillion roubles)**

Source: Bank of Russia.

final phase. The peak of confrontation between the leading powers is expected by 2024 [6]. By this time, it is necessary to rebuild the economic development management system according to the principles of the integrated world economy and break out of the hopeless state of the financial and commodity periphery of the American capital accumulation cycle.

ANTI-CRISIS MEASURES

Amid the spasm of business activity caused by the financial market collapse and asset impairment, the monetary authorities of all developed countries sharply expand lending to the economy to mitigate production cuts and prevent an avalanche of bankruptcy of enterprises. However, the effectiveness of these measures varies greatly depending on the national system of currency regulation and the monetary policy. In the issuing countries of world reserve currencies, cash injections are held by the financial and banking system, which increases the stability of their economies, but does not always overcome the reduction in production and investment. In other countries, issue of money, if not channeled for the needs of the manufacturing sector, may flow into the currency market, increasing pressure on the national currency and exacerbating macroeconomic instability. This is exactly what happened in Russia in 2008–2009 and in 2014–2015, when measures of state support for the banking system fueled the flame of the crisis. Then banks, including state-owned ones, used the obtained credit resources to purchase foreign currency, intensified the devaluation of the rouble and played against the interests of the country (*Fig. 9)*.

Today the situation may recur. On March 27, 2020, the Bank of Russia increased the maximum aggregate limit on irrevocable lines of credit (ILOC) from 1.5 to 5 trillion roubles[2]. This additional liquidity exceeds the entire federal budget allocated to support the economy. Before injecting it uncontrollably, one should stop liquidity-absorbing operations, redeem their bonds and close deposits (this will provide another 3 trillion roubles from the reduction of the "structural liquidity surplus" caused by the overstatement of the Central Bank key rate).

Based on the previous experience of the Bank of Russia's large-scale provision of liquidity during the financial crises (1998, 2008 and 2014), this credit expansion may result in the loss of almost 10% of gold and foreign exchange reserves and a further fall in the rouble, attributed to the forecasted fall in oil prices. To prevent this, it is necessary to protect the financial market from

[2] Bank of Russia. URL: https://cbr.ru/press/pr/?file=27032020_152031dkp2020-03-27T15_20_11.htm

attacks by currency speculators. This implies the introduction of selective restrictions on capital movement across the borders. As such, both direct (licensing, reservation, fixing the currency position of commercial banks) and indirect (tax on capital export) regulation may be used. Residents should stop using foreign currency as a means of accumulation, as well as the Central Bank should stop financing currency speculation. To do so, along with introducing electoral restrictions on cross-border speculative transactions, it is advisable to strengthen measures to deoffshorize the economy, de-dollarize it, stop capital outflow and stabilize the rouble exchange rate.

Serious efforts must be applied to regulate the financial market and protect it from fraudulent manipulations. Objective investigations of signs of market manipulation must be conducted and criminals must be punished. It is necessary to restore state control over the MOEX and the financial market as a whole, to increase essentially the competence and effectiveness of the Bank of Russia as a mega-regulator.

Based on international and domestic experience, the first thing to do is to block the channels for exporting capital and financing speculative attacks against the rouble. That is what V. Gerashchenko did after the 1998 default by introducing the rule of fixing the bank's open foreign exchange position (open FX position) for each operational day, preventing banks from using ILOC funds to buy foreign currency. Besides, restrictions on speculative operations to purchase foreign currency should be introduced on time (reservation of funds, postponement of transactions, total control over the legality of origin and payment of taxes, etc.). As for foreign speculators dominating in the currency market, temporary bans on exchange operations should be introduced. It is also advisable to establish minimum terms to offshore and put in foreign currency of financial resources released after the sale of government bonds and other rouble obligations of Russian issuers.

It is necessary to put into effect "sleeping" standards that carry punishment for manipulating the market. It is necessary to conduct a thorough investigation of all episodes of the collapse and a sharp rise in the rouble exchange rate to identify mechanisms and facts of market manipulation. Measures must be taken to punish criminals who organized the collapse of the rouble in 2014 and now.

For the long-term stabilization of the rouble and the financial market, the following measures should be taken.

1. To block the channels of capital outflow. To provide free currency conversion only for current transactions. To pay for imports in foreign currency may only be possible upon the delivery of goods to Russia or the provision of services. To limit the capital export only to transactions necessary for expanded reproduction of the real sector of the economy and direct investments that contribute to the socio-economic development of Russia. To this end, to introduce licensing of cross-border capital transactions.

2. To eliminate preferential tax of profits from financial transactions, as well as introduce a tax on currency speculation (the so-called "Tobin tax") in the amount of 0.01% of the transaction. This tax will be soft for financial transactions for productive purposes, and will make the activities of financial speculators almost unprofitable. This will protect the financial market from manipulation and speculative attacks).

3. To restore the full sale of currency earnings, as well as stimulate exporters to sell currency by using a wide range of measures (tax leverage, reserves, balance sheet ratios) that create more favorable conditions for storing and conducting transactions in roubles compared with transactions in foreign currency.

4. To temporarily prohibit security purchase from the US issuers and the US dependent states, as well as place government investments in these instruments. This step will reduce the risks of Russian participants in terms of freezing or seizing their funds invested in foreign government securities [7][3].

[3] The former Governor of the Bank of England, M. King, recently spoke about the possibility of the United States to annul foreign assets if the situation becomes tenser: "In the event of serious aggravation of relations, foreign assets may be annulled." The United States and its NATO allies have just confiscated the currency assets of Venezuela and directed them to finance a coup in this country. In recent years, funds placed in the United States by a number of countries in the Arab East

5. The Ministry of Finance of Russia to stop purchasing currency and to cancel the "fiscal rule". To direct oil and gas budget revenues to financing anti-crisis measures, including the purchase of critically needed imported goods, primarily medical supplies.

6. To terminate the deposit insurance system regarding deposits in foreign currency. To offer citizens to exchange these deposits for the rouble ones on an arm's length basis, and for commercial banks to sell disposable foreign currency to the Bank of Russia at the current rate.

Considering the hybrid war, borrowers should be allowed to apply force majeure in relation to credits provided by entities of countries that have established and are introducing financial sanctions against Russia. To introduce a moratorium on the fulfillment of the obligations of sanctioned companies to creditors and investors from the respective countries, as well as an arrest on their shares and stocks. If the currency assets of the Ministry of Finance and the Bank of Russia, state banks and corporations are seized, and Russian enterprises are threatened by total application of sanctions — to introduce a moratorium on the repayment and servicing of credits and investments from the states applying sanctions against Russia, as well as to seize their assets. To prohibit subsidiaries of banks from the countries applying sanctions to attract new funds from Russian investors while the sanctions are being applied.

As part of measures to restore national sovereignty in the monetary sphere, currency exchange rates should be quoted in relation to the rouble, and not to the dollar or the euro, as it is now. Quotations should be carried out in relation to the currencies of the countries — the main trading partners of Russia, excluding the dollar from the currency basket.

The measures to protect the Russian financial market from external threats of destabilization should include: ensuring transparency and regulating off-balance sheet operations of banks and companies, eliminating dependence on American rating agencies to assess the reliability of certain borrowers; creating a public system for disclosing information about the market (issuers and professional participants), owned by the state and free for users.

The above measures would ensure a slump in currency speculation, the subordination of the currency market to servicing cross-border transactions of the real sector and will create the necessary conditions for long-term stabilization of the rouble exchange rate. After they are adopted, the Bank of Russia should clearly indicate the target parameters of the rouble exchange rate, introduce a "rule of exchange rate policy" — to keep the rouble exchange rate at a given level for a long time by conducting timely interventions and measures to eliminate speculative attacks. If there is a threat of breaking the set limits, to make an unexpected for speculators, one-time change of the exchange rate and to hold it in the same way. This will help avoid an avalanche-like "capital outflow" and currency speculation against the rouble when its exchange rate is adjusted due to a change in the fundamental conditions of exchange rate formation [8].

The rouble exchange rate stabilization is necessary to normalize the investment climate, to expand the possibilities for international cooperation, national security and to provide the rouble with the functions of a regional reserve currency in the EAEU and the adjacent part of Eurasia. The Chinese experience can be used as an example of an effective system of currency and financial control to ensure faster economic growth.

Along with the above measures for stabilizing the financial market to avoid an unjustified price increase by domestic goods of the EAEU member states, price indexation at the exchange rate of the national currency should be recognized as unfair trading practice subject to antitrust regulation.

After all the above measures to eliminate the risks of using money issued to overcome the crisis for speculative purposes, it is possible **to build up money supply** as a necessary condition for maintaining domestic demand, raising investment and innovation activity. Unlike issuers of world currencies, the crisis in Russia was

have been freezed. Let us recall about blocking funds of the US allies placed in American banks during the Second World War and other similar cases. (Gold Investor. June, 2016. King M. Misguided policies and economic risk. P. 14–17).

caused not by an excess of money supply and the related financial bubbles, but by permanent under-monetization of the economy, which had been working flat out for a long time due to an acute shortage of credits and investments. The Russian economy needs a substantial expansion of the money supply to restore the domestic market, increase innovation and investment activity in order to modernize and accelerate development. At least 12 trillion roubles that the Bank of Russia has withdrawn from circulation during the last 5 years should be returned to the economy, as well as its operations to absorb money by issuing bonds and accepting money for deposits should be immediately stopped.

It is necessary, to increase the public expenditures on health and education at least one and a half times, since they are the supporting sectors of the new technological structure, as well as to double the R&D funds.

Purpose-oriented credit instruments for manufacturing enterprises should be widely used to prevent spasms in business and investment activity. The Bank of Russia should deploy special refinancing facilities for commercial banks at 1–2% per annum for critical sectors in the crisis (medicine, education, agriculture, etc.), totaling up to 3 trillion roubles against the obligations of enterprises and banks for the purpose-oriented use of funds (for example, through escrow accounts); as well as for investment lending, including in the framework of national projects, by special investment contracts. This type of financing will not create an inflationary effect. The widespread use of special investment contracts will reduce unreasonable costs for banking services by up to 10% and ensure sustainable and full-scale financing of investment projects significant for the Russian regions.

It is also necessary to create a mechanism for special-purpose refinancing of development institutions and expand many-fold their capabilities of investment lending, including the replacement of "dried up" foreign sources of credit.

To reduce the dependence of the Russian economy on the sanctions of the United States and its allies, to ensure its stability in the hybrid war, the following urgent measures should be taken ***to de-dollarize the economy***.

1. To sell all debts of the USA, Canada, and Great Britain from the foreign exchange reserves, as well as securities nominated in the currencies of these countries acquiring an equivalent amount of SCO and BRICS assets and of gold. To increase the share of gold in reserves from 20% to 55% (as in the EU countries).

2. In foreign currency reserves at the expense of purpose-oriented credit issue, to buy foreign currency assets of state-controlled banks and corporations from the Bank of Russia (more than $50 billion) at the rate before the speculative attack due to the drop in oil prices.

3. To stop crediting of non-financial organizations in foreign currency by Russian banks. To prohibit by law loans to non-financial organizations nominated and provided in foreign currency.

4. To eliminate the use of the dollar in foreign trade and investment transactions of state corporations and banks and to recommend that private enterprises do the same. To gradually switch to paying for the main export goods in roubles. This will eliminate the risk of confiscation of the currency earnings of Russian exporters, remove its repatriation, and create conditions for reducing capital outflows. At the same time, it is necessary to provide for the allocation of tied rouble credits to the importing states of Russian products to maintain goods turnover, and to use credit and currency swaps. The Bank of Russia should provide commercial banks with special-purpose concessionary refinancing for rouble crediting of export-import operations at affordable rates on a long-term basis. It should also consider the extra demand for roubles in the main directions of the monetary policy due to the expansion of foreign trade in domestic currency and the formation of foreign rouble reserves of foreign states and banks.

5. To expand essentially the service of settlements in national currencies between enterprises of the EAEU and the CIS countries through the EDB and the Interstate Bank of the CIS, and with other states — by using Russian-controlled international financial organizations (IBEC, IIB, EDB, etc.).

6. To limit credits of state-controlled corporations in countries that apply sanctions. To replace gradually foreign currency credits from these countries with rouble credits from state-owned commercial banks due to their special-purpose refinancing by the Central Bank on the same conditions.

7. To withdraw the securities of Russian issuers from the depositories of NATO countries. The Bank of Russia will cease accepting securities held in foreign depositories as collateral for refinancing.

Along with the above urgent measures to prevent damage from sanctions for the state and Russia as a whole, it is necessary to take measures to minimize the loss of private Russian capital, "stuck" in offshore with predominantly Anglo-Saxon jurisdiction. ***To deoffshorize the economy***, the following conditions are required.

1. To introduce preliminary currency controls on transactions with companies from NATO countries and offshore zones. To introduce licensing of capital transactions with dollars, euros and currencies of countries that have joined the anti-Russian sanctions.

2. To clarify the legislative definition of the term "national company" that meets the requirements of registration, tax residency and main activities in Russia, membership of Russian residents not affiliated with foreign individuals and jurisdictions. Only national companies should be provided with the access to mineral resources and other natural resources, state orders, state programs, state subsidies, credits, concessions, property and real estate management, housing and infrastructure construction, transactions with the savings of the population, as well as to other activities strategically important for the state and sensitive to society.

3. Ultimate owners of stocks of Russian systemic enterprises must leave the offshore and register their ownership rights in Russian registrars.

4. To sign agreements on the exchange of tax information with offshore companies, denounce the existing agreements on the avoidance of double taxation. To prohibit by law transferring assets to offshore jurisdictions, with which there is no agreement on the exchange of tax information, as well as to the controlled by the United States and other countries that apply sanctions.

5. To introduce requirements for offshore companies owned by Russian residents to comply with Russian legislation on the provision of information about company members (shareholders, investors, beneficiaries), as well as tax information disclosure for tax purposes in Russia of all income received from Russian sources under the threat of 30% tax to be applied to any operations.

6. To establish licensing for offshore operations for Russian publicly owned companies.

7. To impose restrictions on the volumes of off-balance sheet foreign assets and liabilities to non-residents on derivatives of Russian organizations, to prohibit investments by Russian enterprises in securities and currency instruments of countries that apply sanctions.

8. To establish the Moscow Club of creditors and investors to coordinate the credit and investment policy of Russian banks and funds abroad, procedures for the repayment of bad credits, and to develop a unified position in relation to the default borrowing countries.

It is necessary to create ***a payment system*** in the national currencies of the EAEU member states based on the EDB and the Interstate Bank of the CIS with its own system for exchanging banking information, assessing credit risks, and quoting currency exchange rates as soon as possible. To make commercial banks use the Financial Messaging System of the Bank of Russia, to propose it for international settlements in the EAEU, SCO and BRICS, which will eliminate dramatic dependence on the US-controlled SWIFT system.

First of all, this must be done in mutual trade with China, which bears the main burden of replacing imports from countries implementing anti-Russian sanctions. Russian banks will also connect to the People's Bank of China's International Settlement System and exchange infor-

mation with Chinese partners, make payments and settlements. A special channel of confidential communication between large Russian and Chinese banks may be established for the same purposes. MIR National Payment Card System should provide co-badged cards with the Chinese UnionPay system, which also requires intensifying efforts by Sberbank and other Russian banks issuing the MIR card. It is advisable to create a network of specialized credit and financial organizations working exclusively in roubles and yuans, invulnerable from external sanctions. To launch the Vladeks trading and payment system that uses a special digital instrument with a fixed exchange rate for the dollar equivalent. This system may take care of the mutual trade of sanction-sensitive goods.

These measures could be applied in relations with our other traditional partners. To do so, it will be necessary to create appropriate clearing systems for settlements in national currencies and agree on currency-credit swaps between central banks. The need to form this system in the EAEU is obvious, which will require a corresponding expansion of the ECE functionality.

To stimulate the processes of Eurasian economic integration, joint surviving and the following surmounting the crisis regimes caused by the global pandemic and negative processes in the single EAEU markets, urgent measures are necessary, including the following[4].

1. To ensure price stability in the mutual trade of domestic goods of the EAEU member states, it is recommended that central (national) banks take urgent measures to stabilize the exchange rates of national currencies. To create the necessary conditions for switching to national currencies in mutual trade and financing joint investments, it is necessary to sign agreements within the EAEU on the limits of mutual fluctuations of national currencies (a "currency snake" as existed in the EU before the euro) and on a mechanism for damping fluctuations (through swaps and EFSD mechanism, whose size must be increased to 1.5–2 trillion roubles). To ensure long-term stability and financial sustainability, the EAEU states could create a payment union using the Interstate Bank of the CIS, specially created to service it.

2. To reduce costs in mutual trade, it is advisable to abolish currency control over current cross-border transactions in roubles. This measure should be preceded by a certain harmonization of national systems of currency regulation in order to avoid capital outflow.

3. To avoid the negative impact of world prices on mutual trade, governments should take measures to transfer payments for fuel and energy products (natural gas, oil and oil products) into the national currencies of the EAEU member states within the formation of a common energy market[5]. It is necessary to stabilize the rouble exchange rate, as well as to deploy a full-fledged exchange trading mechanism with rouble pricing indicators. To reduce external shocks in oil price fluctuations, it is advisable to switch to long-term agreements for the export of oil and gas to China at prices in yuans and roubles.

Due to the growing chaos and turbulence in world markets, it is necessary to provide for **an economic security system**. Along with the currency control instruments described above, it should have protective circuits of financial, distribution and property systems [9].

The protective circuit of the financial system should insure payments and credits to the real sector in the event of an emergency in the banking system. The Central Bank should be ready to "pick up" the settlement system through settlement centers and state banks in the event of a chain reaction of bankruptcies of commercial banks. Support programs for systemic companies, regions and industries in the event of a possible paralysis of the banking system should

[4] Some of these measures were approved on April 8, 2020 by Order of the ECE Council "On measures taken within the framework of the Eurasian Economic Union aimed at ensuring economic stability in the context of the development of the COVID-19 coronavirus infection pandemic".

[5] In his Annual Address to the Federal Assembly on May 10, 2006, V.V. Putin proposed organizing exchange trading in oil and gas with settlements in roubles. "The rouble must become a more universal means for carrying out international settlements and should gradually expand its zone of influence," the President of the Russian Federation said in his Address. After this Message, he kept on giving directions on converting energy trade into national currency, including in the context of harmonization of monetary and financial relations with partners in the EAEU.

be carried out through the Treasury, which can also take over the functions of servicing state enterprises.

To protect strategic assets in the economy and ensure the production of livelihoods (food, energy, transport, etc.), the state should be ready to nationalize the relevant systemic enterprises and infrastructure nodes (power plants, elevators, ports, warehouses) or to put them under tight antimonopoly control. Systemic companies should receive financial assistance only for relevant business plans and the transfer of blocks of stocks (assets) to the state as a security for their obligations to produce products and return funds. In this case, the purchase of strategic assets by foreign capital (or converting debts into property) should not be allowed, except when joint ventures are created or assets are pooled on a par in order to increase competitiveness and technical level.

Human capital reproduction systems should be secured by protecting the relevant budget, regardless of budget revenues. It is also necessary to create strategic reserves of basic commodities, food and medicines in order to maintain the production and import of critically important goods in sufficient quantities to stabilize prices.

FISCAL POLICY

Fiscal policy orientation towards development requires a reduction in the tax burden on all types of innovative and high-tech activities.

In tax area, one should proceed from the structure of creation of national income, whose main source now is resource rent. To skim it, the state as the owner of the subsoil usually applies a windfall profits tax to subsoil users, which in Russia is replaced by a severance tax. However, according to the laws of market pricing, the latter is included in the price of products and is actually a tax on the consumption of energy and natural resources, worsening the competitiveness of the manufacturing industry. In domestic conditions, export duties that do not burden domestic consumption are the best way to extract resource rent to state revenue.

Another fundamental drawback of the tax system is the universal taxation of citizens' incomes at a rate twice as low as the corporate income tax. This violates the principle of social justice, basic for public consciousness, and stimulates the flow of income from production to consumption. A tax maneuver is needed to introduce a progressive income tax rate, offset by the introduction of accelerated depreciation, which reduces the taxation of profits allocated for the purchase of equipment. This will increase investment by 5 trillion roubles while restoring public support for the state fiscal policy.

The current technological revolution requires tax exemption for all R&D expenses. Many countries pay tax bonuses to enterprises implementing innovative projects in promising areas of new technological growth. Based on its structure and the experience of the advanced countries, it is necessary, to increase the public expenditures on health and education at least one and a half times, since they are the supporting sectors of the new technological structure, as well as to double the R&D funds. Thereby, increased funding should be focused on promising areas of developing a new technological structure where Russian organizations have competitive advantages. In particular, it is necessary to increase substantially the funding of scientific developments in molecular biology, genetic engineering and cellular technologies, manufacture of nanotechnological equipment, digital, laser and additive technologies, solar energy, nanopowders and new materials. An obvious direction for budget expenditures with high economic efficiency is the modernization of transport, telecommunications, energy, housing and communal infrastructure based on the new technological structure. Many expenditures critically significant for developing a new technological structure, including the financing of basic and exploratory research, can only be implemented with budget support.

An important component of fiscal policy should be the orientation of public procurement to the acquisition of high-tech products, mainly domestic production.

During the implementation of the anti-crisis policy, the budget deficit should not be strictly limited by financing it from internal sources and covering growing government borrowing by equivalent money issue for refinancing commer-

cial banks secured by state obligations. Moreover, the profitability of the latter should not exceed the average rate of profit in the manufacturing industry. All developed countries issuing world currencies operate in such a way.

For example, the main channel of money issue by the US Federal Reserve (up to 95%) and the Bank of Japan (about 85%) is the purchase of government debt on the domestic market. The European Central Bank issues trillions of euros for the purchase of state obligations of the Euro area countries, and even bonds of systemic corporations for anti-crisis purposes. At the same time, central banks carry out concessionary refinancing of government agent banks for state-guaranteed investment projects, mortgages, and national and regional programs. Moreover, they issue money under state obligations for long periods up to 30–40 years, when the securities purchased by the Central Bank are kept on its balance sheet, and the money issued for them works in the economy.

Currently Russian federal loan bonds play a minor role in the formation of the rouble financial system (less than 5% of the accumulated rouble issue of the Bank of Russia). Along with the expanding volume of debt obligations of the Russian government in euros, this indicates Russia's excessive dependence on the world market and external sources financial resources, on the one hand, and shows great opportunities for expanding the Russian financial system on a national basis. To expand the government borrowing market, it is also necessary to stop using the Bank of Russia bonds and deposits and to return the invested funds to their owners.

Monetary policy instruments should provide adequate money supply for expanded reproduction and faster development of the economy in promising areas of the formation of a new technological structure. Roubini and Mihm [10] proposed simple Keynesian methods for stimulating demand by massive infusion of financial resources to deal with the current crisis. Although they will help mitigate the recession, they will not be able to provide the recovery [11]. This requires a kick-start to scientific, technical and innovation policy. In these conditions, the government should target and channelize the money issue in priority areas of economic activity growth.

It is necessary to create an issuing mechanism for refinancing commercial banks by the Bank of Russia to increase their credit requirements for enterprises in the real sector as the financial needs of a developing economy grow. Both domestic and world experience allow for building the optimal mechanisms of money supply, fixed on financing the real sector of the economy and priority directions of its development. Thus, the access conditions of commercial banks to refinancing by the Central Bank should be linked to obligations for the targeted use of credit resources received from the state to finance manufacturing enterprises and priority areas of economic activity. This can be done by combining indirect (refinancing secured by bonds and bills of solvent enterprises) and direct (co-financing of state programs, providing state guarantees, financing special investment contracts) ways of money supply. Through the Lombard list of the Central Bank and the limits of state guarantees, the state will be able to affect cash flows on a case-by-case basis and to provide expanded reproduction of systemic enterprises, favorable conditions for the growth of economic activity and attracting investments in priority areas of development. At the same time, the refinancing rate should not exceed the average rate of profit in the manufacturing industry (in compliance with international practice, it should range within 1–4% in a structural crisis [12]). The loan terms should correspond to the typical duration of the scientific and production cycle of engineering products (5–7 years).

Along with lowering the refinancing rate, normalizing the price of money requires a proactive policy on limiting the profitability of the government debt market, controlled by the Bank of Russia and large publicly owned banks, applying low-interest purpose-oriented credits for state purposes (for mortgages, small businesses, educational loans), and temporary administrative regulation of rates interest and bank margin. It is advisable to significantly increase the resource potential of the existing and create new development institutions that provide long-term investment credits at quasi-zero interest.

Amid the global crisis, developing the financial sector of Russia is only possible through the outstripping growth of domestic solvent demand in comparison with the external one. In this regard, the restructuring of the financial sector should focus not on the stock market, but on the growth of the banking system, combined with the restriction of financial speculation and the stimulation of long-term investments, development institutions and venture financing [13]. At the same time, government support for commercial banks should be limited to providing only purpose-oriented credits in compliance with the following principles: equal access; limited time and scale of support; participation of banks in anti-crisis measures; inadmissibility of benefits from state support by shareholders. In exceptional cases, state support for the banking sector's equity could be achieved through the acquisition by the Bank of Russia of preferred stocks of commercial banks [14].

The concentration of money issue on refinancing commercial banks against the obligations of manufacturing enterprises creates competition among banks struggling for customers of manufacturing enterprises for the access to refinancing by the Central Bank. As a result, the credit market from the seller's market, monopolized by large commercial banks, will turn into the buyer's market, where the competition will lead to lower interest rates. For this, it will be necessary to completely stop the Bank of Russia operations to absorb the so-called excess liquidity, since by issuing its bonds and opening deposit accounts, it artificially sets the minimum interest rate on the credit market.

The historical experience of a successful development policy indicates that a certain increase in GDP requires a two-fold increase in investment, and therefore, a corresponding increase in the volume of credit as the main tool of advance growth of the modern economy. Along with the dogmatism of the monetary authorities, launching this mechanism in Russia is objectively hindered by the lack of effective currency control. As a result, commercial banks used the credits issued under anti-crisis programs to buy foreign currency, and not to finance to the real sector of the economy. The strategy described above should be implemented using the appropriate instruments. This requires the widespread adoption of digital technology. First of all, this should be done in the sphere of money circulation.

To control the targeted use of money issued for investment lending, it is proposed to use modern technologies for creating digital currencies and controlling their circulation through a distributed ledger system (blockchain). Organizing purpose-oriented credits requires creating a Specialized Development Institute, funded by the Bank of Russia in an amount of at least the money withdrawn from the economy. So, about 15 trillion roubles are needed to compensate for the credit contraction since 2014, of which 5 trillion roubles can be allocated at the initial stage. Modeled after the German KfW[6], the Specialized Development Institute will be able to issue an equivalent amount of "investment roubles" secured by digital technology for this amount of money without inflationary consequences. Purpose-oriented credits in investment roubles are granted exclusively under special investment contracts at 1% (for state corporations) and 2% (for all others) per annum for the final borrower. At the same time, there will be no expenses on bank guarantees and no credit ratings, which allows keeping the interest rate for the final borrower at no more than 3%. The further flow of money issued in this way will be automatically controlled by the distributed ledger system — until salaries are paid, dividends are received and credits are reimbursed.

Besides an adequate monetary policy, the anti-crisis strategy should include a proactive **industrial policy** that stimulates growth zones in the general depressed environment.

A significant increase in the money supply envisaged by the anti-crisis strategy requires a radical increase in the effectiveness of **antimonopoly policy** to suppress inflation. A system policy of **price regulation** should be conducted

[6] The German State Development Bank (KfW) was founded in 1948 to restore the monetary factor of economic growth in post-war Germany. Due to the purpose-oriented credit issue, this development institution provided investment lending for economic development, including infrastructure modernization, updating of fixed assets, and housing construction. 80% of the bank is owned by the Federal Republic of Germany.

along with the intensified application of the standard measures to prevent price fixing. The concept of normal profitability should be enacted. It should include the costs of innovation, improving the quality and lowering costs of products, as well as provide for progressive taxation of excess profits [17].

To equalize the profitability of different sectors of the economy, it is necessary to carry out a restrictive pricing policy for natural monopolies, up to freezing tariffs for their services for the period of the anti-crisis strategy, and to introduce measures to reduce the interest rate as part of production costs. A federal law establishing the forms, limits and procedures of price regulation is required.

Maintaining price proportions favorable for modernization and economic development requires restoring export tariffs on raw materials and increasing import tariffs on finished products, as well as measures to protect the domestic market from outside unfair competition. The profitability of raw material supply to the external market should not exceed the profitability of its processing within the country, and the return on investment in the development of promising sectors of the economy should be sufficient for their expanded reproduction. At the same time, it is necessary to break the information contour of pricing commodities at world market quotes.

A system of exchange trading in roubles is necessary to ensure competitive pricing in the materials sector. For these purposes, it is necessary to develop and approve the Concept on the formation of the common exchange market for goods including measures aimed at the formation and use of exchange and over-the-counter price indicators in roubles and other national currencies of the EAEU.

Macroeconomic, structural and institutional policies combined should solve the problem of the investment crisis, involving a threefold increase in investment in production growth. At a micro-level, it is necessary to restore the relationship between productive and socially useful activities and profits of economic entities, to create conditions stimulating the constructive motivation of entrepreneurship to increase production efficiency, to introduce progressive innovations and master modern technologies, to transform income and savings into investments.

CONCLUSIONS

The strategy of accelerated economic development described above implies a drastic raise in the responsibility of federal executive bodies for the living standards of citizens.

In all circumstances of the global crisis, Russia must retain an independent policy and influence on the global situation. Reliable natural raw materials and defense potential provides us with objective opportunities. Even in the nightmare scenario of the global crisis, Russia owns the necessary resources not only to survive independently, but also for accelerated development. Therefore, in international initiatives Russia should focus solely on its own interests, completely abandon the previous US and other NATO countries lending policy or following them. In the worst-case scenarios of the global crisis, Russia will be able to improve its position in the world economy by pursuing policies to its own advantage.

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ORIGINAL PAPER

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International Cooperation on Climate Protection is Promoted by IFIs

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ABSTRACT

The author explores various aspects of cooperation of International Financial Institutions (IFIs) between themselves (blending), as well as with state and commercial structures of different countries in the field of solving international problems related to climate change on the planet. The **aim** of the article is to describe the role of IFIs, forms of cooperation and the financial instruments used for funding activities for sustainable economic development and solving climate problems in the world and in individual states. The author applies general scientific cognition **methods**, such as analysis, synthesis and systemic approach. The study **generalizes** the experience of IFIs in addressing the issues based on international statistics in areas such as sustainable economic development and global climate change. The paper provides the statistical analysis of individual countries, in particular, in the Central Asian region. The author makes a **conclusion** about the importance of the dialectical interconnection between the methods of collective and individual learning in solving global problems, as well as the development of universal procedures, instruments and criteria for assessing the achievement of goals. The formulated proposals may be of further use to regulators, relevant ministries and departments, as well as companies in cooperation with IFIs in the implementation of infrastructure and climate protection projects.

Keywords: global warming; mitigation; project funding; International Financial Institutions IFIs; infrastructure projects; environmental quality criteria; project cycle; application procedures; blended financing

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1. INTRODUCTION

Climate change will remain for many decades a crucial theme in international cooperation, economy and technology [1][1]. Thus, it is required to find integrated strategies to make mitigation of climate change work [2, 3]. Financing of climate protection projects is a key step in such synoptic global effort. Global climate policy essentially needs forward looking [4].

This article analyses to what extent and how *International Financial Institutions* (IFIs) provide suitable application procedures to identify substantially supportive projects, given the global system of values [5–11] promoted by climate protection. Actually, IFIs initially were founded to overcome poverty and economic dysfunction [12].

In their self-perception, all IFIs are strongly committed to environmental sustainability and social equity and apply certain sets of project quality criteria [13] accordingly to support investment decisions.

[1] FFF (2020), Fridays for Future. International youth movement. URL: https://www.fridaysforfuture.org/ (accessed on 30.04.2020).

2. THE BASIS: EVOLUTION AND DIALOGUE

The world view upon which this article is founded, has two core concepts: evolution and dialogue [14]. The evolutionary approach becomes visible in *Fig. 1*, which shows continuously more efficient energy systems in the world's economies when plotted as a function of economic level: on the left — energy demand per capita, and on the right — energy demand per GDP. Both these trends are extracted from the author's "*Global Change Data Base*" GCDB and suggest a *transition* in the global energy system.

Similar to the energy system, the entire economic fabric is undergoing a structural shift.

Table enumerates the main nine economic sectors of the UN economic statistics, whose evolving percentages are then plotted against GDP/cap in *Fig. 2* to show evolution.

The message of *Fig. 2* is manifold: visibly, each sector grows in absolute values while total GDP/cap grows, but its percentual contribution may increase or decrease, as measures by its distance from blue diagonal lines [15]. Intra-sector variance is highly

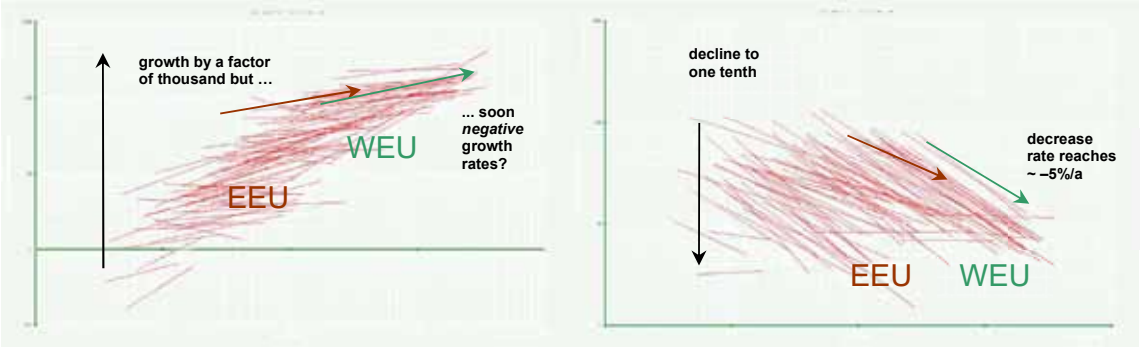

Fig. 1. **Energy demand per capita is still rising worldwide (on the left), but it already starts to saturate when plotted for all single countries as a function of economic level (Gross Domestic Product per capita = GDP/cap). Similarly, energy demand per GDP (= energy intensity) is strongly declining worldwide (on the right) and also this trend's steepness is starting to decrease strongly**

Legend: WEU = Western Europe; EEU = Central & Eastern Europe.

Source: GCDB, [15].

Table

Economic sectors according to the UN sectoral division, including this article's colour codes, while sector 1 = Agriculture is green

Colour legend for 4 industrial sectors:	Colour legend for 4 service sectors:
Violet = (2) Mining and quarrying	Orange = (6) Wholesale and retail trade
Light blue = (3) Manufacturing	Brown = (7) Transport, storage and communications
Turquoise = (4) Electricity, gas and water	Yellow = (8) Finance, insurance, real estate and business services
Dark blue = (5) Construction	Coral = (9) Community, social and personal services

Fig. 2. **Maps of the contributions of all nine classic economic sectors (above) and for the main sectors (below) to the total gross domestic product of every single country as a function of their economic levels. Colour codes are as in *Table 1:* Agriculture (green), industry (blueish), services (yellowish)**

Source: GCDB.

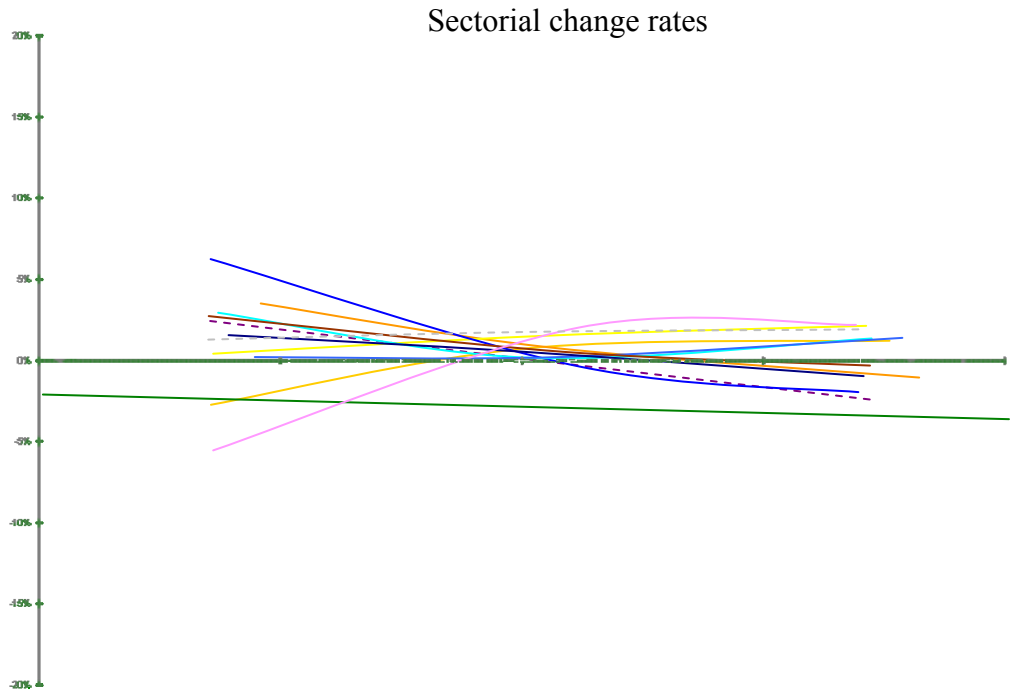

Fig. 3. **Change rates (in %) for all nine sectors as a function of GDP/capita (10 to 100000$/cap). Legend for the colours of the sectors as in *Table 1***

Source: World Bank, GCDB.

diverse, highest with geology-dependent mining, least with the aggregated service sectors. The sectors' relative growth rates seem to vary along regular patterns: fastest decrease in agriculture (primary sector since pre-history), considerable increase e.g. with the financial sectors, a recent fruit of evolution. In order to provide an overview, *Fig.* 3 shows a synopsis of all sectorial growth rates, thus providing an impression of a possibly regular sequence of GDP sectors along a hypothesised techno-socio-economic evolution.

When interpreting *Fig. 3*, the following sequences seem to govern the evolution within an economic system:

- From individual to collective;
- From material to non-material;
- From single exchange to structures and institutions for exchange;
- From direct satisfaction of needs to creation of systems for their permanent satisfaction;
- Human work force seems to be freed along all these steps, because maintaining systems appears as more efficient that individual strife.

The key message of the above sequence seems to be: once a functioning infrastructure or system has been created, it is unlikely that such a system falls apart by itself. Systems hence seems to survive better than individuals.

As a result, the human civilisational evolution is perceived here as a sequence of creation of *infrastructures*, institutions and established procedures.

New levels of challenges create new global infrastructures. Climate change is our latest global example.

History is understood here as autopoietic generation of structures: structogenesis.

At the same time, dialogue is understood as the key means to bridge (transitory) divergences of views within techno-socio-economic evolution [16]. This diagnosis does contrast with a multitude of other grand views on a hypothesised general tendency in economic world history, spanning across convergence or divergence [17, 18], namely:

a) ethically oriented globalisation concepts directed towards cultural and political consensus;

b) positive views of global development, classical development theories, exponential or over-exponential growth theories;

c) critical views such as dependency theory;

d) catastrophic theories or analyses of crises;

e) cyclical theories including narrative approaches as variants;

f) saturation paradigms, logistic curves, abatement scenarios, and post-growth concepts;

g) combined paradigms, namely integrating Kondratieff's cycles with on-going growth;

h) complexity paradigms in narrative or quantitative style, e.g., as "big history" or macro-history and more.

This rather broad world view is now focused on IFIs and their functionality in combating global warming. Section 3 describes IFIs' and their project cycles, section 4 describes blending, section 5 illustrates the example of IFCA for Central Asia, and section 6 describes the meta-level of collective learning, and section 7 provides conclusions.

3. IFIS AND THEIR PROJECT CYCLES IN GENERAL

3.1. International Financial Institutions (IFIs) in general

Background. International Financial Institutions, especially multilateral investment banks, including:

- the European Investment Bank (EIB);
- the European Bank for Reconstruction and Development (EBRD);
- the World Bank (WB);
- the Asian Development Bank (ADB);
- the German Kreditanstalt für Wiederaufbau (KfW);
- the French Agence Française pour le Developpement (AFD);
- the China-based Asian Infrastructure Investment Bank (AIIB);

are large banks with shares held by several states who have an interest to work in, cooperate with or support the countries to which the funding actions of the banks extend. The EBRD, for example, developed out of the post-war reconstruction programmes, and extended its targets to Central and Eastern Europe after the fall of the Iron Curtain.

Being based on a broad membership of borrowing and donor countries, each of these institutions operates independently. All however, share the following goals and objectives:

- to reduce global *poverty* and improve people's *living conditions* and standards;
- to support *sustainable* economic, social and institutional development; and
- to promote *regional cooperation* and integration.

IFIs achieve these objectives through loans (credits) and grants to national governments. IFIs can also provide a mix of loans and grants, equity or guarantees. Such funding is usually tied to specific projects that focus on economic and socially sustainable development. IFIs also provide technical and advisory assistance to their borrowers and conduct extensive research on development issues. In addition to these *public procurement* opportunities, in which multilateral financing is delivered to the national government for the implementation of a project or program, IFIs are increasingly lending directly to non-sovereign guaranteed (NSG) actors. These include sub-national government entities, as well as the private sector.

3.2. Working with IFIs

During the recent years, IFIs have made considerable progress in *harmonising* the way they procure goods and services. In many cases, they are now using similar policies and procedures presented on IFI websites and collected in the IG, while their minor details are not relevant to us at this point.

- Country Strategies;
- The Project Cycle;
- The Procurement Process.

3.3. IFIs' project cycles

In principle, all IFI-funded projects are implemented by the *borrowing countries*, not by the IFI providing the funds. However, all borrowers must follow the IFI's concrete rules and procedures throughout the entire project cycle. This is intended by IFIs' boards to guarantee efficiency and transparency in the use of IFI funds. When applying states consider the need for IFI investment, it is important for them and their administrative staff to understand conditions and requirements related to borrowing, including, but not limited to the following:

- maximum of loans available;
- loan maturity and payback period;
- loan guarantee needed, sovereign or non-sovereign;
- availability of concessional loans;
- debt level counted for eligibility;
- country policy on borrowing.

The project cycle, which in principle has similar stages for all IFIs (see *Fig. 4*), is the framework for the design, preparation, implementation, completion and evaluation of a project. Business opportunities occur throughout the cycle, so becoming familiar with it will increase chances of identifying an opportunity and securing a contract.

In general, an ***IFI project cycle*** consists of the following stages (*Fig. 4*):

Identification: The IFI and the borrowing country identify projects that are appropriate for the country's development strategy and suitable for IFI support. Pre-feasibility studies are often required at this stage.

Preparation: Once a proposed project has entered the project pipeline, the borrower and IFI technical staff study and define it further. The actual design and preparation of the project are the borrowing country's responsibility. During this stage, the borrower and/or the IFI frequently hire consultants to help with feasibility studies, detailed project design and the assessment

Fig. 4. **An IFI project cycle in principle**

of the project's environmental and social effects. The IFI and the Executing Agency do share some of the work of project preparation but the Executing Agency is responsible for all phases of project execution & procurement, while complying with IFI regulations.

Appraisal: IFI staff conduct in-depth assessments of the technical, financial and economic elements of the project. The appraisal phase is the IFI's responsibility and culminates in a project plan.

Negotiation: The IFI and the borrower negotiate the funding agreement and the project implementation plans. Negotiations result in a loan or funding document that is presented to the appropriate IFI board(s) for approval. The funding becomes effective after board approval and after the country has signed the documents. Funds can now be disbursed, thus commencing the implementation stage of the project.

Implementation and Supervision: Implementation of the project, including procurement, is the responsibility of the borrower and is carried out with minimal IFI assistance. However, the IFI does oversee all major procurement decisions made by the borrower. Most of the funds are spent during this phase, which provides the bulk of the procurement opportunities for contractors.

Evaluation: This final phase is an assessment of the project and of the results achieved. It is performed after the project has been completed and all funds have been disbursed.

Within any global region, it is recommended that cooperation partners apply the IFIs' *environmental and social quality criteria* at the earliest stages of the investment project identification and preparation to ensure consistency and compliance with the IFIs' requirements. Besides IFIs' mechanisms, the European Union (EU) provides financial tools such as "blended financing" and additionally emphasises regional cooperation (meaning that projects should encourage neighbouring countries to cooperate in a substantial and meaningful way), and supports IFI's recent emphasis on regional cooperation. This adds a *dialogic* dimension to IFIs [17–21].

4. WHAT IS BLENDING?

Blending is an instrument for achieving European Union (EU) cooperation objectives, complementary

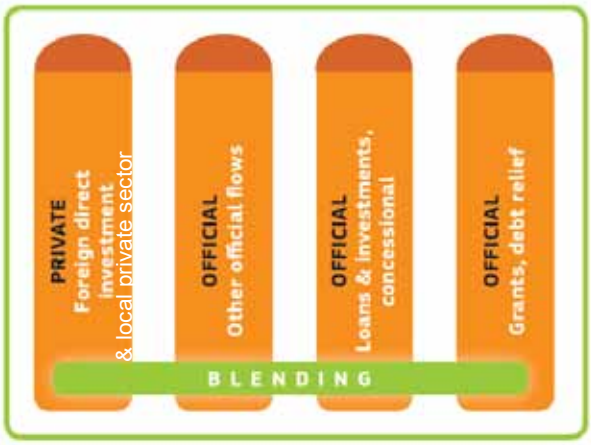

Fig. 5. **Blending cuts across silos**
Source: EU (2015)

to other aid modalities and pursuing the relevant regional, national and overarching policy priorities. Blending is the *combination* of EU grants with loans, risk capital or guarantees from other sources that may be public and private financiers. The idea behind the instrument of blending is that the EU grant element can be used *strategically* to attract additional financing for important investments for development in EU partner countries[2].

In blending, Official Development Assistance (ODA) grants are used in combination with ODA loans as well as with foreign direct investment and local private sector financing to support sustainable growth, see taken from DEVCO (2015) depicting different financial sources as "silos".

4.1. Leverage and its goals

A key concept is that of leverage [13] that answers the strategic question: which additional (i.e., marginal, in the sense of economics) fund triggers how much overall funding? This factor is the leverage factor and proud programs boast a leverage factor of 5–10.

[2] DEVCO (2015), Guidelines on EU Blending Operations, Volume 1 "General", Brussels & Luxembourg, DG for Developmental Cooperation DEVCO. URL: https://europa.eu/capacity4dev/t-and-m-series/document/guidelines-eu-blending-operations (accessed on 30.04.2020); EU (2019), Innovative Financial Instruments (blending). Brochure and information. URL: https://ec.europa.eu/europeaid/policies/innovative-financial-instruments-blending_en (accessed on 30.04.2020).

The following sub-effects are expected from appropriate leverage strategies:

- the financial leverage means to mobilise public and private resources for enhanced development impact and do more with less;
- non-financial leverage means: improve project sustainability, development impact, quality, innovation and enable a faster project start;
- policy leverage intends to support reforms in line with EU and partner country policies;
- aid effectiveness targets to improve cooperation between European and non-European aid actors (i.e. donors and financial institutions);
- visibility means to provide more public visibility for EU development funding.

Blending operations may constitute an opportunity to engage in a dialogue between the EU and regional governments on specific sector policies — also on the multi-government level.

5. THE EU INVESTMENT FACILITY FOR CENTRAL ASIA IFCA

5.1. The example of IFCA

Even if applied in the entire "Global South" (*Fig. 7*), let us illustrate this blending instrument when viewing the region of *Central Asia*[3]: pooling resources through the IFCA (Investment Facility for Central Asia) helps improve the coordination and coherence of donor actions in support of partner countries as they work *in true partnership* towards their *sustainable development* goals — as e.g. promoted in "Global Studies" curricula worldwide [19–22]. It also addresses cross-cutting challenges, such as the need to adapt to and mitigate the effects of climate change. IFCA has been established in 2010 with the objective to promote investments in Central Asia via blending. (With regard to the following it is noted here that IFCA is not an IFI itself, but an EU instrument to include IFIs.)

One basic concept of the EU instrument IFCA is blended financing (*Fig. 6*). *What can be an* ***added value*** *of "blending"?* The EU support can provide added value (EU, 2015) in the sense that it

(i) makes the difference between a project going ahead or being blocked; and/or;

(ii) improves a project's design, quality, timing, sustainability, innovation, impact and/or scale.

Blending means to mix several financing strategies. Thus, blending operations typically combine a grant element with loans, equity, guarantees or other risk-sharing mechanisms from public development finance institutions and others financiers, including — where relevant — private investors (*Fig. 6*).

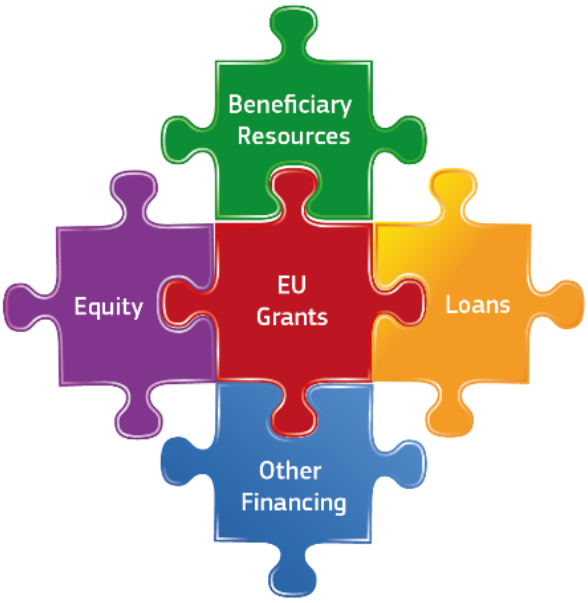

Fig. 6. **Blending components**

Source: EU Blending — European Union aid to catalyse investments. Explanation of the blending mechanism. URL: https://ec.europa.eu/europeaid/sites/devco/files/leaflet-eu_blending-2015_en.pdf (accessed on 30.04.2020).

The added value (or additionality, in this financial language) of grant support in blending operations is defined as the positive results the EU grant achieves above and beyond what could have been achieved without the grant. From an EU viewpoint, use of scarce grant funding is justified only if significant additionality is shown; this wording means here that the project would not have been implemented without the EU contribution.

On a case-by-case basis, the EU grant contribution can take different forms to support investment projects (*Fig.* 7) (EU, 2019):

- investment grant & interest rate subsidy reducing the initial investment and overall project cost for the partner country;
- technical assistance — ensuring the quality, efficiency and sustainability of the project;
- risk capital (i.e. equity & quasi-equity) attracting additional financing;
- guarantees — unlocking financing for development by reducing risk.

Blending provides various benefits to **different stakeholders**:

- beneficiary governments: a sustainable and affordable way to tap into significant additional financing for national development priorities;

[3] EuropeAid (2015), Activities in Central Asia. IFCA. URL: https://ec.europa.eu/europeaid/2015-operational-report-2015-asia-investment-facility-aif-investment-facility-central-asia-ifca-and_en (accessed on 30.04.2020).

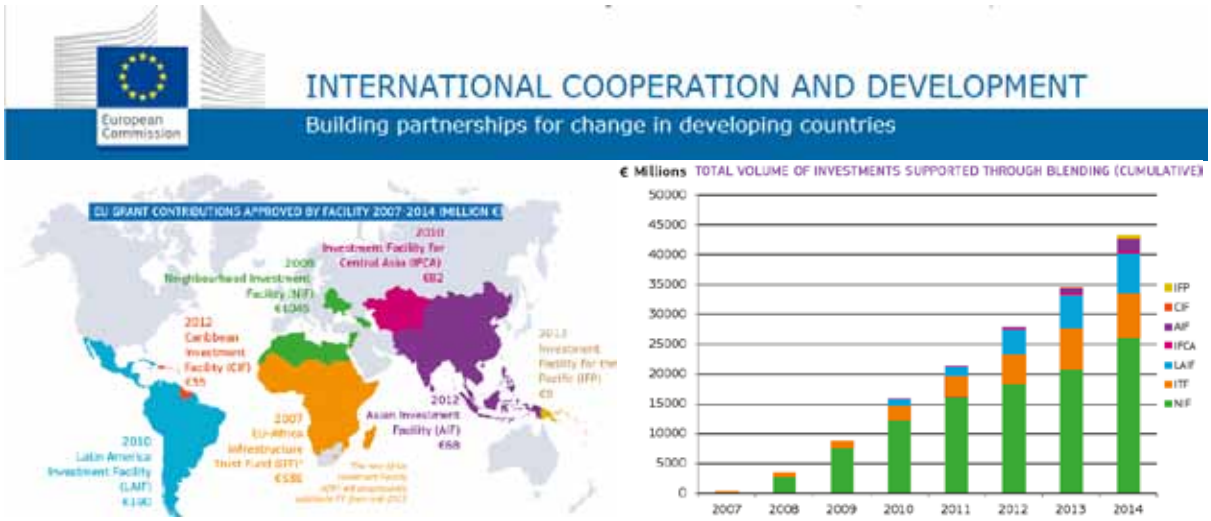

Fig. 7. **Basic blending data. On the left: geographic extension of the main EU instruments using a blending strategy: apart from Central Asia, most main developing countries are covered. On the right: the dramatic increase of EU's available financial volumes for said blending activities is clearly visible, with a clear focus on the EU neighbourhood countries (green)**

Source: EU (2015), EU Blending — European Union aid to catalyse investments. Explanation of the blending mechanism. URL: https://ec.europa.eu/europeaid/sites/devco/files/leaflet-eu_blending-2015_en.pdf; EU (2019), Innovative Financial Instruments (blending). Brochure and information. URL: https://ec.europa.eu/europeaid/policies/innovative-financial-instruments-blending_en (accessed on 30.04.2020).

- final beneficiaries: increased access to public services, infrastructure and credit, to increase socio-economic development;
- financiers: mitigate the risk of investing into new markets and sectors;
- European Union: leveraged impact of EU aid, improved aid effectiveness through greater donor and lender coordination.

The report [13] provides the list of IFCA's "environmental and social project criteria".

5.2. Two key concepts characterize IFCA: additionality and leverage

What do these concepts mean? They are relevant for higher educational processes because of their collaborative approach and their distributed roles in the overall financial decision process.

- **Additionality** — what the EU contribution will add specifically to the project in terms of the benefits defined in the application form[4].
- **Leverage** — third party funds, mobilised by the EU contribution which finance the project (*Fig.* 8)[5].

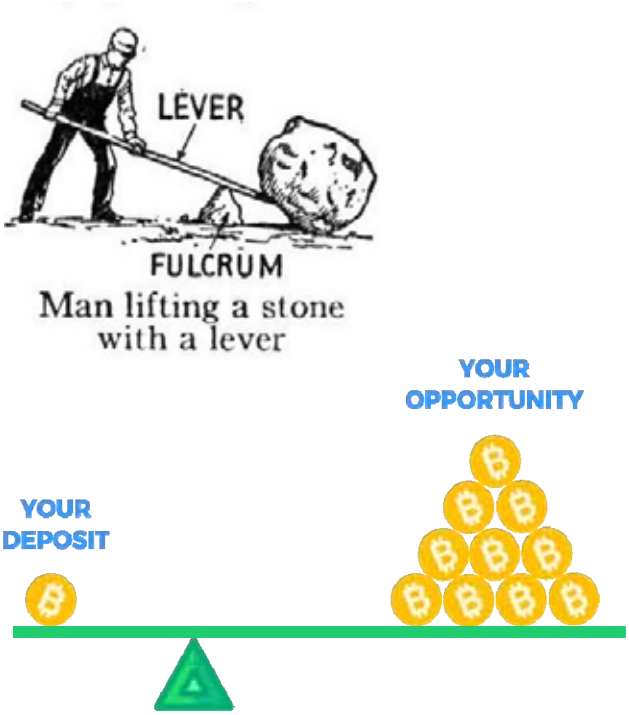

Fig. 8. **The principal functioning of leverage: the raised weight is more than the effort, both in the case of physics (on the left) and of financing (on the right); the "B" symbols represent any funds**

[4] EIB (2016). The European Investment Bank. Including relevant subpages. URL: http://www.eib.org/about/index.htm (accessed on 30.04.2020).

[5] EU (2015), EU Blending — European Union aid to catalyse investments. Explanation of the blending mechanism. URL: https://ec.europa.eu/europeaid/sites/devco/files/leaflet-eu_blending-2015_en.pdf; EU (2019), Innovative Financial Instruments (blending). Brochure and information. URL: https://ec.europa.eu/europeaid/policies/innovative-financial-instruments-blending_en. (accessed on 30.04.2020).

Fig. 9. **On the left: situations in which blending appears as helpful and suitable. On the right: blending rules distinguish between three basic sets of financial institutions (FIs) being qualified for different roles of Lead FI and Supporting FI**

Source: Investments and EU Blending: ppt file from the training for EC staff, 25–27 October 2017, New Delhi, India.

Blending as such is defined as the strategic use of a limited amount of grants to mobilise financing from partner FIs and the private sector to enhance the development impact of investment projects (see *Fig.* 8).

5.3. Themes for IFCA

The *Investment Facility for Central Asia* (IFCA) is the instrument with which the European Union supports the development priorities of its partner countries in the Central Asia region. The facility provides assistance in implementing key infrastructure projects that contribute to inclusive and sustainable growth in the region. Since its launch in 2010, the IFCA has helped beneficiary countries in Central Asia to implement major energy, environmental and social programmes that have had a significant impact in terms of economic growth and job creation[6]. Some of the present analysis was performed for Central Asia[7].

The larger political context framing IFCA is:

- **New European Consensus for Development**: alignment with 2030 Agenda for Sustainable Development and Addis Ababa Action Agenda on Financing for Development
- IFCA's catchword is: from millions to trillions!
- IFCA's ultimate goal is: job creation and inclusive sustainable growth.

Like the other EU blending facilities, the IFCA steps in (see *Fig.* 9) when the market fails to offer sufficient or affordable financing for capital-intensive infrastructure projects that have the potential to promote inclusive and sustainable socio-economic development and change people's lives. By using grant funding, the IFCA has leveraged loans from finance institutions to implement infrastructure projects in the five countries of Central Asia.

The IFCA's overarching aim is to contribute to sustainable development and economic growth in the region. To achieve this, it focuses on projects with the goal of improving **energy infrastructure** and **social service** systems, particularly in health and education. It also aims to increase **protection of the environment** and to support partner countries in their efforts to adapt to and mitigate the effects of **climate change**. A key aim of the facility is also to tap into the potential of the **private sector**, particularly small and medium-sized enterprises (SMEs), as an engine to generate growth and create jobs.

The European Commission allocated €166 million to the IFCA for 2010–2016. The IFCA uses this funding to provide support in a number of ways. Contributions are made to projects in the form of investment grants, technical assistance or risk capital and other risk sharing instruments (*Fig. 10*). Sometimes the IFCA contribution can be a combination of two or three of these elements. Investment co-financing has been the primary form of support used by the facility over the past six years, accounting for 61% of total IFCA contributions. Technical assistance, which helps ensure the long-term sustainability of projects, has accounted for almost 31% of support, and risk capital has accounted for 8%.

The IFCA sets up partnerships with multilateral and bilateral European Finance Institutions, Regional Development Banks, partner countries and

[6] IFCA (2016). Investment Facility for Central Asia. URL: https://ec.europa.eu/europeaid/2016-operational-report-ifca-aif-ifp_en (accessed on 30.04.2020).

[7] Wecoop2 (2017). EU-Central Asia enhanced regional cooperation on environment, climate change and water. EU project, co-organising the EU-Central Asia Working Group on Environment and Climate Change. URL: http://wecoop2.eu/ (accessed on 30.04.2020).

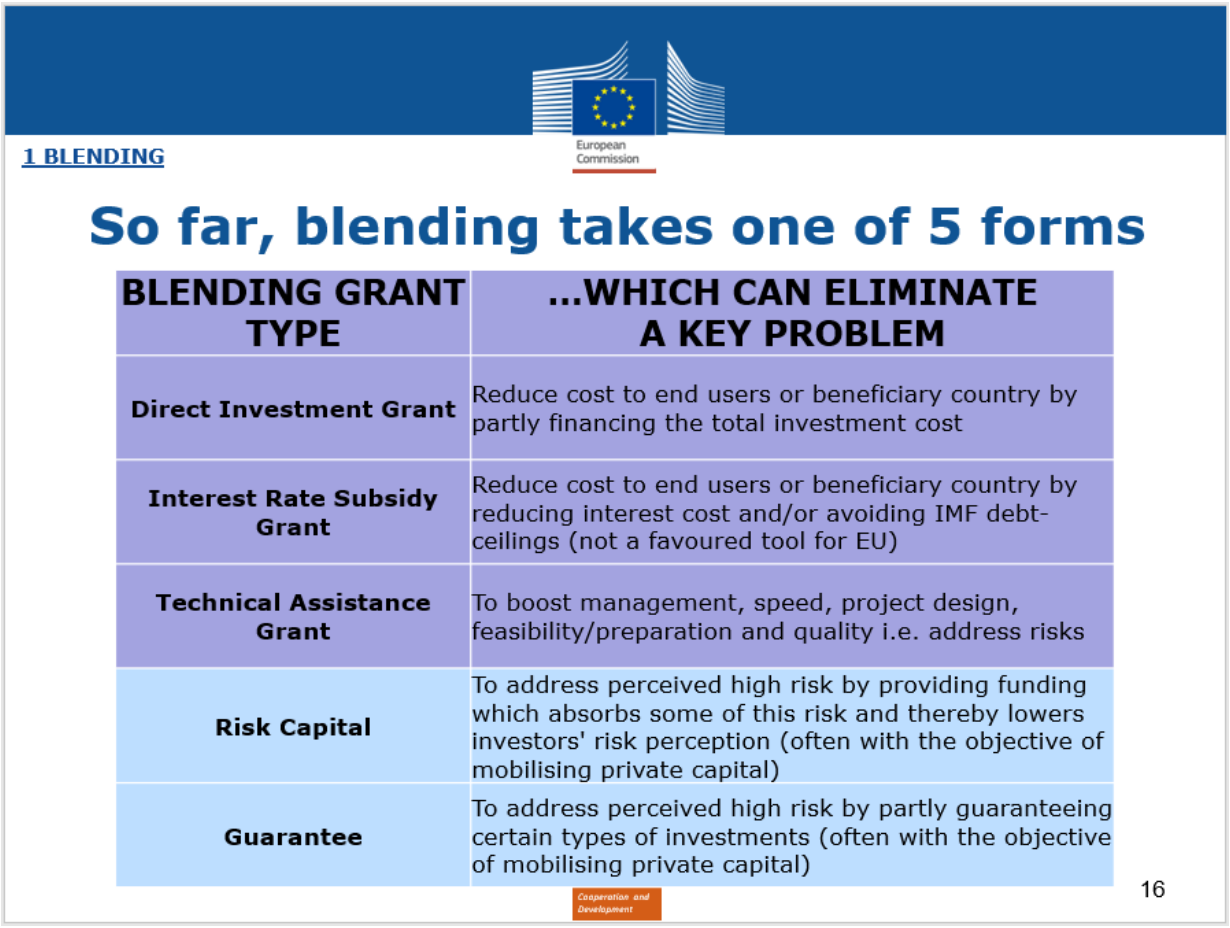

Fig. 10. **Five forms of blending after the Commission definition (EU 2017: 137)**

Source: Investments and EU Blending: ppt file from the training for EC staff, 25–27 October 2017, New Delhi, India.

beneficiary institutions in Central Asia. The range of international expertise and regional knowledge that these partnerships provide ensures that IFCA funding is used to the greatest possible effect. Furthermore, the IFCA Board, which is made up of representatives from the European Commission, Member States and other donors, works closely with the European Commission to ensure overall coherence of IFCA operations.

Global warming mitigation measures include:

- limiting the emission of greenhouse gases caused by human activity;
- improving energy efficiency and increasing energy saving;
- increasing the production and use of renewable energy;
- protecting and/or enhancing greenhouse gas sinks and reservoirs.

Global warming adaptation measures include:

- reducing human and environmental vulnerability to the impact of climate change;
- promoting climate change adaptation technologies, including the related infrastructures;
- measures for emergency prevention and preparedness to cope with natural disasters.

At the 21st Session of the Conference of Parties to the United Nations Framework Convention on Climate Change (COP21) in Paris in December 2015 [23], countries pledged to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

When tentatively comparing the foci of action of those IFIs cooperating most often under the IFCA umbrella to date, it may be observed that

- WB concentrates among others on water resources, power lines and power grids;
- EBRD concentrates on water supply, sanitation and renewable energy;
- ADB concentrates on water resources, agriculture and irrigation.

WB often gives loans to state governments, EBRD addresses the private sector and local governments; ADB addresses both.

6. ON THE META-LEVEL: IFIS' ROLE IN COLLECTIVE LEARNING

Evolution, and especially economic evolution (see Section 2) is understood in this article as being fuelled by collective learning procedures. Similar to individual learning, where personal world views develop, collective understandings and world views evolve through *collective learning*.

This brief IFI analysis was conceptualised and started on the basis of practical experience with IFIs, namely during the largest EU environmental project in Central Asia, where the author (acting as long-term environmental governance and climate change expert) invited several experts from each portrayed IFIs to quarterly conferences with the target to implement ten large-scale transboundary infrastructure projects in the five Central Asian states in cooperation with their governments.

Based on the author's university teaching experience since 1997 (and subsequent three decades of development of didactic procedures), he perceives the design of institutional structures as analogous to advanced, *collective learning design*. Insertion of humanitarian responsibility into our tertiary education[8] is actually a very profound target of all pedagogy.

In this article, combating climate change is seen as a learning endeavour which need suitable global institutions with suitable rules, procedures and structures. This article investigates how these should look like.

The question is: Can International Financial Institutions (IFIs) save the globe from the greenhouse effect and from global warming? When couching in a (neo-)liberal philosophy, which is optimistic of the options for free-market forces to optimally allocate resources[9] [3] to direct climate-relevant action, then possibly the answer is yes.

However, such optimism necessitates clearly guided framework conditions for the functioning of "free" optimal allocation of capital to available project ideas.

Actually, during the past years, practically all such IFIs (list below) established catalogues of "environmental and social quality criteria" which should guide project proposals to optimally obey long-term global society's preferences for sustainability. More specifically, project proposals presented to IFIs for (co-) financing are measured against these detailed quality criteria, and if a proposal does not sufficiently meet the criteria it will not be funded. Such quality criteria in the field of environment will represent the main body of the present article. These were analysed in 2017 by the author and an "Investor Guide" [13] for large infrastructural projects was created (*Fig. 11)*. In the context of the then largest environmental EU project in Central Asia, the "Investor Guide" has the target to inform actors and stakeholder such as governments and industry about options to receive funding for large infrastructure projects of some 10–100 M€ per project [24]. In practice, several IFIs are co-financing such large, and often transnational projects, such as large dams, power plants, irrigation systems, agricultural amelioration, regional waste management — briefly, often climate change mitigation and adaptation projects.

This article understands the act of establishing a rule-based procedure for identifying global infrastructure construction as an act of "*collective, global learning*".

Today in our rule-based societies, higher education providers use sets of quality criteria for defining, implementing and monitoring quality on the level of individual learning. Equally, in the domain of "*collective learning*", such compliance [25] has to be guaranteed: the world's international financial institutions (IFIs) and their "environmental and social quality criteria" are here seen as a lever for society to master the new challenges of climate change in a worldwide environment full of competitors, and competing paradigms.

First, infrastructure projects (such as powerplants, dams or waste management plans) proposed to IFIs are urged to satisfy Quality Assurance criteria to improve their operations. Second, they must satisfy the society's needs for lifelong employability. Third, they have to enhance a respectful economic culture through leading to competency-based societal build-up.

The deeper meaning of an IFI is to support materialisation of societal values. For selecting submitted projects, IFIs use appraisal procedures with quality criteria on environment and climate change.

Again, in this article, the additional target (beyond portraying IFIs' work) is to highlight in which way their actions can be perceived as "societal learning" or "collective learning" with humanity facing the challenge of global warming. IFIs are portrayed and evaluated while keeping in mind that these are key players in the endeavour of mankind's learning experience of how to manage global change, globalisation, and especially climate change.

In this view, the role of an IFI is *at the same time the role of a learner and of a trainer* for learning of other agents (by imposing their rules on the project application and financing mechanism), mainly of project implementers such as large international companies

[8] EUCEN (2017), UNIBILITY — University Meets Social Responsibility. URL: http://www.eucen.eu/projects/unibility (accessed on 30.04.2020).

[9] WB (2017), The World Bank. URL: http://treasury.worldbank.org/cmd/htm/GreenProjectCycle.html (accessed on 30.04.2020).

Fig. 11. **The author's "Investor Guide" for large infrastructural projects to be co-financed by IFIs collected information on their "environmental and social quality criteria" [13]. Stakeholders (i.e., learners in the endeavour of societal learning) use it as "course manuscript" guiding through fact-based content of their learning endeavour. The graphical composition of the title pages shows the target to inform stakeholders in Central Asia (on the left) about IFIs' options to pour" money into these five countries, symbolized by the shape of a funnel targeting this geographic region (on the right)**

and governments [26]. Thus, and because of their institutional situatedness amidst the global control system of finances, IFIs can be in a position to considerably accelerate "global learning", i.e. humanity's answer to global warming.

In comparison to individual learners, all IFIs (such as the World Bank, European Bank for Reconstruction and Development EBRD, European Investment Bank EIB, Asian Development Bank ADB etc.) can be perceived as "collective learners" are strongly committed to environmental sustainability and social equity and apply targeted sets of project quality criteria [27] accordingly to support investment decisions. As a quick example describing the main European Union bank, EIB had defined four priorities[10], supporting projects that make a significant contribution to sustainable growth and employment, specifically in the following four priorities: (1) innovation and skills, (2) SMEs (small and medium enterprises) and midcaps (companies with middle-size share values), (3) infrastructure, and (4) climate and environment.

As a case study on the level of sovereign republics (representing the real actors and subjects of "collective learning") in the area of Central Asia, the EU had launched a regular consultative process entitled the "EU-Central Asia Working Group on Environment and Climate Change"[11] which is intended to the professionals of Central Asian state administrations who are involved in identification and preparation of international investment projects in the areas of Environment, Water and Climate Change.

The main purpose of this "collective learning process" [16] is to:

[10] EIB (2016), The European Investment Bank. Including relevant subpages. URL: http://www.eib.org/about/index.htm (accessed on 30.04.2020).

[11] WGECC (2017), EU-Central Asia Working Group on Environment and Climate Change. Regular consultative process on the state level. URL: http://wecoop2.eu/events/ (accessed on 30.04.2020).

- apply economic knowledge and procedural skills required to develop bankable project proposals that are compatible with the *requirements of climate change*;
- to raise awareness on mechanisms and conditions of various relevant IFIs and donors providing funds for climate change adaptation and water and environment projects;
- to improve knowledge on preparation and submission of project proposals;
- to support implementation of concrete measures included in relevant policies or strategies and promote exchange of experience between actors and countries.

7. CONCLUSIONS AND RECOMMENDATIONS

The target of this article was planned as twofold:

- (1st) Inform everybody interested about the roles and rules of IFIs, and to understand their activity as part of an endeavour of worldwide "societal learning", namely to protect our planet from global warming and other environmental and social threats. IFIs have an increasing option to act as ally when fighting climate change — even if this might still seem unexpected when sticking with old implicit subjective convictions.
- (2nd) To inspire those from the educational community who are willing to draw conclusions from the domain of "societal learning" for their own work in "individual learning" — when courageously deliberating the potential hypothesis that individual and societal learning might have common structural success factors.

Regarding the *first* target: as explained at the end of article 3, the Europe-centred IFIs were fastest to incorporate climate protection necessities into their structures and procedures. While AFD and KfW exhibit strong self-conviction of being leaders in adapting their criteria sets for project assessment to the needs of climate protection, the practical implementation of this lucky self-definition is still to be expected. Together with the "EU's bank" EIB, and to a lesser extent EBRD, who both declare climate protection as important mission targets, these IFIs should coordinate their enhanced versions of "environmental and social project criteria". Such cooperative effort should be supported by well-established national environment agencies, preferably from EU countries, with high level of experience in international projects.

Regarding the *second* target: in "collective learning", the establishment and implementation of clear success criteria was diagnosed as being an essential prerequisite. Additionally, the unceasing renewal of success criteria on the basis of recent scientific findings and in the light of how these recently proved to work or fail. Performance analysis and "manoeuvre critique" will enable the learning actors (i.e. IFIs) to swiftly adapt their definition of targets, operational criteria, and thus primary "work products", namely funded large-scale infrastructure projects. Analogously, in "individual learning", a pragmatic and very quick re-adaptation of a learner's ethic orientation may be essential if the learner wants to survive. Else, sinking down into negligence and lack of relevance for society would be the result. As many of us, i.e. the readership of this volume, might work in tertiary education, the structural reluctance of university structures to renew themselves might serve as an example to be avoided. The author claims that universities and academies of science should be any society's location where societies rejuvenate themselves, but not petrify. The author's personal experience suggests that both in the former USSR and in Europe the design and selection of curricula often reflects the societal needs from half a century ago, but not of the present and future. Structural modernisers such as our youth[12] should thus individually target to overcome the bias of classical disciplinary content definition at universities and take the risk of non-classical avenues for higher formation.

Summing up, this article has been undertaken to portray the endeavour of establishing worldwide sets of "social and environmental criteria" (under whatever name they may appear in different IFIs) as a task of global "collective learning" in the face of the global climate crisis.

The article enumerated the various sets of such criteria that are employed to filter out non-sustainable project applications (at least in theory — and to an unknown degree also in practice) and suggests that they represent a meaningful step towards worldwide rule setting.

The *main conclusion* is that the toolboxes (i.e., the criteria lists plus the project application procedures) from *individual* learning may also be applied to *collective* learning and *vice versa*. Thus, all enhancement provided by "individual pedagogy and didactics" should be invested into "collective pedagogics and didactics", including knowledge on how to maintain high levels of enthusiasm, professionality and achievement.

[12] FFF (2020), Fridays for Future. International youth movement. URL: https://www.fridaysforfuture.org/ (accessed on 30.04.2020).

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Equity Crowdfunding in the Eurasian Economic Union (EAEU)

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ABSTRACT

The **aim** of this article is to provide a comprehensive research and analysis about fundraising through equity crowdfunding or crowdinvesting compared to venture capital and other forms of equity financing in the Eurasian Economic Union member countries. The relevance of the research is conditioned with the fact that equity crowdfunding is one of the fastest growing capital raising platforms and has become a popular financing option for start-ups and early-stage companies. Analyzing generally accepted **methods** for evaluating early-stage companies, the authors propose to use the venture capital method combined with scenario analysis for determining the value of companies in order to raise funds on equity crowdfunding platforms. The statistical data of the EAEU countries were researched on macroeconomic development, stock markets, fintech, etc. This market is expected to grow year by year, but **results** show that for now it is still underdeveloped in the Eurasian Economic Union member states. The **conclusion** is that several regulatory and institutional reforms can enable the growth of equity crowdfunding, thereby diversifying potential sources of equity financing for start-ups and early-stage companies. The suggested approach can be applied by regulators.

Keywords: finance technologies; equity crowdfunding; crowdinvesting; EAEU; early stage financing; raising capital; venture capital; private equity; investors; crowdfunding platforms

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INTRODUCTION

Finance technologies (FinTech) are among the fastest-growing markets. They beat many other industries by the pace of development both in terms of financial performance and the number of end-consumers.

The financial services industry is being transformed by insurgent startups very quickly, each year more companies are becoming unicorns, getting higher equity funding, and exiting through IPO. The need to raise capital is one of the largest financial services subsectors, where equity crowdfunding platforms are utilizing the power of technology to create a new source of funding start-ups.

Equity crowdfunding is a platform where startups or early-stage unlisted private companies raise capital from the crowd by selling the securities (shares, convertible note, debt, revenue share, etc.) to investors. Unlike in traditional crowdfunding platforms, investors in equity crowdfunding expect to make a profit if the company which they chose for investment grows. In traditional crowdfunding campaigns, companies raise capital by selling their products and once investor receives the product, the sides have no obligations against each other. Equity crowdfunding provides investors partial ownership of a company where investment was made [1, 2].

There are many scientific publications covering equity crowdfunding from different perspectives and scientific aims, from emphasizing the role of policy implementation and regulation for equity crowdfunding [3, 4] to researching the operational side and outreach factors in developing countries via collecting and analyzing the data from different stakeholders of an ecosystem through surveys [5–7]. Other scholars are looking at the equity crowdfunding through the prism of how it influence and strengthen the entrepreneurial finance ecosystem [8–10]. The capital structure and rates of returns for crowdfunding ventures and portfolios is another area of the recent research [11–13]. All these scholars to some extent agree that equity crowdfunding can become a useful complement to the start-up ecosystem and serve to the interests and demands of different stakeholders from business angels and investment community to start-ups.

To achieve its aim, the rest of this paper is organized as follows: Section 2 presents equity market overview of the EAEU (Eurasian Economic Union) member states. Section 3 describes the state of the global crowdfunding industry and how platforms operate in a sample of one of the leading platforms — Seedrs. Section 4 analysis the crowdfunding industry in the EAEU member states. Section 5 discusses the valuation of early stage ventures for equity crowdfunding campaigns. Section 6 summarizes the key challenges, opportunities, and the future of the equity crowdfunding industry in the EAEU member states. Finally, Section 7 concludes this work, lists the key findings and results.

EQUITY MARKET OVERVIEW OF THE EAEU (EURASIAN ECONOMIC UNION) MEMBER STATES

The Eurasian Economic Union (further refers to: EAEU) is an international organization for regional economic integration providing for free movement of goods, services, capital, and labor, pursues coordinated, harmonized and single policy in the sectors determined by the Treaty and international agreements within the Union, including creation of a single services market and protocol of financial services. The member-states of the Eurasian Economic Union are the Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic and the Russian Federation[1].

Some macroeconomic indicators determining the sustainability of the economic development of the EAEU member states, 2018 (*Table 1*).

The macroeconomic indicators shows there are divergences in both life standard (Russia and Kazakhstan are 7 times higher in GDP per capita than Kyrgyzstan) and fiscal policy (Armenia and Kyrgyzstan have deficit, while other the EUEA states have surplus, Armenia and Kyrgyzstan have 5 to 6 times higher government debt to GDP ratio compare with Russia).

This difference imposes additional challenge for the union in the pursuit of further integration of institutions and markets.

Russia is the highlighted leader in FinTech industry, where Kazakhstan is trying to catch-up, while other states, being comparably small economies, are still far from creating competition (*Table 2*)[2].

Equity markets in the EAEU countries are still behind debt markets in total volumes (*Table 3*).

Russia has the most developed equity market among the EAEU states. The equity markets consists of public equity and private equity, mainly PE & VC funds (*Table 4*).

[1] Eurasian Economic Union. URL: http://www.eaeunion.org/?lang=en#about (accessed on 14.02.2020).

[2] Center DCR. Private FinTech as a tool for sustainable business development in Russia and Kazakhstan.

Table 1

Macroeconomic indicators of the EAEU member states

Indicator	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia
Surplus / deficit of the consolidated budget general government, as a percentage of GDP	–1.6	3.8	2.8	–0.3	2.9
General government debt, % of GDP	55.63	37.21	25.81	55.98	9.97
Inflation rate (consumer price index), %	2.5	4.9	6.0	1.5	2.9
Gross Domestic Product, growth/decline	5.2	3.0	4.1	3.5	2.3
GDP per capita PPP, USD	10,343	19,995	27,880	3,885	27,147

Source: compiled by the authors based on the data of the Eurasian Economic Commission. URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/econstat/Pages/statpub.aspx (accessed on 16.02.2020).

Table 2

A snapshot of the EAEU FinTech market 2018

Indicator	Russia	Kazakhstan
Fintech market size, USD million	780	44
Total M&A value, USD million	289	n/a
1Consumer sentiment index	0.43	0.08
Number of employed in FinTech industry	3,652	1,675
The average number of B2C clients	102,000	58,000
The average number of employees in FinTech companies	15	42
FinTech Company average age	3	5
The average number of B2B clients	352	370
The number of transactions	17	n/a

Source: compiled by the authors based on the research data of Deloitte CIS Research Center. URL: https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/research-center/FinTech-Market-Trends%202018-en.pdf (accessed on 19.02.2020).

Total trade volumes of stock exchanges of the EAEU member states, excluding Russia are just 2.5% of the volume of the Russian market.

PE and VC funds combined are about 11% of the Russian public equity market (stock market) in 2018, while PE funds volume was about 81% and VC funds volume was the remaining 19% of the private market. Share of the state capital was about 30% and private capital was 70% of the total volume of PE funds. As of 2018, there were 71 PE and 189 VC funds in Russia.

Table 3

Trading volume on major stock exchanges (million USD) of the EAEU member states

		2014	2015	2016	2017	2018	2019
Total trade volumes	Armenia	14,439	2,086	129	181	192	153
	Belarus	31,600	19,914	14,327	12,709	13,693	17,709
	Kazakhstan	245,695	270,936	237,100	457,071	334,883	307,548
	Kyrgyzstan	28	2,010	1,453	1,377	1,748	87
	Russia	9,156,413	9,126,721	14,017,831	14,851,290	12,127,116	13,041,049
Incl.							
Government securities	Armenia	70.5	25.0	95.3	134.5	117.9	103.5
	Belarus	1,097.9	855.7	1,278.3	1,443.6	2,109.4	1,388.3
	Kazakhstan	5,637.0	1,269.3	1,668.0	5,994.4	4,323.9	4,784.3
	Kyrgyzstan	6.1	0.2	1.1	0.0	0.0	0.1
	Russia	78,203.8	60,083.9	100,448.6	152,604.6	217,746.8	247,341.6
Corporate Debt Securities	Armenia	2.4	0.9	3.9	5.4	46.1	21.1
	Belarus	2,377.7	2,161.2	1,737.1	939.6	1,637.0	1,799.1
	Kazakhstan	2,726.6	3,619.2	1,522.7	3,483.1	6,069.3	7,124.1
	Kyrgyzstan	0.0	3.6	5.6	10.0	8.6	14.9
	Russia	110,293.1	93,018.6	140,512.1	302,747.5	211,801.8	208,498.2
Stock Market	Armenia	60.6	2.6	13.6	24.9	4.4	5.0
	Belarus	40.5	10.9	25.9	42.7	44.3	16.2
	Kazakhstan	882.9	2,650.0	752.3	814.9	1,419.4	536.3
	Kyrgyzstan	21.6	49.0	137.4	57.5	48.1	72.2
	Russia	182,778.8	128,941.4	152,937.1	159,469.2	155,893.3	201,001.1
Derivatives market	Armenia	0.0	0.0	0.0	0.0	0.0	0.0
	Belarus	5.1	0.9	0.0	0.0	0.0	0.0
	Kazakhstan	7.2	0.0	0.0	66.7	n/a	n/a
	Kyrgyzstan	n/a	n/a	n/a	n/a	n/a	n/a
	Russia	1,089,895.0	1,285,810.6	1,900,376.2	1,466,951.8	1,284,903.3	1,330,575.2
Foreign exchange market (excluding Repos)	Armenia	648.2	308.0	3.8	9.3	0.0	n/a
	Belarus	25,992.6	14,528.3	9,411.0	8,688.4	7,674.1	8,133.9
	Kazakhstan	185,194.4	195,016.6	108,390.5	223,959.4	123,827.7	105,313.0
	Kyrgyzstan	n/a	1,526.9	1,244.0	1,158.5	1,242.8	n/a
	Russia	4,062,434.0	4,264,893.0	5,439,683.9	6,035,931.0	5,014,610.5	4,979,170.1
REPO transactions (secondary market)	Armenia	13,657.3	1,749.7	12.0	7.3	23.1	23.7
	Belarus	2,085.9	2,357.0	1,874.8	1,595.0	2,228.5	6,371.5
	Kazakhstan	51,247.1	68,381.3	124,766.3	222,752.1	199,243.0	189,789.8
	Kyrgyzstan	n/a	430.1	65.3	151.5	448.2	n/a
	Russia	3,632,808.7	3,293,973.9	6,283,873.2	6,733,586.2	5,242,160.0	6,074,462.5

Source: compiled by the authors based on the data of Eurasian Economic Commission. URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/fin_stat/time_series/Pages/stocks.aspx (accessed on 21.02.2020).

Table 4

Total volume of PE and VC funds in Russia

Volume of funds, million USD	2013	2014	2015	2016	2017	2018
Volume of PE and VC funds	**26,251**	**25,991**	**22,386**	**19,566**	**20,398**	**22,065**
Volume of PE funds	**21,616**	**21,633**	**18,539**	**15,772**	**16,549**	**17,892**
Share of state capital in the total volume of PE funds	*23.01%*	*20.47%*	*14.09%*	*15.71%*	*26.23%*	*29.99%*
Share of private capital in the total volume of PE funds	*76.99%*	*79.53%*	*85.91%*	*84.29%*	*73.77%*	*65.11%*
Volume of VC funds	**4,635**	**4,358**	**3,848**	**3,794**	**3,849**	**4,173**
incl.						
Seed stage capital	*498*	*536*	*423*	*404*	*428*	*446*
Non-seed stage capital	*4,137*	*3,822*	*3,425*	*3,390*	*3,358*	*3,665*
Share of state capital in the total volume of PE funds	*37.55%*	*35.33%*	*27.82%*	*23.47%*	*21.88%*	*27.68%*
Share of private capital in the total volume of PE funds	*62.45%*	*64.67%*	*72.18%*	*76.53%*	*78.12%*	*72.32%*
Number of PE and VC funds	260	264	263	247	253	260
Number of PE funds	94	89	82	73	71	71
Number of PE funds with state capital	5	5	5	6	8	10
Number of PE funds with private capital	89	84	77	67	63	59
Number of VC funds	166	175	181	174	182	189
incl.						
Number of seed capital funds	28	35	34	32	35	36
Number of non-seed capital funds	138	140	147	142	145	149
Number of VC funds with state capital	49	52	56	52	50	51
Number of VC funds with private capital	117	123	125	122	132	138

Source: compiled by the authors based on the yearbook data of Russian Venture Capital Association (RVCA). URL: http://www.rvca.ru/rus/resource/library/rvca-yearbook/ (accessed on 11.03.2020).

In 2018, the volume of PE and VC investments dropped to USD863 million, from that of USD1,492 million in 2017. The major stake, USD801 million, of 2018 investment went to the expansion stage PE and VC investments, USD16 million was Seed and Start-up stage investments, USD26 million — to early growth and another USD16 million — to later-stage investments (*Table 5*).

It is worth mentioning that in 2018, invested capital was a tiny fraction of committed capital of the funds, which is an indication of both weak demand from early and later-stage start-ups and scale-ups for institutional private funding and underdeveloped ecosystem for entrepreneurial finance.

There were exits of the total amount of USD76 million in 2018 in the Russian private equity market, of which USD73 million were sales to financial investors and USD2 million MBOs. The number of PE exits were 10, while VC exists were 20 (*Table 6*).

Table 5

Volume of PE and VC investments in Russia

Volume of funds, million USD	2013	2014	2015	2016	2017	2018
Volume of PE and VC investments	**2,645**	**879**	**1,043**	**818**	**1,492**	**863**
incl.						
Seed and Startup	*74*	*41*	*23*	*15*	*22*	*16*
Early growth	*169*	*80*	*36*	*28*	*316*	*26*
Expansion	*1,193*	*647*	*720*	*639*	*984*	*801*
Restructuring	*40*	*0*	*64*	*0*	*0*	*0*
Later stage	*1,168*	*107*	*182*	*132*	*167*	*16*
Share of state capital in the total volume of PE & VC investments	*33.32%*	*26.13%*	*59.53%*	*65.34%*	*56.29%*	*65.79%*
Share of private capital in the total volume of PE & VC investments	*66.68%*	*73.87%*	*40.47%*	*34.66%*	*43.71%*	*34.21%*
Volume of PE investments	**2360**	**726**	**893**	**687**	**1359**	**691**
incl.						
Seed and Startup	0	0	0	0	0	0
Early growth	0	0	0	0	275	0
Expansion	1152	619	633	555	917	675
Restructuring	40	0	64	0	0	0
Later stage	1168	107	182	132	167	16
Volume of VC investments	**285**	**153**	**150**	**130**	**133**	**172**
incl.						
Seed and Startup	74	41	23	15	22	16
Early growth	169	80	36	28	41	26
Expansion	41	28	87	84	67	125
Restructuring	0	0	0	0	0	0
Later stage	0	0	0	0	0	0
Number of PE and VC investments	**218**	**256**	**203**	**212**	**196**	**203**
Number of PE investments	**30**	**26**	**13**	**7**	**15**	**18**
incl.						
Early growth	0	0	0	0	1	0
Expansion	23	24	7	6	13	17
Restructuring	2	0	2	0	0	0
Later stage	5	2	3	1	1	1
Number of VC investments	188	230	190	205	181	185
incl.						
Seed and Startup	103	171	113	120	91	94
Early growth	72	40	49	48	55	30
Expansion	13	18	22	35	32	35

Source: compiled by the authors based on the yearbook data of Russian Venture Capital Association (RVCA). URL: http://www.rvca.ru/rus/resource/library/rvca-yearbook/ (accessed on 11.03.2020).

Table 6

Volume of PE and VC funds exits in Russia

Volume of funds, million USD	2013	2014	2015	2016	2017	2018
Volume of Exits of PE and VC funds	4,800	3,763	1,927	601	52	76
IPO	1,087	952	0	0	0	0
SPO	95	0	265	0	0	0
Stock trading	472	361	382	0	0	0
Sale to strategic investor	800	207	26	110	23	0
Sale to financial investor	1,346	1,640	1,240	480	29	73
MBO	0	0	0	0	0	2
Write-off	0	0	0	0	0	0
Share buyback	1,000	0	0	0	0	0
Full/part asset sale	0	1	0	0	0	0
Other/Unknown	0	602	14	11	0	1
incl.						
Volume of Exits of PE funds	4,794	3,735	718	535	0	55
Volume of Exits of VC funds	6	78	1209	66	52	21
Number of Exits of PE and VC funds	20	41	50	50	23	30
incl.						
Number of Exits of PE funds	8	20	16	5	2	10
Number of Exits of VC funds	12	23	34	45	21	20

Source: compiled by the authors based on the yearbook data of Russian Venture Capital Association (RVCA). URL: http://www.rvca.ru/rus/resource/library/rvca-yearbook/ (accessed on 11.03.2020).

Table 7

Volume of PE and VC funds in Kazakhstan

Volume of funds, million USD	2013	2014	2015	2016	2017	2018	2019
Volume of PE & VC funds	1,850	2,240	2,240	2,240	2,330	2,330	2,570
Volume of committed PE & VC investments	580	840	840	840	930	930	1120
Number of funds	8	11	12	12	13	13	15

Source: compiled by the authors. URL: https://home.kpmg/kz/ru/home/insights/2019/09/private-equity-report.html (accessed on 24.02.2020).

The volume of Kazakhstan's PE & VC funds[3] is about 12% of Russia's funds as of 2019 (*Table 7*).

Granatus Ventures, HIVE are technology venture capital firms in Armenia, currently managing portfolios of about 20–25 high-tech startups that have together attracted over $100m from VC firms.

It is expected to launch Armenia's National Venture Fund in 2020, which will manage as much as $100 million by 2027[4].

The Russian-Belarusian venture investment fund RBF Ventures was established in December

[3] Private Equity Market in Kazakhstan. KPMG; 2019.

[4] Armbanks.URL:http://www.armbanks.am/en/2019/12/18/126079/ (accessed on 03.03.2020).

Table 8

The Venture Capital & Private Equity Country Attractiveness Index 2018

EAEU member state	Rank	Score
Armenia	77	48.1
Belarus	97	33.9
Kazakhstan	57	56.3
Kyrgyzstan	94	36.8
Russia	39	63.5

Source: compiled by the author based on the IESE Business School data. URL: https://blog.iese.edu/vcpeindex/ranking/ (accessed on 24.02.2020).

2016, which provides investments in the amount of 25 million roubles for projects in the early stages and up to 140 million roubles for companies in the growth stage. Its total size is 1.4 billion roubles. The investors of the fund are the Belarusian Innovation Fund (Belinfond), RVC and RVC Infrafund that at the first stage invested 50%, 49%, and 1% respectively[5].

The development of the venture capital ecosystem in the EAEU is not rapid. Unlike the leading countries in this area (such as China, USA, and UK), the EAEU and particularly Russia's venture funds have recently started making deals in the acquiring markets. However, every year, more and more venture deals are made, new funds are formed, and ventures get their desired investments. As for 2018, among the EAEU countries, Russia has the most attractive VC and PE market according to "The Venture Capital & Private Equity Country Attractiveness Index" (*Table 8*).

There are no available public data regarding the private equity returns of the EAEU member states PE and VC funds. Bain & Company in its recent report found that over the past 30 years, US buyouts have generated average net returns of 13.1%, compared with 8.1% for an alternative private-market performance benchmark, based on the Long-Nickels public market equivalent (PME) method and using the S&P 500 as the proxy. While a narrower look, just after the 2009 recession shows that the US public equity returns (IRR) matched the buyouts (later stage PE funds) returns at around 15% [14].

[5] RBF Ventures. URL: https://rbf.vc/news-en/325/ (accessed on 18.02.2020).

STATE OF THE GLOBAL CROWDFUNDING INDUSTRY AND HOW PLATFORMS OPERATE

Broadly speaking, crowdfunding can be divided into four main categories:

- Donation: funders as philanthropists that don't expect any direct return for their donations (e.g., GoFundMe, Kickstarter).
- Rewards-based: funders are expecting to get rewards/compensations in the form of final products, services (e.g. Indiegogo).
- Lending: funds are offered as a loan, with the expectation of some rate of return on capital invested (e.g., Lending Club, Funding Circle).

– P2P lending: investors and borrowers are individuals.

– P2B lending: investor is an individual, borrower is an entity.

– B2B lending: investors and borrowers are entities.

- Equity: funders are treated as investors, having participation in the projects (e.g., SEEDRS, Crowdcube, AngelList, CircleUp, OurCrowd) [15].

The term equity-based crowdfunding or crowdinvesting defines a variety of transactions where an unspecified number of investors come together in order to invest in a well-defined purpose. The following segment exclusively considers equity-based crowdfunding: investments in equity shares or profit-related returns (for example, royalties or convertible loans). Crowdinvesting has become a popular financing option for start-ups and is considered as a part of venture capital financing. Well-known platforms in this area are EquityNet, CrowdCube and Seedrs.

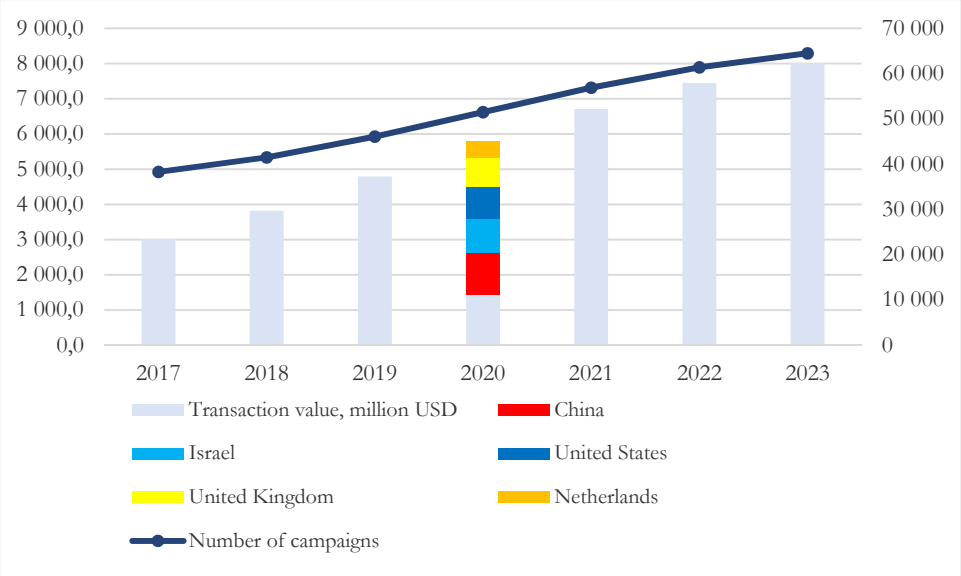

Fig. 1. **Transaction value and number of campaigns**

Source: compiled by the authors based on the data provided by Statista. URL: https://www.statista.com/outlook/377/100/crowdinvesting/worldwide (accessed on 02.28.2020).

Global equity crowdfunding (crowdinvesting) data:

- Transaction value in the crowdinvesting segment amounts to USD5,800.2 million in 2020.
- Transaction value is expected to show the annual growth rate (CAGR2020–2023) of 11.4% resulting in the total amount of USD8,014.6 million by 2023.
- The average funding per campaign in the crowdinvesting segment amounts to USD112,615 in 2020.
- In terms of global comparison, it is shown that the highest transaction value is reached in China (USD1,209 million in 2020)[6].

As shown in *Fig. 1*, equity crowdfunding global market is expected to grow year by year. It is expected that in 2020 top 5 equity crowdfunding markets China, Israel, United States, United Kingdom and Netherlands collectively will generate about 75% of the global crowdinvesting transaction value.

Equity crowdfunding global market transaction value and a number of campaigns (*Fig. 1*).

Seedrs is one of the leading platforms in the UK and comparably is one of the leaders in terms of the amount raised in the platform globally. It is a platform for investing in the equity of fast-growing startups and scale-ups.

The fundraising procedure at Seedrs consists of the following steps:

1. Submit a campaign — The detailed process of submission is explained below.
2. Create a video and marketing plan — The campaign video is one of the most important tools to engage the crowd by showcasing the business, team and current investors. At the same time prepare a marketing plan for warming up the investors.
3. Private launch — Shareholders, consumers and your network have the exclusive opportunity to invest before anyone else when the campaign launches privately.
4. Public launch — If the campaign demonstrates traction during the private launch, they will publish it for all to see on Seedrs. Campaigns run for up to 40 days. Once public, it's important that you get as many potential investors to see the compaign as possible.
5. Campaign hits 100% — After hitting the target, the campaign can stay open to take advantage of overfunding. After closing a round, Seedrs performs legal due diligence on the company and prepares documentation.
6. Receive all funds — Once that's all completed, the amount raised in the fundraising campaign is transferred, less Seedrs fee[7].

The process of submitting a campaign at Seedrs consists of 4 steps:

- Campaign submission — Entrepreneur submits the campaign copy to Seedrs.
- Initial screening — Campaign is reviewed to ensure it is viable, appropriate and engaging.

[6] Statista. URL: https://www.statista.com/outlook/377/100/crowdinvesting/worldwide (accessed on 02.28.2020).

[7] SEEDRS website. URL: https://www.seedrs.com/raise (accessed on 02.03.2020).

Fig. 2. **Map of the Russian crowdfunding market**

Source: compiled by the authors. Data source: DOMBASE. URL: https://rb.ru/opinion/rabotaet-li-kraudfanding-v-rossii/ (accessed on 12.03.2020).

- Detailed verification — Each statement is reviewed, and initial due diligence is performed.
- Campaign live — Once campaign meets the standards; it's approved and becomes available for investment.
- Quick facts about Seedrs:
- sector agnostic with investments raised for more than 17 different sectors;
- GBP 650 m + invested on the platform;
- 860 + deals funded:
- 9,700 + investor exits:
- 74% funding success rate[8].

Seedrs' latest Portfolio Update (2012–2017) shows that "on a fair value basis, early-stage and growth equity investing on Seedrs has produced outstanding annualized rates of return (IRRs)".

Platform-wide IRR12.02% exceeds that of most asset classes, and it increases to 26.42% when impacts of SEIS and EIS tax reliefs are taken into account.

Top decile (10%) of investors who have made 10+ investments have achieved outstanding average IRRs of 47.90% (62.45% when tax-adjusted); top quartile (25%) of these investors have average IRRs of 31.34% (46.74% tax-adjusted) [15].

There is a general optimism towards equity crowdfunding and there is a strong intuition, that it democratizes entrepreneurial finance. One research found that equity crowdfunding opens a diverse investor base, democratizing capital access for entrepreneurs [16]. Other studies found that equity crowdfunding mitigates market frictions in geography [17], entrepreneur gender [18], venture scale and sector[9].

Further, in large campaigns, angels take the lead, with the crowd following and filling their funding gaps, while in small campaigns, crowd plays a more pivotal role in campaign success while angels generally lack the interest.

In another recent interesting research conducted by Hellmann, Mostipan and Vulkan the following conclusions have been made: i) fundraising goal is highly important, ii) experienced teams (entrepreneurial experience & education) are asking for more, are more likely to be successful and raise more money, iii) female teams (especially all-female teams) ask for less, are equally successful and raise less money (but hold out for longer) [19].

CROWDFUNDING INDUSTRY IN THE EAEU MEMBER STATES

In the first nine months of 2019, the volume of the Russian crowdfunding market (the total volume of

[8] SEEDRS website. URL: https://www.seedrs.com/raise (accessed on 02.03.2020).

[9] UKBAA B. The UK Business Angel Market. 2017.

Table 9

Crowdfunding platforms in the EAEU member states (excl. Russia)

EAEU member states	Crowdfunding platforms
Armenia	Boostbloom, OneArmenia — rewards/donation crowdfunding platforms
Belarus	Ulej — rewards/donation crowdfunding platform
Kazakhstan	Start-time — rewards/donation crowdfunding platform
Kyrgyzstan	Hope — donation crowdfunding platform

Source: compiled by the authors based on the research data for the other EAEU member states.

Table 10

Scenarios and assigned probabilities

Base case scenario cash flows, 4% growth	25%
Base case scenario cash flows, 2% growth	25%
50% cash flows*, 4% growth	10%
50% cash flows, 2% growth	10%
Total bust**	30%

Source: assumptions based on industry practices, compiled by the authors.

* This scenario means that the cash flows forecasted in the base case scenario are halved due to the uncertainty and over-optimistic expectations.

** Given the high risk of a venture, there is probability of total write-off of the firm.

transactions in all segments) amounted to USD76 million, decreasing by almost 42% compared to the same period of 2018.

In 2019, the Russian B2B FinTech lending market registered the largest drop of 80.5% (USD12.5 million in 2019 compared to USD64 million in 2018). The declining trend was observed for more than a year — in 2017, the volume of this segment amounted to USD92 million.

The volume of the Russian P2P lending market in 2019 decreased by 70% (from USD3.9 million to USD1.2 million) compared to the previous year.

However, the largest crowdfunding segment — P2B lending — on the contrary, grew by 2.5% in the first nine months of 2019 compared with the same period of the previous year and reached USD59.8 million. The growth was not as explosive as a year earlier, when the volume of the segment in annual terms increased by 4.4 times.

The rewards-based segment also grew slightly by 2.3% up to USD1.93 million in 2019[10].

The main reason for the reduction of the crowdlending market in Russia is competition among banks.

Equity crowdfunding or crowdinvesting is still underdeveloped in Russia and the other EAEU member states. There are few equity crowdfunding platforms in Russia, e.g. StartTrack and Simex, while in the rest EAEU member states such platforms either do not exist or are in the stage of early formation (*Fig. 2*).

The EAEU member states (excl. Russia) mainly have rewards and donation crowdfunding platforms, with an underdeveloped crowdlending and crowdinvesting markets (*Table 9*).

There are no public data regarding the returns for the early-stage ventures, who raised funding equity crowdfunding campaigns in the EAEU.

VALUATION OF EARLY STAGE VENTURES FOR EQUITY CROWDFUNDING CAMPAIGNS

Obviously, the early stage ventures are highly risky investments and the valuation for such investments can be approached similarly with the early stage VC valuation techniques.

Despite that valuation is often looked at as art, rather than science, there are three widely used techniques for the early stage valuation:

- discounted cash flow (DCF) approach;
- scenario analysis (multi DCF);
- "venture capital" method [20].

[10] URL: https://www.rbc.ru/finances/18/11/2019/5dcd55c19a794751a1a5c3ca (accessed on 12.03.2020).

Discounted cash flow (DCF) approach

$$PV = \frac{TV}{(1+r)^t} + \sum_{h=1}^{t} \frac{CF_h}{(1+r)^h},$$

$$TV = (\text{final forecast cash flow}) \times \frac{(1+g)}{(r-g)},$$

where:

r — is the rate of discount;

g — is the growth rate;

t — is time to exit;

TV — is the terminal value.

Scenario analysis (multi DCF)

Multi DCF techniques also use the same DCF equations for calculating present value of future cash flows of the firm. The difference is, that there is one base-case scenario in the DCF technique, which could be over-optimistic and/or not represent main outcomes of potential scenarios.

For example, a venture can have several scenarios and assigned probabilities to them (*Table 10*).

Both DCF and scenario analysis (multi DCF) techniques are highly sensitive to the terminal value and to the discounting rate. Given that the early-stage venture's cash flows are not highly predictable, then for partially mitigating the uncertainty with the terminal value the scenario analysis (multi DCF) technique has a higher accuracy rate compared to the DCF technique.

Furthermore, the terminal values' share in the present value of the discounted future cash flows of the venture frequently counts somewhere between 70% to 90%, which shows high subjectivity of the assumptions underlying the DCF approach. The multi DCF approach can partially bypass this problem by assigning weights to the different scenarios regarding the future of a venture.

"Venture capital" method

The venture capital method (sometimes also known as First Chicago Method) is a technique which blends both multiples-based valuation and DCF approaches.

The formula for VC method is:

$$\text{Venture's Value} = E_t \times \frac{(P/E \text{ ratio})}{(1+r)^t},$$

where:

E_t — is earnings (income) at the time of exit;

P/E ratio — is the price to earnings ratio for similar ventures (or estimated);

r — is the required rate of return;

t — is the time of exit.

Earnings (income) at the time of exit is a highly subjective prediction, but given relevant market data regarding exits of similar firms in the industry, it can be based not so much on the optimistic views of the founders regarding their ventures, but more on the relevant market data. The calculations of ratios for similar ventures are still challenging given the lack of sufficient market information in the EAEU member states.

The rate of return, used in all three early-stage valuation techniques, as already mentioned is highly sensitive regarding the value of a firm and is considered as a black box for many entrepreneurs.

There is a common practice in the Silicon Valley ecosystem to apply discount rates in the range of 50% to 70% for early-stage start-ups.

Applied discount rates for an early stage ventures can be explained by the modified capital asset pricing model (CAPM) [21], with the additional risk premiums associated with the early-stage ventures.

The formula is:

$$CAPM(r) = R_{fr} + \beta \times (\text{market risk premium}) + R_l + R_{va} + R_{cf},$$

where:

R_{rf} — is the base rate of return for the risk-free investment;

$\beta \times$ (market risk premium) — is the systematic risk premium, for the sensitivity of the return on the stock to the return on the market as a whole;

R_l — is the liquidity premium, for investing in the private company, which compared to the investment in the public company stock is characterized by illiquidity, defined as the inability to convert the holding to cash at their full value in a reasonable period of time;

R_{va} — is the value-added by a venture capitalist, who is an active investor and mentor to the firm they invest in. They usually engage in the process of high-level decision making regarding the strategy, C-level executive team hiring and firing;

R_{cf} — is the cash flow adjustment premium. Given that the nature of a start-up venture requires reinvestment of generated cash flows, there are highly limited options for an investor to get some cash inflows during the period prior to the full or partial exit of a firm.

The beta and market risk premium could be calculated based on the Russian stock market data and be used for the other EAEU member states through

the country and currency risk adjustments[11]. The premium for the liquidity and cash flow adjustment to some extent can also be calculated based on comparison with more liquid investments, while the value-added premium is highly subjective.

The venture capital method can be deployed with the scenario analysis approach for testing to what extent the discount rate and the assumption regarding earnings (income) at the time of exit are affecting the outcome of the value of a venture.

CHALLENGES, OPPORTUNITIES, AND THE FUTURE OF THE EQUITY CROWDFUNDING INDUSTRY IN THE EAEU MEMBER STATES

The equity crowdfunding industry in Russia and the other EAEU member states face some challenges, but also, there are opportunities for a potential entrant (further referred to as Platform), which is intending to dominate the EAEU market [22].

Supply and demand-side economies of scale: the platform should gain enough projects, as well as attention from the crowd quickly to benefit both from an economy of scale and gain its market presence. There are significant costs of branding and marketing, as well as operational costs for a platform, which can be breakeven if a critical mass of projects and the crowd gathers around it. Demand-related projects have very limited time to raise funds, if the platform is a waste of time, they will better directly go to VC funds and angel investors.

Customers switching costs: from a perspective of funding alternatives, there are no major switching costs from a platform to a VC or an Angel investor as soon as the project has its pitch deck and valuations. Although in the process of already launched crowdfunding campaigns, the switching costs are relatively high, since the platform will already or in accordance with the conditions charge a project fee for listing.

Capital requirements: the launch of a new equity crowdfunding platform requires significant costs of marketing and branding; the development of the platform requires a business model and solid algorithms.

Incumbent advantages independent of size: track records in the industry are critical for gaining new projects to be listed at the platform, while an innovative business model can disrupt the status quo of incumbent players and the market.

Bargaining power of suppliers: in the majority cases, platforms are operating peer to peer without any intermediary organizations and individuals. While advisory firms can be treated as suppliers of valuations and management advisory services, which can affect the decision-making process and value chain of the fundraising at the platforms.

Bargaining power of investors: the information regarding listed projects at the platforms is very limited, it is practically impossible for an investor to conduct due diligence of a project, and campaigns are open to unsophisticated investors. The sequential nature of crowdfunding may include pledge herding, abstention herding, and information cascades, which affects the rationality of investment decisions and/or investors' actions.

Threat of substitute funding sources: VC & PE funds, alongside Angel Investors, are dominating the equity funding industry. On the flip side, the picture is changing in developed countries, especially in the UK, where the share of equity crowdfunding is growing rapidly in comparison to the growth rates of PE & VC funds. Thus, this innovative financing alternative could gain even faster penetration in the EAEU if the infrastructure, ecosystem, and regulation play in favor of this FinTech area.

Impact of new legislation: for boosting equity crowdfunding industry in the EAEU states, new legislative reforms are required, particularly addressing the following issues:

- tax incentives;
- procedures for ensuring that the public understands the basics of investing in start-ups (e.g. investors self-certification after tutorial and quiz);
- regulatory focus on disclosures on investors' side;
- standardization of valuation, adoption of industry-standard International Private Equity Valuation (IPEV) Guidelines.

Rivalry among existing competitors: at the first stage, the competition will be wider, the platform should compete with existing VC & PE funds, which will be tough and intense competition. As the case with the Russian crowdlending shows, the peer-to-peer lending market dropped significantly in 2019 due to the intense competition from the Russian banks softening the process of SME lending.

In the second stage, after the formation of the equity crowdfunding industry and gaining a solid market share of equity capital allocation, the

[11] One of the open sources for such analysis is the Aswath Damodaran's calculations. URL: http://pages.stern.nyu.edu/~adamodar/ (accessed on 12.03.2020).

competition will switch more between the platforms. The more agile, innovative, better positioned from the branding and marketing perspective, user-friendly platforms will have the potential to gain a competitive advantage from enabled capabilities of the industry and the business model particularly.

CONCLUSION

Finance technologies markets are growing rapidly. Among them equity crowdfunding is one of the fastest growing capital raising platforms worldwide. Crowdinvesting has become a popular financing option for early-stage ventures and is considered as a substitute to the traditional venture capital financing and Angel investment. The popular global crowdfunding platforms are EquityNet, CrowdCube, Seedrs, AngelList, CircleUp, OurCrowd. Top 5 countries with developed equity crowdfunding markets in the world are China, Israel, United States, United Kingdom and Netherlands.

Equity crowdfunding is still underdeveloped in the EAEU member states, and there is no dominant player in the market. Among 5 EAEU countries, only Russia has a few equity crowdfunding platforms. The rest of the EAEU countries have mostly rewards and donation crowdfunding platforms. The valuations of projects on the crowdfunding platforms can be conducted by deploying three widely used techniques: DCF, scenario analysis (multi DCF) and the venture capital method, while we suggest using the latter with the blend with the scenario analysis approach using the modified CAPM formula discussed in this article. Furthermore, legislative reforms are required for boosting the equity crowdfunding industry in the EAEU member states and for enhancing competitiveness of this form of funding and consequently diversifying the spectrum of funding sources and instruments for start-ups and early-stage companies.

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Investments in the Transaction Sector and Financial Assets: Impact on Economic Growth

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ABSTRACT

Investments are distributed unevenly in the economy. This distribution between economic sectors and activities (financial and non-financial) determines not only the dynamics of sectors, but also their contribution to economic growth. **The aim** of the article is to assess the impact of investments in the transaction and non-transaction sectors and the sectors themselves based on their gross value added on economic growth, as well as the impact of investments in financial assets on gross domestic product. The financial sector is an integral part of the transaction sector. Therefore, it is important to consider the impact of investments on economic growth, especially to compare it within countries. The **research methodology** employed the method of structural analysis, econometric modeling, and comparative analysis. The study **resulted** in structural models built to assess the GDP growth rate from investments in the transaction and non-transaction sectors, as well as changes in GDP from investments in financial and non-financial assets. The econometric models helped establish that the transaction sector and the investments in it make the largest contribution to the growth rate in the Russian economy, while financial investments largely weaken the economic dynamics, since the gap between financial and non-financial investments is rapidly increasing. In the other countries, the imbalance between financial and non-financial investments is less pronounced, which reduces the inhibitory effect of financial investments. The analysis of the countries provides the characteristics of their economic dynamics regarding the impact of investments in the transaction sector and financial assets. **The general conclusion** is that the economic growth policy in the Russian economy should consider the impact of investments in financial assets and attempt to narrow the gap with investments in non-financial assets. This will not only increase the sustainability of economic dynamics, but also the contribution of investments to economic growth.

Keywords: transaction and non-transaction sectors; financial assets; investments; economic growth; investment function; contribution of investments in growth rate; contribution of sectors to growth rate; institutional bias of the financial market

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INTRODUCTION

A classic paper on defining the transaction sector in the economy is the article by J. Wallis and D. North written in 1986 [1], where the authors establish a methodological basis for measuring and including the transaction sector in the system of national accounts. On the one hand, they specify the concept of the transaction sector in economic theory, reducing it to a set of types of transaction activities, in contrast to transformation activities (purely production activities), characterized by the costs of exchange organized by sales agents, intermediaries, as well as information search and provision services. On the other hand, the theoretical definition of the sector makes it possible to identify the method of its empirical definition, in particular, by the wages of employees in transaction occupations and providing transaction services — finance, real estate, banking and insurance, legal practice, government trade and services.

However, highlighting purely transaction activities, the paper indicates that there is a certain share of services in non-transaction activities, i.e. transaction activities due to the functioning of intermediaries [1].

Over time, this approach has evolved from different perspectives, for example, in assessing the reduction of emissions that affect climate change. Excluding transaction costs underestimated the total costs [2]. The transaction sector was reducing transaction costs on average, thereby contributing to economic growth. It was showing this effect of home and host country banks on international investment and economic growth [3]. Certainly, transaction costs affect economic growth both in the transaction and non-transaction sectors, where they are included in the total costs. At the same time, institutional innovations, in particular, trade innovations related to transaction management methods, can significantly reduce transaction costs [4].

The approach by J. Wallis and D. North [1], somehow referred to by works [2–4], comes down to considering the total transaction costs for all types of transaction activities, also included in the non-transaction sector. The task of summarizing all types of transaction costs has a right to exist, but in this case, the transaction sector is considered as a certain aggregate sector, which in reality does not exist as an economic unit, since part of transaction costs is disengaged from non-transaction activities (sectors).

In my opinion, this is a model approach, useful in accounting for all transaction activities at the macroeconomic level, which affect economic growth [5–8], considering that such an aggregate sector (in terms of costs covering activities distributed in the economy) is not a sector in the subject-economic sense. The reason is that the activities are actually mixed up even within the two named sectors (transaction and non-transaction). There may be another approach to highlighting the transaction sector in the economy. It includes all definitions of activities with predominantly transaction costs, since their activity is associated with implementing transactions and provision of services. In this case, the indicated activities are distinguished by the Russian Classification of Economic Activities (OKVED). The other activities, not related to the transaction tones, make up the non-transaction sector. This may also include infrastructure elements — energy supply, water supply, waste management, etc. However, it does not include, for example, financial and banking activities, which make up a significant segment of the transaction sector [9].

However, the transaction sector also needs investments in fixed assets, whose state determines the effectiveness of transactions (the value of transaction costs). In particular, the quality of computers and software, and sufficiency in appropriate equipment, will determine the effectiveness of information operations, search, as well as the costs of transactions and financial and banking transactions. This is important for both the transaction and non-transaction sectors.

Investments in the transaction and non-transaction sectors are likely to have different effects on the economic dynamics. The contribution to the economic growth of these two sectors will also differ in each country. Neoclassical models of economic growth [5, 6] hardly consider this circumstance following from the structure and condition of the sectors and determined both by the efficiency of transactions

and motives, the scale of tasks and the structure of investments in each sector [7, 8]. Typically, investments in fixed assets of the transaction sector are not as significant in size as in the non-transaction sector. However, with highly dynamic development of the transaction sector itself, they may be so, that their contribution will be substantial and even comparable (sometimes even higher) to the contribution of investments in the non-transaction sector to the country's economic growth.

In turn, the financial and banking segment of the transaction sector provides the so-called financial investments, or investments in financial assets. They are not considered regarding investments in the transaction sector, since accounting considers investments in fixed assets. However, their impact on economic growth, along with investments in non-financial assets, may be very tangible.

The aim of this study is to assess the impact of the transaction sector and investments in it on the economy (growth rate) emphasizing the impact of investments in financial assets on gross domestic product. This is an independent task in contrast to the studies establishing the impact of the economic structure on financial institutions and capital markets [10], or vice versa, the impact of the securities market, foreign investment and the banking system on the growth [11–13] — various impacts on various industries or even the absence of this impact. As a rule, such studies are based on various criteria and analyze a one-way impact, not cross-impact. This makes it difficult to adequately assess the impact, which is variable and depends on many factors. Apparently, the problem of impact should be reduced to measuring the contribution to the growth rate. For the transaction and non-transaction sectors, as well as investments in them, this can be done with the structure formula [8, 9], transforming it for various sectors and investments. As for financial investments not considered in GDP, it is possible to introduce a parameter for assessing their impact, measuring the superiority of financial investments over the difference in savings and investments in non-financial assets. Besides, it is possible to apply econometric models of the relationship between GDP and financial and non-financial investments, based on which to evaluate GDP growth rate depending on the investment rate of each of these types (financial and non-financial assets).

In this study, we will proceed from the fact that the gross domestic product (measured by gross value added) is the sum of the gross value added of two basic sectors — transaction and non-transaction, allocated by type of activity.

The transaction sector includes the following activities (by OKVED, by gross value added):

- wholesale and retail trade;
- repair of motor vehicles and motorcycles;
- transportation and storage;
- activities of hotels and catering facilities;
- information and communication activities;
- financial and insurance activities;
- real estate operations;
- professional, scientific and technical activities;
- administrative activities and related additional services;
- public administration and military security;
- social security;
- education;
- health activities and social services;
- culture, sports, leisure and entertainment activities;
- other types of services[1].

Thus, *the non-transaction sector* includes the following activities (by OKVED, by gross value added):

- agriculture, forestry, hunting, fishing and fish farming;
- mining;
- manufacturing industries;
- provision of electric energy, gas and steam;
- air conditioning;
- water supply;
- water disposal, waste collection and disposal, pollution elimination activities;
- construction.

Investments in the transaction and non-transaction sectors are the sum of investment by type of activity that compile each of these

[1] Gross value added of the sectors is shown in prices of 2005 for all countries considered in the article. Source: Rosstat. URL: https://www.gks.ru/accounts (accessed on 20. 04.2020).

economic sectors (by type of activity). According to Rosstat[2], investments in financial assets are investments of organizations in state and municipal securities, securities of other organizations, including debt securities with the specified date and redemption amount (bonds, bills); contributions to the authorized (joint) capital of other organizations (including subsidiaries and dependent business entities); loans granted to other organizations, deposits in credit organizations, receivables acquired through assignment, contributions of a partner organization under a simple partnership agreement, etc.[3]

We will now formulate the methodological basis for the necessary model quantitative estimates and will further move to an empirical analysis based on the introduced models.

INVESTMENTS IN THE TRANSACTION AND NON-TRANSACTION SECTORS OF THE ECONOMY. RESEARCH METHODOLOGY

Investments are distributed by sector of economy and type of activity, and this affects the overall economic dynamics. This distribution depends both on the expected return of these types of activities in these sectors, on their current state, and on the investors' decisions arising from the goals and objectives they face.

Fig. 1 shows a simplified communication scheme between economic sectors and transaction segments such as banks and the financial market, through which investments are made in financial and non-financial assets.

The country's national income in *Fig. 1* is divided into consumption, part of which is spent on the purchase of products created by the manufacturing, raw materials (non-transaction) and transaction sectors, and savings, whose significant share is accumulated by the banking system. It allocates loans for activities of three sectors, and allocates a certain part of the available financial resources to purchase securities in the stock market, thereby investing them through the purchase of corporate stocks. Consequently, besides their own funds generated from profit, corporations in these sectors receive investments in the form of loans and through the purchase of securities issued by them. We will consider two sectors — the transaction (*Yf*) and non-transaction (including, for example, the manufacturing and raw materials sectors — *Yn*), which give the total product of the economy $Y = Yf + Yn$. The volume of investments in the sector will determine the future possibilities for increasing the income generated by the sector, i.e. $Yf = f(If)$, where *If* is an investments in the transaction sector, $Yn = q(In)$. Then the total product is $Y = f(If) + q(In)$.

According to the structure formula [9, p. 88], the economic growth rate $g = f\,gf + n\,gn$ is the total growth rate of each sector ($gf = (1/Yf)\,d\,Yf/dt$; $gn = (1/Yn)\,d\,Yn/dt$) by its share in the total value product (income), where *f, n* are the shares of the income generated by the sector in the total income *Y* of the country's economy.

Investments in the transaction and non-transaction sectors add up to gross investment, i.e. $I = If + In$. Then, we apply this value in the expression for the gross product in terms of consumption $Y = C + I + G + Nx = C + If + In + G + Nx$ (*C* is the gross consumption; *G* is the government spending; *Nx* is the net export). We differentiate it by time and transform it, and then obtain a structure formula to assess the contribution of investments in each of the two sectors to the economic growth rate: $g = gC*c + gIf*df + gIn*dn + gG*a + gNX*b$ [9, p. 88], where df is the share of investments in the transaction sector in gross product; dn is the share of investments in the non-transaction sector in gross product; *gIf, gIn* is the growth rate of financial and non-financial investments. Producing the investment rate to their share by this formula

[2] Source: Rosstat. URL: https://www.gks.ru/folder/14476 (accessed on 20.04.2020).

[3] Investments in financial assets (financial investments) include equity instruments and units of investment funds, debt securities, options, forward contracts, other financial assets and liabilities. The World Bank. URL: https://data.worldbank.org/indicator/NE.GDI.TOTL.KD; International Monetary Fund. URL: https://data.imf.org/regular.aspx?key=61545853; Non-financial investments (investments in non-financial assets) — gross capital formation — consists of the costs to replenish fixed assets of the economy plus net changes in inventory balance. The World Bank. URL: https://data.worldbank.org/indicator/NE.GDI.TOTL.ZS; This view practically coincides with the Rosstat's definition. URL: https://www.gks.ru/folder/14476. https://www.gks.ru/accounts (accessed on 20.04.2020).

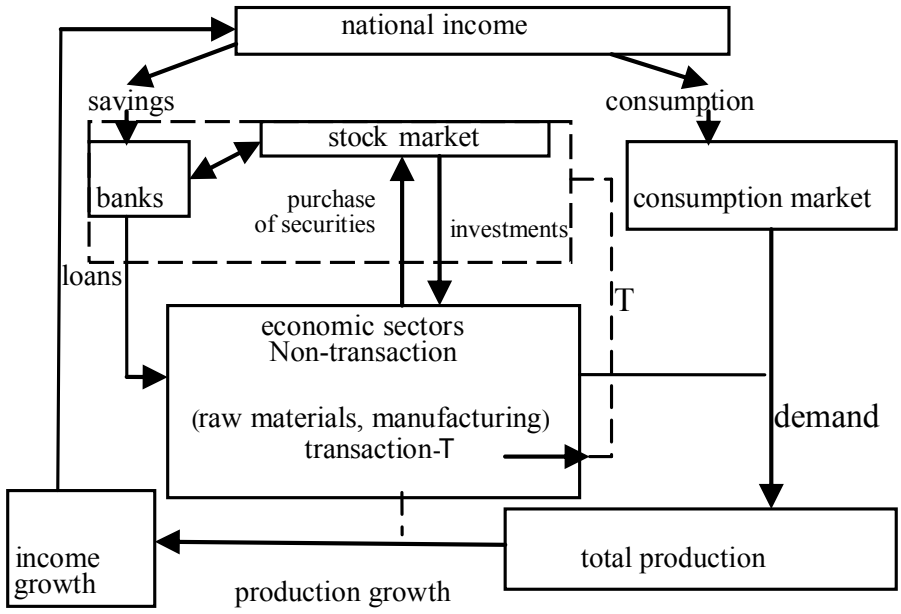


Fig. 1. **Sectoral relations structure: transaction (T) and other elements of macroeconomics**

Source: compiled by the author.

is the contribution of these investments to the product growth rate.

Financial investments may exceed GDP. Together with the investments in the non-transaction sector, they will not amount to gross investments. Therefore, the impact of investments in financial (F) and non-financial assets (N) can be examined with simple econometric models. Two types of such models are possible:

1) $Y = c + a\,F + b\,N$, then the structure formula will be as follows:

$g = a\,if\,g_F + b\,in\,g_N$, where a, b — are the model coefficients; if, in — are the share of financial and non-financial investments in the product Y; $g_F = (1/F)\,d\,F/dt$; $g_N = (1/N)\,d\,N/dt$ — is the investment growth rate in financial and non-financial assets, respectively[4];

2) $Y = AF^{\alpha}N^{\beta}$, then the growth rate will be $g = \alpha g_F + \beta g_N$, where α, β — are the exponents in the investment function of the product Y, or the substitution rate by financial investments for non-financial investments.

3) when assessing the impact of financial investments on economic development, an important parameter is the indicator $\gamma 0 = F/(S - N)$, where S is the total savings. Thus, this parameter shows the excess of financial investments over the difference between savings and investments in non-financial assets. If this difference grows, then the self-sufficient impact of the financial sector on the economy increases. If the parameter is negative, this indicates that the country is attracting capital for its development (investments in non-financial assets).

Ceteris paribus, the lower the interest rate on the loan is, the higher the investment is, and the higher the dividends per share are — the more attractive the stock for purchase is, i.e. investments in the corporate sector are increasing. Within the simplest model, this means that $I_o = n - mi + c\,d$, where I_o is the investment; $n > 0$, $m > 0$, $c > 0$ are the coefficients; i is the interest rate; d is the value of the dividend per security.

Thus, a positive growth rate of the interest rate (increase in interest) will inhibit the economic growth, and a positive growth rate of dividends in the real sector of the economy will contribute to the growth, the contribution to the overall rate will be positive (ceteris paribus). This is true under the assumption that the investment is related to the value of the interest rate and dividends. In the absence of such a connection and/or the presence of a different

[4] In this study, we use this type of model, whose statistics confirm the required accuracy.

assessment of the contribution to the overall growth rate will change.

Based on the formulated methodological base, we will build further research in three main areas, considering the Russian economy as an object:

- we will estimate the contribution of the transaction and non-transaction sectors to the economic growth rate, identifying the specifics of such dynamics;
- we will measure the impact of investments in the transaction sector on the pace of the economic dynamics compared with investments in the non-transaction sector;
- we will determine the gap of the financial sector by the amount of investments in financial assets from the real sector of the (non-financial) economy and estimate the contribution of financial and non-financial investments to the rate of economic growth using simple econometric models. As an example, we will conduct a comparative analysis with the United States and Germany (the data for China by financial investments are not available in the general source).

Thus, the proposed algorithm will become the basis for the necessary relevant conclusions on assessing the impact of investments in the transaction sector and in financial assets on economic growth.

CONTRIBUTION OF THE TRANSACTION AND NON-TRANSACTION SECTORS TO THE ECONOMIC GROWTH AND INVESTMENT STRUCTURE

We will now evaluate the contribution of the sectors of the Russian economy (by the product created and investments in the sector) to the economic growth rate according to the approach outlined in the previous section[5].

Fig. 2. shows the contribution of the transaction and non-transaction sectors of Russia to the economic growth rate for 2000–2018.

Fig. 2, a shows that within the framework of a two-sector view of the economy, the share of the non-transaction sector decreased, and that of the transaction sector increased in the period of 2000–2018. At the same time, the contribution of the transaction sector to the economic growth rate was the largest relative to the non-transaction sector, with the exception of 2004–2005, 2015, and 2017–2018. In 2009, 2015 and 2017–2018 the contribution of the transaction sector to the growth rate was negative (*Fig. 2, b*). A common feature of the sectoral dynamics was that over the period under review, the contribution of the two sectors, in general, decreased, since the growth rate also decreased. Thus, an increase in the share in the GDP of the transaction sector was accompanied by a decrease in the contribution to the overall growth rate; a decrease in the share of the non-transaction sector occurred with a decrease in its contribution.

Thus, we can conclude that the transaction sector makes a decisive contribution to the growth rate of the Russian economy over the considered period. However, after the 2015–2016 recession, the contribution ratio of the sectors changes, so that the transaction sector even inhibits the economic growth. Since the impact of the transaction sector on the economy is large, it is likely that the recession that occurs during the virus attack in 2020, will retain the negative contribution from this sector and will bring the greatest and fastest losses to it compared to the non-transaction sector.

Fig. 3–5 show the dynamics of the economic structure of the USA, China and Germany with an assessment of the contribution of the transaction and non-transaction sectors to the economic growth rate of these countries.

In the USA, where the share of the transaction sector is very high, it increases slightly with a decrease in the share of the non-transaction sector (*Fig. 3, a*). Moreover, the largest contribution to the economic growth rate comes from the transaction sector (*Fig. 3b*) over the entire interval, and this contribution increases (with a slight increase in the share of the transaction sector).

Among the examined countries, China shows the largest increase in the share of the transaction sector in the structure of GDP (*Fig. 4, a*). Moreover, the contribution of the transaction sector to the growth rate until 2005 is less, then comparable with the non-transaction sector until 2012. After 2012, the Chinese economy makes a greater contribution to the growth rate precisely due to the

[5] All calculations used the prices of 2005 for all countries. The gross value added (GVA) of the transaction and non-transaction sectors was determined as the total GVA of the activities included in each sector. These activities are defined in the introduction.

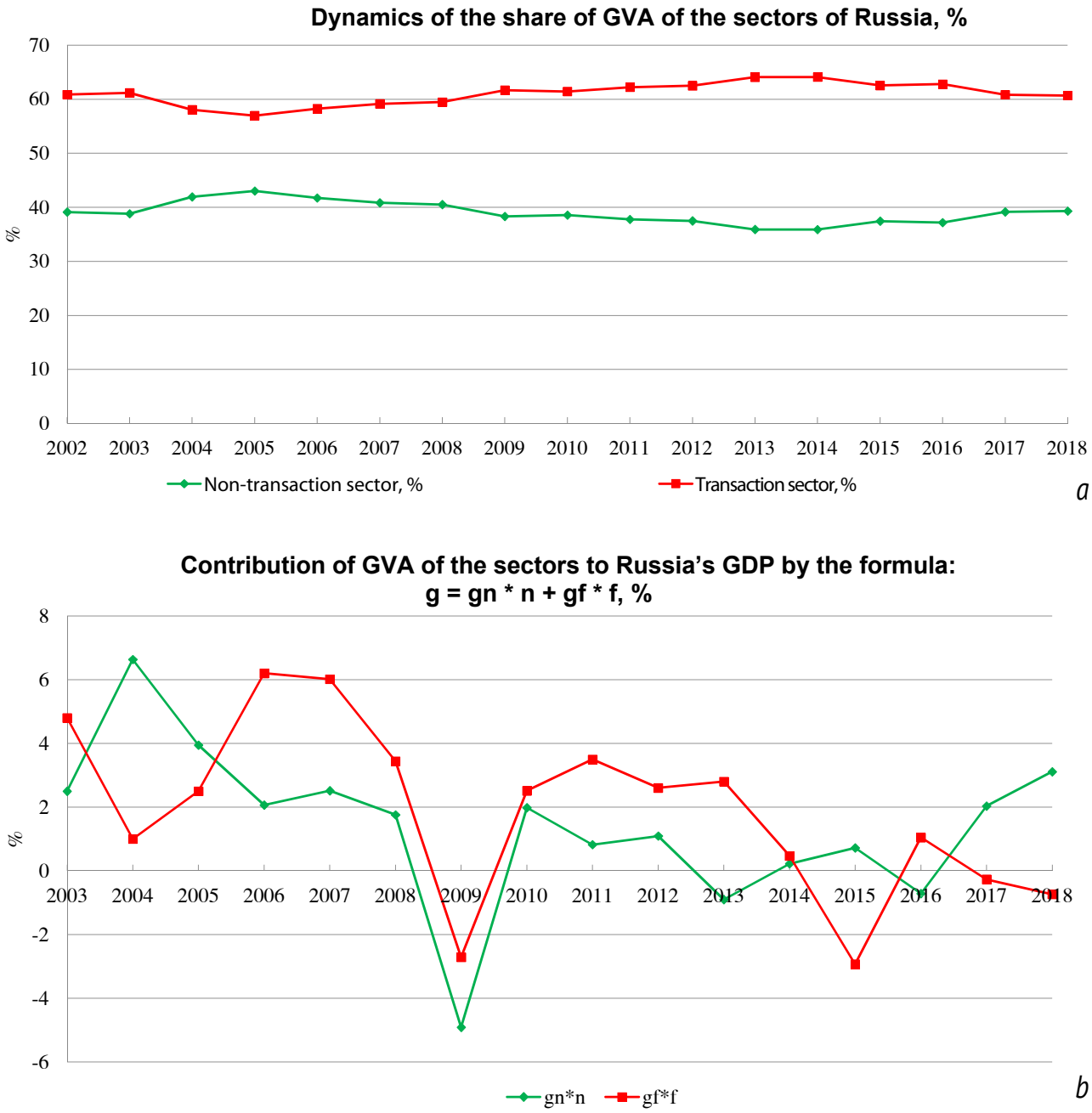


Fig 2. **Sectoral structure of the Russian economy — *a*, contribution of the transaction and non-transaction sectors to growth rate — *b*, 2000–2018**

Source: compiled by the author according to Rosstat. URL: https://www.gks.ru/accounts; https://www.gks.ru/free_doc/new_site/business/invest/tab_inv-OKVED.htm (accessed on 20.04.2020).

transaction sector; the contribution of the non-transaction sector significantly decreased (*Fig. 4, b*).

Unlike the other countries examined, the German economy shows a more or less stable two-sector structure (*Fig. 5, a*), with the non-transaction sector dominating in terms of its share of GDP. It also makes a greater contribution to the growth rate than the transaction sector. Therefore, the German economy can be considered the least transaction relative to the other countries. Moreover, the contribution of the sectors to the growth rate more or less corresponds to the existing structure, i.e. there is no dynamics of the contribution to the rate itself [increase or decrease with a change in the proportion between the sectors, which does not change significantly

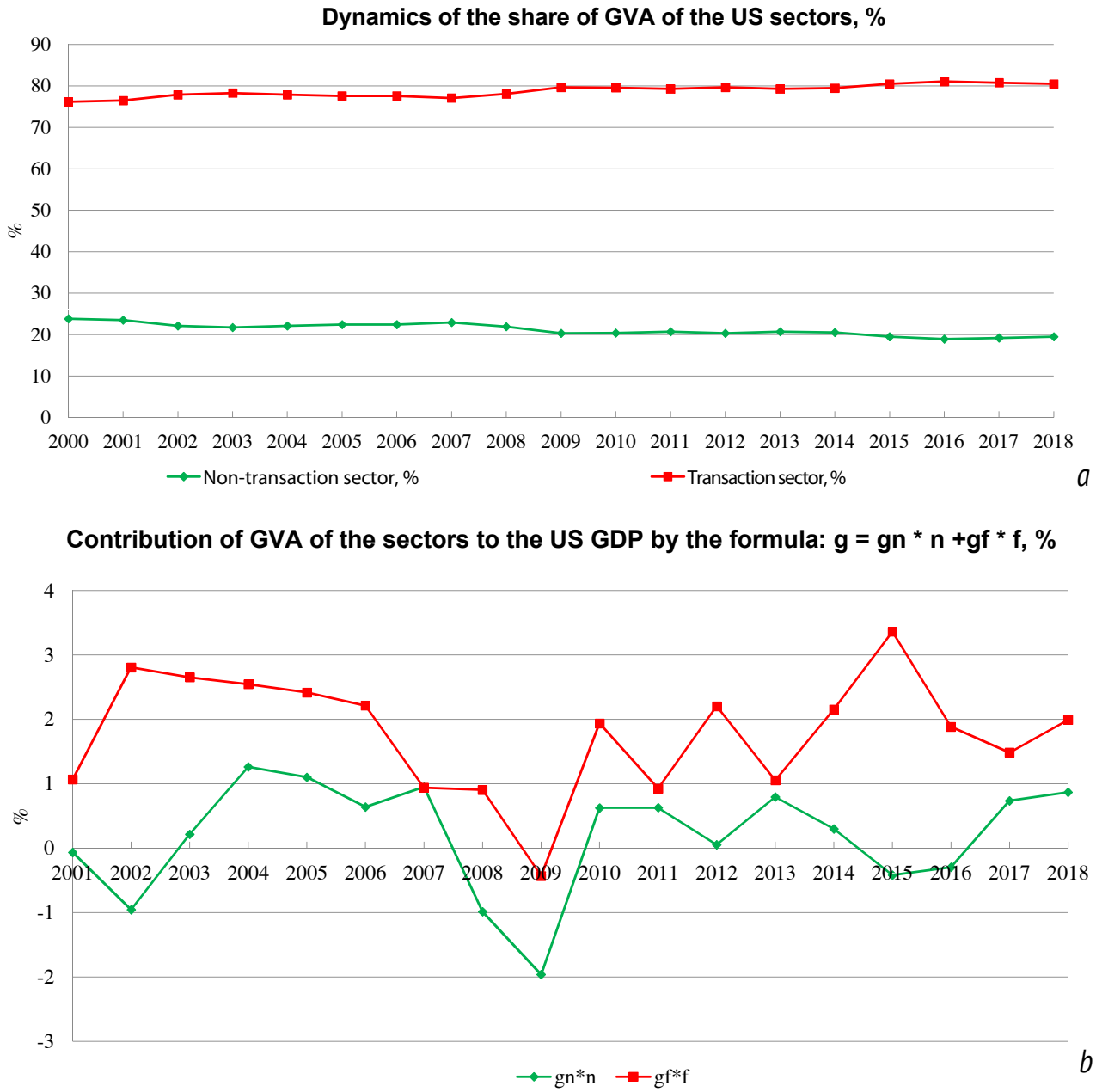


Fig 3. **Sectoral structure of the US economy — *a*; contribution of the transaction and non-transaction sectors to growth rate — *b*, 2000–2018**

Source: compiled by the author according to the World Bank. URL: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=US; US Bureau of Economic Analysis. URL: https://apps.bea.gov/iTable/iTable.cfm?reqid=56&step=2&isuri=1#reqid=56&step=2&isuri=1; https://apps.bea.gov/histdata/fileStructDisplay.cfm? HMI=8&DY=2012&DQ=Annual&DV=Comprehensive&dNRD=January-23-2014 (accessed on 20.04.2020).

(*Fig. 5, a*), in contrast to the other countries]. Only Germany, unlike the other countries, shows a change in the structure of the sectors in 2009 in favor of the transaction sector, and after the crisis, the proportion returns to the previous ratio.

As we see, the sectoral dynamics and the economic structure differ in the countries under review, as well as the impact of the sectors on the economic growth in each country. In this regard, it is appropriate to assume that investment[6] in the transaction sector affects not only its dy-

[6] Investments are shown in 2005 prices, considering the index — the GDP deflator.

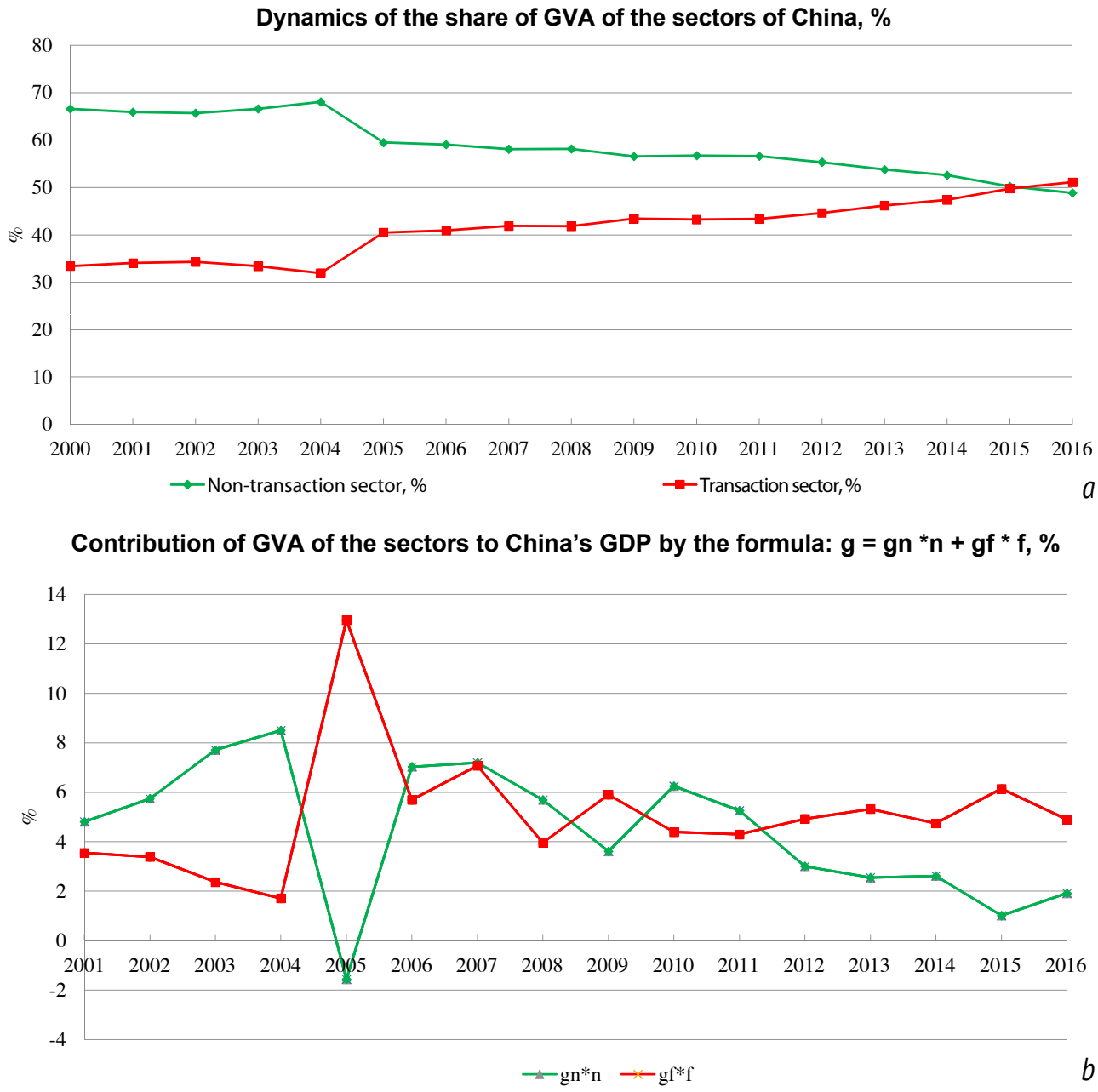


Fig 4. **Sectoral structure of the Chinese economy — *a*; contribution of the transaction and non-transaction sectors to growth rate — *b*, 2000–2016**

Source: compiled by the author according to the World Bank. URL: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=CN; National Bureau of Statistics of China. URL: http://www.stats.gov.cn/english/Statisticaldata/AnnualData (accessed on 20.04.2020).

namics, but also its contribution to the economic growth rate. It should be noted that the impact of investments in the sectors on the economic dynamics may differ from the impact of the sectors themselves (in terms of their overall dynamics). This circumstance is of fundamental importance from the position of the formation of a policy of economic growth. Therefore, we will assess the contribution of the investment structure (distributed between the two sectors) to the economic growth for Russia, the USA, China and Germany, focusing on the Russian economy (*Fig. 6, 7*).

As we see from *Fig. 6, a*, investments in the transaction sector make the largest contribution to the growth rate of the Russian economy, with the exception of 2017–2018. In the United States,

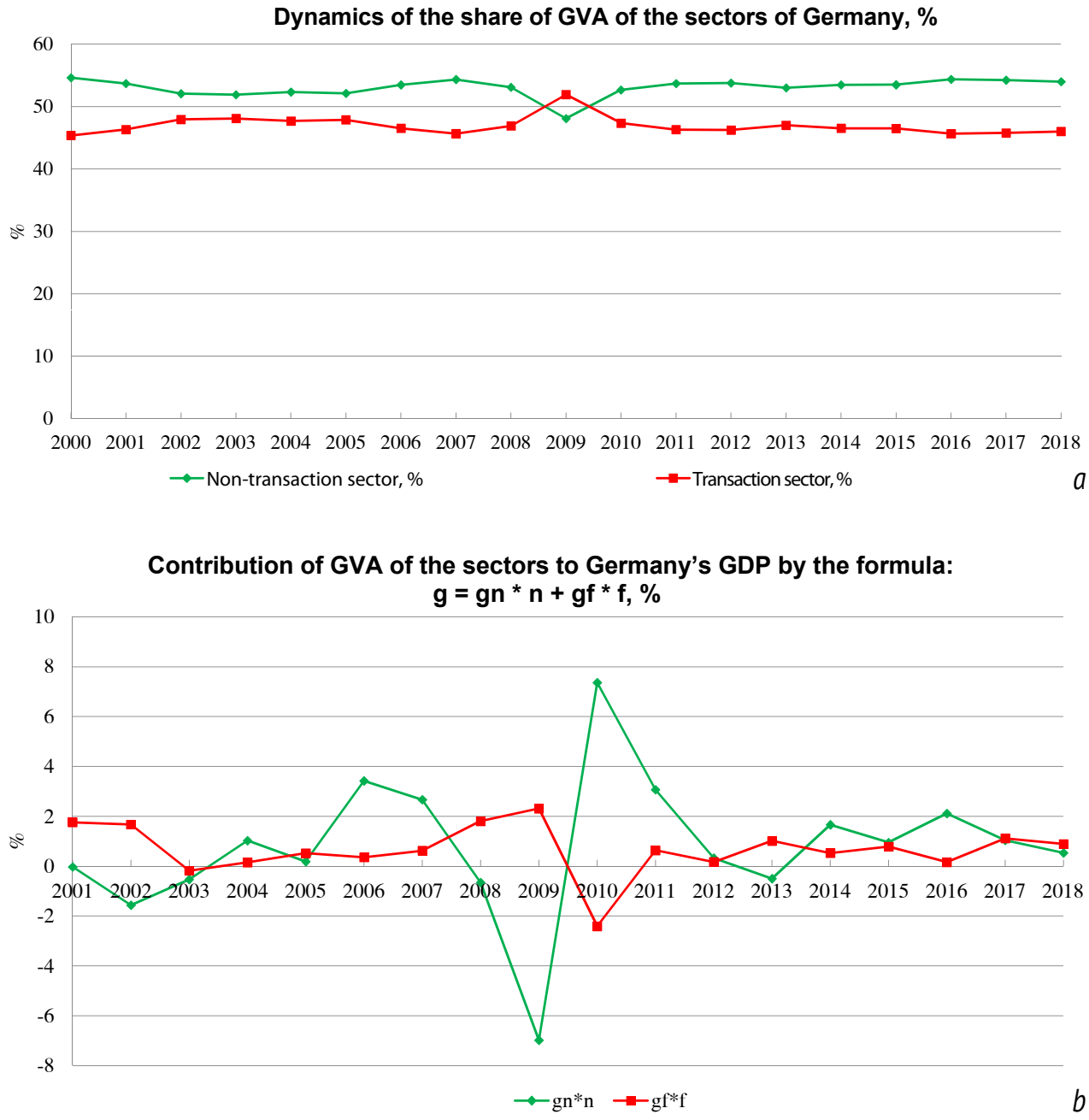


Fig 5. **Sectoral structure of the German economy — *a*; contribution of the transaction and non-transaction sectors to growth rate — *b*, 2000–2018**

Source: c compiled by the author according to the World Bank. URL: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=DE; Eurostat. URL: https://appsso.eurostat.ec.europa.eu/nui/setupDownloads.do (accessed on 20.04.2020).

the situation is approximately the same, with the exception of the years of the crisis of 2007–2009, as well as 2018. In Germany, the contribution to the growth rate of investments in the transaction sector is also decisive (*Fig. 7, a*). It significantly increases in 2015 to 2018 (despite the implementation of Industry 4.0 doctrine, which has been widely used from Germany since 2011).

Until 2008, China had a greater contribution to the growth rate of investments in the non-transaction sector; until 2014, investments in the transaction sector dominated. From 2015 to 2017, the contribution of investments in the non-transaction sector to the rate of China's economic dynamics was significantly higher (*Fig. 7, b*).

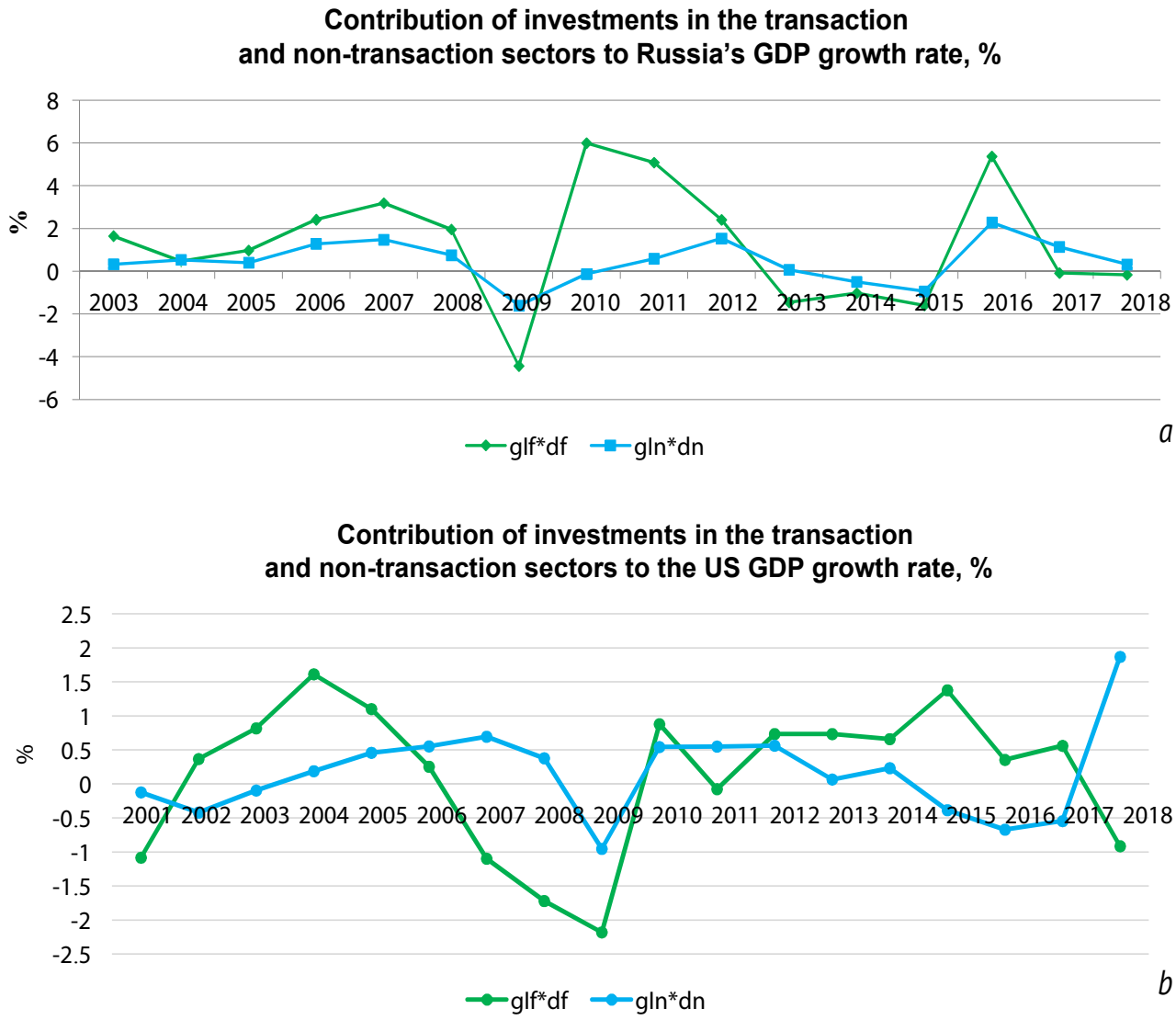


Fig. 6. **The contribution of investments in sectors to the GDP growth rate in Russia — *a*, 2003–2018 rr.; USA — *b*, 2001–2018**

Source: compiled by the author according to Rosstat. URL: https://www.gks.ru/accounts; https://www.gks.ru/free_doc/new_site/business/invest/tab_inv-OKVED.htm; according to the World Bank. URL: https://data.worldbank.org/indicator/NE.CON.PRVT.ZS; https://data.worldbank.org/indicator/NE.CON.GOVT.ZS?locations=US; U.S. Bureau of Economic Analysis. URL: https://apps.bea.gov/iTable/iTable.cfm? ReqID=10&step=2 (accessed on 20.04.2020).

It is important to note what the superiority of investments in the transaction sector was over investments in the non-transaction sector in these countries, and how it changed. The sources shown above indicate that this ratio varied[7] for Russia — in the range from 1.3 to 2.4; USA — from 2 to 3.5; Germany — from 1.9 to 2.7; China — from 1.15 to 1.4.

Thus, investments in the transaction sector were superior to investments in the non-transaction sector, with fewer times in China, most of all in the United States. In terms of share and contribution to the growth rate in the American economy, the transaction sector shows the highest impact. Investment superiority also emphasizes this fact.

[7] We only indicated the range of the change (the smallest and largest values of the change). Within the range, the change for countries was different, except Germany, where the ratio was steadily increasing.

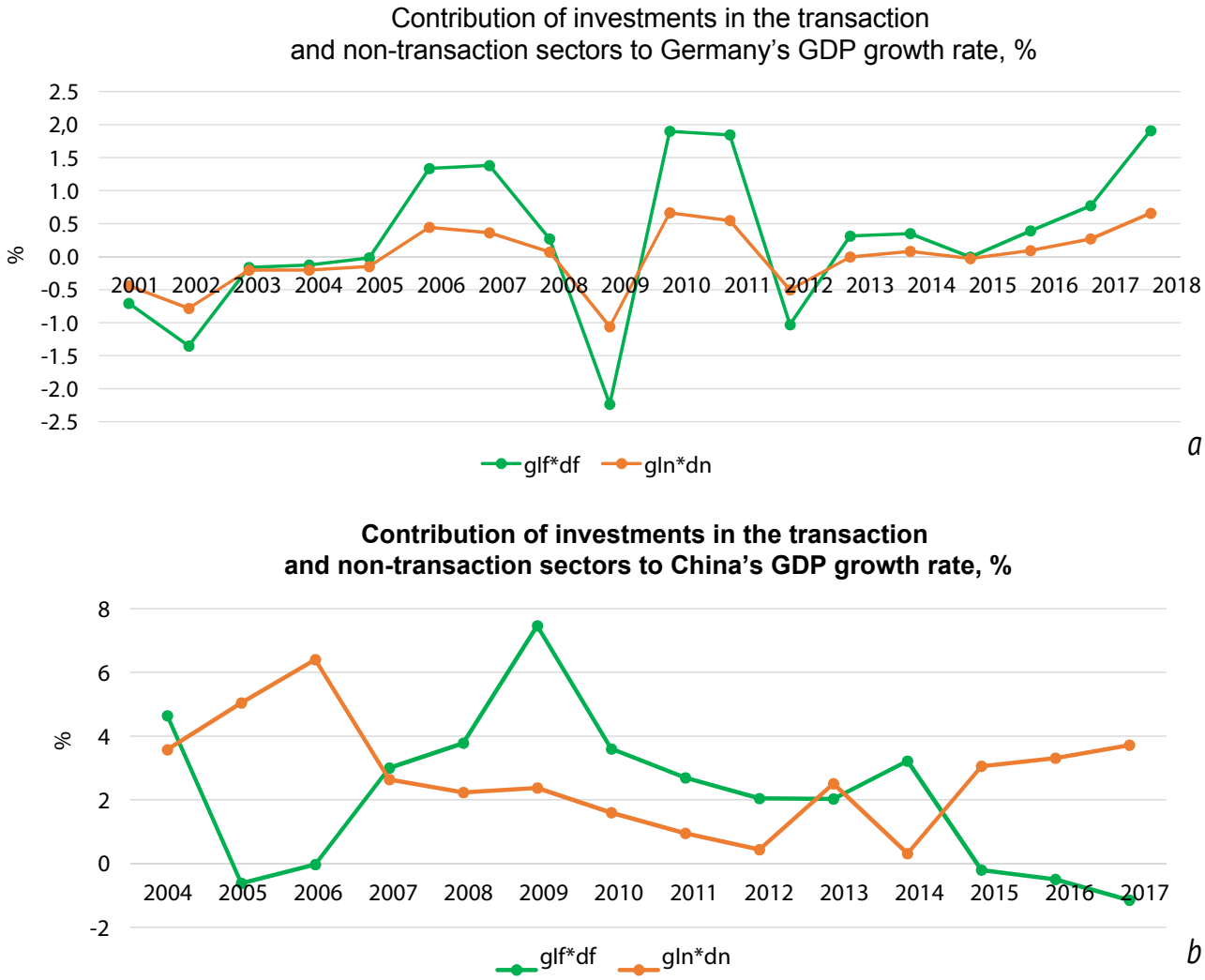


Fig. 7. **The contribution of investments in sectors to the GDP growth rate in Germany — *a*, 2001–2018; China — *b*, 2004–2017**

Source: compiled by the author according to the World Bank. URL: https://data.worldbank.org/indicator/NE.GDI.TOTL.ZS?locations=DE; https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG; https://data.worldbank.org/indicator/NY.GDP.MKTP.KD; https://data.worldbank.org/indicator/NE.GDI.TOTL.ZS?locations=CN;Eurostat. URL: https://ec.europa.eu/eurostat/data/database; National Bureau of Statistics of China. URL: http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm (accessed on 20.04.2020). 2018 data for China are not available.

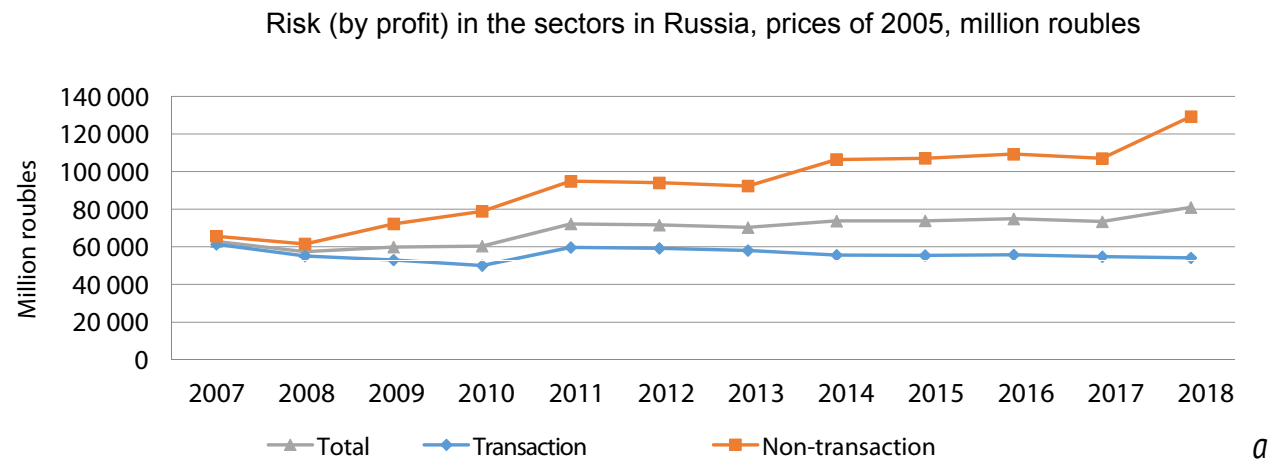
In Russia, the ratio of investments in the two sectors is also quite high, so the transaction sector occupies the first position in terms of contribution to the growth rate. Thus, investments in the transaction sector contribute to its growth rate.

In China, the increase in the contribution of the non-transaction sector to the economic growth rate in 2015–2017 can be associated with an increase in the contribution of investments to the non-transaction sector relative to the transaction sector (*Fig. 4, 7, b*).

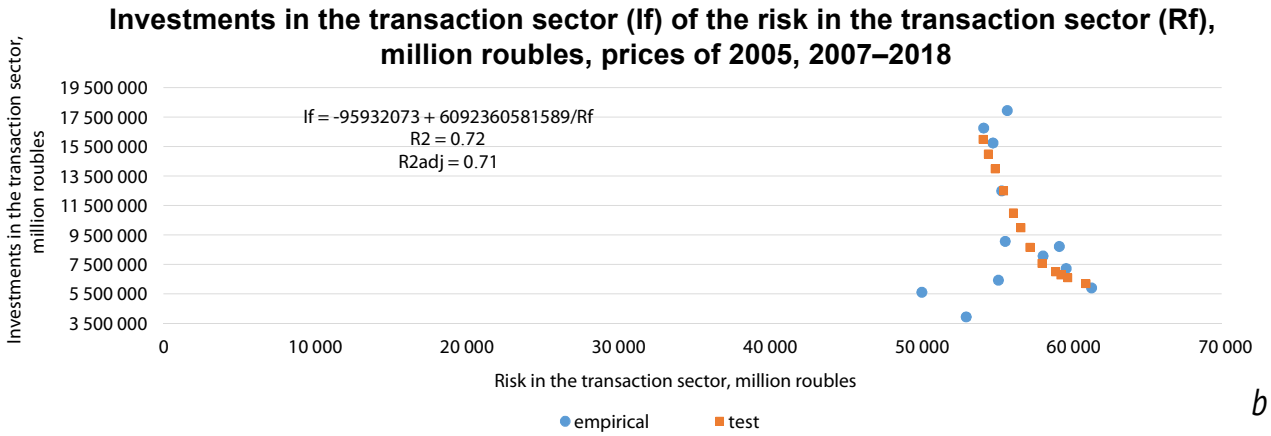
In the Russian economy (*Fig. 8*)[8], the risk[9] in the non-transaction sector, in contrast to the transaction sector, increased significantly, which

[8] The difference in the time interval is due to the lack of data for calculating the necessary parameters from these sources.

[9] The risk was calculated as the standard deviation of profit margin. The profit was quoted in the prices of 2005 using the consumer price index for goods and services. The profit of each sector is equal to the sum of profit by the types of activity that make up each economic sector. The risk in each sector and the total risk were calculated as the arithmetic mean of the risks by the types of activities that make up the sector and the entire economy.



a



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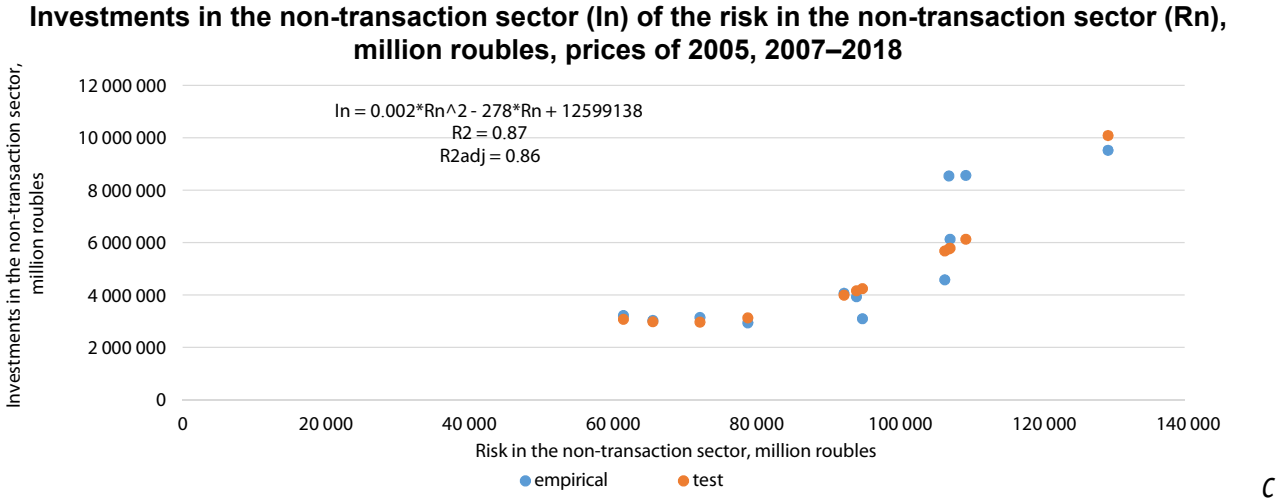


c

Fig. 8. **Risk in the Russian economy — *a*; investment in the transaction sector from risk — *b*; in the non-transactional sector from risk — *c*, 2007–2018**

Source: составлено автором по данным ЕМИСС / compiled by the author according to EMISS. URL: https://www.fedstat.ru/indicator/31074; https://www.fedstat.ru/indicator/57733; https://www.fedstat.ru/indicator/31541 (accessed on 20.04.2020).

Note: * model statistics: F-test = 7.2; D-W test = 1.4 ∈ [1.33; 2.67]; White test: χ^2 test = 7.5; χ^2 crit. = 19.7. ** model statistics: F-test = 51.9; D-W test = 1.4 ∈ [1.33; 2.67]; White test: χ^2 test = 5.8; χ^2 crit. = 19.7.

supported investments in the transaction sector and provided their higher contribution to the economic growth rate (*Fig. 6, a*). Risk reduction led to an increase in investments in the transaction sector and increased financial investments. An increase in investments in the non-transaction sector was accompanied by an increase in risk (*Fig. 8*).

The risk in the Russian economy increased with the growth of the key interest rate and decreased with its decrease. Therefore, changes in interest rates affected the investment process and the distribution of investments between the transaction and non-transaction sectors. Also, as the interest rate decreased, financial investments (investments in financial assets) increased by a larger amount than investments in non-financial assets. As the interest decreased, the growth rate of investments in the transaction sector (as well as in the non-transaction one) increased in the studied time interval. The GDP growth rate was determined by the risk elasticity of investments[10]. The higher it was, the higher the growth rate was. As the risk elasticity increase increased, the rate decreased (*Fig. 9*).

Thus, a positive effect on the growth rate of risk elasticity of investments in the Russian economy was observed up to a certain sensitivity. If investments became more sensitive to risk (they changed more than 18 roubles when the risk changed by one rouble), this helped lower the growth rate (*Fig. 9*).

As we see, an increase in risk in the non-transaction sector is accompanied by a slight increase in investments; a decrease in risk in the transaction sector is accompanied by an increase in investments. This effect supported the largest contribution of investments in the transaction sector to Russia's economic growth rate. At the same time, part of the transaction sector (financial and banking transactions) made investments in financial assets that could somehow affect the economic growth along with investments in non-financial assets. We will consider this final structural aspect of the study in the next section, while comparing the Russian economy with the American and the German ones[11]. The proportions and their current dynamics, including the established regime of the contribution of economic elements (investments or individual sectors) to the growth rate, cannot be ignored when developing a macroeconomic growth policy. This is especially important from the perspective of modernization or industrialization of the economy. The impact of the transaction sector that has grown in many countries and its substantial part — the financial and banking sector — cannot but be ignored both in terms of diverted by these sectors resources that could be used for development tasks and in terms of their impact on the economic dynamics. Thus, not only the development of structural policies, but also of classical measures in the framework of macroeconomic growth policies [14–16] require considering this impact. Moreover, through the functioning of the financial system, the debt economy mode is developed [17], which is an urgent problem not only within the framework of "financial economics".

INVESTMENTS IN FINANCIAL AND NON-FINANCIAL ASSETS: COMPARATIVE ANALYSIS

The final stage of the study will be devoted to considering the impact of investments in financial and non-financial assets on the change in gross domestic product in Russia, the USA, and Germany. The comparative aspect will clarify the degree of impact of financial and non-financial investments on product changes within each economy.

Fig. 10 shows the relative difference between the countries regarding investments in financial and non-financial assets, respectively, to the country's GDP [19].

First, it should be noted that in Russia the difference between the two types of investments (to GDP) is very significant (*Fig. 10, a*).

Second, this difference increases due to the outstripping growth of financial investments, so that their ratio to GDP is steadily increasing and exceeds the value of GDP itself (more than one

[10] The risk elasticity of investments is the sensitivity of changes in investments to changes in risk, i.e. shows how the investments will change if the risk changes by one percent (measured in percentage).

[11] The data on investments in China's financial assets are not available, therefore are not considered here.

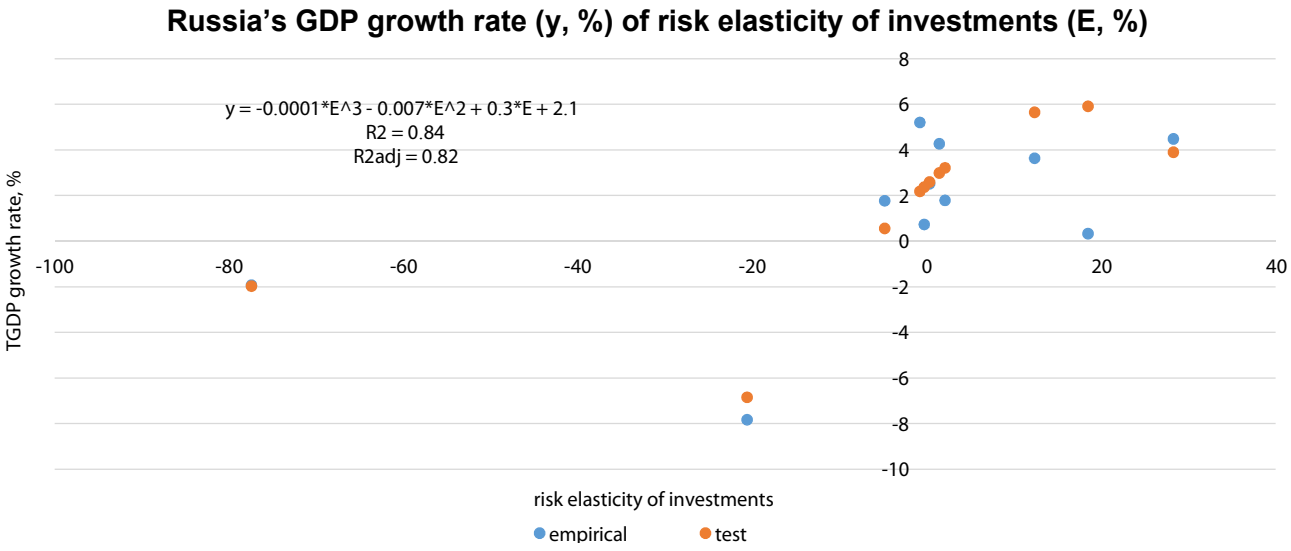


Fig. 9. **Russia's GDP growth rate and risk elasticity of investments, 2008–2018**

Source: compiled by the author according to Rosstat. URL: https://www.gks.ru/free_doc/new_site/business/invest/tab_inv-OKVED.htm; https://www.gks.ru/accounts; ЕМИСС / EMISS. URL: https://www.fedstat.ru/indicator/57733; https://www.fedstat.ru/indicator/31541 (accessed on 20.04.2020).

Note: * model statistics: F-test = 54; D-W test = 2.1 ∈ [1.32; 2.68]; White test: χ^2 calculation. = 6.3; χ^2 crit. = 18.3.

since 2011, then since 2014). Since 2014, there has been a sharp increase in financial investments and a decrease in non-financial investments, and neither Germany nor the United States show such an upward trend in this time interval.

Third, in the United States, financial investments to GDP are about twice inferior to investments in non-financial assets (*Fig. 10, b*). Moreover, the ratio to GDP is significantly less than one (unlike the Russian economy).

Fourth, in Germany, investments in financial and non-financial assets in relation to GDP exceed the corresponding types of investments in the USA and investments in non-financial assets in Russia. At the same time, investments in financial assets are higher than investments in non-financial assets. Moreover, a sharp separation of financial investments from investments in non-financial assets happened in 2009 and survived to date (*Fig. 10, c*).

Fifth, *Fig. 11* gives a very indicative picture of the institutional bias (γ0) of the financial market from the "real economy" for each country. It is growing strongly for Russia (*Fig. 11a*), and is more or less stable for Germany [19]. A positive value of γ0 indicates the situation for these countries when investments in non-financial assets do not exceed total savings, and financial investments exceed the difference in savings and investments in non-financial assets by the number of times shown in the *Fig*. For Germany, this superiority is almost not increasing. For Russia, it is growing quite quickly. Of course, this parameter can increase with the growth of investments in non-financial assets without a significant increase in savings and with the growth of financial investments. For the Russian economy, this is due to the growth of investments in financial assets. For the German economy, the indicator is stable due to the fact that the difference between the two types of investments relative to GDP has practically remained unchanged since 2010 (*Fig. 10, c*). For the United States, the parameter of the institutional bias of the financial market is negative, since investments in non-financial assets exceed savings; the country attracts a significant amount of capital for investments. It is due to this, and not the strong growth of investments in financial assets, that the parameter γ0 increases in the negative range of values by 2014 and then returns to the past values.

Thus, in the countries under review, the ratio of financial investments to non-financial investments clearly affected the economic dynamics in different ways. Obviously, investments in

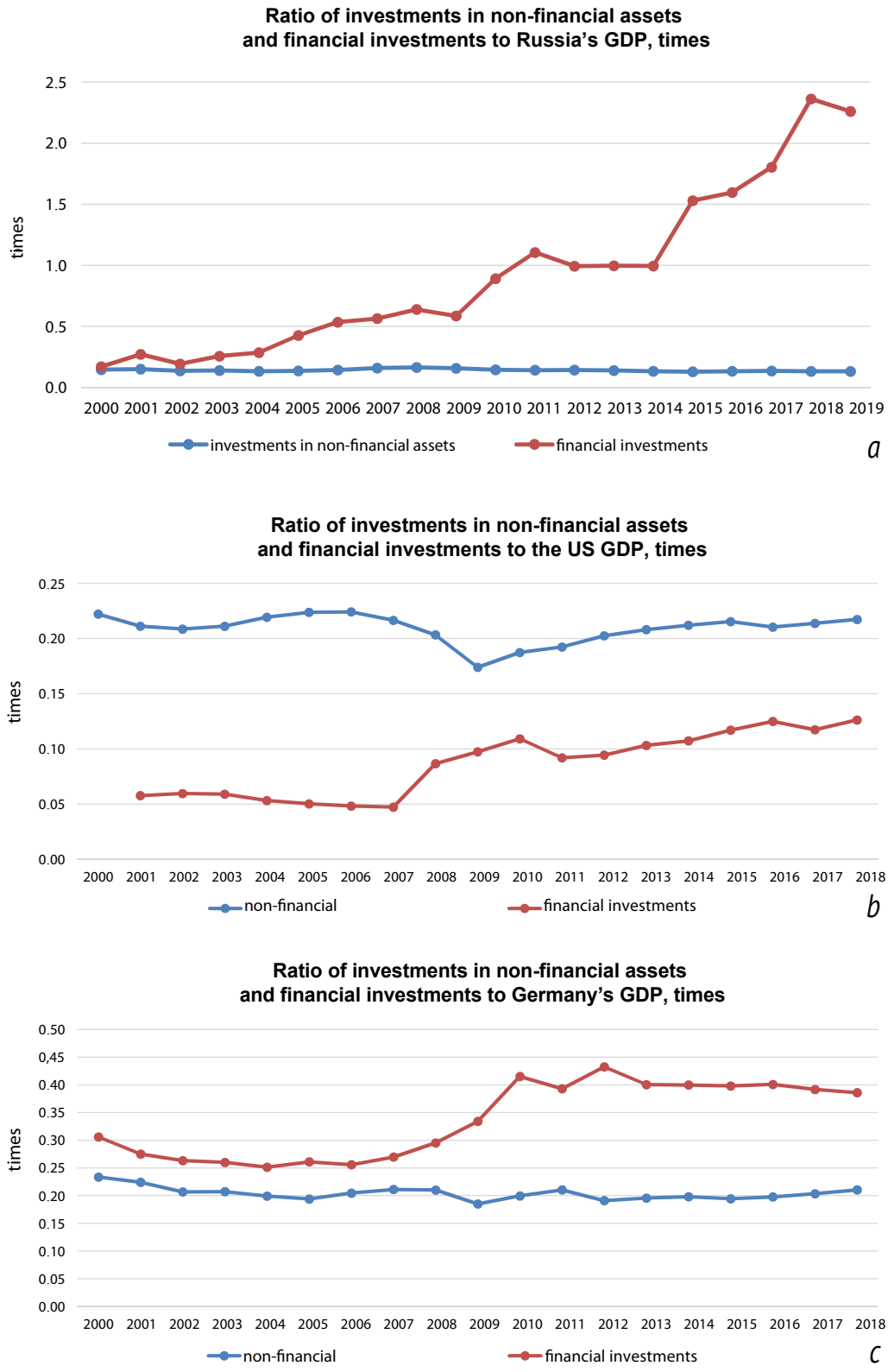


Fig. 10. **Investments in financial and non-financial assets in Russia — *a*; USA — *b*; Germany — *c***

Source: compiled by the author according to Rosstat. URL: https://www.gks.ru/investment_nonfinancial; https://www.gks.ru/folder/14476; https://www.gks.ru/storage/mediabank/tab1(2).htm; World Bank. URL: https://data.worldbank.org/indicator/NE.GDI.TOTL.KD; https://data.worldbank.org/indicator/NY.GDP.MKTP.KD; International Monetary Fund. URL: https://data.imf.org/regular.aspx?key=61545853 (accessed on 20.04.2020).

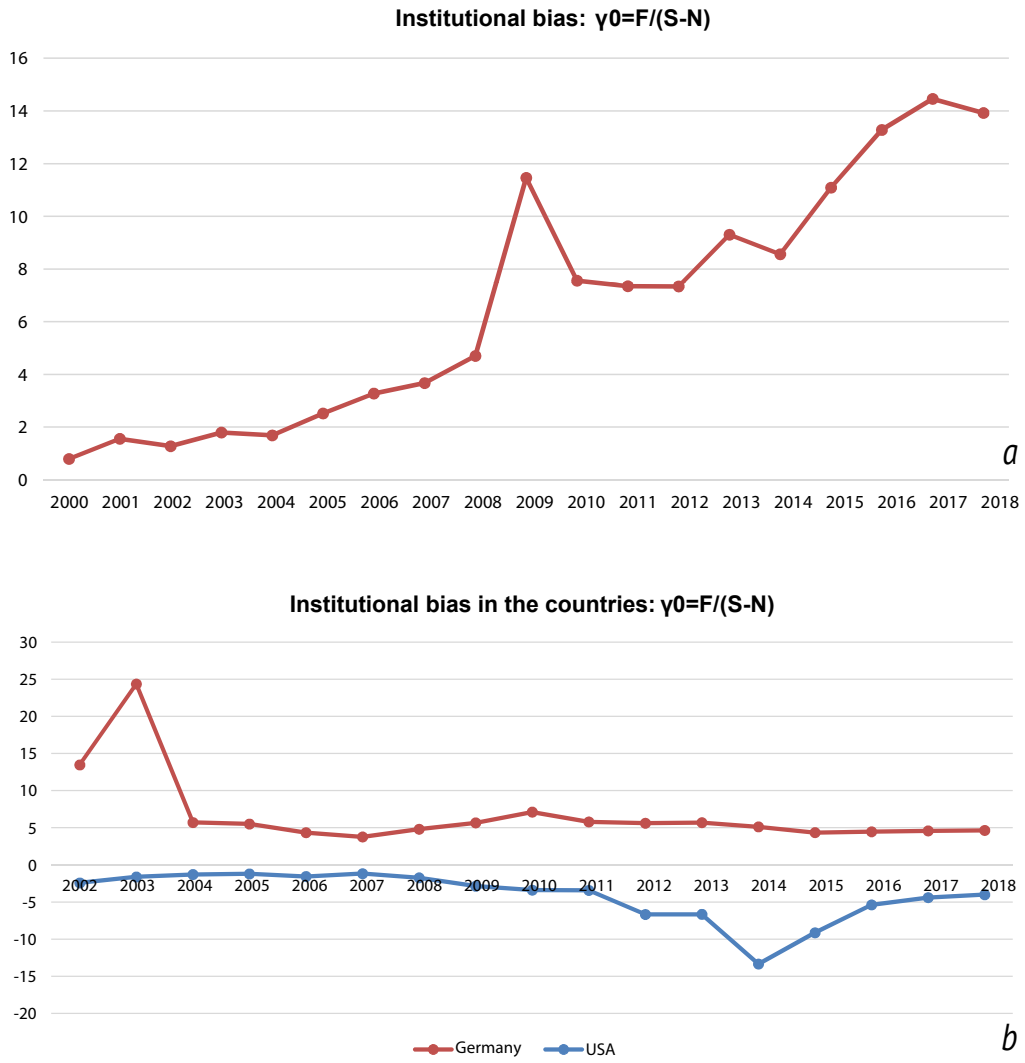
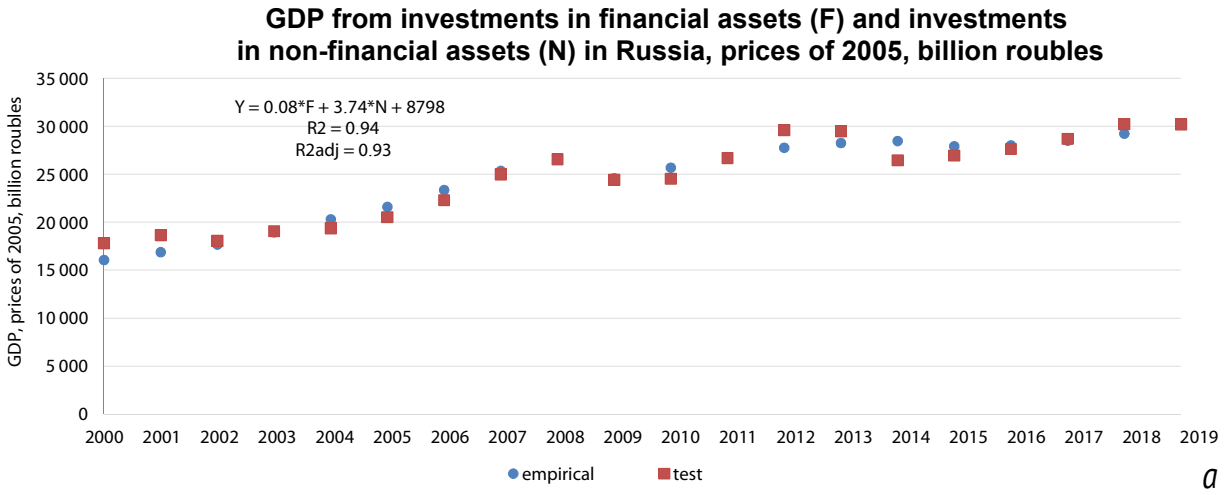


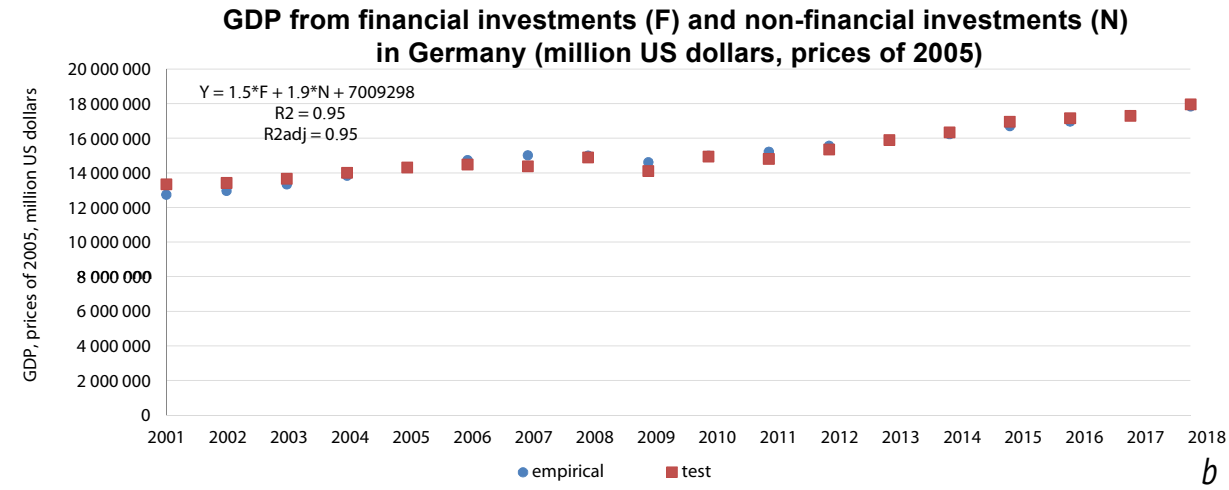
Fig. 11. **The value of the institutional bias of the financial market γ0 in Russia — *a*; USA, Germany — *b***

Source: compiled by the author according to Rosstat. URL: https://www.gks.ru/investment_nonfinancial; https://www.gks.ru/folder/14476; https://www.gks.ru/storage/mediabank/tab1(2).htm; World Bank. URL: https://data.worldbank.org/indicator/NE.GDI.TOTL.KD; https://data.worldbank.org/indicator/NY.GNS.ICTR.ZS; https://data.worldbank.org/indicator/NY.GDP.MKTP.KD; International Monetary Fund. URL: http://data.imf.org/regular.aspx?key=61545865 (accessed on 20.04.2020).

financial and non-financial assets are related in a certain way. This relationship depends not only on financial, but also on sectoral economic structure, on the ratio of risks and profitability in various types of activities.

Fig. 12 shows the models linking the GDP of each country with investments in financial and non-financial assets. Comparing the obtained ratios, we conclude that for the American economy the impact of investments in financial and non-financial assets on the change in GDP is the most even. With the same change in investments in financial and non-financial assets, the impact on the change in GDP will be quite close. The German economy shows a less even impact on the considered time interval. The largest gap in the impact on the change in GDP of financial and non-financial investments is shown by Russia, for which the indicator of the financial market bias is growing significantly (not due to an increase in investments in non-financial assets, but solely due to the growth of financial investments). At the same time, with the





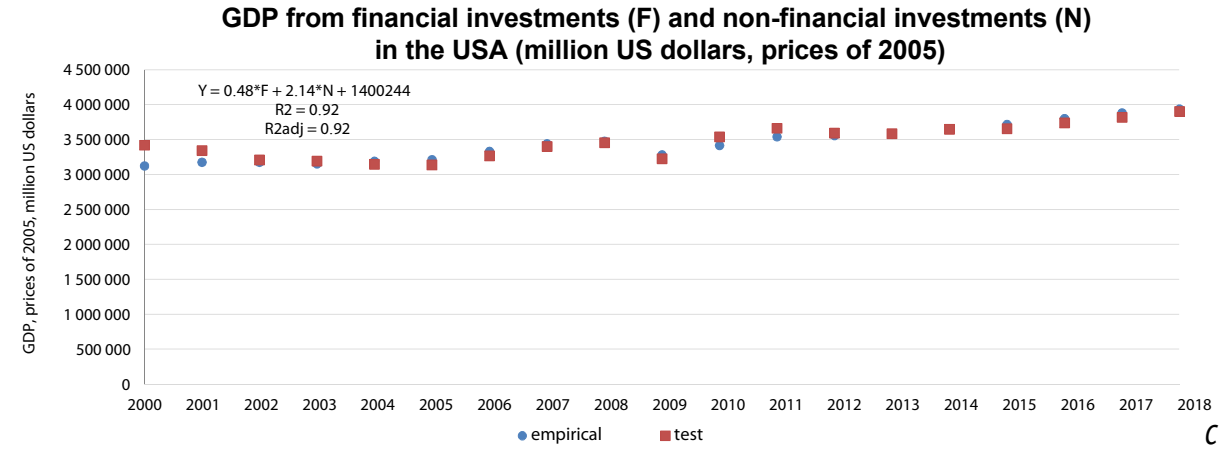


Fig. 12. **Model of GDP dynamics of the value of investments in financial (*F*) and non-financial assets (*N*) of Russia — *a**; USA — *b***; Germany — *c******

Source: compiled by the author [19] according to Rosstat. URL: https://www.gks.ru/investment_nonfinancial; https://www.gks.ru/folder/14476; https://www.gks.ru/storage/mediabank/tab1(2).htm; World Bank. URL: https://data.worldbank.org/indicator/NE.GDI.TOTL.KD; https://data.worldbank.org/indicator/NY.GDP.MKTP.KD; International Monetary Fund. URL: https://data.imf.org/regular.aspx?key=61545853 (accessed on 20.04.2020).

Note: * model statistics: F-test = 125.3; D-W test = 1.4 ∈ [1.4; 2.6]; White test: χ^2 test = 1.5; χ^2 crit = 30.1.

** Model statistics: F-test = 147; D-W test = 1.8 ∈ [1.53; 2.47]; White test: χ^2 test = 3.9; χ^2 crit = 27.6.

*** Model statistics: F-test = 88.3; D-W test = 1.9 ∈ [1.53; 2.47]; White test: χ^2 test = 4.6; χ^2 crit = 28.9.

Table

Final comparative structural analysis of the impact of investments in the transaction sector and financial assets by the countries under consideration

Country	The largest contribution of the sector to the growth rate	The largest contribution of investment in the sector to the growth rate	The impact of financial investments — on γ0 and on the growth
Russia	Transaction	Transaction	Financial investments dominate, γ0 > 0 and grows due to financial investments. The financial investments slow down the dynamics of GDP. The importance of non-financial investments for the growth rate is great
USA	Transaction one with a significant margin	Transaction	Non-financial investments dominate, γ0 < 0 (due to non-financial investments), γ0 grows due to the growth of financial investments. The impact on the GDP dynamics is comparable with non-financial investments
Germany	Non-transaction	Transaction	Financial investments dominate, γ0 > 0 and is stable due to non-financial investments. The impact on the GDP dynamics is significantly less than non-financial investments
China	Non-transaction Transaction	Non-transaction Transaction	

Source: compiled by the author according to the study results (*fig. 2–12*).

same change in financial and non-financial investments, the impact on the change in GDP is many times greater for non-financial investments. Consequently, such a significant excess of financial investments over investments in non-financial assets essentially means that there is a certain effect of the GDP growth slowdown, structural imbalance in favor of the financial sector as part of the transaction sector. The transaction sector itself makes an essential contribution to the growth rate of the considered economies, in particular the Russian economy. However, the outstripping growth of financial investments rather slowed down the rate of the Russian economy.

The multiplicative econometric model ($Y = 418F^{0.11}N^{0.37}$)[12], selected to estimate the change in Russia's GDP from investments in financial and non-financial assets, also confirms the above conclusion regarding the Russian economy, slowed down by growing financial investments.

Now we will summarize the analysis results in the final *Table*. The *Table* shows the features of qualitative structural manifestations in the economic dynamics and, respectively, the impact of the transaction sector and financial investments on it.

[12] Statistics of the model: R2 = 0.97; R2adj = 0.97; F-test = 269.7; D-W test = 1.5 ∈ [1.4; 2.6]; White test: χ2 test = 1.1; χ2 crit = 30.1.

In the Russian economy, both the transaction sector and investments in it have a greater impact on the growth rate than the non-transaction sector. In the US, the transaction sector is even more significant. The Chinese economy is characterized by a commensurate impact on the dynamics of the two sectors and investments in them. In Germany, the non-transaction sector makes a greater contribution to the growth rate, but investments contribute more to the growth rate in the transaction sector (see *Table*). In the Russian economy, there is an excessive bias towards financial investments, which holds back the economic dynamics, in contrast to the American and German economies, where there is no similar bias and financial investments have less impact on the rate relative to non-financial investments.

This leads to the conclusion that economic policy should consider not only the change in the sectoral contribution to the growth rate of investments in the transaction and non-transaction sectors, affecting the distribution of resources between them, but also affect the change in the sensitivity of GDP to investments of various kinds. Thus, it is necessary to avoid bias towards financial investments [15, 17]. Of course, it is not the growth rate per se that matters, but the quality of the economy (including structural relationships, also, those considered in the study), which is formed during its functioning and the ongoing macroeconomic growth policy.

CONCLUSIONS

To sum up, we will denote the most relevant conclusions.

First, the economic dynamics of the Russian economy was largely determined by the transaction sector — by the product created and by investments in it. Financial investments significantly exceed non-financial ones, which slows down the economic dynamics.

Second, the great superiority of financial investments over Russia's GDP creates a high potential for instability in economic development. Equivalent ratios of investments in financial assets to GDP for the United States and Germany are much smaller than in Russia, and the amount of non-financial investments is much higher in both relative and, especially, absolute terms. Thus, the Russian economy is faced with the main structural task of creating a new growth model — the balanced development of the financial market (financial investments) and non-financial markets (investments in non-financial assets). In fact, it is about lowering the parameter of institutional bias of the financial market $\gamma 0$, among other macroeconomic policies that affect the growth rate.

Further research is conditioned by the need to consider the possible relationship between investments in financial and non-financial assets when the parameter of the institutional bias of the financial sector changes, as well as to clarify the impact of the dynamics of this parameter on the economic growth rate. Moreover, it will be useful to receive models linking various indices characterizing the state of the stock market (for example, the S&P index and others) with the dynamics of financial investments, with the definition of assessing the impact on the change rate of GDP and inflation. These tasks might be solved in the future research.

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ORIGINAL PAPER

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Cryptocurrency Market Development: Hurst Method

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ABSTRACT

The aim of this work is to study the pricing in the cryptocurrency market and applying cryptocurrencies by the Bank of Russia for its monetary policy. The research **objectives** are to identify the cyclical nature of price dynamics, to study market maturity and potential risks that have a long-term positive relationship with the financial stability of the cryptocurrency market. The author uses the Hurst **method** with the Amihud illiquidity measure to study the resistance of four cryptocurrencies (Bitcoin, Litecoin, Ripple and Dash) and their evolution over the past five years. The study **results** in the author's conclusion that the cryptocurrency market has entered a new stage of development, which means a reduced possibility to have excess profits when investing in the most liquid cryptocurrencies in the future. However, buying new high-risk tools provides opportunities for speculative income. The author **concludes** that illiquid cryptocurrencies exhibit strong inverse anti-persistence in the form of a low Hurst exponent. A trend investing strategy may help obtain abnormal profits in the cryptocurrency market. The Bank of Russia could partially apply digital currency to implement monetary policy, which would soften the business cycle and control the inflation. If Russia accepts the law "On Digital Financial Assets" and legalizes cryptocurrencies after the economic crisis caused by the COVID-19 pandemic, the Bank of Russia might act as a lender of last resort and offer crypto loans.

Keywords: Bitcoin; Litecoin; Dash; Ripple; monetary policy; liquidity; volatility; profitability; Hurst method; crypto loans

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INTRODUCTION

The study and analysis of the cryptocurrency market is a relatively new area. A few works published in recent years have had the potential interest in this topic.

Many scientists have been studying Bitcoin from different angles ever since it appeared. In Russia, digital financial assets (crypto assets) have not yet become legal, since the State Duma adopted the draft law "On Digital Financial Assets", but subsequently it raised many questions in the Government of the Russian Federation*.

Due to the young age of blockchain technology, academic literature on this topic is still in its infancy. There are many studies on the security and technological aspects of cryptocurrencies that will not be discussed here.

One of the problems is that most articles contain information only about the most popular cryptocurrency — Bitcoin.

Cryptocurrency is a digital currency, whose creation and control is based on cryptographic methods. As a rule, cryptocurrency accounting is decentralized.

Some researchers claim that Bitcoin is just a bubble. The fundamental value of Bitcoin is difficult to reveal, and history shows that innovative assets are indeed more prone to bubbles.

The macroeconomic index and asset price index can affect the price of Bitcoin. Cryptocurrency can also get some value from network effects due to the size of the network where it is used. The ratio between the cost of the network and its size is super-linear meaning that the cost of the most popular cryptocurrency (Bitcoin) is much higher than other cryptocurrencies with fewer users, which is translated into the market capitalization. As computing power grows, the value of cryptocurrency should also increase.

Active trading in the cryptocurrency market started only in 2013. A key question to be analyzed is whether the behavior of crypto assets can be predicted. Forecasts of the cryptocurrency market parameters might be used as the basis for trading strategies aimed at profit earning in the cryptocurrency market.

* URL: http://duma.gov.ru/news/27027/.

LITERATURE REVIEW

The heterogeneous agent model of the Bitcoin market simulates many characteristics of the real market relatively accurately. It includes various trading strategies, the initial distribution of wealth under the Pareto law, a realistic mechanism for trading and price equalization based on the order book and an overall increase of Bitcoins over time due to mining.

Autocorrelation of raw returns is very low for all time periods, while autocorrelation of absolute incomes is much higher, which affirms the presence of volatility clustering [1].

R. Böhme, N. Christin, B. Edelman, T. Moore and A.M. Antonopoulos studied the profitability of Bitcoin production, its weaknesses and long-term financial stability [2, 3].

Cost models are proposed in terms of creation costs (technicality). Calculations and experiments revealed that the cost of business processes in Ethereum can be twice higher than in Amazon SWF [4, 5]. Given the high volatility of the exchange rate, a cost estimation model is important [6, 7].

Blockchain pursues a decentralized approach to building trust. This is a fundamental technology and platform for innovation, its value will grow in the future [8].

The vast majority of economic literature on Bitcoins and cryptocurrencies is devoted to the study of various factors that could explain the development of prices. Price determinants may be grouped and summarized as follows:

- market forces, i.e. supply and demand factors;
- macro-financial factors;
- interest of the public and investors;
- news coverage.

The main factors are attractiveness for investors, as well as public interest in the media. Examples of studies addressing these factors, as well as other price determinants of Bitcoin, are provided below.

The indicators of trading volumes and cryptocurrency volatility passed a number of tests, such as Dicky-Fuller (ADF) and CGCD tests [9, 10].

Investments in Bitcoin show very high volatility, but also very high returns. Moreover, for

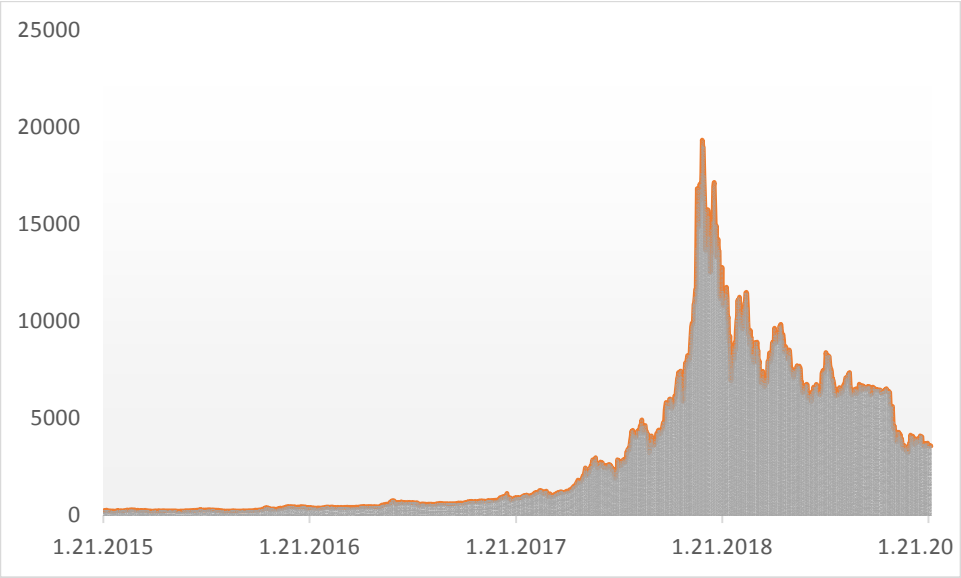

Fig. 1. **Bitcoin dynamics (BTC), US dollar**
Source: Thomson Reuters Datastream.

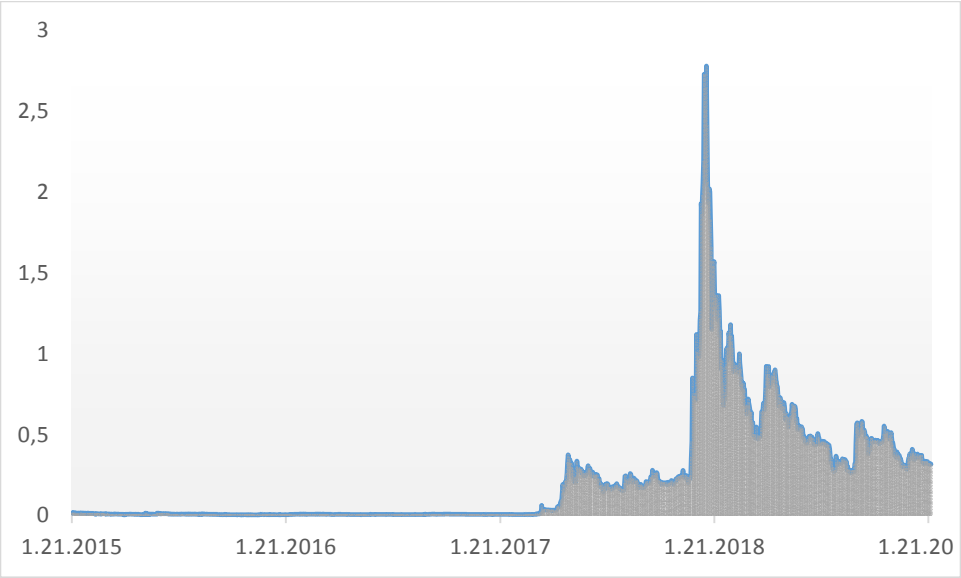

Fig. 2. **Ripple (XRP) dynamics, US dollar**
Source: Thomson Reuters Datastream.

holders of well-diversified portfolios, high risk is offset by a low correlation with other assets [11–13].

Financial intermediaries should modernize and optimize their activities based on the cryptocurrency study results [14, 15].

The results of the cryptocurrency market research confirm the hypotheses of negotiations and strategic trading [16].

It was found out that price constancy is of great importance for the future volatility of the two cryptocurrencies (*Fig. 1–4*). The conditional covariance of two cryptocurrencies significantly depends on previous news, which confirms the conclusions about the interconnectedness of cryptocurrencies [17].

Researchers identify a specific pricing mechanism: maximizing the profits of entrepreneurs who play a coordinating role in creating opportunities for using the new currency (within a small network) [18]. However, one must remember about the differences between virtual (centralized) and

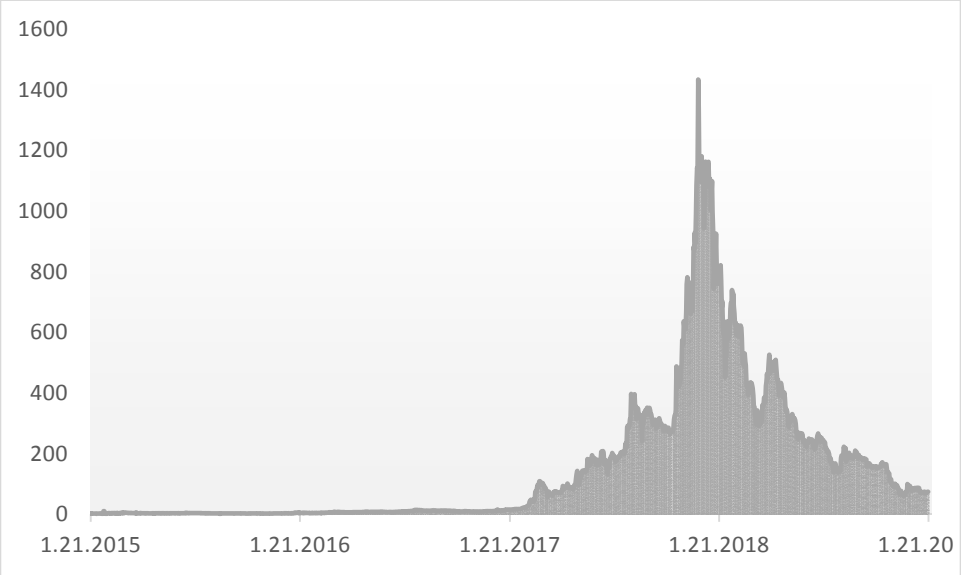

Fig. 3. **DASH dynamics, US dollar**
Source: Thomson Reuters Datastream.

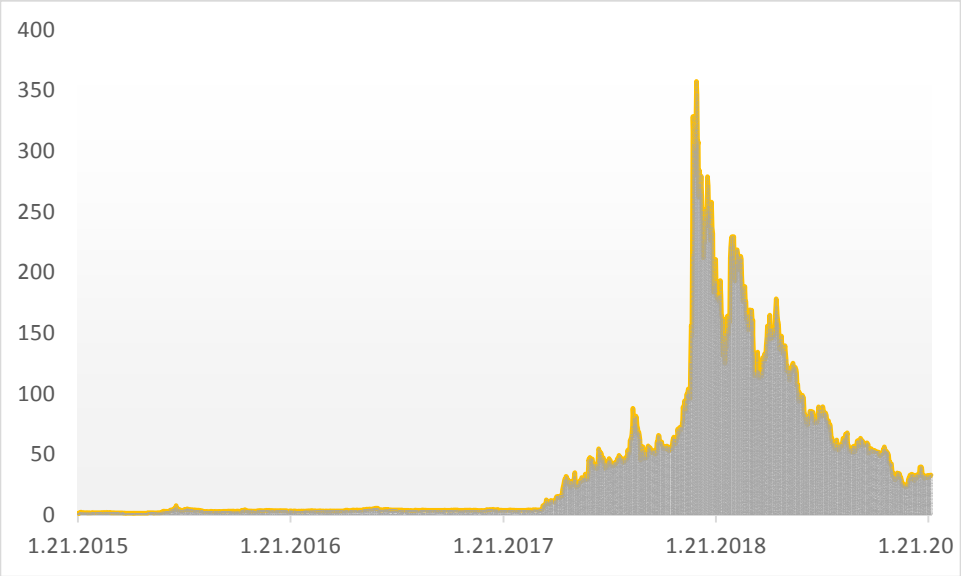

Fig. 4. **Litecoin (LTC) dynamics, US dollar**
Source: Thomson Reuters Datastream.

crypto (decentralized) currencies [19]. Bitcoin correlates with various financial and percentage drivers, however, none of the internal factors has a significant impact on the price [20, 21].

Controlling money supply and interest rates is becoming increasingly difficult. The role of central banks will have to be adapted to this new monetary system if cryptocurrencies are accepted as equivalent means of payment and financial assets with significant market capitalization [22, 23].

The legal and economic difficulties of cryptocurrency realization for international transfers were disclosed [24, 25].

Higher transaction costs in low-turnover markets affect the ability of traders to act quickly [26, 27].

In general, foreign researchers consider Bitcoin not as cash, but as an asset. Empirical studies show that economic factors such as CPI, DJIA, USDI and the Fed rate have a long-term negative effect on the Bitcoin price. This implies that Bit-

coin can be a hedging tool against a decline in the US dollar [28, 29].

DATA AND METHODS

The framework of the study was the profitability analysis of various cryptocurrencies sorted by market liquidity. To study the market, the author used tests based on the application of the Amihud illiquidity ratio [30, 31].

We chose this approach due to its reliability and simplicity. It only requires daily market data, which is convenient when information about the market microstructure is not available. At the same time, complete data on market capitalization, necessary for the turnover-based indicators, are not required, which can be a problem for Altcoins.

The daily return on asset *i* on day *t* in US dollars is calculated by the formula

$$Rt = \ln(Pt) - \ln(Pt-1), \quad (1)$$

where $\ln(Pt)$ is the natural logarithm of the price P of time *t*.

The Amihud illiquidity ratio is defined as follows:

$$\mathrm{ILLIQ}_T^i = \frac{1}{D_T}\sum_{t=1}^{D_T}\frac{\left|R_t^i\right|}{P_t^i V_t^i}, \quad (2)$$

where D_T is the number of days traded per year *T*;

R_t^i US is the daily return on asset *i* on day *t* in US dollars;

V_t^i is the daily volume, traded asset *i* on day *t*;

P_t^i is the daily price of asset *i* on day *t* in US dollars.

This ratio provides an understanding of the relationship between volume and price changes.

To study the cryptocurrency market, one may use a set of statistical tests:

- the Ljung-Box test;
- the Bartels test, if the returns of the cryptocurrencies turn out to be independent;
- the Lo&McKinlay's test, to check if the standard deviation from √T scales.

To test the coefficient of variation, it is advisable to use the automatic dispersion test (AVR), proposed by researchers J. H. Bergstrand, J. J. Lewer and H. Van den Berg [32, 33] and the BDS test for time based dependence in a series with average *p* values in different specifications.

The R/S Hurst exponent helps research long-term memory profitability. Impulses appear in the time series of profitability, if the Hurst exponent is greater than 0.65, and the average reversal of the time series (or anti-persistence) appears when the Hurst exponent is less than 0.45.

Table 1 presents the average values for each of the five groups of cryptocurrencies. One can see the relationship between their liquidity and volatility. Group 1 — is the most liquid cryptocurrencies, group 5 — is the least liquid cryptocurrencies. At the same time, there is no evidence of a liquidity premium in cryptocurrencies. This is interesting and contradicts the features of traditional asset classes.

One may also note strong positive distortions and high levels of income kurtosis. Positive distortions in the price series may speak of a significant level of optimism among investors in a time of instability.

Table 2 shows the average value of *p* with the average Hurst exponent.

Cryptocurrencies with the lowest liquidity reject the null hypothesis of randomness in all tests. *p* average values increase in higher liquid quantiles.

Besides, the Hurst exponent proves persistence in illiquid markets (<0.5) confirming the results by C. Carrere, J. S. Silva and S. Tenreyro [34, 35].

The Hurst exponent lies in the interval [0,1] and is calculated by the formula

$$X_{k,a} = \sum_{i=1}^{k}\left(N_{i,a} - e_a\right). \quad (3)$$

Three categories of data series can be identified by *H* values:

- the series is anti-persistent, the results are negatively correlated ($0 \leqslant H < 0.5$);
- the series is random, the return is not correlated, the series has no memory ($H = 0.5$);
- the series is stable, the results are strongly correlated, the memory dynamics ($0.5 < H \leqslant 1$).

Table 1

Profitability of cryptocurrencies sorted by the Amihud illiquidity measure

Liquidity	Profitability statistics					
	Group	Amihud measure	Average	Standard deviation	Distortion	Kurtosis
High	1	< 0.00001	0.010	0.106	0.92S	11.422
	2	0.00011	0.010	0.160	1.167	13.162
	3	0.00101	0.009	0.234	0.90	17.409
	4	0.00900	0.009	0.22	0.742	20.276
Low	5	0.02581	0.010	0.366	0.101	10.829

Source: Thomson Reuters Datastream, calculated by the author.

Table 2

The Hurst exponent for cryptocurrencies sorted by the Amihud illiquidity measure: *p* average values

Liquidity			*p* average values					Hurst exponent
	Group	Amihud measure	Ljung-Box test	Runs test	Bartels test	AVR	BDS	
High	1	<0.00001	0.35	0.44	0.40	0.41	0.02	0.53
	2	0.00011	0.11	0.27	0.19	GL25	0.01	0.50
	3	0.00191	0.05	0.12	0.04	0LQ9	0.01	0.46
	4	0.00960	0.02	0.09	0.02	0103	0.02	0.44
Low	5	0.03531	0.01	0.04	0.01	OL02	0.01	0.41

Source: Thomson Reuters Datastream, calculated by the author.

Table 3

Results of *R/S* dynamic analysis (step = 50, data window = 300)

Log-yield	No conditions	Interception	Time
BITCOIN	0.992 (0.961. 1.040)	1.009 (0.983. 1.039)	1.009 (0.983. 1.039)
LITECOIN	1.005 (0.977. 1.038)	1.021 (0.994. 1.053)	1.021 (0.994. 1.053)
RIPPLE	1.028 (0.997. 1.064)	1.053 (1.023. 1.086)	1.053 (1.023. 1.087)
DASH	0.966 (0.933. 1.005)	0.985 (0.954. 1.022)	0.986 (0.954. 1.022)

Source: Thomson Reuters Datastream, calculated by the author.

Table 4

Top 10 cryptocurrencies by capitalization as of 02.01.2019

No.	Name	Capitalization	Price
1	Bitcoin	60 958 002 560	3480.60
2	XRP	12 605 993 911	0.306 242
3	Ethereum	11 147 795 484	106.51
4	EOS	2 112 336 072	2.33
5	Bitcoin Cash	2 045 890 560	116.26
6	Tether	2 030 218 013	1
7	Litecoin	1 957 580 695	32.48
8	TRON	1 739 274 086	0.026 089
9	Stellar	1 582 069 187	0.082 539
10	Bitcoin	1 130 006 345	64.21

Source: Thomson Reuters Datastream, calculated by the author.

RESULTS

The study revealed that Altcoins demonstrate cyclicality, as speculators affect the level of pessimism. However, in the higher liquidity quintiles, the Hurst exponent is close to random walk (0.5) [36].

Most studies of financial stability focus on cryptocurrencies as an investment asset. Most Bitcoins are owned by investors and are not considered a means of payment. After skyrocketing of prices in 2017–2018, it became clear that there is a bubble in the cryptocurrency market. In 2018, it was actively deflating, and Bitcoin lost about 85% of its maximum historical value.

Typically, a bubble is defined as a positive deviation from the fundamental asset value. The question boils down to the fact that recent price gains have been driven by expectations of future price gains and, therefore, could be subjected to a sudden reversal. Asset price bubbles are often tied to technological change and an uncertain future. However, deflating these bubbles does not necessarily lead to problems of financial stability. For example, the dotcom bubble burst in 2000 with limited consequences.

In the cryptocurrency market, the bubble is also deflated. This fact is confirmed by the results of the *R/S* dynamic analysis (*Table 3*) and a decrease in the overall market capitalization (*Table 4*).

The asset class, which is only about $60 billion (as of February 1, 2019), is probably too small to be significant for financial markets. Risks to the financial stability of crypto assets, now or in the near future, are likely to be concentrated in countries where they are in great demand. In cases when a significant and rapid decline in the value of the currency may lead to widespread losses or even panic, it is difficult to understand how these losses will be transferred to the main financial intermediaries in the economy.

Similar problems arise when the central bank must provide the lender with last resort in foreign currency. In this situation, the major central banks could create currency swap mechanisms to facilitate such operations. In the case of digital currency, however, there is no counterparty for the central bank to create a swap line together.

The central bank could be well placed to act as a lender of last resort to banks, although this is limited by its need to maintain an adequate

supply of digital currency to repay bank deposits it received.

A complete transition to digital currency is convenient, although, by all accounts, implausible. The situation will be somewhat similar to the one as if the entire global economy was fully converted into dollars.

In this case, the central bank could not stabilize the macroeconomics. Moreover, since the supply of digital currency is fixed, economic and financial volatility could increase.

If monetary policy could completely switch to digital currency, it would be possible to cancel the zero lower bound at nominal interest rates.

If the amount of digital currency is fixed, the real value of each currency unit will increase with the economic growth.

In other words, if the prices of goods in foreign currency fall, deflation occurs, which, as a rule, is associated with an inefficient economy. In this case, enterprises and households usually put expenses aside, since in the future prices will be lower than at present.

The deterrent effects of deflation are primarily due to the fact that nominal interest rates usually cannot be negative. Their zero border is explained by the fact that the currency always provides a zero rate of return. In the digital currency world, interest rate caps can be cancelled.

Anyway, the problem of deflation seems to be partially solved, allowing the amount of digital currency to grow with the economy. Despite this, the amount of digital currency will not be able to move up and down with seasonal demand, and also partially respond to other external shocks of the economy.

Partial use of digital currency by the economy would be more realistic. The central bank could then soften the business cycle and control the inflation rate in the currency, though with less accuracy.

Some recent monetary policy debates concern the central bank's digital currencies. The central bank's single digital currency can take the form of a token, similar to digital cash.

If monetary policy could completely switch to digital currency, it would be possible to cancel the zero lower bound at nominal interest rates. The central bank could pay a negative interest rate to banks, making its policy rate as low as necessary to achieve economic incentives.

Economic crises of the XX century were associated with the distorting effect of monetary policy pursued by governments, and not with the so-called market failures.

However, the central bank would not have to cease operations immediately. In competition with commercial banks and other private money producers, it will have a strong incentive to provide citizens with a stable currency.

Cryptocurrency monitoring relies heavily on public aggregated data from third parties. Most of the aggregated information is available on public websites. For example, indicators for blockchain networks, market capitalization estimates, prices and volumes of trade, as well as funds collected in initial coin offerings (ICOs). These sources vary depending on the methodologies used, coverage and access to basic source information.

The processing of baseline information (when available) is ambiguous due to the absence (only partial) of regulation related to various participants in the value chain of crypto assets that operate in an environment without borders.

Nevertheless, data processing allows some quality control of the data. Besides public sources, statistical and control reporting mechanisms usually do not cover cryptocurrencies.

Building a cryptocurrency monitoring structure on this basis requires careful processing of available data and a phased approach to filling current gaps.

Monitoring needs will be reviewed periodically to ensure that the monitoring structure is still relevant and monitoring efforts remain proportionate to the potential risks associated with changing market sizes and price changes of individual cryptocurrencies, as well as the links between cryptocurrencies and the financial system.

After the all-time maximum capitalization of 650 billion euros in January 2018, and the following savage correction, the market capitalization of cryptocurrencies decreased to 96 billion euros in January 2019. It moved in tandem with asset prices, as evidenced by the price of Bitcoin, whose correlation with the general market capitalization is 95%. In relative terms, the market capitalization of cryptocurrencies is 4% of the market capitalization of the stock, and is 1% of GDP in the Euro area.

This cryptocurrency bubble is smaller than the peak of the two main past bubbles — dotcoms and subprime mortgage-backed securities. Compared to money aggregates, the value of cryptocurrencies is 1.2% of M1 in the Euro area and 0.8% of money aggregates M3. Bitcoin keeps leading in the field of crypto assets in terms of market capitalization, user base and popularity.

Although over the past two years, Bitcoin has lost some positions compared to other cryptocurrencies due to increased competition and uncertainty about the success of the various business models underlying behind, its market share has recovered during 2018 and is currently 54%.

For comparison, at the peak of the dotcom bubble, the NASDAQ Composite was four times higher than three years ago. Over the past two years, the historical volatility of cryptocurrencies has overshadowed not only the volatility of diversified European stock and bond markets, but also the volatility of oil and gold prices, highlighting the market risk that cryptocurrency investors are exposed to.

Compared to the beginning of 2018, when some cryptocurrencies had price peaks, volatility decreased. It is interesting to note that Bitcoin is not so volatile as other cryptocurrencies, which potentially reflects a wider investor base and a relatively longer lifespan as an asset.

CONCLUSIONS

As you can see, the perseverance changes over time and fluctuates around the average. The temporary variation is especially evident in the case of Litecoin, whose indicator has significantly decreased: from 0.70 in 2015 to 0.40 in 2018. This indicates the adaptability of the market: after 2–3 years, it became more liquid, and the number of participants and trade volumes have increased.

A monetary system based on digital currency may seem attractive, as it provides an opportunity to limit the role of the central bank. Higher transaction costs in the markets affect the ability of traders to act quickly, which leads to market failures.

As a result, the study revealed that illiquid cryptocurrencies exhibit strong inverse antipersistence in the form of a low Hurst exponent.

The study revealed the cyclical dynamics of cryptocurrency prices. We studied the level of market formation and proved that the cryptocurrency market has moved to a new development stage confirmed by a decrease in the volatility of all liquid cryptocurrencies. We identified potential risks that have a long-term positive relationship with the financial stability of the cryptocurrency market.

It is concluded that the partial use of digital currency would be realistic when implementing monetary policy by the Bank of Russia, which could thus mitigate the business cycle and control inflation.

If Russia accepts the law ‘’On Digital Financial Assets’’ and legalizes cryptocurrencies after the economic crisis caused by the COVID-19 pandemic, the Bank of Russia might act as a lender of last resort and offer crypto loans.

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New Ways to Measure Catastrophic Financial Risks: "*VaR* to the power of *t*" Measures and How to Calculate Them

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ABSTRACT

The work introduces a family of new risk measures, "*VaR* to the power of *t*". The **aim** of the work is to study the properties of this family of measures and to derive formulas to calculate them. The study used **methods** for assessing financial risks by risk measures VaR and ES. As a result, the author proposed a new tool to measure catastrophic financial risks — "*VaR* to the power of *t*". The study proved that for the measuring, it is sufficient to calculate the common risk measure VaR with the confidence probability changed in a certain way. The author **concludes** that this family of measures should find application in solving the problem of penetrating risk events with low probabilities, but with catastrophic financial losses. The study results may be of use to the regulator to assess the capital adequacy of financial institutions. If $t > 1$, these measures prove to be more conservative risk measures of catastrophic losses than the known risk measures VaR, ES and GlueVaR.

Keywords: risk measure VaR; risk measure ES; risk measure VaR squared: $VaR^{(2)}$; risk measures *VaR* to the *t* power: $VaR^{(t)}$; risk measures GlueVaR; confidence probability; probability density distribution; distortion risk measures; risk appetite; subadditivity; tails of distribution

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INTRODUCTION

Financial and insurance risk management practitioners typically have to deal with two opposing demands: on the one hand, they want business units to achieve or outperform the objectives fixed by the firm's executive committee, yet, on the other, they are responsible for controlling their economic risks. Finding a trade-off between these two demands is the challenging task that risk managers face on a daily basis. At the same time, they need to decide how risk should be quantified.

Financial and insurance firms are subject to the capital requirements established by regulators' guidelines and directives. These requirements are typically equal to, or proportional to, a risk measure value that determines a minimum cushion of economic liquidity. The selection of such risk measures and tolerance levels is crucial therefore from the regulators' point of view.

Financial institutions and insurance companies prefer to minimize the level of capital reserves required by solvency regulations, because they must contend with many restrictions on how this capital can be invested and, as such, the return on their capital reserves is usually lower than that provided by other opportunities. For this reason, companies typically favor regulations that impose risk measures and tolerance levels that are not overly conservative.

Managers also prefer simple, straightforward risk measures rather than more complicated alternatives, since they claim that the former are more easily communicated.

From the regulators' perspective, controlling the risk of financial institutions and insurance companies is fundamental in order to protect consumers and investors, which may have conflicting objectives. Strict solvency capital requirements may limit the capacity of firms, but they also reassure consumers and guarantee the position of the financial industry in the economy. Thus, the debate as to what constitutes a suitable risk measure and what represents a suitable tolerance level is interminable, without their apparently having been much investigation as to what might represent an appropriate compromise.

VaR is currently a classic market risk measure widely adopted and developed both in theory and in practice (for example, [1–3]). VaR estimates the threshold that is not overcome in a given (large) percentage of observations over a given period. According to the Basel Committee, it was included as a mandatory risk measure in assessing not only market risk, but also other risks (for example, credit risk and liquidity risk). The VaR measure is used in assessing various risks in corporate governance (for example, [4–5]).

Value-at-Risk (VaR) has been adopted as a standard tool to assess the risk and to calculate capital requirements in the financial industry. However, VaR is known to present a number of pitfalls when applied in practice. A disadvantage when using VaR in the financial context is that the capital requirements for catastrophic losses based on the measure can be underestimated, i.e. the necessary reserves in adverse scenarios may well be less than they should be.

The underestimation of capital requirements may be aggravated when fat-tailed losses are incorrectly modeled by mild-tailed distributions. There are attempts to overcome this kind of model risk when using VaR or, at least, to quantify the risk related to the modelling [6].

A second drawback is that the VaR may fail the subadditivity property. A risk measure is subadditive when the aggregated risk is less than or equal to the sum of individual risks.

Subadditvity is an appealing property when aggregating risks in order to preserve the benefits of diversification. VaR is subadditive for elliptically distributed losses [7]. However, the subadditivity of VaR is not guaranteed for any distribution not included in the class of elliptical [8, 9].

Since the end of the 20th century, a measure of expected shortfall, conditional VaR, a measure of expected tail losses exceeding VaR, often defined as ES (or TVaR) has been widely used in theory and practice of risk management (for example, [1–3]).

The ES measures average losses in the most adverse cases rather than just the minimum loss, as the VaR does. Therefore, capital reserves based on the ES have to be considerably higher than those based on VaR and significant differences in the size of capital reserves can be obtained depending on which risk measure is adopted.

The ES risk measure does not suffer the two drawbacks discussed above for VaR and, as such, would appear to be a more powerful measure for assessing the actual risks faced by companies and financial institutions. However, ES has not been widely accepted by practitioners in the financial and insurance industry. VaR is currently the risk measure contemplated in the European solvency regulation.

In relatively recent papers [10, 11], a new family of risk measures GlueVaR was proposed and examined in the class of distortion risk measures.

The search for various risk measures that satisfy certain needs has a rather long history (general approaches to this problem are presented by [12, 13]). One of the significant classes of examined risk measures is the distortion risk measures introduced by S. Wang [14, 15]. They are closely related to the distortion expectation theory.

Tsanakas and Desli [16] provide a review on how risk measures can be interpreted from several perspectives, and include a clarifying explanation of the relationship between distortion risk measures and distortion expectation theory.

A detailed literature review of distortion risk measures is available in the works by M. Denuit et al., A. Balbas et al. [17, 18].

J. Belles-Sampera et al. [10, 11] define a new family of risk measures, called GlueVaR, within the class of distortion risk measures. The authors find out their relationship with VaR and ES, and receive analytical closed-form expressions for many statistical distributions that are frequently used in financial and insurance applications. Tail-subadditivity is investigated and it is shown that some GlueVaR risk measures satisfy this property. An interpretation in terms of risk attitudes is provided and a discussion is given on the applicability in non-financial problems such as health, safety, environmental or catastrophic risk management.

In work [19], the author introduced the concept of new measure $VaR^{(2)}$. It assesses risks more conservatively than VaR, and even than ES, as some threshold value that cannot be overcome with a given probability (like VaR), and not as an average value from the set of "bad", tail loss values (like ES). For this risk measure, closed computational formulas were obtained in cases of uniform and triangular loss distributions.

The author continued studying $VaR^{(2)}$ risk measure in work [20]. A general, independent of loss distribution formula was obtained for it and expressed it through the common risk measure VaR with the confidence probability changed in a certain way. Moreover, the study investigated the relationships between risk assessments by $VaR^{(2)}$ and other known risk measures, such as ES. It turned out that the ratio under study often depends on the assumption of the loss distribution law, and sometimes on confidence probabilities. It was also revealed that $VaR^{(2)}$ most often provides a more conservative risk assessment than ES [20].

The current work continues the previous research by the author. It introduces the concept of risk measures VaR to any power $t \geq 1$, derives formulas to calculate $VaR^{(t)}$ as the common VaR with the confidence probability changed in a certain way. The work discusses possibilities of practical application of this family of risk measures.

Thus, we propose a new family of risk measures called $VaR^{(t)}$, formulas to calculate them, which lead to the fact that all existing models and tools to calculate the common VaR are also

applicable to any measure of the $VaR^{(t)}$ family of measures. The paper gives analytical expressions of $VaR^{(t)}$ closed computational formula for some of the distribution functions most often used in financial and insurance applications. The relationships between $VaR^{(t)}$ at $t > 1$ and risk measures VaR and ES are explained.

This new family of measures is associated with the most popular risk measures and includes a sufficient number of parameters to consider management and regulatory requirements for risk. Therefore, this article is motivated by an attempt to answer the following question: is it possible to develop risk measures that would provide a risk assessment meeting various needs and allowing penetration into the risk assessment of arbitrarily high catastrophe, exceeding the capabilities of both VaR and ES?

The $VaR^{(t)}$ family of risk measures is defined as a function with two parameters: confidence probability p and exponent t. By calibrating these parameters, VaR risk measures can be matched to a wide variety of contexts. In particular, if the level of confidence is fixed, the new family contains risk measures between VaR and ES and can adequately show the risks of moderate catastrophe. However, in certain situations, much more conservative risk measures than even ES may be preferred. We show that these highly conservative risk measures can also be defined using the $VaR^{(t)}$ family. We obtain closed analytical expressions of $VaR^{(t)}$ closed formula, for statistical distributions commonly used in the financial context. These expressions should allow practitioners to make a simple transition from using VaR and ES to risk measures $VaR^{(t)}$.

THE CONCEPT OF RISK MEASURES VAR TO THE POWER OF *n* ($VaR^{(n)}$, *n* — IS A NATURAL NUMBER) AND THE DERIVATION OF COMPUTATIONAL FORMULAS

Work [19] introduced a new risk measure supplementing VaR — VaR squared ($VaR_p^{(2)}$), which tracks rare tail risks associated with serious financial losses.

$VaR_p^{(2)}$ risk measure with confidence probability p (see [19]) is a value that will be exceeded by profit (not exceeded by losses), provided that its threshold value is not exceeded (exceeded) with confidence probability p for a given time.

Work [20] provides a formula to calculate this risk measure.

Let X be the value of the windfall profit for this asset for a given period of time ($-X$ shows the value of the corresponding losses).

The following formula was proved in work [20], which allows calculating $VaR_p^{(2)}$ as VaR with the confidence probability changed in a certain way:

$$VaR_p^{(2)}[X] = VaR_{1-(1-p)^2}[X]. \quad (1)$$

Thus, to calculate $VaR_p^{(2)}$, we should calculate VaR with the confidence probability $1-(1-p)^2$.

In particular, if the loss distribution law is known (for example, normal), then $VaR_p^{(2)}$ can be calculated by formula (1) with the Monte Carlo method or by the known formula for VaR under this assumption and by formula (1), which will lead to the following result:

$$VaR_p^{(2)} = Vk_{1-(1-p)^2}^{0.1} \cdot \sigma, \quad (2)$$

where V is the denomination of the position at time 0; σ – is the standard deviation of profitability in the time period over which we estimate $VaR_p^{(2)}$; $k_q^{0.1}$ is the quantile of a standardized distribution of returns with confidence probability q.

If the distribution of returns is not known, $VaR_p^{(2)}$ can be calculated using the empirical loss distribution and formula (1).

In formula (2) we used the formula for calculating the relative VaR, i.e. the maximum deviation in an unfavorable direction from the expected profit with a given probability for a given (unit) time.

The concept of $VaR^{(2)}$ in work [20] was generalized considering that confidence probability p' in determining $VaR^{(2)}$, i.e. the threshold value that the profit will not exceed (the loss will exceed) under the condition of non-exceeding (exceeding) VaR_p with probability p', may differ from p. This risk measure was defined as $VaR_{p,p'}^{(2)}$ and the following formula was obtained:

$$VaR_{p,p'}^{(2)}[X] = VaR_{1-(1-p)(1-p')}[X]. \quad (3)$$

We introduce the concept of risk measures VaR to the power of n, where n is any natural number. We will introduce these measures inductively, sequentially, moving from VaR to $VaR^{(2)}$, then to $VaR^{(3)}$, and so on, and the we will reach $VaR^{(n)}$. At the same time, we will deal with the sequential derivation of formulas for risk measures VaR to the power of n, $VaR^{(n)}$.

To begin with, we represent the common VaR in the form:

$$VaR_p^{(1)}[X] = VaR_p[X] = VaR_{p_1}[X],$$

$$\text{where } p_1 = 1-(1-p).$$

Then, according to formula (1)

$$VaR_p^{(2)}[X] = VaR_{p_2}[X], \text{where } p_2 = 1-(1-p_1)^2.$$

Then, according to the definition, we assume that VaR squared is just $VaR_{p_2,p}^{(2)}[X]$. So, we get that

$$VaR_p^{(3)}[X] = VaR_{p_2,p}^{(2)}[X] = VaR_{p_3}[X],$$

where according to formula (3) $p_3 = 1-(1-p_2)(1-p)$, but then using formula (1) we have:

$$p_3 = 1-(1-p_2)(1-p) =$$
$$= 1-(1-[1-(1-p)^2])(1-p) = 1-(1-p)^3.$$

In the same way, defining VaR to the power of four as $VaR_{p_3,p}^{(2)}[X]$, we get:

$$VaR_p^{(4)}[X] = VaR_{p_3,p}^{(2)}[X] = VaR_{p_4}[X], \quad \text{where}$$

according to formula (3) $p_4 = 1-(1-p_3)(1-p)$, but then using formula (1) we have:

$$p_4 = 1-(1-p_3)(1-p) =$$
$$= 1-(1-[1-(1-p)^3])(1-p) = 1-(1-p)^4.$$

By proceeding in the same way, we introduce risk measure VaR to the power of n for any natural number n as $VaR_{p_{n-1},p}^{(2)}[X]$, where $p_{n-1} = 1-(1-p)^{n-1}$ and we get:

$VaR_p^{(n)}[X] = VaR_{p_{n-1},p}^{(2)}[X] = VaR_{p_n}[X]$, where according to formula (3) $p_n = 1-(1-p_{n-1})(1-p)$, but then using formula (1) we have:

$$p_n = 1-(1-p_{n-1})(1-p) =$$
$$= 1-(1-[1-(1-p)^{n-1}])(1-p) = 1-(1-p)^n.$$

Thus, we introduced the concept of risk measures VaR to the power of n for any natural number n and obtained a formula that reduces their calculations to calculating the common risk measure VaR with the confidence probability changed in a certain way.

$$VaR_p^{(n)}[X] = VaR_{1-(1-p)^n}[X]. \qquad (4)$$

To calculate $VaR_p^{(n)}$, it is just necessary to calculate VaR with the confidence probability $1-(1-p)^n$.

With risk measures $VaR_p^{(n)}[X]$ the risk manager may delve into studying the left tail of the profit distribution law for confidence probabilities that are multiples of initial confidence probability p, and get information about less probable, but more catastrophic risks.

CONSEQUENCE

For any value of confidence probability $p \in (0,1]$ with unlimited growth of n, the value of risk measure $VaR_p^{(n)}[X]$ unlimitedly approaches the left (right) border of profit distribution carrier X (loss $-X$).

PROOF

This follows from the fact that for the indicated values of p $1-(1-p)^n \to 1$, at $n \to \infty$.

Table 1 provides the table for the calculation formulas for of $VaR_p^{(n)}$, at n = 2, 3, and 4 and certain confidence probabilities.

Table 1 shows that with growth of n, the confidence probability of the corresponding common measure VaR tends to 100%. The faster it is growing, the greater is confidence probability $VaR_p^{(n)}[X]$ with which the risk measure is calculated. Therefore, the values of $VaR_p^{(n)}[X]$ quickly approach the left (right) border of profit distribution carrier X (loss $-X$)., i.e. show losses with increasingly catastrophic and less likely risk events.

Table 1

Expression for $VaR_p^{(n)}[X]$ through the common risk measure VaR at various values of n and confidence probabilities *p*

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p^{(2)}[X]$	$VaR_{99\%}[X]$	$VaR_{99.75\%}[X]$	$VaR_{99.99\%}[X]$
$VaR_p^{(3)}[X]$	$VaR_{99.9\%}[X]$	$VaR_{99.9875\%}[X]$	$VaR_{99.9999\%}[X]$
$VaR_p^{(4)}[X]$	$VaR_{99.99\%}[X]$	$VaR_{99.999\%}[X]$	$VaR_{\approx 100\%}[X]$

Source: the author's calculations.

Table 2

Values $VaR_p^{(n)}[X]$ at various values of *n* and *p*, assuming uniform distribution of variable X at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	110	105	101
$VaR_p^{(2)}[X]$	101	100.25	100.01
$VaR_p^{(3)}[X]$	100.1	100.0125	100.0001
$VaR_p^{(4)}[X]$	100.01	100.000625	≈100

Source: the author's calculations.

We will test the results on the known loss distributions and the corresponding numerical examples.

UNIFORM DISTRIBUTION

According to study [21], if profit value X is uniformly distributed in interval (a, b), then for any confidence probability p

$$VaR_p[X] = pa + (1-p)b.$$

We rewrite this expression as follows:

$$VaR_p[X] = b - (b-a)p = a + (1-p)(b-a).$$

Then according to formula (4), we have:

$$VaR_p^{(2)}[X] = VaR_{1-(1-p)^2}[X] =$$

$$= b - (b-a)(1-(1-p)^2) = a + (1-p)^2(b-a)\cdot$$

Note that the expression naturally coincides with the expression obtained by the straight-

forward conclusion from the definition of $VaR_p^{(2)}[X]$ in work [19] [formula (2)].

Similarly, we get the expression for $VaR_p^{(n)}[X]$:

$$VaR_p^{(n)}[X] = VaR_{1-(1-p)^n}[X] =$$

$$= b-(b-a)(1-(1-p)^n) = a+(1-p)^n(b-a)\cdot$$

I.e.

$$VaR_p^{(n)}[X] = a+(1-p)^n(b-a). \qquad (5)$$

We can rewrite formula (5) as follows:

$$VaR_p^{(n)}[X] = (1-(1-p)^n)a+(1-p)^n b,$$

which means that at uniform profit distribution X, value $VaR_p^{(n)}[X]$ is presented as a weighted average between the ends of interval (a, b), and the weight of the left end rapidly tends to 1 with growth of n. Therefore, the value of $VaR_p^{(n)}[X]$ quickly approaches the left (right) border of profit distribution carrier X (loss $-X$).

This is illustrated on *Example 1 (Table 2)*.

Example 1

We calculate $VaR_p^{(n)}[X]$ at $n = 1, \ldots, 4$, $p = 90\%$, 95% and 99%, if $a = 100$ units, and $b = 200$ units.

TRIANGULAR DISTRIBUTION

According to study [21], if random variable X is subordinate to the triangular distribution with a carrier coinciding with interval (a, b) and a vertex, whose projection onto the carrier is represented by point $v \in (a, b)$, then:

$$VaR_p[X] = \begin{cases} a+\sqrt{(1-p)(b-a)(\nu-a)}, \\ \text{if } \nu \geq pa+(1-p)b \\ b-\sqrt{p(b-a)(b-\nu)}, \\ \text{if } \nu \leq pa+(1-p)b. \end{cases}$$

We rewrite this expression as follows:

$$VaR_p[X] = \begin{cases} a+\sqrt{(1-p)(b-a)(\nu-a)}, \\ \text{if } \nu \geq a+(1-p)(b-a) \\ b-\sqrt{(1-(1-p))(b-a)(b-\nu)}, \\ \text{if } \nu \leq a+(1-p)(b-a). \end{cases}$$

Then according to formula (4),

$VaR_p^{(2)}[X] = VaR_{p_2}[X]$, where $p_2 = 1-(1-p)^2$,

we have:

$$VaR_p^{(2)}[X] = \begin{cases} a+\sqrt{(1-p_2)(b-a)(\nu-a)}, \\ \text{if } \nu \geq a+(1-p_2)(b-a) \\ b-\sqrt{(1-(1-p_2))(b-a)(b-\nu)}, \\ \text{if } \nu \leq a+(1-p_2)(b-a) \end{cases}$$

or

$$VaR_p^{(2)}[X] = \begin{cases} a+\sqrt{(1-p)^2(b-a)(\nu-a)}, \\ \text{if } \nu \geq a+(1-p)^2(b-a) \\ b-\sqrt{(1-(1-p)^2)(b-a)(b-\nu)}, \\ \text{if } \nu \leq a+(1-p)^2(b-a). \end{cases}$$

This expression can also be written as follows:

$$VaR_p^{(2)}[X] = \begin{cases} a+(1-p)\sqrt{(b-a)(\nu-a)}, \\ \text{if } \nu \geq a+(1-p)^2(b-a) \\ b-\sqrt{p(2-p)(b-a)(b-\nu)}, \\ \text{if } \nu \leq a+(1-p)^2(b-a). \end{cases}$$

Note that the expression naturally coincides with the expression obtained by the straightforward conclusion from the definition of $VaR_p^{(2)}[X]$ in work [19] [formula (2)].

Similarly, we get the expression for $VaR_p^{(n)}[X]$:

$$VaR_p^{(n)}[X] = VaR_{1-(1-p)^n}[X] =$$

$$= \begin{cases} a+\sqrt{(1-p)^n(b-a)(\nu-a)}, \\ \text{if } \nu \geq a+(1-p)^n(b-a) \\ b-\sqrt{(1-(1-p)^n)(b-a)(b-\nu)}, \\ \text{if } \nu \leq a+(1-p)^n(b-a). \end{cases} \qquad (6)$$

We study the behavior of these risk measures depending on the values of distribution mode ν and confidence probability in *Examples 2–4 (Tables 3–5)*.

Example 2

We calculate $VaR_p^{(n)}[X]$ at $n = 1, \ldots, 4$, $p = 90\%$, 95% and 99%, if $a = 100$ units, $b = 200$ units and $\nu = 105$ units.

Table 3

Values $VaR_p^{(n)}[X]$ at various values of *n* and *p*, assuming triangular distribution of variable *X* at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	107.0711	105	102.2361
$VaR_p^{(2)}[X]$	102.2361	101.118	100.2236
$VaR_p^{(3)}[X]$	100.7071	100.25	100.0224
$VaR_p^{(4)}[X]$	100.2236	100.05559	100.0022

Source: the author's calculations.

Table 4

Values $VaR_p^{(n)}[X]$ at various values of *n* and *p*, assuming triangular distribution of variable *X* at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	122.3607	115.8114	107.0711
$VaR_p^{(2)}[X]$	107.0711	103.5355	100.7071
$VaR_p^{(3)}[X]$	102.2361	100.7906	100.0707
$VaR_p^{(4)}[X]$	100.7071	100.1768	100.0071

Source: the author's calculations.

Table 5

Values $VaR_p^{(n)}[X]$ at various values of *n* and *p*, assuming triangular distribution of variable *X* at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	130.8221	121.7945	109.7468
$VaR_p^{(2)}[X]$	109.7468	104.8734	100.9747
$VaR_p^{(3)}[X]$	103.0822	101.0897	100.0975
$VaR_p^{(4)}[X]$	100.9747	100.2437	100.0097

Source: the author's calculations.

Example 3

We calculate $VaR_p^{(n)}[X]$ at $n = 1, \ldots, 4$, $p = 90\%$, 95% and 99%, if $a = 100$ units, $b = 200$ units and $\nu = 105$ units.

Example 4

We calculate $VaR_p^{(n)}[X]$ at $n = 1, \ldots, 4$, $p = 90\%$, 95% and 99%, if $a = 100$ units, $b = 200$ units and $\nu = 195$ units.

Examples 2–4 show that with growth of n, $VaR_p^{(n)}[X]$ quickly enough tends to the left border of the profit distribution carrier, and the greater the confidence probability p is, the faster this happens. The closer distribution mode ν is to the left border of the profit distribution carrier, the faster $VaR_p^{(n)}[X]$ tends to the left border of the profit distribution carrier for all values of confidence probability p, i.e. the more risky this position is at all levels of catastrophe.

NORMAL DISTRIBUTION

As we know (for example, [1–3]), assuming that the profit distribution is normal, VaR (relative VaR) is calculated by formula

$$VaR_p[X] = V\sigma k_p^{0.1},$$

where V is the denomination of the position at time 0; σ – is the standard deviation of profitability in the time period over which we estimate VaR; $k_q^{0.1}$ is the quantile of a standardized distribution of returns with confidence probability q.

Then according to formula (4), we have

$$VaR_p^{(n)}[X] = V\sigma k_{1-(1-p)^n}^{0.1}. \qquad (7)$$

We investigate the behavior of these risk measures depending on confidence probability p (*Table 6*). Since only quantiles depend on the confidence probability, the example provides the dependence of the corresponding quantiles on confidence probabilities.

We see that for each confidence probability p, the corresponding quantiles increase with growth of n of risk measures $VaR_p^{(n)}[X]$. Thus, for large n, risk measures $VaR_p^{(n)}[X]$ evaluate increasingly catastrophic risks, and the greater confidence probabilities p are, the greater the assessment of such risk measures is.

POLY-VAR RISK MEASURES

We introduce a family of measures generalizing measures $VaR_p^{(n)}[X]$, and will allow the confidence probabilities used in constructing VaR to various powers to vary.

To begin with, we present the common risk measure VaR as follows:

$$VaR_p[X] = VaR_{\tilde{p}_1}, \text{ where } \tilde{p}_1 = p_1 = p = 1-(1-p).$$

Using formula (3), we introduce the concept of poly-VaR squared:

$$VaR_{p_1,p_2}^{(2)}[X] = VaR_{\tilde{p}_2}[X], \text{ where } \tilde{p}_2 = 1-(1-p_1)(1-p_2).$$

Thus, poly-VaR to the third power is defined as follows:

$$VaR_{p_1,p_2,p_3}^{(3)}[X] = VaR_{\tilde{p}_2,p_3}^{(2)}[X] = VaR_{\tilde{p}_3}[X],$$

where

$$\tilde{p}_3 = 1-(1-\tilde{p}_2)(1-p_3) = 1-(1-[1-(1-p_1)(1-p_2)])(1-p_3) = 1-(1-p_1)(1-p_2)(1-p_3).$$

Further, poly-VaR to the power of n is defined as follows:

$$VaR_{p_1,p_2,\ldots,p_n}^{(n)}[X] = VaR_{\tilde{p}_{n-1},p_n}^{(2)}[X] = VaR_{\tilde{p}_n}[X],$$

where

$$\tilde{p}_n = 1-(1-\tilde{p}_{n-1})(1-p_n) = 1-(1-[1-(1-p_1)(1-p_2)\ldots(1-p_{n-1})])(1-p_n) = 1-(1-p_1)\ldots(1-p_n).$$

That is, the formula for poly-VaR to the power of n is as follows:

$$VaR_{p_1,p_2,\ldots,p_n}^{(n)}[X] = VaR_{1-(1-p_1)(1-p_2)\ldots(1-p_n)}[X], \quad (8)$$

expressing it through the common risk measure VaR with the confidence probability recalculated in a certain way.

VAR RISK MEASURE TO ANY VALID POWER $t \geq 1$, $VaR_p^{(t)}[X]$

Any real number $t \geq 1$ can be unambiguously represented as follows $t = k + \alpha$, where k is a

Table 6

Values $VaR_p^{(n)}[X]$ (through values of corresponding $k_q^{0.1}$) at various values of *n* and *p*, assuming normal distribution of variable *X*

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$k_p^{0.1}$ (VaR_p)	1.2816	1.6449	2.3263
$k_{1-(1-p)^2}^{0.1}$ $(VaR_p^{(2)})$	2.3264	2.8070	3.7190
$k_{1-(1-p)^3}^{0.1}$ $(VaR_p^{(3)})$	3.0902	3.6623	4.7534
$k_{1-(1-p)^4}^{0.1}$ $(VaR_p^{(4)})$	3.7190	4.3687	5.6120

Source: the author's calculations.

Table 7

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming uniform distribution of variable *X* at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	110	105	101
$VaR_p^{(1.1)}[X]$	109.1	104.525	100.901
$VaR_p^{(1.5)}[X]$	105.5	102.625	100.505
$VaR_p^{(1.9)}[X]$	101.9	100.725	100.109

Source: the author's calculations.

natural number; and α — is a real number, with $0 \le \alpha < 1$. Obviously, k is the integer part of t, and α is its fractional part.

Then we can determine VaR to any valid power $t \ge 1$, $VaR_p^{(t)}[X]$ as follows

$$VaR_p^{(t)}[X] = VaR^{(k+1)}_{\underbrace{p,p,\ldots,p}_{k},\alpha p}. \quad (9)$$

In particular, applying (9) and (8), we have:

$$VaR_p^{(1+\alpha)}[X] = VaR_{p,\alpha p}^{(2)}[X] = VaR_{1-(1-p)(1-\alpha p)}[X] \quad (10)$$

and

$$VaR_p^{(2+\alpha)}[X] = VaR_{p,p,\alpha p}^{(3)}[X] = VaR_{1-(1-p)^2(1-\alpha p)}[X] \quad (11)$$

etc.,

$$VaR_p^{(t)}[X] = VaR_p^{(k+\alpha)}[X] = VaR_{1-(1-p)^k(1-\alpha p)}[X]. \quad (12)$$

Table 8

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming uniform distribution of variable *X* at interval (*a*, *b*)

	p = 90%	*p* = 95%	*p* = 99%
$VaR_p^{(2)}[X]$	101	100.25	100.01
$VaR_p^{(2.1)}[X]$	100.9	100.226	100.009
$VaR_p^{(2.5)}[X]$	100.6	100.131	100.005
$VaR_p^{(2.9)}[X]$	100.2	100.036	100.001

Source: расчеты автора / the author's calculations.

With risk measures $VaR_p^{(t)}[X]$, the risk manager may delve into studying the left tail of the profit distribution law for confidence probabilities that are multiples of initial confidence probability *p*, and get very detailed information about less probable, but more catastrophic risks.

UNIFORM DISTRIBUTION (VAR TO A FRACTIONAL POWER)

Applying formulas (10) and (11) in the case of a uniform distribution, we have:

$$VaR_p^{(1+\alpha)}[X] = a + (1-p)(1-\alpha p)(b-a)$$

and

$$VaR_p^{(2+\alpha)}[X] = a + (1-p)^2(1-\alpha p)(b-a).$$

***Example 5** (Table 7)*

We calculate $VaR_p^{(t)}[X]$ at t = 1; 1.1; 1.5; 1.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units.

***Example 6** (Table 8)*

We calculate $VaR_p^{(t)}[X]$ at t = 2; 2.1; 2.5; 2.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units.

Examples 5 and 6 show that at growing α, risk measures $VaR_p^{(1+\alpha)}[X]$ and $VaR_p^{(2+\alpha)}[X]$ tend to the left border of the profit distribution carrier, and the greater the confidence probability *p* is, the faster this happens. However, this happens more slowly than when moving from $VaR_p[X]$ to $VaR_p^{(2)}[X]$, and, accordingly, from $VaR_p^{(2)}[X]$ to $VaR_p^{(3)}[X]$ (compare with *Example 1*). That is, applying VaR risk measures to the power of $(1+\alpha)$ and $(2+\alpha)$ at various α, the risk manager, depending on the risk appetite of his company, can rather subtly examine the risks in the left tail of the profit distribution.

TRIANGULAR DISTRIBUTION (VAR TO A FRACTIONAL POWER)

Applying formulas (10) and (11) in the case of a uniform distribution, we have:

$$VaR_p^{(1+\alpha)}[X] = \begin{cases} a + \sqrt{(1-p)(1-\alpha p)(b-a)(\nu-a)}, \\ \text{if } \nu \geq a + (1-p)(1-\alpha p)(b-a) \\ b - \sqrt{(1-(1-p))(1-\alpha p)(b-a)(b-\nu)}, \\ \text{if } \nu \leq a + (1-p)(1-\alpha p)(b-a) \end{cases}$$

and

$$VaR_p^{(2+\alpha)}[X] = \begin{cases} a + \sqrt{(1-p)^2(1-\alpha p)(b-a)(\nu-a)}, \\ \text{if } \nu \geq a + (1-p)^2(1-\alpha p)(b-a) \\ b - \sqrt{(1-(1-p)^2(1-\alpha p))(b-a)(b-\nu)}, \\ \text{if } \nu \leq a + (1-p)^2(1-\alpha p)(b-a) \end{cases}$$

***Example 7a** (Table 9)*

We calculate $VaR_p^{(t)}[X]$ at t = 1; 1.1; 1.5; 1.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units and $\nu = 105$ units.

***Example 7b** (Table 10)*

We calculate $VaR_p^{(t)}[X]$ at t = 1; 1.1; 1.5; 1.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units and $\nu = 105$ units.

Table 9

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming triangular distribution of variable *X* at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	107.5338	105	102.2361
$VaR_p^{(1.1)}[X]$	107.0726	104.7566	102.1225
$VaR_p^{(1.5)}[X]$	105.2503	103.6228	101.5890
$VaR_p^{(1.9)}[X]$	103.0822	101.9039	100.7382

Source: the author's calculations.

Table 10

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming triangular distribution of variable *X* at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	122.3607	115.8114	107.0711
$VaR_p^{(1.1)}[X]$	121.3007	115.0416	106.7119
$VaR_p^{(1.5)}[X]$	116.5831	111.4564	105.0249
$VaR_p^{(1.9)}[X]$	109.7468	106.0208	102.3345

Source: the author's calculations.

Table 11

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming triangular distribution of variable *X* at interval (*a*, *b*)

	***p* = 90%**	***p* = 95%**	***p* = 99%**
$VaR_p[X]$	130.8221	121.7945	109.7468
$VaR_p^{(1.1)}[X]$	129.4024	120.7334	109.2518
$VaR_p^{(1.5)}[X]$	122.8583	115.7916	106.9264
$VaR_p^{(1.9)}[X]$	113.4350	108.2991	103.2179

Source: the author's calculations.

Table 12

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming triangular distribution of a variable *X* at interval (*a, b*)

	p = 90%	*p* = 95%	*p* = 99%
$VaR_p^{(2)}[X]$	103.0206	101.1180	100.2236
$VaR_p^{(2.1)}[X]$	102.9766	101.0636	100.2125
$VaR_p^{(2.5)}[X]$	102.8005	100.8101	100.1589
$VaR_p^{(2.9)}[X]$	100.9747	100.4257	100.0738

Source: the author's calculations.

Table 13

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming triangular distribution of variable *X* at interval (*a, b*)

	p = 90%	*p* = 95%	*p* = 99%
$VaR_p^{(2)}[X]$	107.0711	103.5355	100.7071
$VaR_p^{(2.1)}[X]$	106.7454	103.3634	100.6712
$VaR_p^{(2.5)}[X]$	105.2440	102.5617	100.5025
$VaR_p^{(2.9)}[X]$	103.0822	101.3463	100.2335

Source: the author's calculations.

Table 14

Values $VaR_p^{(t)}[X]$ at various values of *t* and *p*, assuming triangular distribution of variable *X* at interval (a, b)

	p = 90%	*p* = 95%	*p* = 99%
$VaR_p^{(2)}[X]$	109.7468	104.8734	100.9747
$VaR_p^{(2.1)}[X]$	109.2978	104.6361	100.9252
$VaR_p^{(2.5)}[X]$	107.2284	103.5311	100.6926
$VaR_p^{(2.9)}[X]$	104.2485	101.8557	100.3118

Source: the author's calculations.

Table 15

Values $VaR_p^{(t)}[X]$ (through values of corresponding $k_q^{0.1}$) at various values of t and *p*, assuming normal distribution of variable *X*

	p = 90%	*p* = 95%	*p* = 99%
$k_p^{0.1}$ (VaR_p)	1.281552	1.644854	2.326348
$k_{1-(1-p)(1-0.1p)}^{0.1}$ $(VaR_p^{(1.1)})$	1.334622	1.692766	2.365207
$k_{1-(1-p)(1-0.5p)}^{0.1}$ $(VaR_p^{(1.5)})$	1.598193	1.939011	2.572387
$k_{1-(1-p)(1-0.9p)}^{0.1}$ $(VaR_p^{(1.9)})$	2.074855	2.4446632	3.064547

Source: the author's calculations.

Example 7c *(Table 11)*

We calculate $VaR_p^{(t)}[X]$ at t = 1; 1.1; 1.5; 1.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units and $\nu = 195$ units.

Examples 7a, 7b, and *7c* show that at growing α, risk measures $VaR_p^{(1+\alpha)}[X]$ tend to the left border of the profit distribution carrier, and the greater confidence probability p is, the faster this happens. However, this happens more slowly than when moving from $VaR_p[X]$ to $VaR_p^{(2)}[X]$. Moreover, the closer distribution mode ν is to the left border of the profit distribution carrier, the faster risk measures $VaR_p^{(1+\alpha)}[X]$ at growing α tend to the left border of the profit distribution carrier at all p. That is, this position is all the more risky. Applying VaR risk measures to powers $(1+\alpha)$ at various α, the risk manager, depending on the risk appetite of his company, can rather subtly examine the risks in the left tail of the profit distribution.

Example 8a *(Table 12)*

We calculate $VaR_p^{(t)}[X]$ at t = 2; 2.1; 2.5; 2.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units and $\nu = 105$ units.

Example 8b *(Table 13)*

We calculate $VaR_p^{(t)}[X]$ at t = 2; 2.1; 2.5; 2.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units and $\nu = 150$ units.

Example 8c *(Table 14)*

We calculate $VaR_p^{(t)}[X]$ at t = 2; 2.1; 2.5; 2.9, and p = 90%, 95% and 99%, if a = 100 units, b = 200 units and $\nu = 195$ units.

Examples 8a, 8b, and *8c* show that at growing α, risk measures $VaR_p^{(2+\alpha)}[X]$ tend to the left border of the profit distribution carrier, and the greater confidence probability p is, the faster this happens. However, this happens more slowly than when moving from $VaR_p^{(2)}[X]$ to $VaR_p^{(3)}[X]$. The closer distribution mode ν is to the left border of the profit distribution carrier, the faster risk measures $VaR_p^{(2+\alpha)}[X]$ at growing α tend to the left border of the profit distribution carrier at all p. That is, this position is all the more risky. Applying VaR risk measures to powers $(2+\alpha)$ at various α, the risk manager, depending on the risk appetite of his company, can rather subtly examine the risks in the left tail of the profit distribution.

NORMAL DISTRIBUTION (VAR TO A FRACTIONAL POWER)

Applying formulas (9) and (10) in the case of a normal distribution, we have:

$$VaR_p^{(1+\alpha)}[X] = V\sigma k_{1-(1-p)(1-\alpha p)}^{0.1}$$

and

$$VaR_p^{(2+\alpha)}[X] = V\sigma k_{1-(1-p)^2(1-\alpha p)}^{0.1}.$$

We study the behavior of these risk measures, depending on the confidence probability in *Tables 15* and *16*. Since only quantiles depend on the confidence probability, the examples provide precisely the dependence of the corresponding quantiles on confidence probabilities.

Table 16

Values $VaR_p^{(t)}[X]$ (through values of corresponding $k_q^{0.1}$) at various values of *t* and *p*, assuming normal distribution of variable *X*

	p = 90%	*p* = 95%	*p* = 99%
$k^{0.1}_{1-(1-p)^2}$ $(VaR_p^{(2)})$	2.326348	2.807034	3.719016
$k^{0.1}_{1-(1-p)^2(1-0.1p)}$ $(VaR_p^{(2.1)})$	2.361524	2.839036	3.74527
$k^{0.1}_{1-(1-p)^2(1-0.5p)}$ $(VaR_p^{(2.5)})$	2.542699	3.008547	3.888177
$k^{0.1}_{1-(1-p)^2(1-0.9p)}$ $(VaR_p^{(2.9)})$	2.894304	3.379946	4.24561

Source: the author's calculations.

Tables 15 and *16* show that for each confidence probability *p*, the corresponding quantiles increase with the growth of α, risk measures $VaR_p^{(1+\alpha)}[X]$ and $VaR_p^{(2+\alpha)}[X]$ increase. Thus, at large α, these risk measures rather subtly assess the increasingly catastrophic risks of various levels of catastrophe, and the greater confidence probabilities *p* are, the greater the assessment of such risk measures is.

CLARIFYING RISK ASSESSMENTS USING RISK MEASURE "VAR TO THE POWER OF ..." ADDING INCREASINGLY SMALL FRACTIONS TO THE POWER

Suppose that the risk manager assessed the asset risk using $VaR_p(X)$. However, in some time, s/he had to check the left tail of the profit distribution on the asset a little further to protect her/himself from slightly less frequently observed threats. Thus, s/he calculated risk measure $VaR_p^{(1+\frac{1}{2})}(X)$. Further circumstances may make her/him check the left tail of the profit distribution on the asset even farther to protect her/himself from even less frequently observed threats — and s/he calculated risk measure $VaR_p^{(1+\frac{1}{2}+\frac{1}{3})}(X)$. This may lead to the situation when calculation and application risk measures such as $VaR_p^{(1+\frac{1}{2}+\frac{1}{3}+\ldots+\frac{1}{n})}(X)$. May be of practical interest in risk management. Applying formula (7), we have the following formula to calculate these risk measures in the form of common risk measures VaR with a specially selected confidence probability:

$$VaR_p^{(1+\frac{1}{2}+\frac{1}{3}+\ldots+\frac{1}{n})}(X) = VaR_{\tilde{p}_n}, \qquad (13)$$

where

$$\tilde{p}_n = 1-(1-p)(1-\frac{1}{2}p)(1-\frac{1}{3}p)\ldots(1-\frac{1}{n}p). \quad (14)$$

We are interested in questions that have both theoretical and practical meaning: how deeply can one investigate with the help of such measures all kinds of risks (catastrophic) that can be observed in the left tail of the profit distribution on the asset? Is it possible to cover 100% of all the risks possible for this asset with the help of this sequence of risk measures?

To do this, we first try to investigate the asymptotic behavior of confidence probabilities $\tilde{p}_n$ at unlimited increase of *n*.

Note that these probabilities can be as follows

$$\tilde{p}_n = 1-e^{x_n}, \text{ where}$$

$$x_n = \ln[(1-p)(1-\frac{1}{2}p)(1-\frac{1}{3}p)...(1-\frac{1}{n}p)] =$$
$$= \ln(1-p) + \ln(1-\frac{1}{2}p) + \ln(1-\frac{1}{3}p) + ... + \ln(1-\frac{1}{n}p).$$

Remember that function $\ln(1+x)$ is expanded in a Taylor series as follows:

$$\ln(1+x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \frac{1}{4}x^4 + ...,$$

converging for all $x \in (-1,1]$, and we apply this expansion to each member of the expression for x_n

$$\ln(1-p) = -p - \frac{1}{2}p^2 - \frac{1}{3}p^3 - \frac{1}{4}p^4 - ...$$

$$\ln(1-\frac{1}{2}p) = -\frac{1}{2}p - \frac{1}{2}\frac{1}{2^2}p^2 - \frac{1}{3}\frac{1}{2^3}p^3 - \frac{1}{4}\frac{1}{2^4}p^4 - ...$$

$$\ln(1-\frac{1}{3}p) = -\frac{1}{3}p - \frac{1}{2}\frac{1}{3^2}p^2 - \frac{1}{3}\frac{1}{3^3}p^3 - \frac{1}{4}\frac{1}{3^4}p^4 - ...$$

etc.

$$\ln(1-\frac{1}{n}p) = -\frac{1}{n}p - \frac{1}{2}\frac{1}{n^2}p^2 - \frac{1}{3}\frac{1}{n^3}p^3 - \frac{1}{4}\frac{1}{n^4}p^4 - ...$$

Substituting all these expansions into the expression for x_n and making a reduction of such terms in powers of p, we have:

$$x_n = -p(1+\frac{1}{2}+...+\frac{1}{n}) - \frac{p^2}{2}(1+\frac{1}{2^2}+...+\frac{1}{n^2}) -$$
$$-\frac{p^3}{3}(1+\frac{1}{2^3}+...+\frac{1}{n^3}) - ...$$
$$-\frac{p^s}{s}(1+\frac{1}{2^s}+\frac{1}{3^s}+...+\frac{1}{n^s}) + ...$$

Marking through

$\varsigma_n(s) = \sum_{k=1}^{n}\frac{1}{k^s}$, при $s = 1, 2, ...$, the expression for x_n can be as follows:

$$x_n = -p\varsigma_n(1) - \frac{p^2}{2}\varsigma_n(2) - \frac{p^3}{3}\varsigma_n(3) - ... -$$
$$-\frac{p^s}{s}\varsigma_n(s) - ... = -\sum_{s=1}^{\infty}\frac{p^s}{s}\varsigma_n(s).$$

Note that values $\varsigma(s)$ are partial sums of a series that determines the value of the famous Riemann zeta function:

$\varsigma(s) = \sum_{k=1}^{\infty}\frac{1}{k^s}$, which in our case is considered only for the natural values of argument s. As we know (for example, [22]), this function takes a finite value at $s = 2, 3, ...$, however, its value is infinite (the series diverges) at $s = 1$.

This means that all values $\varsigma_n(s)$ at $s = 2, 3, ...$ tend to a finite limit at $n \to \infty$, but $\varsigma_n(s)$ tends to $+\infty$ at $n \to \infty$.

Wherein

$$x_n = -p\varsigma_n(1) - \sum_{s=2}^{\infty}\frac{p^s}{s}\varsigma_n(s)$$

since $\varsigma_n(s) < \varsigma(s)$, a $\varsigma(s) \le \varsigma(2)$, and $s \ge 2$ we have

$$\sum_{s=2}^{\infty}\frac{p^s}{s}\varsigma_n(s) < \sum_{s=2}^{\infty}\frac{p^s}{s}\varsigma(s) \le \varsigma(2)(\sum_{s=1}^{\infty}\frac{p^s}{s} - p) <$$
$$< \varsigma(2)(\sum_{s=1}^{\infty}p^s - p) = \varsigma(2)(\frac{p}{1-p} - p) = \frac{\pi^2}{6}\frac{p^2}{1-p} < \infty.$$

Here, we used the formula for the sum of an infinite decreasing geometric progression, as well as the well-known Euler's identity, which states that $\varsigma(2) = \frac{\pi^2}{6}$ (for example, [22]).

Thus, $x_n \to -\infty$ at $n \to \infty$, and therefore, with $\tilde{p}_n = 1 - e^{x_n}$, пwe have $\tilde{p}_n \to 1$ at $n \to \infty$.

This means that a gradual increase in confidence probability with decreasing probabilities $p, \frac{1}{2}p, ..., \frac{1}{n}p, ...$ when calculating risk measures $VaR_p^{(1+\frac{1}{2}+\frac{1}{3}+...+\frac{1}{n})}(X)$, leads to full coverage of the left tail of the asset profit distribution, and the value of these measures tends to the left end of probability distribution carrier X.

CONCLUSIONS

The paper introduces a new family of risk measures, called VaR to the power of t, $VaR^{(t)}$. Expressions obtained for this family are easily applicable in practice, as well as closed analytical expressions for many statistical distributions that are often used in financial and insurance applications.

$VaR^{(t)}$ family of measures can help regulators and practical risk managers. Risk measures $VaR^{(t)}$ should improve regulatory methods in calculating capital requirements, as they may include more information about the relationship of agents with risk positions. Including quality information in decision-making tools is important for risk managers, and risk measures $VaR^{(t)}$ may play a key role in achieving this goal.

By calibrating parameters, one can compare risk measures $VaR^{(t)}$ with a wide variety of contexts. In particular, with a fixed level of confidence, the new family contains risk measures that are between VaR and ES measures and can adequately reflect average catastrophic risks of loss. However, in certain situations, more conservative risk measures than ES may be preferred. We show that such extremely conservative risk measures can also be determined by means of $VaR^{(t)}$ family. The conservatism of risk measures $VaR_p^{(t)}[X]$introduced in the work increases with the growth of t, and at large values of $t > 1$ they are more conservative compared to the known measures VaR and ES. These measures can be applied by cautious investors, who are afraid of possible very bad investment results. Although these results are very unlikely, in their opinion, they are quite possible in these circumstances. Research and assessment of such risks can be carried out using sequential calculation of $VaR_p^{(t)}[X]$ with increasing values of t. The way to calculate risk measures $VaR_p^{(t)}[X]$ will depend on many investor preferences, including their risk appetite.

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The Effect of Inventory Appraisal and Revaluation of State Property on the Optimization of Non-Tax State Revenue

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ABSTRACT

This study **aims** to obtain empirical evidence related to inventory appraisal, revaluation and management as well as utilization of state property in order to optimize non-tax state revenue. The paper employed probability sampling with simple random sampling. The authors conducted the study in 137 Asset Utilization Authorities (KPB) of the ministry/institution. They used questionnaires as primary data sources. The data analysis tools used was the **method** of multiple regression with SPPS statistics version 20.00. **Conclusion:** Inventory appraisal, revaluation and management as well as utilization of state property simultaneously had significant effect on non-tax state revenue. However, partially inventory appraisal and revaluation did not have any significant effect whereas the management and utilization of state property has a significant effect on optimizing non-tax state revenue in the form of rent.

Keywords: inventory appraisal; revaluation; management; utilization; non-tax state revenue; rentals

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INTRODUCTION

A significant amount of funds is needed to achieve the planned development targets, to finance the governance and to develop a country/state. The funds are obtained from the revenue collected by the state government in accordance with the government's ability to collect it, such as Tax, Non-Tax State Revenues (PNBP) and Grants (Law No. 17 of 2003).

It is widely known that state revenues come from the two main groups, which belong to the tax sector and outside the tax sector — the well-known Non-Tax State Revenues (PNBP) with a ratio of about 75:25. This means of revenue comes from the tax sector as the currently largest revenue.

The biggest problem faced by the Indonesian government in achieving the target of state revenue is failing to reach the revenues particularly from taxes. For instance, the failure happened in 2016 affected the deficit of the state budget.

2007–2009 was a period of controlling and restructuring state property used by ministries/institutions through inventory and appraisal of state property aiming at updating accounting of state property and structuring state property in all ministries/institutions' work units.

Inventory is carried out through preliminary data collection activities, matching and clarifying preliminary data and physical checks. Inventory aims to find out the actual quantity, value and condition of state property, both in the management of property authorities and those in the property management.

Some state property was found in poor condition during the inventory appraisal. Much of it was used improperly in relation to its functions and some data about the property were not in accordance with the actual facts or even not found. Therefore, the inventory appraisal of state property should be carried out continuously.

The inventory of state property (IP-BMN) in 2007 was followed by the issuance of the Presidential Regulation of the Republic of Indonesia No. 75 of 2017 on revaluation of state/regional property, and then the Directorate General of State Treasury went through the next step of inventory by revaluing state property. The revaluation of state property carried out in all ministries/institutions in 2017 was an effort to improve the quality of unqualified value recorded on the balance sheet considering the inventory appraisal of state property. Actually, it had been carried out 10 years before, but it is necessary to understand that the value of the properties increased compared to unqualified value of the properties 10 years ago regarding the current development of the Indonesian economy.

The revaluation of state property aims to obtain the value of fixed assets actively used by ministries/institutions. It also gets the latest value of state property throughout Indonesia by increasing the leverage of state property as underlying assets for issuing State Sharia Securities (SBSN) and identifying idle state property, as well as quality state goods for managing state property [1].

The impact from the revaluation of state property is expected to be able to present an update or correction of the unqualified value of state property as revalued objects in terms of land, buildings, roads, bridges, and water structures on the government balance sheet. Optimizing state property in terms of use is measured by standards. One of the expected ways to optimize state property is to rent it, where it can have an impact on the efficiency and effectiveness of the state budget and increase non-tax state revenue.

LITERATURE REVIEW

Based on Regulation of the Minister of Finance No. 57/PMK.06/2016 about the procedure of state property rental, it is defined that rental is a form of utilization of state property in order to optimize the property which has not been used in tasks and functioned administratively for the state and to prevent an illegal use of state property by other parties. The legal umbrella related to the implementation of state property rental has been regulated in government's Regulation No. 27 of 2014, Regulation of the Minister of Finance No. 78/PMK.06/2014 and Regulation of the Minister of Finance No. 33/PMK.06/2012.

The purpose of rental of state property is to optimize the utilization of state property not used to implement the duties and functions of the state administration, so that in this case idle state property becomes a priority to be rented to other parties who can provide maximum benefits. Thus, the rental of state property is a form of optimizing state assets. State property which has been declared idle becomes wasteful if it is not utilized in terms of rental. If it is not used at all, idle state property can be quickly damaged. Then, the state must incur costs for maintenance and security. Renting state property will free up maintenance and security costs that burden the state budget as well as the potential to gain state revenue from Non-Tax State Revenue (PNBP).

The problem in implementing rental of state property at KPKNL Palembang is that the rental compliance has not been optimal in increasing state revenue at the Palembang State Treasury and Auction Services Office. The tenants fail to pay because they are unable to pay due to high rental fees. In this case, the objects rented by work units do not have permission from the authority of state property of State Treasury and Auction Services Office Palembang. The objects of the rental can only be

land and/or buildings. Meanwhile, work units have not made the implementation of rental of state property (BMN) another target to be achieved.

The purpose and advantages of this study could be the valuable material to determine the impact of implementing the inventory appraisal of state property and revaluation of state property on the optimization of Non-Tax State Revenue from rental of State Property at KPKNL Palembang and it can be a source of reference and information for further research.

Stewardship theory can be applied to accounting research in public sector organizations such as government [2–4] and other non-profit organizations [5–7], where since the beginning of their development, accounting for public sector organizations has been prepared to meet the information needs of the relationship between stewards and principals. Accounting as a driver of financial information (driver) transactions are increasingly complex and followed by growing specialization in accounting and the development of public sector organizations.

The implication of the stewardship theory to this research is that it can explain the existence of the government as an institution that can be trusted to accommodate the aspirations of the community, can provide good services to the public, be able to make financial responsibilities mandated to it so that economic objectives are met and the welfare of the community can be achieved to the maximum.

State Revenue is the income obtained by the state to finance and run every government program, while the sources of state revenue come from various sectors, where all proceeds will be used to finance development and improve the welfare of all the people of Indonesia [8]. According to Law No. 12 of 2018 about the State Revenue and Expenditure Budget article, State Revenue is the right of the Central Government recognized as an addition to net treasuries consisting of tax revenue, non-tax state revenue and grant income. It suggests that tax is an obligation to hand over a portion of wealth to the state treasury, caused by a situation, event or act that gives a certain position. However, this is not a punishment, according to the regulations established by the government, and it can be forced, but there is no lead service directly from the state in order to maintain general welfare [9].

According to Law No. 09 of 2018 abbreviated as (PNBP), Non-Tax State Revenue is defined as levies paid by individuals or entities to obtain direct or indirect benefits for services or utilization of resources and rights obtained by the state. Based on regulatory legislation, the Central Government revenues outside of tax and grant revenues are managed in the mechanism of the state budget of revenues and expenditures.

An element of state revenue included in the structure of the State Budget is the Non-Tax State Revenue (PNBP). Non-Tax State Revenue arises due to the implementation of the duties and functions of government in the service, regulation, protection of the community, management of state assets including the use of natural resources. Non-Tax State Revenue has an important role in achieving the State Budget target that the government expects.

All state revenues from foreign exchange or foreign exchange, rupiah, services, and securities obtained from grants which do not need to be paid back and are not binding, both originating from domestic or abroad, are called grant revenues.

Table 1 illustrates state revenue.

In 2018, state revenue reached Rp.1,893.5 trillion. This figure is higher than the state revenue in the same month last year, which was Rp. 1,750.3 trillion.

According to Article 1 of Law No. 1 of 2004, properties are all goods purchased or obtained at the expense of the state budget (APBN) or derived from other legal acquisition. Article 1 of Presidential Regulation No. 27 of 2014 defines that state properties are all goods purchased or obtained at the expense of the State Budget and derived from other legal acquisition. Thus, the definitions of state property in Law No. 1 of 2004 and Presidential Regulation No. 27 of 2014 are the same.

Inventory is an activity to collect data, record and report the results of state property data collection. The purpose of inventory is to find out the number and value and the actual condition of state property, both those in the possession of the property user and those in the management of the property manager. The objectives of inventory are (a) all state properties can be well recorded in an effort to realize an orderly administration and (b) to facilitate the implementation of state property management.

Implementation of the state property control is carried out through the implementation of inventory, appraisal and certification of all state properties at the Ministry/State Institution in order to realize an orderly, effective, efficient and accountable administration of state property in an administrative, technical and legal manner.

Saiman (2002) said that inventory is a list, which contains the names of items belonging to the institutions [10]. Inventory in question is a list, which contains some information about the property/treasury of the state controlled by an institution. The information contained the names of the goods and items listed in the inventory called inventory items. Inventory also provides information about the existence of assets belonging to the state.

Table 1

Realization of state revenue in rupiah

Year	Tax Revenue	Non-Tax State Revenue (PNBP)	Grant	Total of State Revenue
2018	161 895.50	275 428.00	1196.90	1 893 523.50
2017	198 809.00	250 242.10	140 810	1 750 952.00

Source: Directorate of State Treasury Management and DJKN Information System.

State property is a state asset, whose management must be organized and accounted for in accordance with established regulations and laws, starting from sources/inputs, the process carried out until the results or outputs received. A proper and correct state property management will affect state revenue for the importance of Indonesian community prosperity.

The management of state property aims to carry out services optimally through existing state properties, with the aim of minimizing potential risks and costs, and to ensure positive achievement. The most important factors are good governance, the right system, and the processes and resources involved.

The utilization of state property as part of the management of state property is regulated by Article 27 PP. No. 27 of 2014 concerning forms of utilization, which may concern rentals, loans, use of cooperation, use of wake-up construction or hand-over construction and cooperation in the provision of infrastructure. The aim is to ensure the orderly, directed, just and accountable use of state property in order to realize efficient, effective and optimal use of state property, as well as to be able to contribute to service of the community. The results of such utilization constitute Non-Tax State Revenues (PNBP) and will surely be used by the state for the welfare of the community as much as possible (Media of the State's Wealth, 2014).

THE EFFECT OF INVENTORY APPRAISAL AND REVALUATION OF STATE PROPERTY

According to Arfan, utilization or utilization of state property constitutes development activities, or utilization of state property to support ministry/institution activities whether profit/commercial oriented or not [11]. Regulation of the Minister of Finance No. 96/PMK.06/2007 concerning procedures for utilization, deletion and transfer of state property explains the procedures for the use of state property both as supporting supporters of the duties and functions of ministries/institutions or activities that receive commercial profit and profits that will be a source of Non-Tax State Revenue (PNBP). The scope of utilization of state property includes the determination of state property usage status, state property utilization and state property alienation.

This study used quantitative method a research method based on the philosophy of positivism. It is used to examine the population or sample, where the data collection uses research instruments and is analyzed quantitatively or by statistical data analysis in order to test the hypotheses that have been set [12]. Primary data sources were obtained directly from the object of study as the relevant parties by distributing questionnaires to provide information related to the problems of the study. The study used questionnaire to collect data. It was done in such a way that all Palembang KPKNL work units had the same opportunities. Likert scale was used as a measurement scale, a scale used to measure the results of the answers or opinions of respondents with five answer choices with different levels of scores.

The objects of the study were the work units [13], the users of state property directly involved in. There were about 479 work units spread across the regencies/city regions of South Sumatra. When selecting the sample, the Slovin's formula was used for calculation with a 5% error. There were around 137 samples taken randomly in the population of district/city work units. The technique used probability sampling, which provides equal opportunities for each element (member) of the population to be selected as a sample [14]. The sample in this study was the Asset Utilization Authorities (KPB), the work units of the operators of State Treasury Management Information System (SIMAN) and Management and Accounting Information Systems for State Property (SIMAK-BMN). Questionnaires were distributed by sending directly to the work units [13] and filled in by 1 (one) respondent representing their respective work units.

Based on the results of the distribution of questionnaires, it can be seen that 84 (72%) of the respondents in this study were male. 61 (53%) of the respondents had a Bachelor's degree (S1). 42 (36%) of the respondents had their work experience from 6 to10 years. Then, as for the officers who filled out the questionnaire,

76 (66%) of the respondents were SIMAN/SIMAK BMN operator officers.

The Cronbach's alpha value of inventory appraisal variable of state property was 0.815. The value of revaluation variable of state property was 0.806. The state property management variable was 0.848. The state property utilization variable was 0.769 and 0.812 for variable optimization of Non-Tax State Revenue (PNBP) in state property rental. Due to the fact that the Cronbach's alpha value for each variable was greater than 0.6, all of these variables were considered to be reliable.

The t-test was used to test the effect of each independent variable used in this study partially, while the F-test was carried out to test the research model. In this study, hypotheses 1 through 4 were tested using the t-test. In the t-test, the calculated t value was compared with the t table value. If the t calculated value was greater than t table, then Ha would be accepted. Ho was rejected, and vice versa. Meanwhile the research model was tested by the F-test. The F-test was done by comparing the calculated F value with the F table value. If the calculated F value was greater than the F table, then the model used was feasible, and vice versa. The table below presents the result:

This test aims to determine the extent to which independent variables used are able to explain the dependent variable. In this study the inventory appraisal of state property (X1), revaluation of state property (X2), management of state property (X3) and utilization of state property (X4) are simultaneously related to the dependent variable, namely, optimization of Non-Tax State Revenue in the form of state property rentals (Y), and whether the model was appropriate or not.

Based on *Table 2,* the calculated F value of 24.214 with F sig. 0.000, where F sig. 0.000, was smaller than 0.05, then Ho was rejected. It was interpreted that simultaneous inventory appraisal of state property (X1), revaluation of state property (X2), management of state property (X3) and utilization of state property (X4) significantly influence the optimization of Non-Tax State Revenues in the form of state property rentals (Y).

The t-test interpretation was explained in *Table 2*; the calculated t value generated in the state property inventory variable was 0.924 with sig. 0.358. The analysis results of sig. 0.358 were greater than 0.05, which means that inventory variable did not significantly influence the optimization of Non-Tax State Revenues in the form of state property rentals.

The t-value in the revaluation variable of state property was 0.975 with sig. 0.332. The results of analysis sig.0.332 were greater than 0.05, which means that the revaluation variable of state property did not significantly influence the optimization of Non-Tax State Revenues in the form of state property rentals.

The calculated t value in the management variable of state property was 2.866 with sig. 0.005. The results of analysis sig.0.005 were smaller than 0.05, which means that management variables of state property significantly influence the optimization of Non-Tax State Revenues in the form of state property rentals.

The calculated t value in the utilization variable of state property was 3.746 with sig. 0.000. The results of analysis sig. 0.000 were smaller than 0.05, which means that the utilization variable of state property had a significant effect on the optimization of Non-Tax State Revenues in the form of state property rentals.

The coefficient of determination (R^2) is to measure the ability of the model to explain the variation of the dependent variable. The value of R^2 is between 0 and 1. The small value of R^2 means that the ability of the independent variables to explain the variation of the dependent variable is very limited. R^2 of 0.466 (46.6%) could be interpreted so that the ability of the inventory appraisal model of state property (X_1), revaluation model of state property (X_2), management model of state property (X_3) and utilization model of state property (X_4) explained the variations in the variable of Non-Tax State Revenue optimization in the form of state property rentals (Y) by 46.6% and the rest influenced by other independent variables by 53.4%.

The efforts to continue increasing state revenues are currently being promoted, one of which is through state revenues related to state property. It started from the inventory appraisal with ministries/institutions as work units [13] and was followed by revaluation or reappraisal of state property in 2017 in order to obtain the accurate data on how much state treasury was from state property, which has a sizable proportion for state revenue. Based on Regulation of the Minister of Finance No. 96/PMK.06/2007, the utilization of state property is to support state revenue, which is carried out by implementing the rental of state property.

The results of this study were in line with the stewardship theory. The stewardship theory was the description of conditions where managers were motivated from the target outcome of the interests of the organization rather than motivated from their personal interests. The stewardship theory illustrates why there is no place for management to be more motivated from individual goals than the purpose, primary goals and interests of the organization.

The results of data testing show that the variables of inventory appraisal, revaluation, management and utilization of state property affected the optimization of Non-Tax State Revenue in terms of rental at KPKNL

Table 2

T-test

Model	Unstandardized coefficients			
	B	t count	sig	Description
(Constanta)	8.187	2.493	0.014	
Inventory Appraisal of State Property	.079	0.924	0.358	Not Significant
Revaluation of State Property	.102	0.975	0.332	Not Significant
Management of State Property	.241	2.866	0.005	Significant
Utilization of State Property	.356	3.746	0.000	Significant
F count F sig.	24.214 0.000		R R *Square*	0.683 0.466

Source: data processed by the authors, 2019.

Palembang, which was the state property management office. The regression coefficients values for all variables were positive. These results stipulated that the implementation of inventory appraisal, revaluation, management and utilization of state property had led to an increase in optimization of Non-Tax State Revenues in terms of rental of state property at KPKNL Palembang.

If there was an improvement in the process of managing and utilizing state property by work units as users of goods after the inventory appraisal and revaluation. It means the optimization of the use of state property in terms of state property rental at KPKNL Palembang increased. The results of this test were made with a theory developed in hypothesis testing. The value of the regression coefficient for the value of inventory variable of state property was positive at 0.924 and revaluation of state property was positive at 0.975. These results proved that the inventory appraisal and revaluation of state property led to an increase in Non-Tax State Revenue (PNBP) optimization in the form of rental at the KPKNL Palembang.

If there was an improvement in the process of management and utilization of state property by work units as users of goods, the optimization of the use of state property in terms of state property rental at KPKNL Palembang increased. The results of this test were made with a theory developed in hypothesis testing. The value of the regression coefficient for the management variable of state property was positive at 2.866 and utilization of state property was very positive at 3.746. These results stated that management and utilization of state property led to an increase in PNBP optimization in terms of rental of state property at KPKNL Palembang.

The results of this study supported several previous studies such as Walelang and Alexander [15], Taha and Loganathan [16], French [17], where their study examined how much state revenue on non-tax state property received from the management making use of state property/asset. Based on the study results, the researchers contributed an idea stating that the inventory appraisal and revaluation of state property had a very important role in increasing non-tax state revenues from rentals or other revenues. Rental of state property works to optimize the use of state property that has not been/cannot be used. It becomes a priority to rent it to other parties, so that it can provide maximum benefits to increase state revenue in addition to taxes at KPKNL Palembang.

Previous research by Sondakh and Sabijono [18] and Hamdi [19] explained a number of factors affecting non-tax state revenue. One of them was the work unit, which had to make the implementation of rental of state property an achieved target and regulating the determination of state property usage status (PSP) — an important step in managing the country, so that the users of the goods got control in the use of state property.

CONCLUSIONS

Based on the results of the analysis and hypotheses testing regarding the effect of the inventory appraisal and revaluation of state property on the optimization of non-tax state revenues in the form of state property rental, we can conclude that:

1. The inventory appraisal, revaluation, management and utilization of state property had a significant effect on optimizing non-tax state revenue from state property rental. This shows that every time there is an increase of state property in work unit, there would be an indication of an increase in non-tax state revenue from rental or other receipts of state property at KPKNL Palembang.

2. The test results of this study also indicated that the inventory appraisal, revaluation, management and utilization of state property conducted by the office of state treasury and auction Palembang affects the optimization of non-tax state revenue from rentals owned by the work units of ministries/state institutions as assets utilization authorities.

This study had limitations, which could affect the results of the research. Therefore, it is necessary to make improvements in the future. These limitations include:

1. This study only used four independent variables to describe the effect of the inventory appraisal and revaluation of state property on non-tax state revenue. If this study is used as a reference for further research, other variables should be added to get optimal results.

2. The objects of this research were limited to the work units of the ministries/institutions under the state treasury and auction office services Palembang. Besides, this study questioned only 116 respondents. Therefore, if this study is used as a reference for further research, it is necessary to add more respondents to get optimal results.

The suggestions regarding the limitations described above, and which are expected to be useful for further research, are as follows:

1. It should be possible to add other independent variables such as knowledge of state property in terms of land and/or buildings and other than land and/or buildings that affect Non-Tax State Revenue (PNBP) optimization in terms of state property rental.

2. It should be possible to add a number of respondents from ministries/institutions work units as users of state property to show the true picture of the effect of other independent variables on (PNBP) optimization in terms of state property rentals.

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Challenges of a New Investment Policy: Investment Promotion and Protection

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ABSTRACT

The study **aims** to analyze key aspects of the new emerging investment policy, which sets the priority for private investment protection and promotion. **The relevance of the study** is due to the search for new, non-budget, funding sources for implementing large-scale national tasks and large infrastructure projects. Attracting private capital within changing global investment becomes an important task for national governments, and therefore requires a departure from investment protectionism to investment protection and promotion. Due to the **methods** of theoretical (analysis, synthesis, generalization, historical method) and empirical (comparison, measurement) research, the authors managed to reveal the main economic determinants and components of the national investment climate that contribute to attracting foreign capital; to systematize the key measures of investment policy; to identify trends in the dynamics of global flows of foreign direct investment. As a **result**, the authors established key principles and criteria for the new investment policy of sustainable development, as well as identified contemporary models of the new investment policy. These include a model for stimulating the development of individual priority economic activities; a model for improving the technological level of national industries; a model for creating new integrated meta-industries. The authors focus on reforming the investment regime in the Russian Federation. The new legislation provides for the possibility to conclude an investment protection and promotion agreement with private investors based on "a stabilization clause". Thus, investors implementing large-scale investment projects will be subject to new rules that will establish the conditions at the time of the agreement, in particular, tax and customs policies. According to the authors, such agreements will improve the quality of the investment climate in the Russian Federation.

Keywords: private investment; investment protectionism; investment policy; guidelines for investment policy; investment policy models; investment incentives; new investment project; investment promotion

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INTRODUCTION

National investment policies are key for attracting foreign direct investment (hereinafter referred to as FDI). Those policies have to be seen in the broader context of the determinants of FDI, among which economic factors predominate (*Fig. 1*).

On the one hand, national FDI policies seek to stimulate the country's economic development, and on the other, to preserve its economic independence. To achieve the first goal is possible by increasing the share of foreign participation in the authorized capital of organizations. The second goal is to ensure control over investor organizations by national governments.

In recent years, theoretical problems of investment policy have had wide coverage in foreign and domestic scientific and analytical literature. Set out in section "Fighting Protectionism and Promoting Trade and Investment" of the Seoul Summit Document[1] (11.12.2010), where the participating states asked the WTO, OECD, and UNCTAD to continue monitoring the situation and to report publicly on a semi-annual basis, the request encouraged the large-scale research.

According to leading analysts, the main problem of investment policy is to achieve the best ratio of liberalization and protectionism, i.e. the balance between the facilitation and promotion of foreign investment on the one hand and the measures of restriction, prevention and deterrence on the other [1, 2].

Researchers note that international investment policy is constantly changing. The annual number of new bilateral investment treaties keeps declining, while regional investment policies are strengthened. In recent years, numerous ideas have appeared on improving the framework for the settlement of investment disputes between investors and the state, but, unfortunately, only a few of them were implemented.

The literature systematizes the main investment policy measures[2], including:

1. FDI-specific measures. Exclusive for foreign investors; include conditions for investing, restrictions on the participation of foreign investor national firms in the authorized capital, rules for controlling FDI placement, measures to support foreign investors [3].
2. General investment measures. Applicable to both local and foreign investors. May be expressed in restriction of private property, rules for issuing licenses to new enterprises, privatization plan, etc. [4].
3. Systemic measures affecting the business climate in the country. Have an indirect effect on the investment process. Affect

[1] The Seoul Summit Document. Seoul, November 12, 2010. URL: https://www.oecd.org/g20/summits/seoul /Seoul-Summit-Document.pdf (accessed on 05.04.2020).

[2] Investment Policy Monitor. Issue No 20. December 2018. UNCTAD. URL: https://unctad.org/en /PublicationsLibrary/diaepcb2018d5_en.pdf (accessed on 05.04.2020).

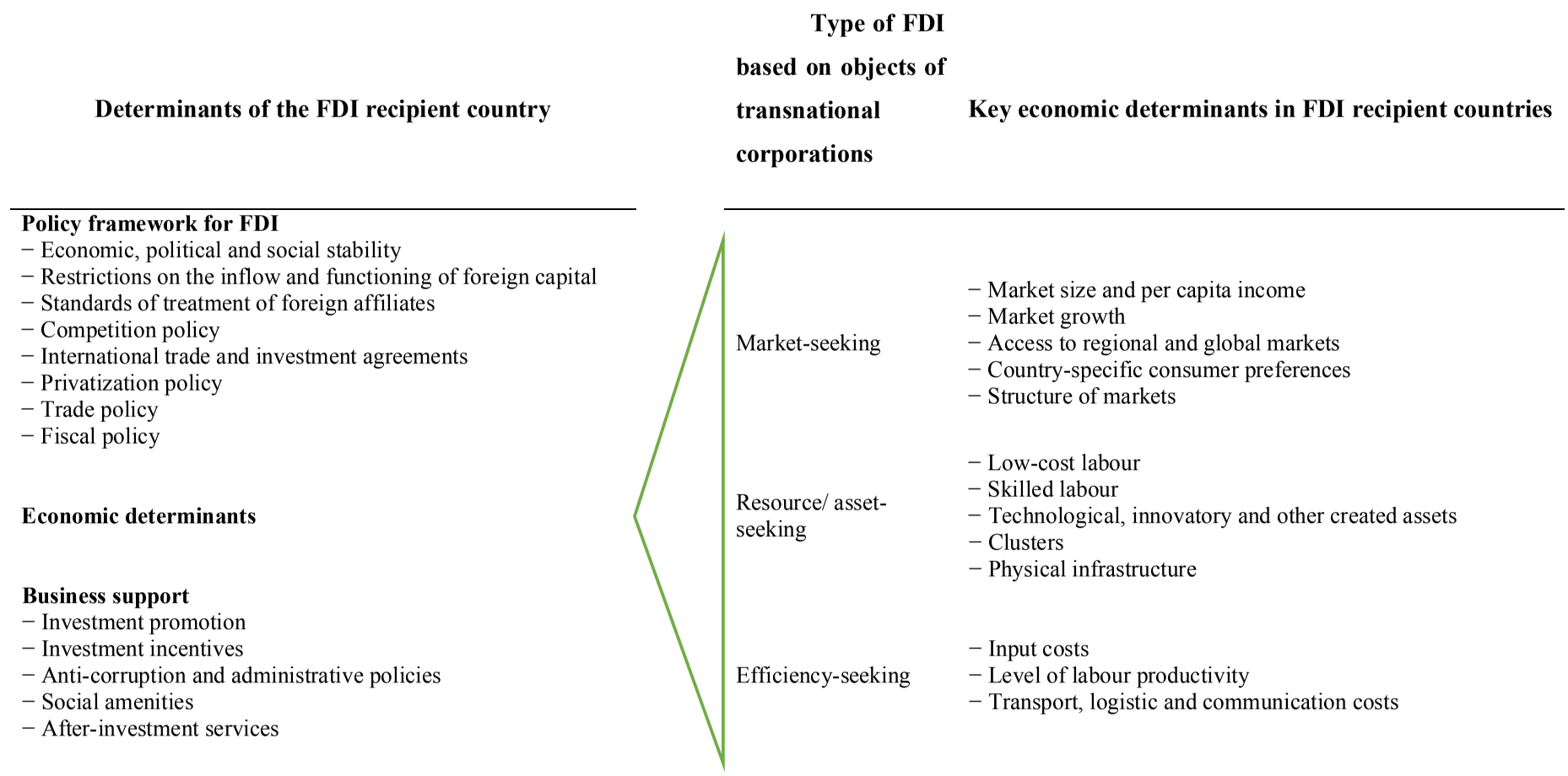

Fig. 1. **Determinants of FDI in the context of the formation of a national investment policy**
Source: World Investment Report 2003. UNCTAD / World Investment Report 2003. UNCTAD. URL: https://unctad.org/en/Docs/wir2003_en.pdf (accessed on 02.04.2020).

changes in civil, tax, labor, antitrust and environmental laws [5].

Depending on the policy area to which they relate, investment measures, except systemic, are in turn divided into the following types: attraction and placement, business operations and exploitation, as well as assistance and facilitation [6]. In addition, we can identify measures that have a positive and negative impact on investors. The former involves creating a favorable investment climate, for example, through liberalization or the provision of incentives. The latter have the opposite effect; they are directly aimed at administratively restricting FDI inflow and limiting repatriation of earnings [7].

Despite the fact that international political forums, state institutions, and the expert community at the highest level often refer to the concept of investment protectionism, its generally accepted definition has not been developed yet. In a broad sense, this term covers a country's actions that directly or indirectly impede the attraction of foreign investment without an official regulatory framework. At the same time, different scientific schools interpret the nature of investment protectionism in different ways. Some authors include in investment protectionist measures only measures that apply to foreign investors, which put the latter in an unequal position for national investors and which force them to abandon the implementation of planned investment projects in the country [8]. Other authors believe that protectionist measures should also include measures against domestic companies that impede the conduct of investment and operating activities abroad [9, p. 28]. In this context, it is primarily a question of legislative regulation of investments, but does not exclude the use of political instruments.

A big scientific discussion raises the question of whether the green economy can generate a side effect in the form of increased investment protectionism[3].

[3] Harnessing Freedom of Investment for Green Growth. 2011. OECD. URL: https://www.oecd.org/daf/inv/ internationalinvestmentagreements/47721398.pdf (accessed on 05.04.2020).

Obviously, costs of environmental protection can hamper FDI [10]. Increasing demands for emission limits and energy efficiency measures may encourage investors to stop investing. Environmental factors can also indirectly affect FDI flows. For example, importing countries may impose restrictions on the import of goods produced using non-environmentally friendly technologies. Similar problems are typical of the public procurement sector.

Some authors — and there are many — are skeptical about criticism of investment protectionism. They believe that the measures to achieve the legitimate goals of state policy may well be motivated by political considerations, the need to ensure national security, protect the health of citizens, and preserve the country's economic sovereignty [11]. It is important to achieve the balance of investment, social, environmental and trade policies, as well as to identify restrictive measures that pursue discriminatory goals. Despite this, for most researchers and investment politicians, the term "protectionism" has a negative connotation and is unambiguously associated with a "toxic" effect on the dynamics and volumes of investment flows.

Today, changes in the global investment landscape, showing a prolonged recession, an increasing role of governments in the economy and a growing need to stimulate international investment, are creating new phenomena in investment policy: a shift away from investment protectionism towards protecting and promoting investment[4].

FOREIGN DIRECT INVESTMENT TRENDS

According to the World Investment Report 2019, projections for global FDI show only a modest recovery of 10 per cent to about $1.5 trillion, below the average over the past 10 years. The underlying FDI trend remains weak.

[4] Investment Policy Monitor. Special Issue — National Security-related Screening Mechanisms for Foreign Investment. December 2019. UNCTAD. URL: https://unctad.org/en/PublicationsLibrary/diaepcbinf2019d7_en.pdf (accessed on 05.04.2020).

FDI net of one-off factors such as tax reforms, megadeals and volatile financial flows has averaged only 1% growth per year for a decade, compared with 8% in 2000–2007, and more than 20% before 2000. Explanations include declining rates of return on FDI, increasingly asset-light forms of investment and a less favourable investment policy climate.

Global FDI flows continued their slide in 2018, falling by 13% to $1.3 trillion (*Fig. 2, 3*).

FDI flows to developed economies reached the lowest point since 2004, declining by 27% — to $557 billion. FDI inflows declined due to large-scale repatriations of accumulated foreign earnings by United States multinational enterprises (MNEs), following tax reforms introduced in the country.

FDI inflows to developing countries remained stable, rising by 2% — to $706 billion. As a result of the increase and the anomalous fall in FDI in developed countries, the share of developing countries in global FDI increased to 54%, a record.

FDI flows to economies in transition continued their downward trend in 2018, declining to $34 billion, driven by a 49% drop in flows to the Russian Federation (from $26 до $13 billion). The wary attitude of investors towards Russia was due to the geopolitical situation, weak GDP growth, as well as the policy of de-offshoring [12]. The decline in FDI inflows affected other countries in this economic group: Azerbaijan, Kazakhstan and Ukraine.

FDI outflows from economies in transition reached $38 billion. As in previous years, the Russian Federation accounted for the bulk of outward FDI ($36 billion, or 95%). The country's outflows rose by 7%, and was driven mainly by reinvested earnings in projects and the extension of intracompany loans to established affiliates. Equity investment in new ventures and foreign acquisitions declined by almost half, reflecting the caution about foreign expansion.

The value of announced new projects rose by 41% to $961 billion from their low 2017 levels. In 2018, the value of projects in the Asian region has almost doubled.

During the last five years 5,300 R&D projects were announced, representing about 6% of all investment projects, and up from 4,000 in the previous five years. Developing and transition economies capture 45% of all innovation-related FDI.

TRENDS IN INVESTMENT POLICY DEVELOPMENTS

Under conditions of economic uncertainty, aggravating trade conflicts and stagnation of commodity markets, policy measures of many countries show a more critical stance towards investment instruments as reliable means of growth and development of national economies.

In 2018, 55 economies introduced at least 112 measures affecting foreign investment. 65% of the measures were aimed at liberalization, promotion and facilitation of new investments. 35% introduced new restrictions or regulations relevant to FDI — the highest number since 2003.

Steps toward liberalization were made in various industries, including agriculture, media, logistics, mining, energy, retail trade, finance, transportation, infrastructure and internet business. Two-thirds of these measures were in developing countries in the Asian region. Some countries have taken measures to privatize public companies. The trend towards simplifying or streamlining administrative procedures for foreign investment continued, for example, by canceling the requirements for obtaining licenses or creating online portals for submitting applications. Also, several countries provided new fiscal incentives for investment in specific industries or regions.

Strengthening government regulation is most pronounced in respect of foreign investment in strategic industries and critical infrastructure. Here the trend is ambiguous: with a general policy of favoring the attraction of foreign property, in some developed countries access procedures have been tightened as a result of the introduction of new requirements for investors or verification procedures for the implementation of investment projects.

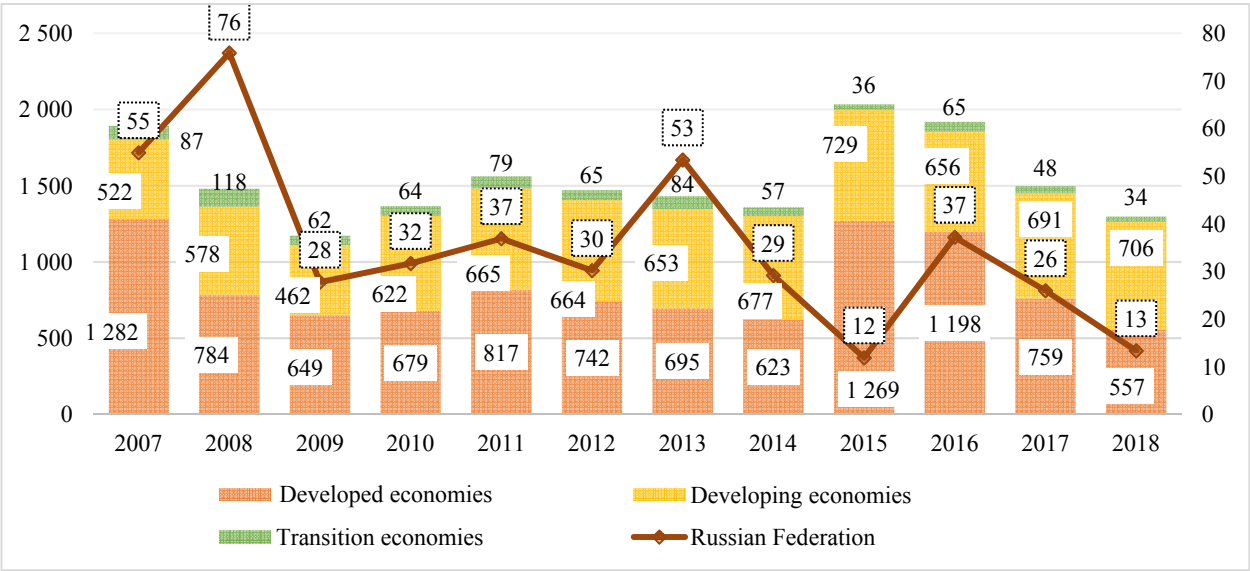

Fig. 2. **FDI inflow by economic groups of countries and separately by the Russian Federation, 2007–2018, billion dollars**

Source: according to the World Investment Report 2019. UNCTAD. URL: https://unctad.org/en /PublicationsLibrary/wir2019_en.pdf (accessed on 02.04.2020).

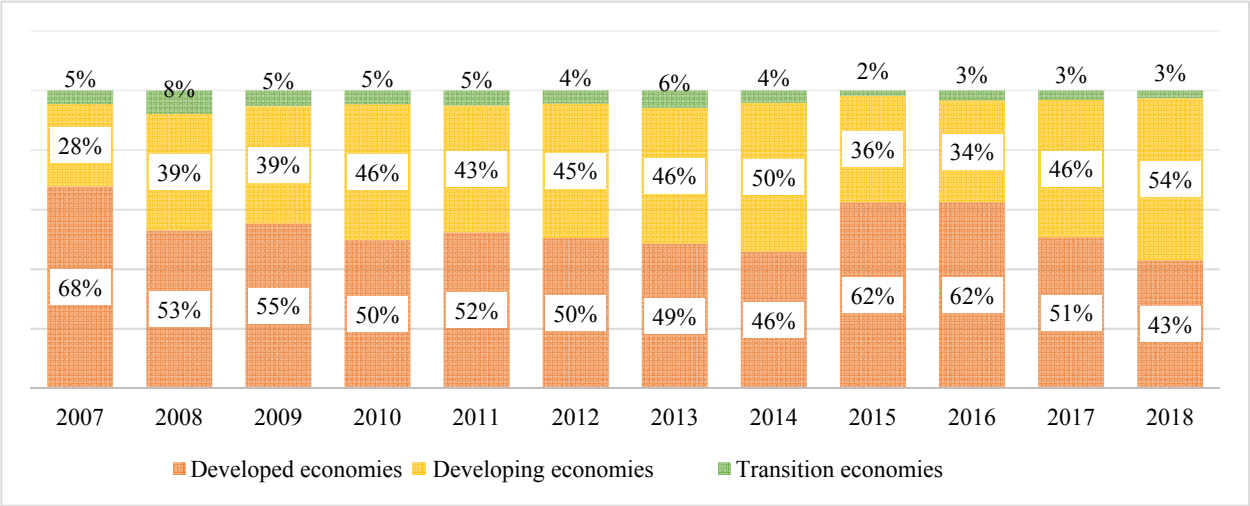

Fig. 3. **FDI inflow by economic groups of countries, 2007–2018, %**

Source: according to the World Investment Report 2019. UNCTAD. URL: https://unctad.org/en /PublicationsLibrary/wir2019_en.pdf (accessed on 02.04.2020).

In recent years, two trends have been competing with varying success: liberalization of investment regimes as a factor of technological modernization, on the one hand, and restrictions on foreign investment in order to support national industry, on the other. State policy manipulates the appropriate instruments very subtly to solve the tasks. It must be recognized that the liberalization process aimed at achieving the sustainable development goals is accompanied by the creation of an appropriate regulatory and institutional framework [13].

In a broad sense, the new investment policy has the following goals:

- harmonization with the goals of the national industrial policy to build a unified development strategy. It implies, first, the

identification of key areas of investment in terms of both domestic economic needs and the tasks of increasing the country's international competitiveness; second, setting investment priorities while maintaining high economic growth rates and at the same time ensuring the inclusive and socially equitable development of society;

- maximum investor commitment to the principles and values of corporate social responsibility. Whenever possible, economic, social, environmental, cultural, intergenerational and other "costs" and losses associated with production investments should be minimized;
- ensuring the effectiveness of the policy in its development, implementation, and institutional environment.

Key principles of the new investment policy determine its development criteria (*Table 1*, *Fig. 4*).

Modern models of the new investment policy, emerging in the new industrial revolution, include:

- stimulating development of certain types of economic activity (significance of a particular type of activity depends on the strategic priorities of national and regional policies);
- raising the technological level of national industries in order to advance the country to higher links in global value chains [14];
- creating new integrated meta-industries amidst the achievements of the new industrial revolution [15, 16].

All these models provide for employing various instruments — separate tax incentives, a set of support measures within special economic zones, measures to promote and facilitate investment activities, and investment control mechanisms. The three models of investment policy use the same type of investment instruments, but with different focuses and scales.

Tax incentives are the most frequently used instrument under the new investment policy. The provision of tax incentives is always associated with shortfalls in the public budget, which are not always covered by tax payments from investment projects. Therefore, increasing the efficiency of providing incentives as levers of industrial and investment development is of particular importance. About 60% of incentive programs in the manufacturing sector are currently aimed at supporting specific types of economic activities, such as R&D.

Requirements for investors' performance indicators (conditions for providing incentives) and their investment projects are also widely used to maximize the contribution of MNEs to industrial development. These requirements became a frequent practice in the development of special economic zones [17, 18].

The process of creating new special economic zones and their diversification is ongoing. In most countries, the transition from simple export processing zones to industrial free trade areas has already finished. High-tech zones and industrial parks are becoming a key instrument of investment policy based on the achievements of the new industrial revolution.

Due to modern investment policies, many investment activity regulations (permits, registrations, approvals, notifications, etc.) have been greatly simplified. From once lengthy bureaucratic procedures, they are now turning into instruments for quick targeted formation of powerful nodes and centers of modern production, building global production networks, especially in industrially advanced developing economies.

Targeted investment promotion remains the core of investment strategies: about 60% of national investment attraction agencies, identifying priority economic activities for their promotion, proceed from industrial policy directions, and 75% implement investment attraction projects in high-tech sectors that they consider to be the most promising.

For investment policy adapted to the new realities of industrial development and aimed to promote private investment in every way, the design criteria should be applied to its key elements (*Fig. 4*).

Table 1

Key principles of the new investment policy of sustainable development

Region	Key principles
Sustainable investing	Sustainable investing is the key goal of investment policy
Policy coherence	Harmonization of investment policies within the country: with a strategy for socio-economic development and outside with the global investment community
Public administration and institutions	Investment policy is based on the rule of law, protection of property rights, an independent court, transparency and efficiency of power
Dynamism in policymaking	Flexibility, adaptability, monitoring and necessary adjustment of tasks and instruments of investment policy
Balance between rights and obligations	Equal rights and obligations of the parties of the agreements; full responsibility of investors and the state for performing their duties
Right to regulation	The state has the right to regulate the rules and standards for foreign investors, considering international obligations and public safety, without prejudice to the legitimate interests of bona fide investors
Openness to investment	Transparency, stability, predictability and free access to relevant information are the main features of a favourable investment climate
Investment protection and investment regime	Legislative guarantees for maintaining a non-discriminatory investment regime; protection of investments from illegal actions of business entities and authorities at various levels
Investment promotion	Support, stimulation, promotion of investments in the context of sustainable inclusive development goals; eliminating the risk of unfair, discriminatory and destructive competition
Corporate management and responsibility	Standards and values of corporate social responsibility incorporated into investment policy
International cooperation	Countermeasures to investment protectionism; supporting an economic strategy for strong, sustainable, balanced growth

Source: according to the World Investment Report 2012. UNCTAD. URL: https://unctad.org/en/ PublicationsLibrary/wir2012_embargoed_en.pdf (accessed on 02.04.2020).

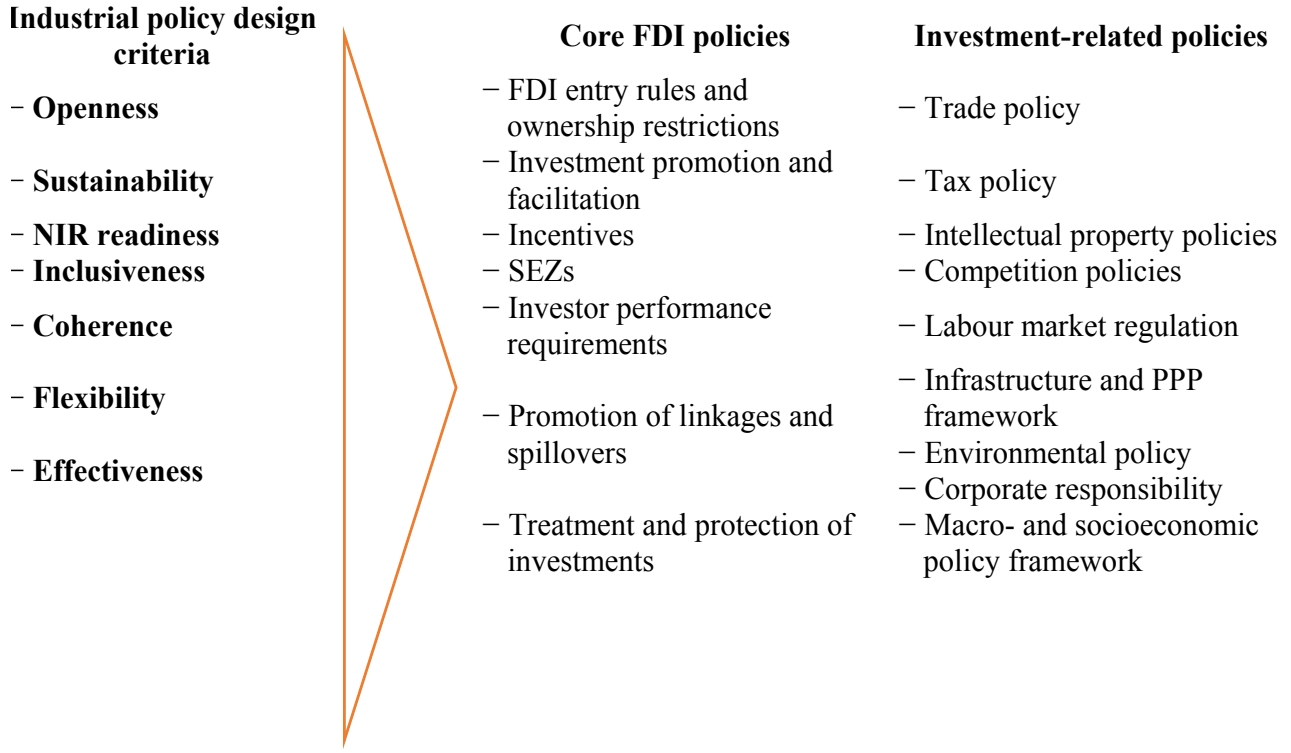

Fig. 4. **Investment policy framework for sustainable development**

Source: according to the World Investment Report 2018. UNCTAD. URL: https://unctad.org/en/ PublicationsLibrary/wir2018_en.pdf (accessed on 02.04.2020).

INVESTMENT POLICY FRAMEWORK IN THE RUSSIAN FEDERATION

The Russian Federation currently takes active measures to reform the investment regime in the framework of a new industrial policy. For the first time, investment promotion is a priority in developing investment policy instruments in the Russian Federation. *Table 2* presents the main stages in the development of investment legislation in Russia.

The investment legislation evolution of Russia reflected the development of state approaches and state investment policy from the initial steps to legalize and make investments (there was no private investment in the USSR) to various instruments, forms, institutional nuances of modern investment activity. The new investment policy framework is laid in Federal Law of April 1, 2020 "On the Protection and Promotion of Investments in the Russian Federation" (hereinafter Federal Law of April 1, 2020 No. 69).

Federal Law of April 1, 2020 No. 69 is aimed at creating the most favorable conditions for attracting investment in Russia. The Law provides for concluding agreements, on a competitive basis, to protect and promote investments (hereinafter the "APPI"). Parties to the APPI may be the Russian Federation, a constituent entity of the Russian Federation or a municipality and a Russian legal entity, provided that it implements a new investment project. A new investment project complies with one of the following conditions:

- the organization implementing the project decided to approve the budget for capital costs[5] before Federal Law of April 1, 2020 No. 69 took effect, but not earlier than May 7, 2018, and sub-

[5] Excluding the budget for the costs associated with the design estimates, the design and survey and exploration works.

Table 2

Development of investment legislation in Russia

Stage	Regulatory framework	Features
Mid 1980s	Resolution of the Council of Ministers of the USSR of January 13, 1987 No. 48 "On the Procedure for Creating Joint Ventures, International Associations and Organizations of the USSR and Other CMEA Member Countries"	Creating joint ventures on the territory of the USSR with the participation of Soviet organizations and firms of capitalist and developing countries is allowed
	Resolution of the Council of Ministers of the USSR of December 2, 1988 No. 1405 "On the Further Development of the Foreign Economic Activity of State, Cooperative and Other Public Enterprises, Associations and Organizations"	Restrictions on investments by foreign enterprises are removed
Early 1990s	Fundamentals of Law on Investment Activity in the U.S.S.R. of December 10, 1990 (No. 1820–1, adopted by the Supreme Council of the USSR)	The concept and status of participants in the investment process is defined The agreement is provided as a fundamental document in relations between subjects of investment operations The need to respect the rights and interests of investors has been proclaimed
	Fundamentals of Law on Investment Activity in the U.S.S.R. of July 5, 1991 (No. 2302–1, adopted by the Supreme Council of the USSR)	The fundamental provisions regarding the legal regime of foreign investment are established
	Law of the RSFSR of June 26, 1991 No. 1488–1 "On investment activity in the RSFSR"	The developed regulatory framework on foreign and domestic investments has become the basis for the development of investment processes in the Russian Federation
	Law of the RSFSR of July 4, 1991 No. 1545–1 "On Foreign Investments in the RSFSR"	
	Resolution of the Government of the Russian Federation of June 11, 1992 No. 395 "On the conclusion of agreements between the Government of the Russian Federation and the governments of foreign states on the promotion and mutual protection of capital investments"	
End of 1990s	Federal Law of February 25, 1999 No. 39-FZ "On Investment Activities in the Russian Federation in the Form of Capital Investments"	The administrative and economic foundations of investment activities carried out in the form of capital investments on the territory of the Russian Federation are determined Capital investments should be protected by law equally, regardless of the form of ownership, volume, legal affiliation of the investor
	Federal Law of July 09, 1999 No. 160- FZ "On Foreign Investments in the Russian Federation"	The basic guarantees of the rights of foreign investors to investments and the income and profits received from them, the conditions for entrepreneurial activity of foreign investors in the Russian Federation are given The stability of the conditions for the activities of foreign investors and compliance with the legal regime of foreign investment with international law are determined by the rule of law
2020	Federal Law of April 1, 2020 No. 69-FZ "On the Protection and Promotion of Capital Investment in the Russian Federation"	A new type of investment agreement is introduced — an agreement on the protection and promotion of investment The parameters for using by investors the stabilization clause are established

Source: developed by the authors.

mitted an application for the project implementation no later than December 31, 2021;

- the organization implementing the project decided to approve the budget for capital costs before Federal Law of April 1, 2020 No. 69 took effect and submitted an application for the project implementation no later than one calendar year after the decision was made.

The most important provision introduced by Federal Law of April 1, 2020 No. 69 is the stabilization clause. It provides for not applying against the Organization regulations of the public entity, which impair conditions for implementing the Project, in particular:

- regulations increasing the time required to implement the procedures necessary for the investment project implementation;
- regulations increasing the number of procedures required for the investment project implementation;
- regulations increasing the fees charged to the organization implementing the project in order to implement the investment project;
- regulations establishing additional requirements for the conditions for the investment project implementation, including requirements for the provision of additional documents;
- regulations establishing additional prohibitions that impede the investment project implementation.

The maximum term of the stabilization clause may not exceed 6 years for investment projects of up to 5 billion roubles, 15 years for projects of 5 to 10 billion roubles, and 20 years for investment projects of 10 billion roubles and more.

The stabilization clause includes issues related to land use regulation, zoning standards, conditions for various tax payments (corporate income tax, corporate property tax, transport tax, other taxes and fees), and export duties.

Under the budget legislation of the Russian Federation, the organization implementing the project is provided government support measures in form of compensation of costs from the federal budget or from the budget of the constituent entity of the Russian Federation:

- on building, modernizing, reconstructing the fundamental infrastructure and related infrastructure of the project;
- on paying interest under credit and loan agreements, coupon income on bond loans attracted for building, modernizing and reconstructing facilities providing and related infrastructure necessary for implementing the project.

In this case, the amount of costs to be compensated cannot exceed the amount of obligatory payments to be made by the organization implementing the project to budgets of the public entities that are parties to the APPI.

Note two fundamental structural elements of the APPI, enshrined in the Federal Law:

- the investor has the right, but not obliged, to implement the investment project (in this case, if the deadline for the implementation established by the APPI is violated, the agreement can be terminated at the initiative of a public legal entity);
- the Russian Federation, the constituent entity of the Russian Federation is obliged not to apply acts changing the conditions for the project implementation (in this case, if the application of non-applicable legislation has taken place, the investor has the right to demand compensation for real damage).

Under the Decree of the President of the Russian Federation of May 7, 2018 No. 204 "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024", a working group was created to facilitate the implementation of new investment projects[6].

The aim of the working group is to develop mechanisms and instruments to protect and promote investment in the Russian Federation, and to make up a list of new investment projects.

From December 2018 to December 2019, as part of the activities, the working group

[6] Decree of the Government of the Russian Federation of September 15, 2018 No. 1093 (as amended on March 19, 2020) "On the working group to facilitate the implementation of new investment projects".

considered 33 new investment projects in the areas of international cooperation and export, ecology, gas chemistry, forestry, modernization and expansion of the main infrastructure with a total value of about 7.1 trillion roubles, of which about 1.5 trillion roubles were their own investor funds.

The priority criteria for projects applying for state support are access to sales with the maximum ratio of accumulated revenue and investment in fixed assets until 2024 of one rouble of state support.

The projects considered by the working group expect the conclusion of the APPI. The planned total investment in the framework of new investment projects will exceed the amount of financing from the federal budget of national projects (programs) by at least 2–3 times and will amount to 26 to 39 trillion roubles in 2019–2024.

CONCLUSIONS

Today, the mobilization of private capital and its effective attraction into the national economy is the priority of the new investment policy.

However, passive liberalization (open door policy) is not always the best way to attract FDI. Liberalization can stimulate receiving large volumes of FDI, but this is not enough. Currently, attracting FDI in a highly competitive investment market requires significant advantages in FDI placement and well-directed efforts to promote them. The policy of attracting FDI into technologically advanced or export-oriented economic activities is even more complicated.

For countries, the main ways to attract FDI are as follows.

- Reducing FDI barriers by removing restrictions on their inflow into the country and placement, as well as on the activities of foreign branches. The key issues here are to define the term "investment" [19, 20] in order to liberalize the investment inflow into the country or provide protection (direct and portfolio capital flows can be interpreted differently) and the level of control over the implementation of the investment process.
- Establishing the most favorable regime for foreign investors, in which the national economy and national governments are most interested.
- Protecting foreign investment by introducing legislative norms on the prevention of damage in case of expropriation or nationalization, on guarantees of repatriation of earnings.
- Facilitating the FDI inflow through measures that improve the business climate in the country, provide information on investment opportunities, offer incentives to place FDI, facilitate FDI through institutional and administrative improvements and the provision of post-investment services.

The new investment policy is being developed to protect and promote investment. In the Russian Federation, the adoption of Federal Law of April 1, 2020 No. 69 "On the Protection and Promotion of Capital Investment in the Russian Federation" created the legal framework to support private investment, to improve the investment climate, to establish a solid basis for equal cooperation and interaction between business and the state. These foundations of sustainable growth are vital to the domestic economy.

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Adaptive Data Warehouse as the Technological Basis of the Banking Ecosystem

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ABSTRACT

New guidelines of omnichannel and ecosystem are emerging driven by modern digital transformation of the banking business. To improve customer experience of interaction with banking services more banks are switching to the omnichannel model. In this model, the customer is able to perform operations in a unified interface using any communication methods, and sees no difference in the processes between off-line and on-line operations. This requires changes in a bank's IT architecture, whose center is a bank data warehouse. The **aim** of this study is to show the possibility of developing a method for designing a banking data warehouse so that it can be easily adaptable for new business projects and tasks. The authors used the following research **methods**: analysis, logical modeling of the identified relationships. They developed an adaptive banking data warehouse designer in the environments of SAP PowerDesigner, StarUML, PL/SQL Developer. The article **tackles** the approach towards development of an adaptive model of a banking data warehouse, based on the principle of splitting data into components. It makes it possible to set the warehouse contours for specific business tasks, combine elements, and expand the structure of the banking data warehouse in the context of its integration with various external software objects. The article highlights the interaction between the components of the banking data warehouse and business tasks, the list of which can be expanded in the context of various bank projects. The article provides a detailed description of the basic set of components of the adaptive banking data warehouse model. This set may serve as the foundation for designing a banking data warehouse for a specific business task. The article provides the data model and attribute composition of the General Ledger component, the data model of the Plastic Cards, Transactions, Applications, Contractors, etc. components, as well as indicates the relationships between the components. The study presents design features of a new type of the banking data warehouse. The authors concentrate on the technological features of creating a unified front-end omnichannel banking system as a separate task. They **conclude** that the developed basic set of components and business objects of adaptive banking data warehouse will ensure data integrity and reduce design time.

***Keywords**:* client path; bank; omnichannel; ecosystem; data warehouse; design; methodology; information systems; digital services

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INTRODUCTION

Information management, processing of large data flows and integration with many software products are critical tasks for the banking sector. In terms of the transition to new digital business models, banks should pay special attention to predictive analytics, be able to make quick decisions to launch new products and have a flexible project management environment. Currently, in the context of digitalization and the transition to digital service channels, new guidelines are emerging to extract additional value from data. In this regard, a unified data warehouse can objectively give the bank a lot.

Moreover, the change in management paradigms also affects bank activities. Today, the bank is not just a digital or IT company. It can strengthen its position in the global business system and become an ecosystem for its customers. Today, such evolution of digital ecosystems is called Black ocean strategy [1]. This strategy combines a number of digital offers under one brand, which makes it impossible for competitors to seize the initiative in meeting the customer's need. Moreover, this need is studied in detail throughout the entire route: the need to receive a service — payment — a positive impression of the service and brand.

The trend for creating an ecosystem in business first appeared more than 20 years ago and was successfully implemented in the strategies of IT and service companies[1].

A strong bank is able to accompany the customer throughout his/her life, "navigate users through their daily digital journey"[2] so that s/he does not need to switch from a bank offer to a product of another company. The bank can monetize the extensive information about its customers by providing a wide range of products.

Information support of such diverse business processes and business tasks expands the requirements to the methodology for designing data warehouses (DWs), which is becoming a key technological basis of the banking ecosystem.

BANKING ECOSYSTEM PLATFORMS

The new network economy is a unified customer-centric ecosystem with three orbits of thinking around the customer. They interact clearly and determine the company's strategy: market position, change in business processes, and reaction to innovations. Today, banks are creating ecosystems, going beyond IT and fintech startups, actively implementing their own projects in healthcare, education, retail and, partially, transport. To some extent, aimed at increasing competition in the payment services market, adopted by the EU new directive on payment services PSD2 gave rise to banks for evolving into the ecosystem. It affected banks to provide open access to the API (Application Programming Interface is the interface that allows developers to create their own programs, applications, scripts

[1] Going digital: The banking transformation road map. A.T. Kearney & Efma. 2014.

[2] Ecosystem of ecosystems: an overview of Mail.ru Group's strategy. URL: https://corp.mail.ru/ru/company/strategy_ceo/?fbclid=IwAR1baqZoMkJKGhGH8_bqlU6–9kwhszoxdRTf-fAqiFZvu3B-WCOAdsu_LR3A (accessed on 28.02.2020).

for working with the service[3]). Open banking not only updated the banking technological infrastructure, but also intensified competition. To keep meeting market requirements and customer expectations as new steps, banks choose to build a common ecosystem (lifestyle banking), where one mobile banking application can cover almost 100% of the customer's potential needs in any area of life — from buying products to acquiring housing, from selecting and paying for training courses to ordering food.

The leading companies aim to improve the experience for their customers not only in their field, but also throughout their entire life path. Therefore, their new offers refer to human experience and needs outside of specialized services.

In the Russian banking industry, Alfa-Bank, Tinkoff Bank, VTB Bank (PJSC) and other banks introduce the ecosystem paradigm. PJSC Sberbank adopted an implementation strategy to be transformed into a universal technology company by 2020. In December 2018, it established SberX Ecosystem Development Department[4]. This ecosystem includes over 20 different companies. Today, PJSC Sberbank sells coffee in its branches, provides food delivery together with Mail.Ru, gathers vacancies together with Rabota.ru, provides access to telemedicine together with DocDoc, conducts online trading together with Yandex. Market (Yandex.Market, marketplaces Beru! and Bringly), provides services for the sale of apartments together with DomCklik. In 2020, in the Moscow branch of Sberbank near the Novoslobodskaya metro station, they opened McCafe areas with a tablet on the wall, so that the customer could order from the McDonald's standard menu and order food delivery to the department. Today, the advanced bank has integrated itself into the value chain in many segments. In exchange, the partners gained access to customer data. The introduction of new technologies supports the ecosystem's IT functionality, including through identification services, fast data exchange, etc. The ecosystem has open interfaces or provides compatibility: convenience, security. Unified software interfaces make it easy to connect to the platform.

The primary goal of the bank's ecosystem is to provide omnichannel services, where many channels of communication support the creation of a seamless client path. The transition to omnichannel poses many challenges (*Fig. 1*). The transition to omnichannel brings its own adjustments to management, IT architecture, corporate culture, etc. [2].

To switch to the omnichannel model, the bank is expanding its portfolio of software services. Thus, PJSC Sberbank acquired services that made a name in the market and introduced into its brand, and launched the SberCloud cloud platform. JSC Tinkoff Bank creates its own services and integrates third-party ones, and offers customers more than 120 affiliate programs[5]. It also contributes to changing the technological platform.

ARCHITECTURAL CONCEPT OF CREATING A UNIFIED FRONT-END OMNICHANNEL BANKING SYSTEM

In the context of omnichannel, the bank creates various options. The customer is given the opportunity to make transactions on the website, via the mobile application, etc., the contact history is saved in all points of access to the bank, new data is collected, and feedback is provided based on heterogeneous information from various sources. At the same time, the customer does not feel the difference between the service channels, whether it is the bank's office or its mobile application. The truth is that creating several channels and integrating them is not enough. Blurring the distinction between the processes of various channels requires implementing the prin-

[3] What is the Yandex.Direct API? URL: https://yandex.ru/dev/direct/doc/start/intro-docpage/ (accessed on 20.02.2020).

[4] Sberbank replaced the head of its SberX ecosystem. URL: https://www.vedomosti.ru/finance/news/2019/07/03/805704-sberbank-smenil-rukovoditelya-ekosistemi (accessed on 28.02.2020).

[5] Going digital: The banking transformation road map. A.T. Kearney & Efma. 2014.

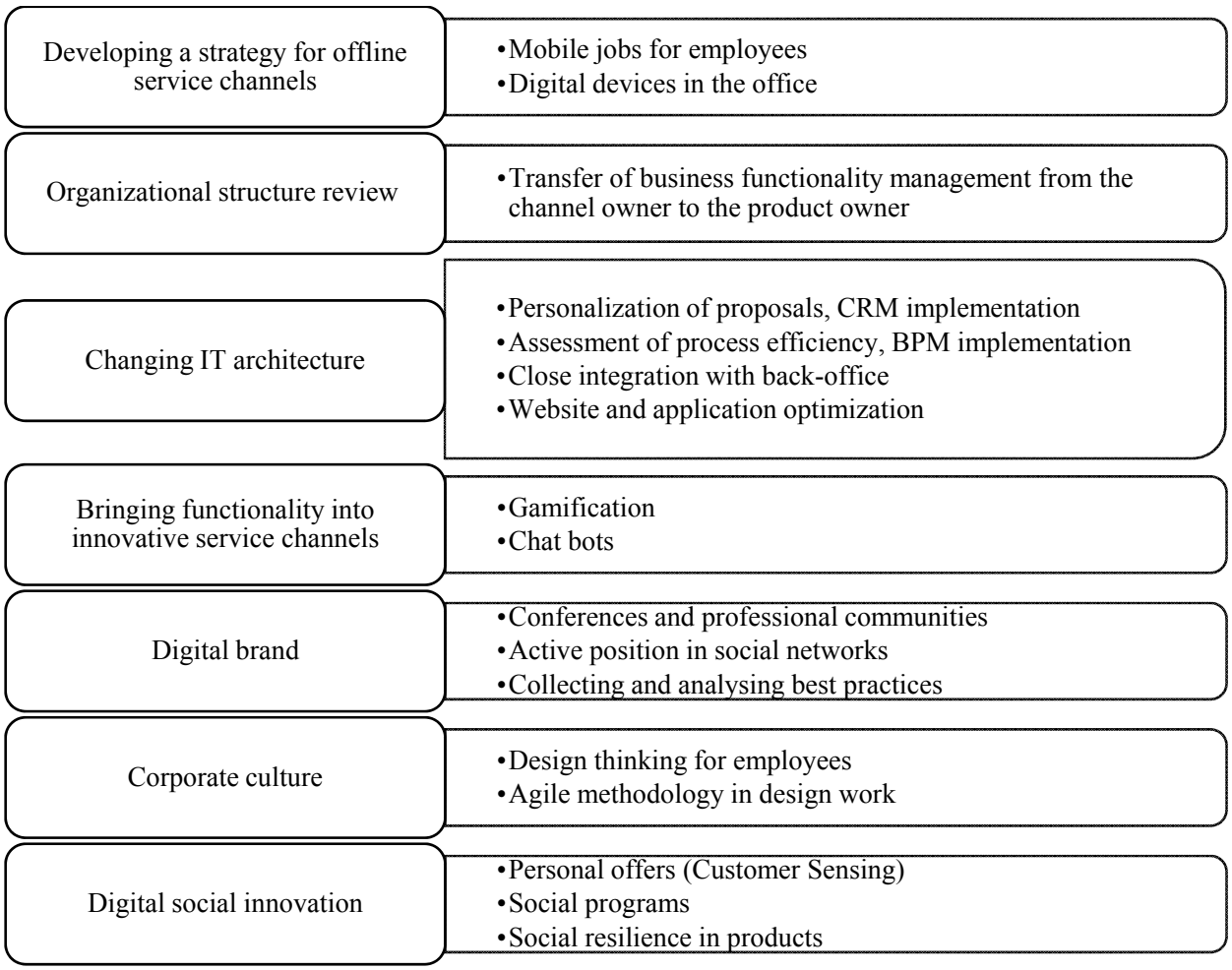

Fig. 1. **Key strategic objectives to transform customer experience based on omnichannel**

Source: complied by the authors.

ciples of a unified business logic for providing services. Interaction with the customer is based on combining front and back offices, all bank processes, and updating the entire service model.

Moving from multichannel to omnichannel in a large bank is a long process of implementing many projects. Processes should be optimized and internal regulatory documents, regulations, technological schemes and work methodology changed. All local front-end systems must be decommissioned, and the functionality must be transferred to the target unified front-end system. All local back-office systems must be integrated into a unified back-office system consisting of flexible customizable applications. The departments of security, quality, and operational risks should strengthen the technologies used and automated systems.

The technological basis of banking is BaaS multi-component platform (Banking-as-a-Service)[6]. In this case, complicated banking applications exist as web services. From the perspective of IT architecture, this means moving from monolithic independent systems, each servicing a limited number of channels, implementing its own business logic and set of services, to a unified front-end application architecture. It shows the service model, provides an optimal user interface considering the characteristics of the channel, and relies on a unified business node of the entire network.

[6] Going digital: The banking transformation road map. A.T. Kearney & Efma. 2014.

Implementing omnichannel requires **a unified business logic of operations**. Each operation is automated as a business process including:

- calling channel-dependent subprocesses or services (if this is implemented, for example, for the subprocesses of identification, credit processing, opening a deposit or transfers);
- calling a specific subprocess using a channel-independent representation of the application. Payment process is an example of such a subprocess. This subprocess assumes the existence of a unique search operation for a service provider to which the funds will be transferred. At the same time, the search for the service provider does not depend on where the payment was initiated: in the mobile application or in the browser version of the online bank.

All business processes with a common business task, but different in implementation depending on the channel, must have a common channel-independent API. All processes associated with filling an application with the content attribute (a set of specific characteristics) should be based on a unified application class for all channels. The process of performing an operation with the possibility of starting and ending the operation in different channels must meet the requirements, depending on whether the process stops and/or resumes on the channel.

A key step towards moving the bank to omnichannel is the step from monolithic independent systems with a limited number of channels that implement their own business logic and a set of services, to a unified architecture of front-end applications in the system. Following the basic architectural development principles allows for creating reusable services in different channels. The rational approach to changes enables banks to avoid mistakes typical of the multi-channel strategy: with a huge number of applications, either completely closed for updates, or unreasonably high costs for updates.

The omnichannel project should focus on introducing design thinking [1–5] and product management approaches in the Lean StartUp principles [6–8]. When implementing front-end solutions, it is necessary to iteratively approach the layout development of user interfaces, apply the tools and methods of design thinking, usability testing. Besides, it is important to analyze customer behavior and optimize business functionality, determine the reasons for customer requests and terminating operations. It is important to understand that the customer's actions are his/her voice. Thus, along with technological integration of channels, there should also be a new mental service strategy.

When implementing the omnichannel approach, we also solve convenience and well-functioning issues of digital channels, and preserve the possibility of personal communication with the customer [9–13].

THE ROLE OF THE DATA WAREHOUSE IN THE DEVELOPMENT OF BANKING BUSINESS IN THE AGE OF DIGITAL TRANSFORMATION

Today, the classical definition of data warehouse by B. Inmon [14] as a "subject-oriented collection of data" may be expanded to consider business-specific guidelines. The main purpose of the data warehouse associated with reporting and business analysis in the organization is supplemented by advanced functions for ensuring customer-oriented and personalized offers, covering customer needs at 360 degrees, interacting with partners in a large pool of tasks, including beyond the usual areas of the bank's activity, flexible transformation of existing product lines and introducing new ones.

A limiting factor in the banking sector development may be the underestimation of the capabilities of the data warehouse design technology. The data warehouse should be an integrated (unified) collection of data with centralized management [15], should meet the needs of all the company's departments on the principle of "source once, distribute many times" [16] and solve the problem of collecting and processing data from hetero-

Strategic development and operations management	Planning and monitoring key performance indicators, KPI
	Cost-effectiveness analysis and business process optimisation
Corporate and retail unit management	Assessment of profitability of banking products, customers and distribution channels
	Customer profitability and performance analysis
Financial management	Budgeting and management reporting for the bank, branches and divisions
	Regulatory reporting, preparation of tax returns and IFRS reporting
Marketing	Evaluation of the effectiveness of product policies, marketing costs
	Flexible pricing
Product management	Personalization and targeting of an offer
	Omnichannel services

Fig. 2. **Data warehouse functions in business process management tasks of a bank**
Source: complied by the authors.

geneous sources, supporting the entire IT architecture of the bank.

Fig. 2 presents data warehouse functions that can support business processes at different levels of the organization.

Adaptive banking data warehouse concept

The concept of an adaptive banking data warehouse model is based on the following principles and features: the ability to quickly configure for business tasks, scalability, omnitude, complexity, target level of abstraction.

The business-oriented approach is based on the GRAnD methodology (goal-oriented approach to requirement analysis in data warehouses), which allows designing a data warehouse considering the needs and characteristics of the organization [17, 18]. The growth needs of information support require efforts to review the model and, if necessary, update the banking data warehouse (BDW) in terms of its adaptation to specific tasks. This process can be simplified by designing a universal data warehouse model that can be adapted to new business goals, thereby becoming the basis for the design of *an adaptive banking data warehouse*. Development based on previously created components that are modified to meet new requirements is a frequent technique in creating software products [19, p. 40]. First, the basic set of tasks is compiled, by which new business requirements, technical requirements for the data warehouse are developed and formalized, and then they are implemented in accordance with the selected reference model.

A banking data warehouse model must also be scalable to enable designers to grow storage as they expand their task list. It is important that increasing number of tasks and the

data warehouse lead to a change in hardware requirements and a revision of the hardware and software configuration.

The adaptive banking data warehouse model describes the key elements of the banking subject area and contains a basic set of components and business objects. Component-wise system development with adaptation to new requirements has been used in software development since the late 1990s. Studies [19–22] are devoted to the possibilities of reusing components. I. Sommerville stated that generic models do not so accurately describe an object or process as they represent "useful abstractions that help apply various approaches and technologies to the development process" [19].

B. Meyer proposed the classification [20], where the components of the adaptive banking data warehouse belong to the level of system abstraction and can be applied in various modifications.

Work [21] developed the idea of generic patterns by S. Alexander [22]. E. Gamma, R. Helm, R. Johnson and J. Vlissides call the design pattern a design solution template that can be changed in different situations of the problem area. I. Sommerville notes that such a multicomponent approach allows reducing development costs and speeding up the design process itself [19].

The basic set of components of the adaptive banking data warehouse was based on expert opinion. The group of experts took part in selecting the component set, which included representatives of the business departments of two banks, the end users of the data warehouse, specialists of bank IT departments responsible for data management, as well as employees of the integrator company that implements the data warehouse in banks. The examination procedure was based on the Delphi methods, normalized rank [23], and index grouping. To assess the consistency of expert opinions, the dispersion coefficient of concordance was calculated, and its statistical significance was evaluated.

The adaptive warehouse architecture implies possible expanding the data model for

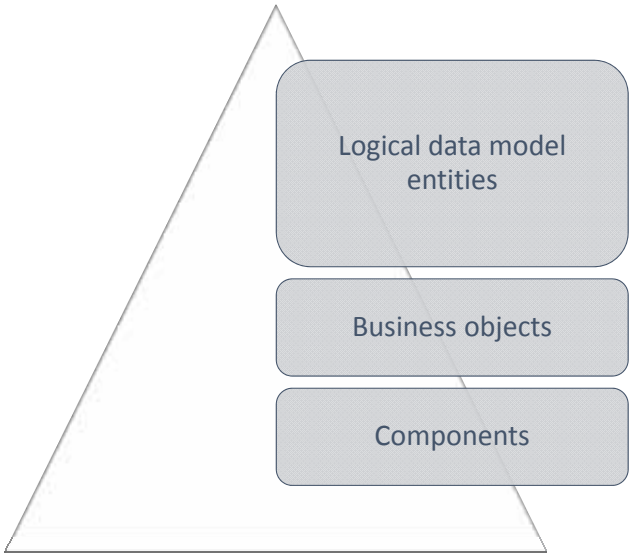

Fig. 3. **Architecture of the adaptive model of a banking data warehouse**

Source: complied by the authors.

a specific request. The adaptive banking data warehouse architecture is a three-level structure of elements that allow describing the subject area at various levels of abstraction (*Fig. 3*).

At the lower level of the architecture are the components of the adaptive banking data warehouse — a set of business objects that have semantic connections and a similar data structure. At the next level, each component is detailed to the level of business objects that correspond to any participant in one or more business processes of the organization. At the top level of the architecture, an area has been allocated for detailing each business object to the set of entities of the logical data model.

All credit organizations have common features: they have similar business processes, goals, objectives, information flows, etc. A business object at the top level of architecture is one or more required entities and an unlimited number of additional entities.

The next level reflects the features associated with the policies of a particular organization, market position, information systems used and a number of other reasons. Therefore, at each level, the degree of abstraction decreases, the entities are typified. The data description is concretized in a universal logi-

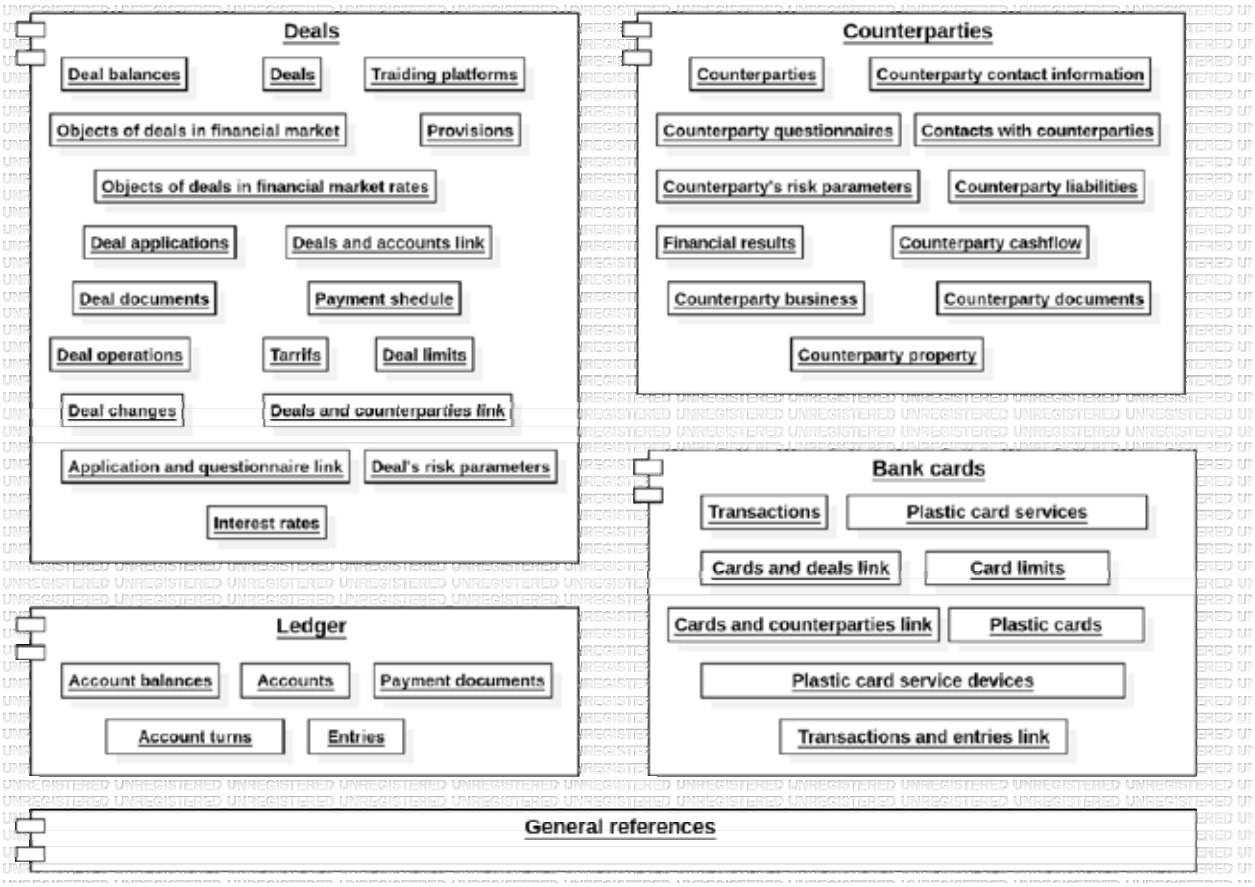

Fig. 4. **Basic set of components and business objects**

Source: developed by the authors.

cal model, adapting to the needs of new projects. Using components allows for reducing labor costs for design and improving the quality of the final system.

Fig. 4 presents the basic set of components and business objects of the adaptive model of a banking data warehouse and business objects, which can be used as the basis for designing a banking data warehouse for a specific business task.

Logical data model entities describe a business object. The key entity is the *main table*, which contains the basic attributes characterizing the business object. The main ones can be tables "Deal", "Counterparty", "Account", etc. A standard table is an entity that contains additional information about business object instances that have the same type in the main table. It contains additional attributes typical for this type of object. For example, standard entities are the "Credit deal" and "Deposit deal" (in this example, the main table is the "Deal" entity). The third type of entity of this data model is *a bridge table*, necessary for implementing many-to-many relationships between other entities. Bridge tables can be used:

- to link two business objects (including different components), for example, "Deal and accounts link";
- to link instances of one entity, including to present the hierarchy of objects, for example, "Deals link".

Some attributes of business objects may change over time, for example, attributes of the deal status or counterparty rating. Special entities of the "*Version Attribute Table*" type are created for them in the model.

In some cases, highly specialized information about some objects should be stored in data warehouses. This kind of information, as a rule, represents one or more attributes assigned to few instances of business objects. To do this and to avoid high sparse data, entities

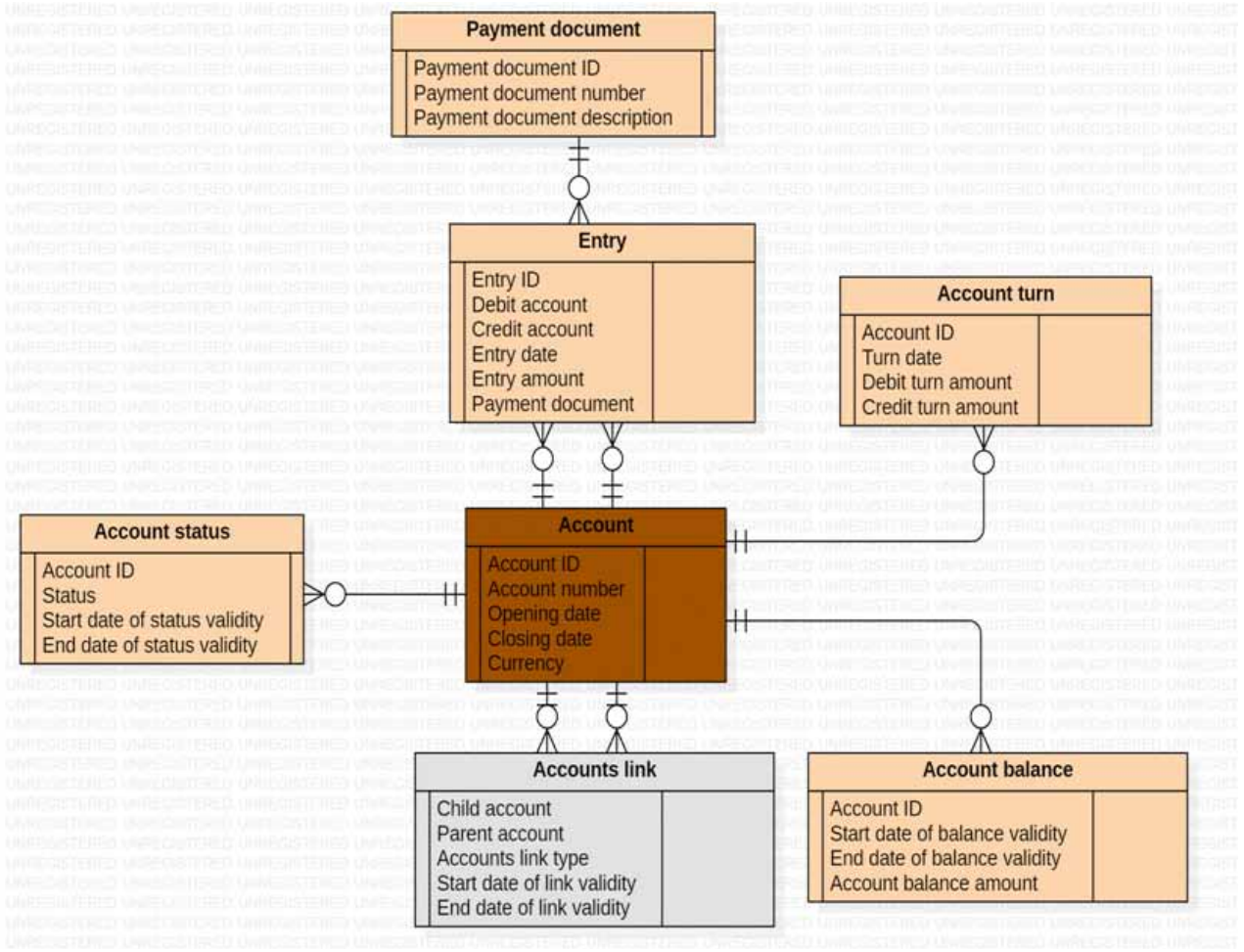

Fig. 5. **General Ledger component (subpicture)**

Source: developed by the authors.

of the "*Additional attributes table*" type are created in the model. Just as a mandatory set of tables is provided for any type of business object, a set of required attributes (attribute composition) is provided for each type of table.

Here is a description of some of the basic components of the adaptive banking data warehouse. The list of basic components of the adaptive banking data warehouse is based on key business processes implemented in banks, as well as standard banking services.

Fig. 5 illustrates the data model of the General Ledger component of the adaptive banking data warehouse model.

The General Ledger contains information about all bank accounts, their main details and factual information:

- entries are atomic banking transactions that involve flow of funds from one account (credit account) to another account (debit account);
- the payment document is the document that generated the entry; it contains detailed information about the purpose of the entry, turnovers;
- the account turn in the business sense is the aggregation of entries of the account within one banking day (respectively, for credit and debit of the account);
- the account balance is the amount of all the account turns at any moment of time (usually at the end of the banking day).

Some accounts may be linked to each other, for example, a relationship between an asset's account and a reserve account of this asset. Accounts can have various statuses: open, closed, arrested, blocked, etc. *The table* below presents the basic attributes of the tables in the General Ledger component.

The Deals component contains entities similar to the composition of the General Ledger, but related to deals (contracts). These are, for example, the "Deal relationship", "Deal status" and "Deal balance" entities. Besides, the Deals component include specific entities. Such an entity is "Deal maturity", which contains information about the contract validity and planned closing date. The deal maturity may change, for example, due to the prolongation (in the case of deposits). Deals typically have different interest rates (for example, for credits): the main interest on the principal debt; on overdue principal debt; for unpaid commission amount, etc.

Important information is transactions that may correspond to an entry, may be associated with several entries or may not be associated with entries at all, for example, when changing the type of transaction balance within one bank account. Besides, the Deals (base) component includes information on schedules and tariffs.

Credits are a very specific type of banking deals. In turn, they can also be divided into fundamentally different subtypes: one-time loans and credit lines. An important feature of credits is the need to reserve them, i.e. the bank must create provision for reserves in case of non-return of previously issued funds. Depending on various factors, a loan can be reserved individually or in a portfolio. A provisioning portfolio is a portfolio of homogeneous loans grouped by a similar debt structure. There are collaterals for many loans. The collateral may be the lending object itself (for example, a car or real estate), securities, a guarantee agreement, etc. A credit deal may be restructured in the event of a change in the payment schedule, currency change, etc. In case of problems with collecting debts from the borrower, the bank may require borrowed funds through the court. Decisions made in court are also uploaded to the credit institution's information system.

Fig. 6 shows the data model of the Plastic cards component (a subpicture is presented for credit cards). Deals with plastic cards have

Table

Attribute composition of the entities of the General Ledger component (fragment)

Entity	Attribute
Account	Account ID
Account	Account number
Account	Opening date
Account	Closing date
Account	Currency
Accounts link	Child account
Accounts link	Parent account
Accounts link	Accounts link type
Accounts link	Start date of link validity
Accounts link	End date of link validity
Account turn	Account ID
Account turn	Turn date
Account turn	Debit turn amount
Account turn	Credit turn amount
Account status	Account ID
Account status	Status
Account status	Start date of status validity
Account status	End date of status validity
Entry	Entry ID
Entry	Debit account
Entry	Credit account
Entry	Entry date
Entry	Entry amount
Entry	Payment document
Payment document	Payment document ID
Payment document	Payment document number
Payment document	Payment document description

Source: developed by the authors.

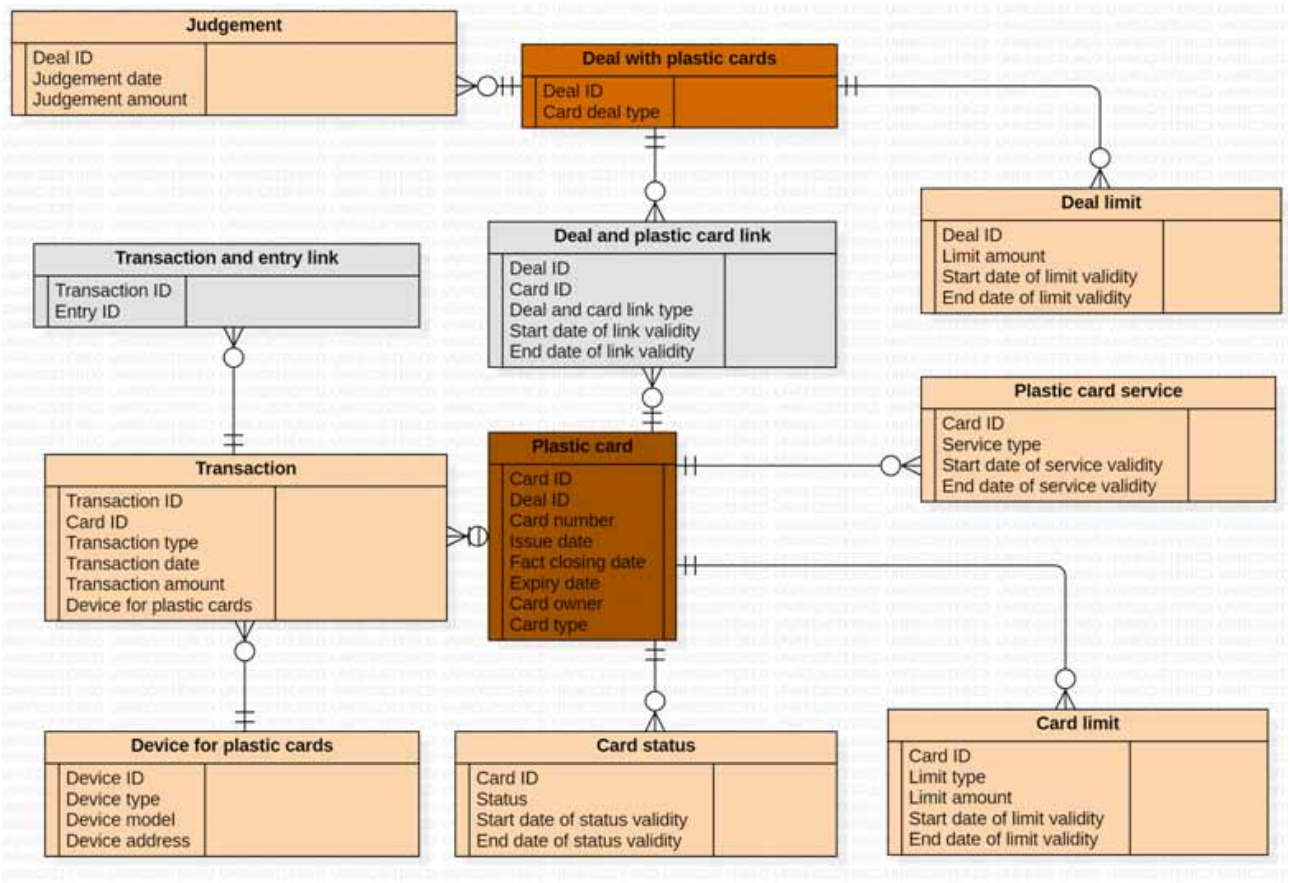

Fig. 6. **Plastic cards component (subpicture)**

Source: developed by the authors.

their own features. First, several plastic cards can be linked with the same agreement: one main and many additional ones. All cash accounting is carried out under the contract, and there is a credit limit, i.e. how much money a customer can get on credit. For the plastic card, as well as for the deal, the limit is set by the customer as part of the deal limit, and the status. Plastic cards are characterized by transactions — similar to deals, but with the specifics of accounting in the processing system.

The Applications component is small in the number of entities, but very rich in the attributes in applications and customer profiles (both existing and potential).

The Counterparties component is very extensive, but clear in business sense, since it does not contain information specific to the banking sector. It stores all information about the customers available to the bank (both from internal and external sources). This component is crucial in solving problems of segmenting the customer base, scoring, etc.

The Deals in the financial market appear as a separate component of the model for two main reasons: the relatively rare need of the bank for such information in the data warehouse and a sufficiently large number of attributes that characterize various objects of such deals. Note that if there is no need to implement the "Security" entity and its subsidiaries, tables "Currency" and "Quotation of object of deal" should be implemented as part of the Deals (base) component, since in any case information about exchange rates is needed to convert funds on accounts and deals in various currencies.

Despite the relative unitarity of the model components, they are interconnected:

- the General Ledger is linked with the Deals (base) component by the "Deals and accounts link" and "Deal and entry link" bridge entities;

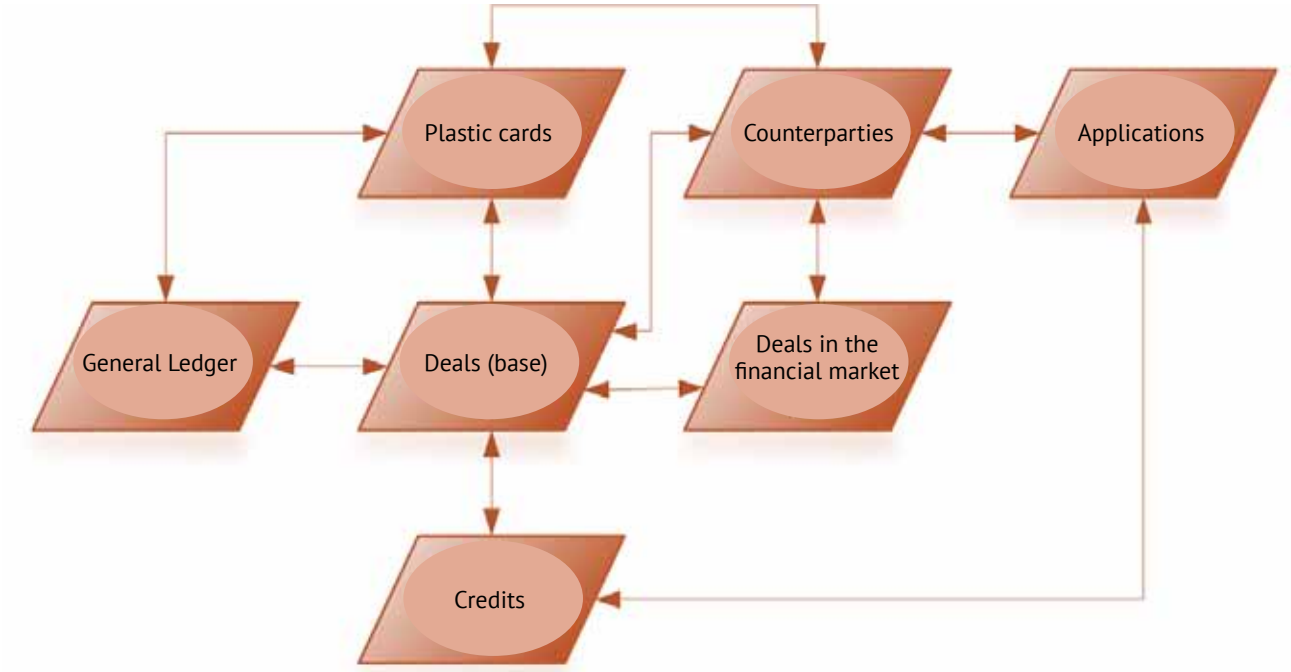

Fig. 7. **Interaction between the components of the reference model of a banking data warehouse**
Source: developed by the authors.

- the General Ledger is linked with the Plastic cards component by the "Deal and entry link" bridge entity;
- the "Credit deal" entity of the Credits component is a child entity with respect to the "Deal" entity of the Deals (base) component i.e. the Credits and Deals (base) components have a one-to-one relationship in the "Deal ID" field;
- the "Plastic card deal" entity of the Plastic cards component is a child of the "Deal" entity of the Deals (base) component, i.e. the Plastic cards and Deals (base) components have a one-to-one relationship in the "Deal ID" field;
- the "Deal in the financial market" entity of the Deals in the financial market component is a child of the "Deal" entity of the Deals (base) component, i.e. the Deals in the financial market and Deals (base) components have a one-to-one relationship in the "Deal ID" field;
- the "Credit deal" entity of the Credits component is linked with the "Application" entity of the Applications component by the "Deal ID" attribute;
- the Deals (base) is linked with the Counterparties component by the "Deal and counterparties link" bridge entity;
- the "Questionnaire" entity of the Applications component is linked with the "Counterparty" entity of the Counterparties component by the "Counterparty ID" attribute;
- the "Plastic card" entity of the Plastic cards component is linked with the "Counterparty" entity of the Counterparties component by the "Counterparty cardholder" attribute;
- the "Security" entity of the Deals in the financial market component is linked with the "Legal entity" entity of the "Counterparties" component by the "Counterparty issuer" attribute.

Thus, the interaction between the components of the adaptive model of a banking data warehouse can be represented by a diagram *(Fig. 7)*.

To generate financial statements and manage the liquidity of a credit institution, it is sufficient to implement the basic component of the reference model, the General Ledger, in the data warehouse. Solving other problems will require implementing the remaining components of the model. The Deals (base) and Counterparties components are necessary to solve the vast majority of the business tasks. The Deals in the financial market and

Applications, on the contrary, are required in a relatively small number of business cases. For this reason, many credit organizations are able to optimize their costs to build a data warehouse by abandoning these components. The task of managing bank risks is extremely complex and large-scale. Solving this kind of problems requires an end-to-end analysis of almost all business processes of the bank; therefore, if a credit institution intends to manage risks using a data warehouse, it will have to implement all the proposed components of the model.

Adaptive banking data warehouse design technique: key steps

The sequence of actions aimed at moving from a high-level business description of a problem to a formalized data model and architecture of applied systems can be as follows:

1. Verbal high-level description of automated business processes.
2. Classification and grouping of business processes in order to identify areas of activity.
3. Highlighting common fragments of business processes, key participants, key accounting objects and data flows.
4. Determination of the necessary warehouse components from the basic set of the adaptive banking data warehouse.
5. Selection of the required business objects from the basic set of the adaptive banking data warehouse and their enrichment for the particular organization in accordance with its architecture.
6. Detailing business objects to entities of a logical model, establishing relationships between them, developing an ER-model.
7. Filling manual reference business objects.
8. Development of a functional architecture of applied systems.

CONCLUSIONS

The current situation in the banking services market requires new technological solutions. Banks are expanding the range of offers, offering customers new products and services. Customers expect interaction primarily through digital channels. High competition with fintech companies makes banks to become fully digital. A fully digital organization is built on digital technology.

One of the most effective solutions to solve the problem of a quick transition to new business models and to implement new areas of activity is data warehouses. The implementation of analytical systems in banks is carried out through solving a number of business problems. However, the fundamental task of data warehouses is to consolidate all information available in the company, unify and verify it, as well as to integrate existing information systems into requests for data sources.

The study formulates the basic principles and characteristics of the adaptive banking data warehouse model. The paper presents the architecture of the banking data warehouse, which may consist of many components and be configured for various tasks. In a model of this type, each level describes the subject area and the associated data flows with varying degrees of detail and abstraction. The article provides the basic set of components and business objects of the adaptive banking data warehouse, covering a significant part of the typical business needs of credit organizations.

To provide omnichannel and 360-degree customer service, the bank's IT architecture must be very flexible and scalable. In particular, such requirements are imposed on the data warehouse as a key element of this architecture. Applying the component approach to designing DWs, in particular, will allow us to solve this problem, i.e. to increase not only the volume of stored data, but also the reach of supported business processes. Simplifying the DW design process increases the development of the bank's IT architecture in terms of information provision and makes it possible to build an ecosystem that meets all requirements of the modern customer.

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Solyanov K. S. — concept of adaptive banking data warehouse, development and implementation of a basic set of components and business objects of the adaptive banking data warehouse model, graphical representation of the results.
Konevtseva T. D. — architectural principles for creating a unified front-end omnichannel banking system.

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Support to the Banking Sector as a Factor of the Central Bank Losses (the Case of the National Bank of Kazakhstan)

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ABSTRACT

Central bank activities in developing and transit economies differ in specificity, due to the underdevelopment and increased vulnerability of national banking systems to external shocks. In some cases, this specificity leads to central bank losses, including over long periods and in large volumes. The **subject** of the article is central bank activities contributing to their losses. The **relevance** of the study is due to the increasing instability of the external environment within the growing crisis in the global economy, which causes the constant generation of shocks for the financial sector of developing economies. Maintaining financial stability and supporting the banking sector under these conditions may be factors of central bank losses. The **aim** of the article is to assess the impact of these factors on the example of the Central Bank of Kazakhstan. The study employed the **methods** of the analysis of the financial results of the National Bank of the Republic of Kazakhstan during its active support to the country's banking sector, as well as a comparative analysis of its financial statements with other central banks. As a **result**, the study revealed that the specifics of the monetary policy in Kazakhstan implemented to ensure the stability of financial markets and support to the banking sector led to massive losses for the regulator. This significantly distinguishes its results from similar indicators of other central banks in the world and the CIS countries. The resulting losses developed due to factors of both a temporary and situational nature, as well as systemic features of monetary policy that arose in a difficult period and became permanent afterwards. The **conclusion** confirms the hypothesis about the significance of support measures for the national financial sector in the formation of a negative financial result for the central bank, as well as illustrates the specificity of monetary policy in developing economies with a dominant commodity sector.

Keywords: central bank; central bank profit; central bank losses; monetary policy; banking sector recovery; interest expense; issue of debt instruments

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INTRODUCTION

Central bank activities are usually assessed in terms of their monetary policy and achieving its objectives (inflation targeting, stimulating economic growth and employment, dynamics of financial markets), and performing other key functions, such as financial supervision or ensuring the national currency stability. The issue of central bank profitability is considered much less frequently, since the profit making function of these institutions is secondary towards the primary function of implementing monetary policy as a state body. The secondariness of the central bank profit as an effectiveness indicator of its activities is recorded in the legislation of some countries and in many corresponding scientific papers[1] [1–3]. Nevertheless, the issues of central bank profitability in its various aspects obtained some coverage in the scientific literature [4–8].

The functions of the state body for regulating the financial sector and implementing monetary policy performed by central banks do not cancel its nature as a financial institution, usually organized as a joint stock company, which in the course of business gets a certain financial result as profit or loss. Moreover, the profit of the central bank as a state institution is subject to transfer to the state budget and, therefore, is a factor in the budget process. This aspect of central bank activities is also highlighted in the relevant literature from various perspectives.

Some American authors consider the legal perspective and note that "some laws explicitly exclude measures of profit from central bank objectives"[2], which eliminates "tensions between central banks and their governments"[3] regarding the transfer of their profits to the budget. M. Blejer and K. Chu recognize the secondariness of the profit making compared to the effectiveness of the objectives of regulators to achieve a given inflation rate, and note that performance should still be evaluated. The evaluation criterion may be "information on operating costs incurred by the central bank while achieving inflation targets" [13, p. 27].

According to other views on central bank profitability, these institutions should not be completely free from obligations on making profit and transferring it to the budget. P. Stella believes that central banks ought to earn profit on a regular basis and to deliver it to the treasury, except the profit required to

[1] Current development in monetary and financial law. Vol. 3. Washington, DC: International Monetary Fund; 1999.

[2] The same. P. 443.

[3] The same. P. 448.

ensure financial stability. "The accumulation of "excess" net worth is not justified; could require the government to borrow from private capital markets at excessively high rates" [1, p. 32], while these excess profits could be used to reduce the budget deficit.

Despite the consensus on the secondariness of central bank profitability compared to the effectiveness of the main regulatory functions, this does not cancel the need for profit and cost management in the context of the state's interests to ensure the budget process. In this regard, the problem of central bank losses is also of interest to researchers. M. Teijeiro and O. Sweidan [9, 10] investigated the causes and consequences of this phenomenon; J. Dalton and C. Dziobek [11] studied central bank losses in selected countries; J. Benchimol and A. Fourçans [12] examined the correlation of central bank losses with the current monetary policy.

This thesis is not only a theory, but is also used in practice, since many central banks of developed countries deliver almost all their net profit to the government. In 2019, the US Federal Reserve received net income of $55,458 million[4], of which provided $54,893 million (99%) to the Treasury. At the end of 2018, the Fed remittances to the Treasury — $65,319 million — even exceeded its net income of $63,101 million, which led to losses[5].

At the end of 2018, the Bank of Japan received a net income of 587 billion yen, of which 557.6 billion (95%) was paid to the government[6].

The issue of central bank profitability in developing or transition economies is not sufficiently developed, especially in terms of its formation factors and consequences for non-banking sectors of the economy. At the same time, the processes of generating the financial result of central banks in such countries differ significantly from similar processes in developed economies, which is due to both the features of economic models and the less developed and more stable banking systems of such states. Therefore, studying the processes determining the formation of the Kazakhstan central bank's financial result seems relevant in the context of its objectives, such as identifying the main factors affecting the profitability of the regulator in developing economies based on the upstream industry.

MAIN FACTORS OF CENTRAL BANK'S FINANCIAL RESULTS FORMATION

We should consider the main factors and sources of central bank formation in the context of their profitability issues. The central bank's financial result is influenced by many factors that affect their main income and expense items. The features of the regulator's monetary policy may significantly affect the volumes of individual income and expense items and their result, making profit or losses. Sometimes central bank income (or expenses) may include items specific to the conditions of a particular country or the current economic situation, difficult to find in the financial statements of regulators in other countries. For example, a specific article by the Bank of Russia about "income gained from equity participation of Sberbank of Russia public joint stock company", which made a significant part of this regulator's total income — its share was 23.4% at the end of 2018[7]. Nevertheless, given the wide diversity of central bank structure of income and expenses in various countries, we can distinguish some key items that have the most significant impact on the financial result.

The largest income and expense items for most central banks are currently interest and operating (from operations with securi-

[4] Hereinafter, by dollars we mean US dollars.

[5] Federal Reserve Banks Combined Financial Statements. As of and for the Years Ended December 31, 2019 and 2018 and Independent Auditors' Report. Federal Reserve System Audited Annual Financial Statements. P. 4. URL: https://www.federalreserve.gov/aboutthefed/files/combinedfinstmt2019.pdf (accessed on 20.03.2020).

[6] Financial Statements for the 134th Fiscal Year. Fiscal 2018. Financial Statements. P. 3. Bank of Japan. The Bank's Accounts. URL: https://www.boj.or.jp/en/about/account/zai1905a.pdf (accessed on 20.03.2020).

[7] Bank of Russia's 2018 Annual Report. P. 258. M.: AEI PRIME, 2019.

ties and financial instruments). Significant expense items also include the formation of reserves or provisions (various banks use different terms) and various administrative expenses, where staff expenses prevail. These items are typical of most central banks as the most significant both in absolute volume and in specific weight.

The impact of individual items on the formation of a financial result may vary depending on economic conditions and the specifics of the central bank's monetary policy. This explains numerous views of specialists on the significance of certain factors of central bank profitability. At the same time, they admit the high variability of the financial result from the specific composition of the measures. O. Smirnova believes that "using three main instruments of monetary policy (monetary base, reserve requirements and refinancing rates) gives 8 different options to combine them, each providing its own unique character of central bank income and expenses" [14, p. 15].

Some authors focus on the impact of monetary policy on the formation of the central bank's financial result and note that "changes in exchange rates will usually cause changes in the domestic currency counterpart of net foreign assets resulting in an unrealized profit (or loss)" [13, p. 27].

A. Sukharev believes that the profit of the central bank is also formed due to its operations in the foreign exchange market: "By smoothing daily fluctuations in the exchange rate, the central bank buys excess currency at a lower rate and sells it at a higher rate, thus, it will make profit. However, the greater the fluctuations between the demand and supply of foreign currency are during the year, the greater the profit the central bank will have" [2, p. 19].

In the context of exchange rates impact, P. Stella and A. Lönnberg note the importance of extending international financial reporting standards (IFRS) to evaluating central banks, which led to "the possibility of volatile income and balance sheet statements" [15, p. 5]. According to IFRS, the revaluation of assets related to foreign exchange revaluation changes refers to either profits or losses.

Despite numerous aspects of central bank activities that influence the formation of their financial result, in most cases interest income and expenses are its main factors. Thus, in 2018, the Bank of Russia's interest income (362 billion roubles) amounted to 62.6% of total revenue (578 billion roubles), and the interest expenses (354 billion roubles) became the largest expense item (877 billion roubles)[8] with a specific weight of 40.4%.

In 2019, the US Federal Reserve interest income in the amount of $102.8 billion accounted for almost all of the revenue ($103.8 billion) — 98.9%, and interest expense ($41 billion) were 84.7% of total expenses ($48.4 billion)[9].

The interest income of the European Central Bank in 2018 (EUR2,503 million) also became the bank's main source of income (EUR3,062 million) with the specific weight of 81.7%[10].

The objectives of this article do not include studying the reasons why interest received and paid by central banks determines their financial results. In recent years, in developed economies, central banks have pursued an aggressively soft monetary policy, in which they redeem a large number of debt financial instruments from the market, settled by 2018 on their balance sheets in amounts exceeding $16 trillion [6][11]. The maximum volumes of such securities on the balance sheets, several trillions of dollars, were generated by the Bank of Japan, the European Central Bank

[8] Bank of Russia's 2018 Annual Report. P. 258. M.: AEI PRIME, 2019.

[9] Federal Reserve Banks Combined Financial Statements. As of and for the Years Ended December 31, 2019 and 2018 and Independent Auditors' Report. Federal Reserve System Audited Annual Financial Statements. P. 4. URL: https://www.federalreserve.gov/aboutthefed/files/combinedfinstmt2019.pdf (accessed on 20.03.2020).

[10] European Central Bank. Annual Report 2018. P. A24. URL: https://www.ecb.europa.eu/pub/pdf/annrep/ar2018~d08cb4c623.en.pdf?d4db50437f47e3bf9914e1381b1a2cde (accessed on 21.03.2020).

[11] Central banks led the world into crisis and helped the rich. Vesti.ru. 31.01.2018. URL: https://www.vesti.ru/doc.html?id=2982335&cid=6 (accessed on 02.04.2020).

and the US Federal Reserve. Therefore, these central banks receive rather large volumes of income from the repurchased assets, which explains both the high absolute volume of interest income and their dominance in the income structure.

In most other countries, central banks have a less specific monetary policy, and that is why do not have gigantic volumes of debt assets bought up in the markets on their balance sheets. Thus, the size and share of interest income from other central banks are much lower, and these incomes are not always sufficient to ensure overall profitability amid strong fluctuations in the volumes of other components of the balance sheet and income.

In many cases, these fluctuations are caused by the increasingly complicated external and macroeconomic environment for the functioning of national banking systems, especially in relatively small commodity-type economies, dependent on world commodity markets with high volatility and lower prices. External shocks are transmitted to the level of such national economies and have a negative impact, including on financial systems. Thus, central banks have to respond to emerging challenges both to ensure macro-financial stability and to support specific financial institutions. This response often generates increased expenses, not only within the traditional monetary policy directions, but also in non-standard one-off events.

FORMATION OF FINANCIAL RESULTS OF THE NATIONAL BANK OF KAZAKHSTAN: FACTORS AND FEATURES

Having had a negative impact on the financial results of the National Bank of the Republic of Kazakhstan, the situation in the Kazakhstan financial sector sets an example of the impact of such challenges on central bank activities and their profitability.

Like other central banks, the National Bank of Kazakhstan receives a financial result as a profit or loss, thus acting not only as a state body, but also as a joint stock company, whose result belongs to its shareholders. The main shareholder of the National Bank of Kazakhstan is the state, which in accordance with the applicable Law[12], owns the authorized capital of this state institution.

The activity of the National Bank is not aimed at making profit, which is due to its main functions as a state body and is reflected in the regulatory framework. The main goal of the National Bank of Kazakhstan is to ensure the price stability and to implement the tasks to accomplish it, rather than generate income and make profit. At the same time, in accordance with the Law, part of the National Bank's profit is subject to transfer to the state budget. Kazakhstan has legally established the possibility to compensate losses to the National Bank from the state budget. However, at present the relevant part of Art. 11 of the Law on the National Bank is suspended and is in force as amended in 2018, in which budgetary compensation for losses is not provided, and the corresponding provision is removed from the text of the article.

This version of the Law is valid, since the reserve capital of the National Bank dropped to zero for the first time as of the end of 2018. If the standard version of the Law were in effect, it would be necessary to form the reserve capital of the regulator at the expense of the state budget. The zeroing of the reserve capital took place in just three years and from a very significant level of 346 billion tenge (about a billion US dollars) that the bank had at the end of 2015. The reserve capital of the National Bank was depleted, since it compensated for the losses, incurred by the regulator in 2016–2017–158 billion tenge in 2016 (in 2017) and 175 billion tenge in 2017 (in 2018)[13].

The reserve capital depletion is due to the unprofitable activity of the National Bank for four consecutive years — from 2015 to 2018

[12] Law of the Republic of Kazakhstan dated March 30, 1995 No. 2155 "On the National Bank of the Republic of Kazakhstan". Information system "Lawyer". URL: https://online.zakon.kz/document/?doc_id=1003548 (accessed on 02.04.2020).

[13] Consolidated Financial Statements for the Year Ended December 31, 2018 p. 122. National Bank of the Republic of Kazakhstan. URL: https://nationalbank.kz/cont/NBRK%202018%20FS_RUS_.pdf (accessed on 23.03.2020).

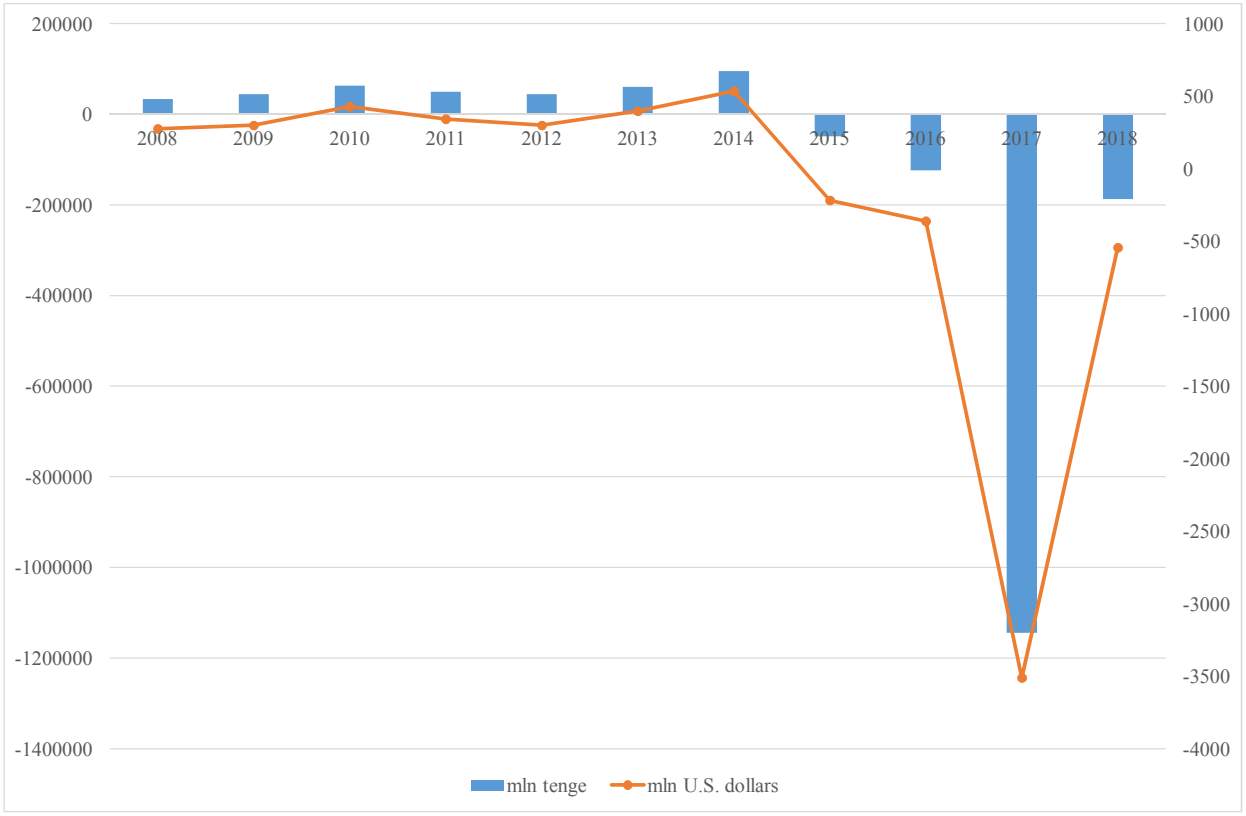

Fig. 1. **losses (–) of the National Bank of the Republic of Kazakhstan for 2008–2018**

Source: National Bank of the Republic of Kazakhstan (consolidated financial statements for 2011–2018), calculated by the author.

(the data for 2019 is not yet available). This is a new trend for the Kazakhstan central bank activities, always profitable before, including the period of the 2008–2009 global financial crisis, after which large-scale measures were taken to support the country's financial sector (*Fig. 1*).

From 2008 to 2014, the profit of the National Bank increased steadily from 33 to 95 billion tenge simultaneously with its dollar equivalent, whose average value for this period amounted to $367 million. However, after 2014, the National Bank was making losses that reached the maximum of 1145 billion tenge, or $3.5 billion, in 2017. Over four years, the total volume of continuous losses reached 1505 billion tenge, or $4.6 billion.

Recurring losses of a central bank is a regular part of the world practice. Since, as noted above, the main function of this institution is to regulate the financial sector and to implement monetary policy in areas that sometimes require significant costs, it is difficult to avoid losses. However, the question is how often they arise and how large they are.

If we consider the functioning of some central banks of the CIS countries and the world over the past five years, we will see that such regular and large losses as those of the National Bank of Kazakhstan are a rare exception (*Table 1*).

The Bank of Russia made quite large losses, but only for two of the past five years (in 2017–2018). The Central Bank of Azerbaijan also had losses for two out of five years (in 2014 and 2018), but they were small. The central banks of Kyrgyzstan and Ukraine have not had a loss in the past five years. Of the four leading central banks of developed countries, the US Federal Reserve (in 2015 and 2018) and the Bank of England (in 2017) made losses, while the European Central Bank and Bank of Japan remained consistently profitable. Belarus, whose National Bank has been loss-making over the past five years, is the only example of the same consistent and

Table 1

Profit / loss volumes of some central banks of the CIS countries and the world in 2013–2018, million US dollars

	2014	2015	2016	2017	2018
Bank of Japan	9542.5	3395.9	4663.1	6822.5	5316.7
National Bank of Ukraine	8170.7	3723.9	2707.8	2334.1	1386.6
Central Bank of Azerbaijan	–393.6	5385.4	253.2	2042.7	–28.1
European Central Bank	1315.1	1200.6	1320.9	1440.9	1861.2
US Federal Reserve	2751	–16829	711	784	–2176
National Bank of the Kyrgyz Republic	100.6	101.5	54.0	32.7	33.4
Bank of England	733.5	1980.8	359.2	–268.1	244.5
National Bank of the Republic of Belarus	–700.7	–0.1	–746.8	–586.7	–386.3
National Bank of the Republic of Kazakhstan	532.8	–219.0	–363.2	–3631.8	–545.0
Bank of Russia	4770.6	1836.6	651.1	–7465.6	–6933.7

Source: compiled by the author according to the financial statements of the corresponding banks.

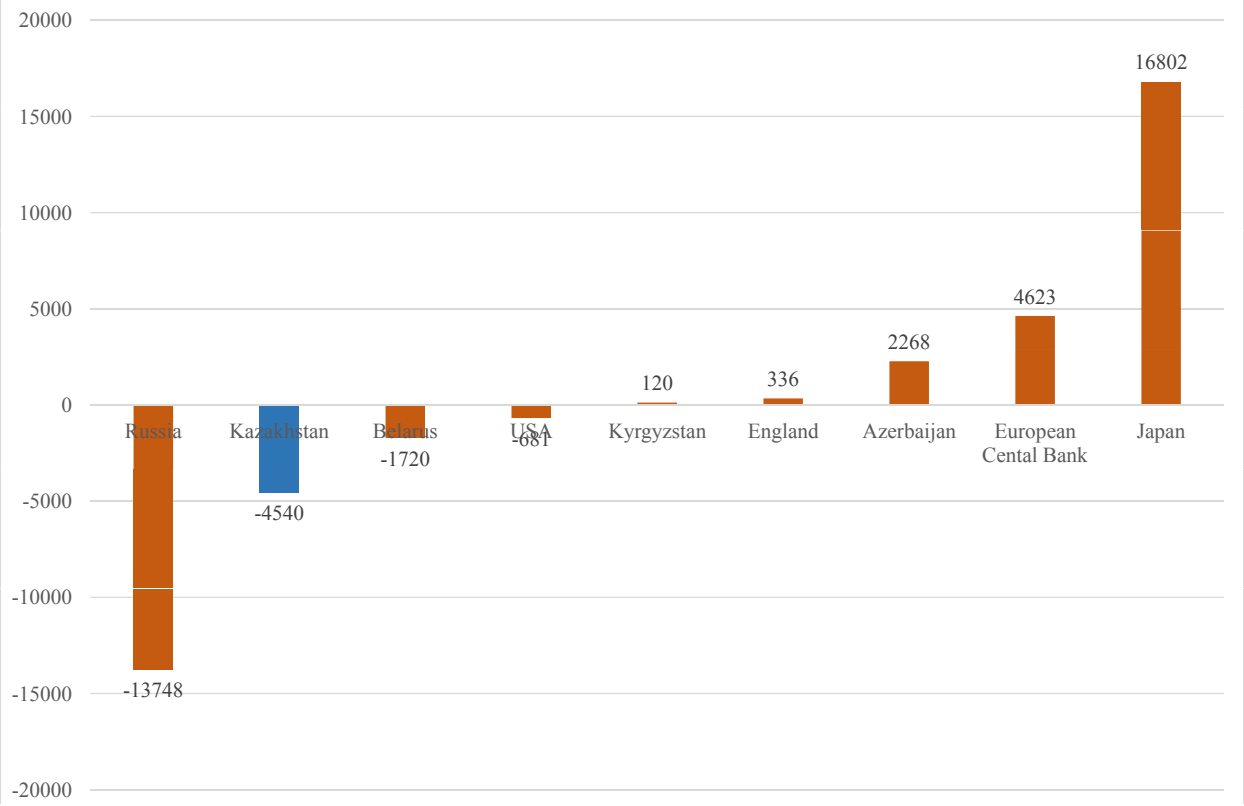

Fig. 2. **Cumulative profits / losses of the some central banks of the CIS and the world in 2016–2018, million US dollars**

Source: financial statements of the respective central banks, calculated by the author.

Table 2

Largest expenses of the National Bank in 2014–2018, mln tenge

	2014	2015	2016	2017	2018
Interest expense	–4416	–15 700	–275 513	–357 179	–380 590
Banking sector recovery expenses	–	–	–5429	–585 623	–102 378
Disposal expenses of a subsidiary	–	–	–	–507 474	–
Other operating expenses	–5596	–152 446	13 753	39 381	55 607
Personnel expense	–19 180	–22 955	–24 298	–26 066	–28 715

Source: compiled by the author according to the consolidated financial statements of the National Bank of the Republic of Kazakhstan.

large-scale loss-making of the financial regulator as Kazakhstan.

As for the size of losses, especially in relative terms, the negative experience of the National Bank of Kazakhstan in recent years is also outstanding. In absolute terms, the total loss of the Kazakhstan regulator over the past three years is second only to that of the Bank of Russia (*Fig. 2*), and in relative terms (comparing GDP) — to the Belarusian National Bank. Over the past three years, the Kazakhstan regulator made the average loss to GDP of 0.94%, and the Belarusian one — 1.1% (the Russian one — 0.28%)[14].

The reasons for such large losses of the National Bank in recent years are clearer when considering the most significant items of its expenses (*Table 2*).

Table 2 illustrates the specifics of the formation of the financial result of the Kazakhstan central bank associated with providing assistance to the country's banking system. Two items — banking sector recovery expenses and disposal expenses of a subsidiary — made the main contribution to the regulator's losses in 2017. Expenses on these two items amounted to almost 1.1 trillion tenge — the amount corresponding to 2% of Kazakhstan's GDP of that year.

The banking sector recovery expenses were made by the National Bank for three consecutive years and amounted to 693 billion tenge, their bulk fell on 2017 and 2018. The losses under this item were the result of differences in the value of bonds issued by banks and by troubled entities of the quasi-public sector, bought out by JSC Kazakhstan Sustainability Fund, a subsidiary of the National Bank. These bonds, issued at non-market rates of

[14] Calculated by the author based on the financial statements of the National Bank of the Republic of Kazakhstan, the National Bank of the Republic of Belarus, and the Bank of Russia.

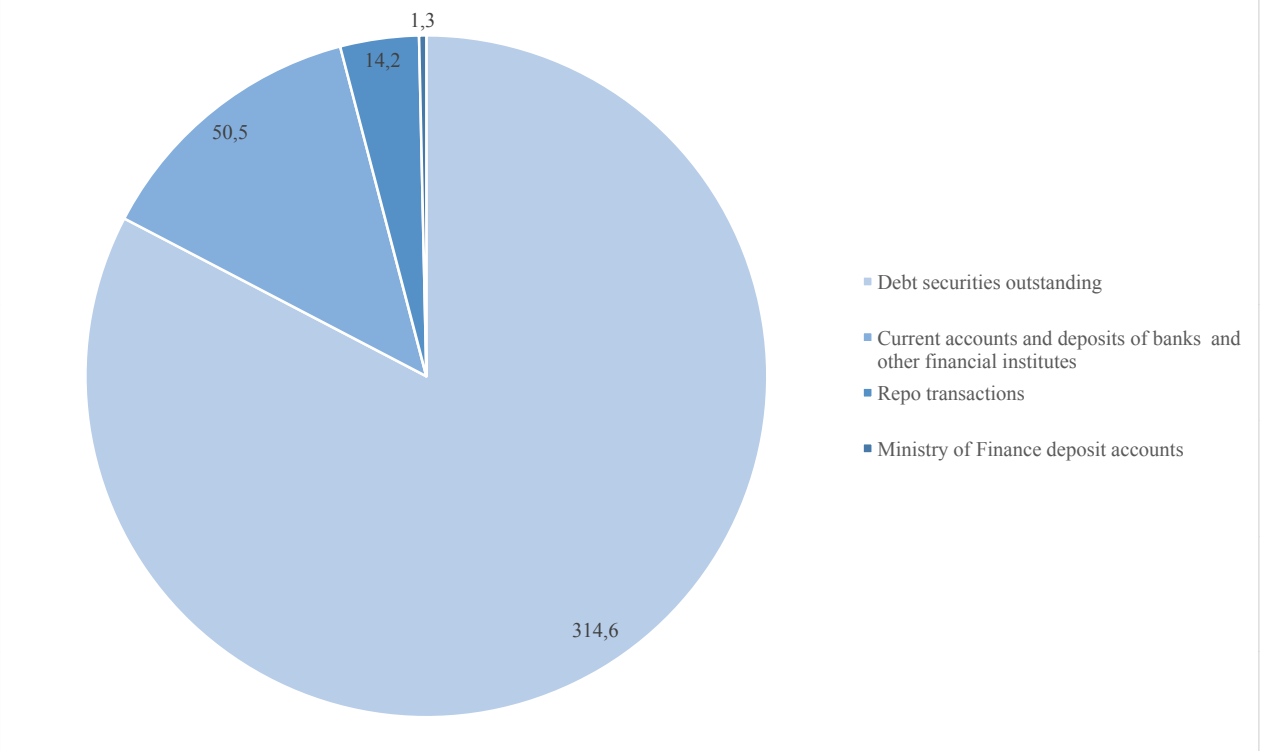

Fig. 3. **Interest expenses of the National Bank in 2018, billion tenge**

Source: National Bank of the Republic of Kazakhstan (consolidated financial statements for 2018), calculated by the author.

return (from 4 to 10.95%)[15], have a fair value, significantly different from the nominal one, and the difference in their value is recognized by the National Bank as a loss.

The second largest loss item of the National Bank of recent years — disposal expenses of a subsidiary — also refers to the problems of the banking sector and measures previously taken by the state to solve them. As part of these measures, JSC Fund of Problem Loans, the institution of the National Bank, inter alia, provided support to the banking sector by donating its shares to the Government of the Republic of Kazakhstan in 2017 (represented by the State Property and Privatization Committee of the Ministry of Finance). The loss from the disposal of these shares in the amount of 507,474 million tenge was recorded as a loss of the National Bank for 2017[16].

ISSUE OF NOTES AS A FORMATION FACTOR OF REGULAR LOSSES OF THE NATIONAL BANK

Thus, the bulk of the losses of the National Bank was due to the support measures to the banking system. At the same time, the loss-making of this institution in recent years has been the result not only of solving the problems of the banking system, but also of the peculiarities of monetary policy, which led to an increase in interest expense to very high levels. This was the largest expense item both in 2016 and in 2018, except 2017, when banking sector recovery expenses attained a maximum. In 2018, the volume of interest expenses exceeded 380 billion tenge (more than $1 billion), and this amount, though not a consequence of some extraordinary events, is nevertheless comparable to the volume of funds spent a year earlier on emergency items related to assistance to banks.

Interest expenses are payments made by the National Bank for its obligations — securities, bank deposit money, etc. The structure

[15] Consolidated Financial Statements for the Year Ended December 31, 2018 p. 122. National Bank of the Republic of Kazakhstan. URL: https://nationalbank.kz/cont/NBRK%20 2018%20FS_RUS_.pdf (accessed on 23.03.2020).

[16] The same. P. 123.

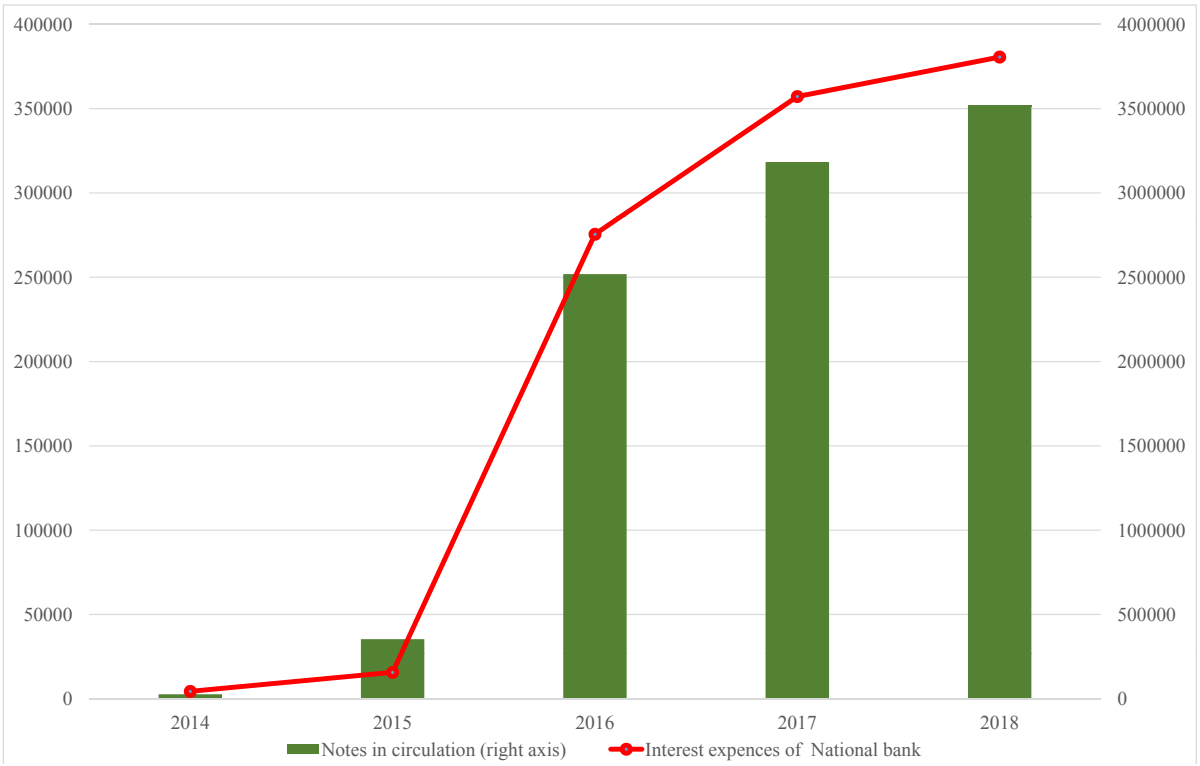

Fig. 4. **Comparative dynamics of the volume of notes of the National Bank in circulation and its interest expenses, mln tenge**

Source: National Bank of the Republic of Kazakhstan (consolidated financial statements for 2015, 2018; structure of government securities denominated in national currency), calculated by the author.

of these expenses reflects the structure of the regulator's obligations; in 2018, its bulk (almost 83%) was represented by servicing debt securities in the amount of 314.6 billion tenge (*Fig. 3*).

These significant expenses for the interest payment on debt securities, the main type of obligations of the National Bank, are due to their large volumes of issue. Unlike measures to improve the banking sector, this regulator's activity is systemic, which means generating losses on a regular basis. At the same time, interest expenses have been steadily increasing since 2015, as the volumes of the issue of debt securities by the National Bank — notes — and their volume in circulation are constantly growing (*Fig. 4*). Thus, its growing debt burden determines the growth of interest paid on debt, which are becoming an increasingly large expense item and lead to the formation of a negative financial result of the regulator.

Notes of the National Bank are issued primarily for implementing monetary policy, and not because the regulator needs cash — this is the specificity of these instruments and the difference between the motives for their issue and ordinary debt securities (for example, government debt to cover budget deficit). The jump in their output in recent years referred to the difficult situation in the country's financial market, including the need to provide banks with tools for placing excess cash, which otherwise could become a destabilization factor of financial markets, primarily foreign exchange. However, the policy of sterilizing excess liquidity by issuing notes also had a number of serious negative consequences, including for central bank profitability.

In the case of the issue of notes of the National Bank of Kazakhstan, this effect was manifested through a rapid increase in the regulator's interest expenses as a result of both an increase in their issue volume and

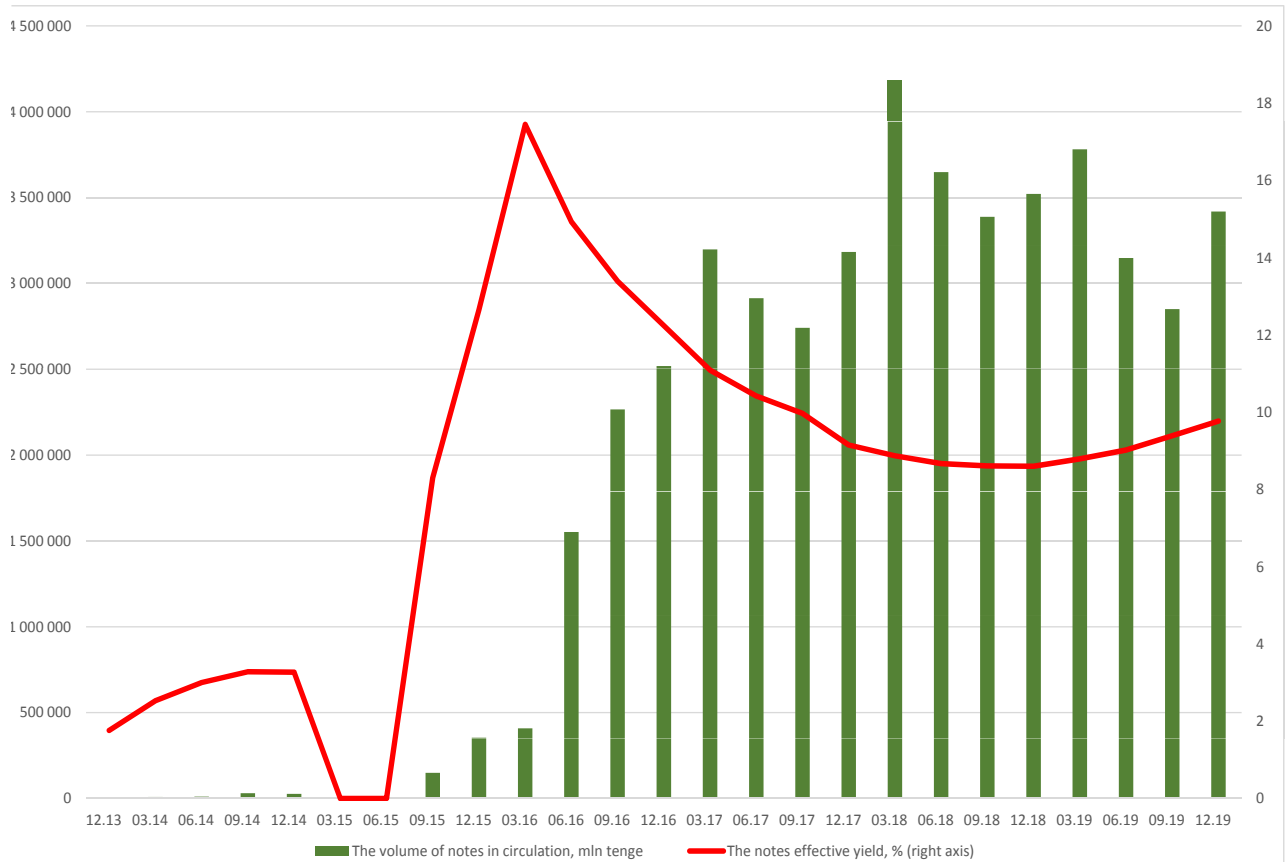

Fig. 5. **Notes in circulation and their yield**

Source: National Bank of the Republic of Kazakhstan (structure of government securities denominated in national currency), calculated by the author.

high maintenance costs. The notes were issued at sufficiently high interest rates to tie up money that could put pressure on the tenge — that is why a sharp surge in the issue of notes occurred during the period of high devaluation expectations after the fall in oil prices in 2015–2016 (*Fig. 5*).

Due to the jump in the issue of notes and their high servicing costs, the debt burden on the National Bank amounted to about 3.5 trillion tenge (about $10 billion) only through these financial instruments, and interest payments on them exceeded 1 trillion tenge (about $3 billion)[17] in just three years (2016–2018). This made a significant contribution to the growth of interest expenses and the formation of the regulator's losses.

Another negative consequence of the massive issue of notes, which does not directly affect the National Bank's profitability, but creates the prerequisites for maintaining a high level of interest expenses, was that these instruments started replacing loans in the bank assets for the economy. While the National Bank was actively issuing notes (since 2016), the volume of bank lending to the economy decreased, despite the growth of the banking system assets during this period. From the end of 2015 to the end of 2019, second-tier bank assets increased by 13%, and the volume of the loan portfolio decreased by 5%[18]. At the same time, we can clearly see the relationship between the period of a strong reduction of the loan portfolio from mid-2017 to mid-2018

[17] Consolidated Financial Statements for the Year Ended December 31, 2018 p. 122. National Bank of the Republic of Kazakhstan. URL: https://nationalbank.kz/cont/NBRK%202018%20FS_RUS_.pdf (accessed on 23.03.2020).

[18] Information on equity, liabilities and assets for 2014–2020. National Bank of the Republic of Kazakhstan. URL: https://nationalbank.kz/?docid=1060&switch=russian (accessed on 11.03.2020).

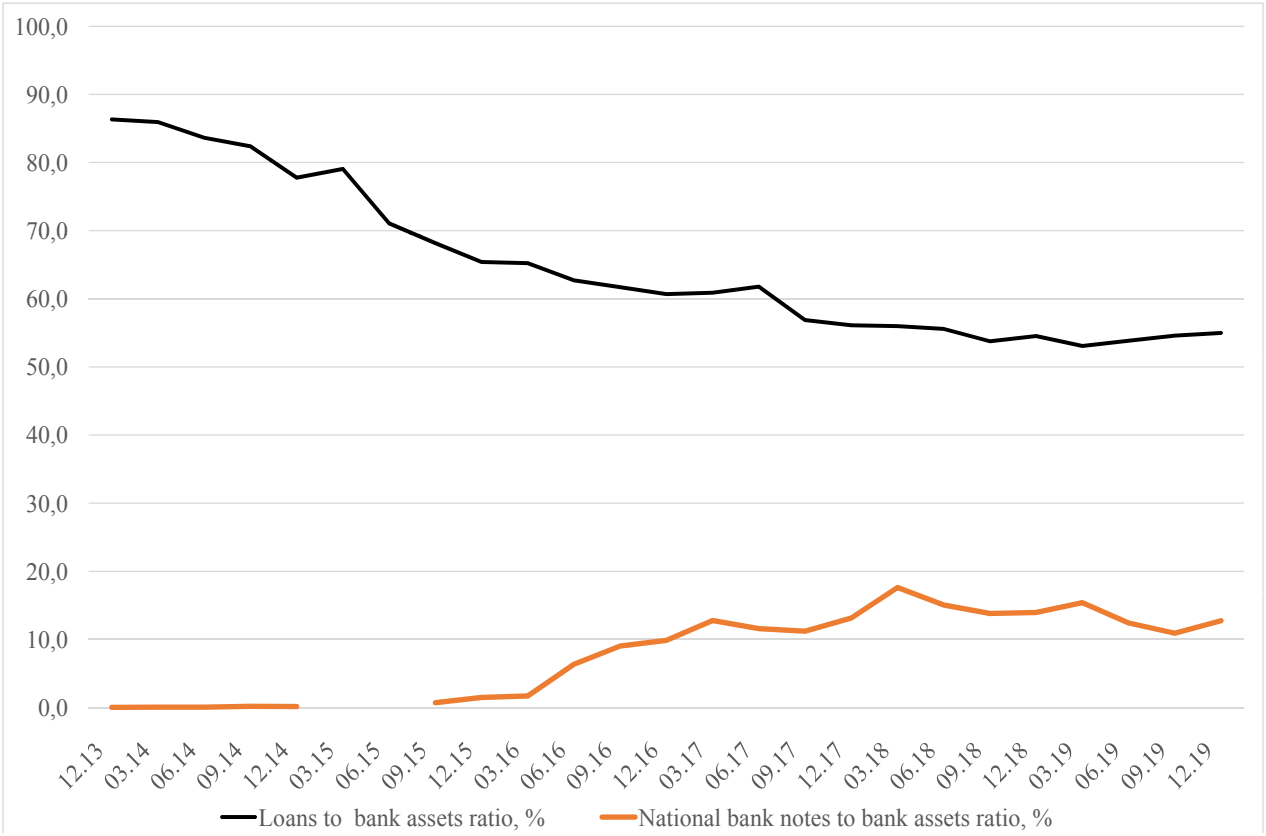

Fig. 6. **Comparative dynamics of the volumes of notes and loans relative to the volumes of banks assets**

Source: National Bank of the Republic of Kazakhstan (information on equity, liabilities and assets for 2014–2020), calculated by the author.

and the growth in the volume of notes of the National Bank in the same period (the maximum was attained in the first quarter of 2018). That is, the relationship between the growth in the issue of notes and the reduction in bank lending to the economy is clear. This relationship is even better illustrated by the dynamics of two ratios — the share of loans in bank assets and the ratio of the volume of notes of the National Bank in circulation and the STB-owned assets during the period of active issue of notes (*Fig. 6*).

The increase in the volume of notes issued was accompanied by a decrease in the share of loans in the banking sector assets, i.e. notes replaced loans in bank assets because they were a much more attractive way to place money. In our opinion, besides the negative impact on the credit market, this phenomenon has a deferred effect on the National Bank profitability, making it maintain a high level of notes in circulation. The issue of these instruments was originally determined by the regulator's situational response to an extraordinary situation and the need to link excess liquidity. However, they became a constant and large component of the assets side of the balance sheet and a systemic factor in the stability of Kazakhstan's financial market. A sharp cessation of their release may lead to an imbalance, especially in the face of a strong reduction in demand for loans amidst an escalation of the global crisis and shocks caused by the coronavirus pandemic. The threat of imbalances in the banking system due to the limited supply of notes by the National Bank will force it to continue issuing and, as a result, incur high interest expenses, which will remain the main item forming a negative financial result.

CONCLUSIONS

Currently, the formation of the financial result of the central bank in developing economies has significant differences from a similar process in the regulators of developed countries, demonstrating the cost analysis of the National Bank of Kazakhstan in recent years. These differences are due to the vulnerability of the banking sector to external shocks, especially in countries with a high role of upstream industries, where product prices are highly volatile, which causes instability, including in national financial systems. The vulnerability of the financial sector is reflected in the specifics of the central bank activities. The experience of Kazakhstan demonstrates that they are forced to provide large-scale support to troubled banks and incur significant costs in the course of this support. They also have to pursue a monetary policy, coupled with an increase in interest expenses, to ensure the banking sector with reliable and liquid assets in order to sterilize excess liquidity and maintain stability in the foreign exchange market and in the financial system as a whole.

Such a policy of central banks may lead to the formation of a negative financial result, including over long periods and in significant volumes, as in the case of Kazakhstan. As a result of the central bank systematic loss-making, the economy faces a number of negative consequences. They include an increase in the country's state debt, part of which is the regulator's debt, a deterioration of the budget process due to the lack of receipt of part of its profit, a decrease in the bank credit activity, etc. These refresh the problem of ensuring central bank profitability, although obtaining a positive financial result is not a priority for these institutions.

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Impact of the Russian Stock Market on Economic Growth*

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ABSTRACT

The article considers the impact of the stock market on the economic growth. The **aim** of the study is to determine the degree of impact of the Russian stock market on gross domestic product, as well as to analyze the significance of various financial instruments in this process. The study suggests three hypotheses: 1) the dynamics of changes in the stock market as a whole has an impact on GDP growth; 2) the growth of the stock market has a positive impact on the change in GDP; 3) the stock market affects the GDP growth more, than that of corporate bonds. To test these hypotheses, the work employs **methods** of economic and mathematical modeling and building a vector autoregressive (VAR) model. The authors used the data from the International Monetary Fund (IMF), Moscow Exchange (MOEX) and Finam Investment Holding for the period from January 2000 to July 2019. As a **result,** they proved that not only traditional macroeconomic and production factors affect the country's GDP growth, but also the positive dynamics of the stock market. The paper revealed that the impact of the growth of stock indices and corporate bonds on the change in gross domestic product would be different. At the same time, a different degree of impact of the stock market on gross domestic product over time. The authors **concluded** that ensuring the growth of stock indices is a condition to achieve stable growth in Russia's GDP. Most of all, the GDP growth depends on the growth of the largest liquid companies trading in the Russian stock market.

Keywords: stock market; RTS index; economic growth; real GDP; stocks; bonds

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INTRODUCTION

After 2014, the Russian economy is going through another crisis. The fall in oil prices, the depreciation of the national currency, the anti-Russian sanctions restricting financial flows and access to foreign financing of the largest Russian companies — all this has a very negative impact on the economic situation in the country. Under these conditions, searching for sources of sustainable economic growth, stabilizing macroeconomic indicators, as well as improving the living standards of the population are priority. Traditional economic growth factors are considered factors of domestic production and everything related to it (labor productivity, level of development of technologies and innovations, human capital), as well as general macroeconomic factors that, in the era of globalization, affect the development of each individual economy (currency exchange, resource prices, volumes of foreign economic activity). However, some researchers consider separately or in addition to traditional factors specific indicators that may affect the economic growth of the country as a whole. These include environmental situation, financial market development level, healthcare system, etc. Since the Russian stock market is a developing one, i.e. has the potential for development, the study of the relationship between the state of the stock market and economic growth is of scientific interest.

LITERATURE REVIEW AND SUBSTANTIATION OF THE HYPOTHESIS

We can conveniently classify the studies devoted to economic growth factors into two large groups: the study of traditional macroeconomic factors affecting economic growth, and the study of specific factors.

The first group pays much attention to the production development (level of technological development, labor productivity, etc.).

S. Acikgoz and M. S. Ben Ali identify economic growth factors using the example of the Middle East and North African countries [1]. The authors analyze the sources of economic growth in three main areas: technological progress, human capital and investment capital. The results showed that in most countries technological progress and the overall level of production contribute more to economic growth. In turn, human capital had the least impact on economic growth. The countries not involved in oil production are experiencing a serious shortage of financial resources and must increase their savings and labor productivity to ensure economic growth.

K. Nakamura, S. Kaihatsu and T. Yagi [2] made similar conclusions after they examined the background of recent Japan's low labour productivity growth and issues regarding Japan's sustainable growth. The authors conclude that there are two reasons behind the slowdown in labor productivity: inefficient use of existing technologies and R&D results. They emphasize that to ensure sustainable economic growth, it is necessary to improve labor productivity and efficiency in the labor and capital markets.

As part of a more focused study, L. F. Gabriel and L.C. de Santana Ribeiro established in which sector value added has a greater impact on economic growth in developing coun-

tries: raw materials, manufacturing or services [3]. The authors found that manufacturing is the strategic key sector in terms of driving economic growth for most developing countries.

Modern studies provide the main provisions of the theory of production factors, thus, proving that economic growth directly depends on production level, technological development and labor productivity. O. S. Sukharev and E. N. Voronchikhina noted that considering country specifics, as well as industrial development level, are necessary to identify economic growth factors [4].

The authors in the second group of studies identify diverse approaches to this issue and indicate various specific factors that affect economic growth. R. P. Pradhan, M. B. Arvin and S. Bahmani using the Granger causality test investigate the interactions between innovation, financial development and economic growth [5]. Innovation is measured using a composite index calculated based on the number of patents granted, research and development costs, and the share of high-tech exports in GDP. Financial development is assessed through composite indices of the banking sector, stock market and other financial markets. As a result, the authors found that all the studied indicators mutually influence each other.

P. Procházka, K. Čermáková analyzed the impacts of selected institutional factors on economic growth [6]. The authors consider Open Market category — one of the four groups of indicators included in the Index of Economic Freedom (IEF) presented by the Heritage Foundation. The study employs the correlation analysis to test the connection between GDP and trade openness, measured by the value of customs tariffs; investment freedom, measured by the volume of foreign direct investment; Doing business index; R&D expenditures. The study revealed the closest connection between GDP and R&D expenditures. At the same time, customs tariffs and FDI flows do not significantly affect economic growth.

Special mention should go to the works analyzing the dependence of GDP on the financial sector. K. K. Makun considers the regression dependence of GDP on three factors — imports, remittances and foreign direct investment — in the Fiji economy [7]. All factors turned out to be significant, however, imports have a negative impact on economic growth in the long term, and remittances and foreign direct investment positively influence economic growth both in the long run and the short run. The authors of works [8–9] come to similar conclusions about the impact of foreign direct investment, as well as the development level of the financial sector on economic growth. Among the parameters of the financial sector development, they most often analyze inflation level, volume of bank loans and market capitalization.

Many works examine the dependence of stock market development and economic growth on the example of various countries, including Belgium [10], Portugal [11], African countries [12], OPEC countries [13], China [14]. The results of these studies are contradictory. However, most of them prove a direct correlation between stock market development and economic growth, since companies that operate efficiently within the country are attractive both for internal and external investors. The negative impact of the stock market on economic growth is noted in the presence of factors characterizing the inefficient functioning of the market, in particular corruption and financial bubbles.

Therefore, economic growth depends on two sets of variables — traditional macroeconomic (general factors) and specific factors. We focus on the impact of specific factors such as the state of the stock market, characterized through the main stock indices. Thus, we will analyse the following hypotheses:

Hypothesis 1: **changes in the state of the stock market as a whole affects GDP growth.**

Since the Russian stock market is developing and less prone to financial bubbles [14],

the development of the stock market (positive dynamics of the RTS index) will stimulate economic growth [10, 12].

Hypothesis 2: **stock market growth has a positive effect on the change in GDP.**

Stock market development can be estimated by the MOEX index — a vector of sustainable development, whose calculation base includes shares of companies showing the best dynamics of sustainable development and corporate social responsibility, i.e. the most investment attractive. The increase in investment attractiveness, expressed through the growth of the index, will contribute to economic growth [11].

Hypothesis 3: **GDP growth is affected more by the stock market than by the corporate bond market.**

The stock market in Russia is more developed than the corporate bond market; thus, stock trading has a greater impact on economic growth.

METHODOLOGY AND EMPIRICAL BASE

We tested these hypotheses with a vector autoregression (VAR) model, widely used to make forecasts of macroeconomic indicators. For modeling, we selected traditional macroeconomic variables (a similar set of variables as in [15–17]) and specific factors reflecting the state of the stock market.

The macroeconomic variables include:

- consumer price index;
- industrial production index;
- oil price in the world market;
- USD to RUB exchange rate;
- unemployment rate;
- monetary aggregate M2.

The specific variables include:

- RTS index;
- MOEX index of the ten most liquid companies;
- corporate bond index.

We used the monthly benchmarks from the official databases of the International Monetary Fund (IMF), Moscow Exchange (MOEX), and Finam Investment Holding for the period from January 2000 to July 2019.

Table 1 provides the description of variables used for modeling with the index and the notes to the calculation method.

RESULTS

Initially, we analyzed the dynamics of changes (*Fig. 1*) in the analyzed indicators to test the hypotheses.

Some benchmark macroeconomic variables shows seasonality at visual analysis. Therefore, to eliminate its influence, we made an adjustment using the generally accepted X-13ARIMA-SEATS methodology. Seasonality was removed for the following variables: real GDP, industrial production index, unemployment rate, monetary aggregate M2, consumer price index. *Fig. 2* shows the dynamics of the adjusted time series of the analyzed variables.

Hypothesis test results:

Hypothesis 1

We check whether the RTS index affects GDP and add only EX_RTS to the control variables. Data sampling for the period from December 2002 to September 2018 (190 observations).

Fig. 3 shows GDP impulse response function to one-unit shock of variables (one dispersion amplitude) indicated in the heading of the graphs, with a 95% confidence interval and a period of 12 months in advance.

Table 2 and *Fig. 3* show the positive shock of the RTS index leads to a stable and statistically significant growth (response) of real GDP at a 5% level over the next 12 months. At the same time, the contribution to the dispersion of GDP in 1 month is 2.1%, and in 6 months is already 9.3%. The maximum contribution takes place in 9 months after the shock and amounts to 11.1%, followed by a decline in influence. Thus, the positive dynamics of the Russian stock market stimulates economic growth and leads to an increase in real GDP (hypothesis 1 was substantiated). The RTS index reflects the state of the stock market as a whole, while the index growth reflects an increase in the total

Table 1

Variables used for modeling

Index	Name	Notes to the calculation method
GDPR	Real GDP, trillion roubles	Nominal GDP in 2010 prices (converted by the GDP deflator) and seasonally adjusted
ER	USD to RUB exchange rate	Monthly average
IPI	Industrial production index	2010 seasonally adjusted index
UR	Unemployment rate,%	Seasonally adjusted unemployment rate
M2	Monetary aggregate M2, trillion roubles	"Broad Money" seasonally adjusted
CPI	Consumer price index	2010 seasonally adjusted index
OIL	Oil price (Brent), RUB/barrel	USD to RUB converted at the corresponding average monthly exchange rate
EX_RTS	RTS index	
EX_LIQ	MOEX index of the ten most liquid companies	
EX_CBI	Corporate bond index	

Source: compiled by the authors.

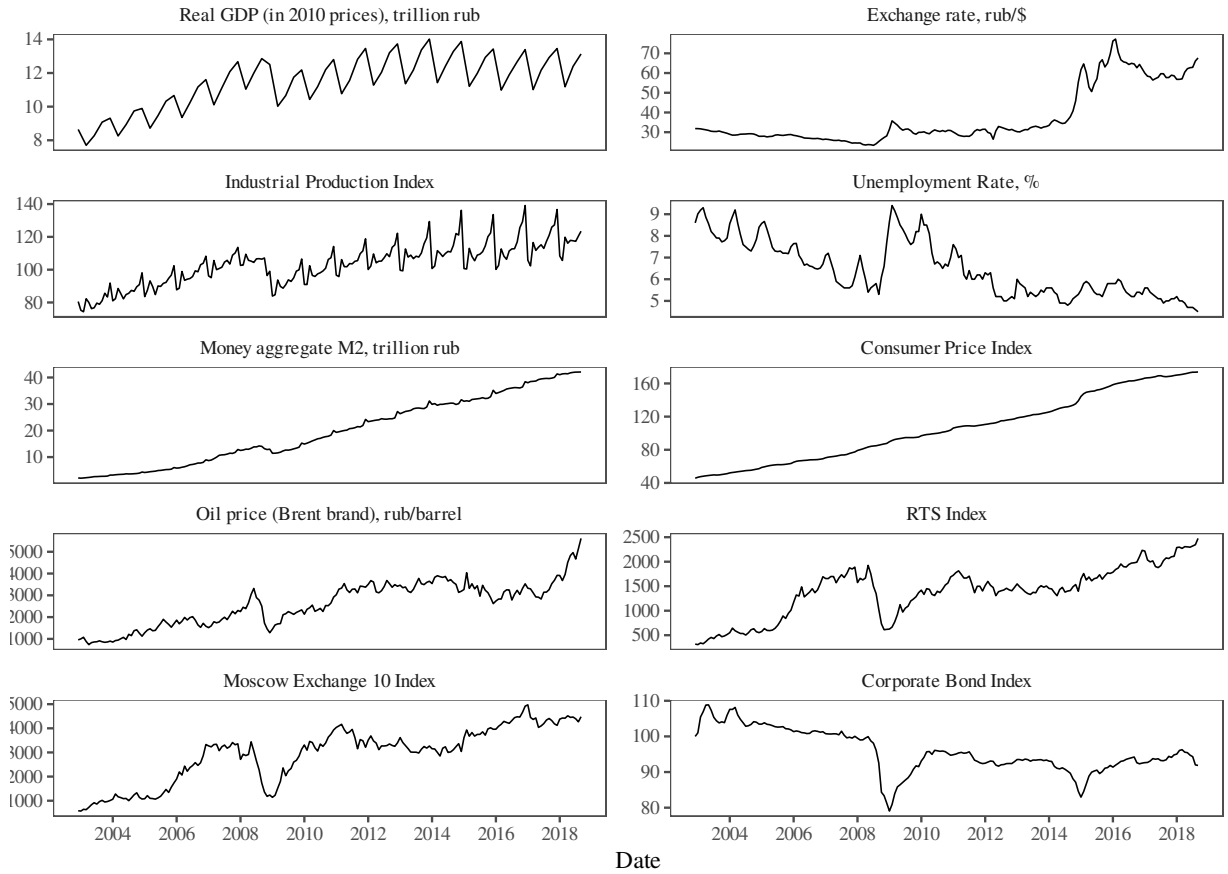

Fig. 1. **Dynamics of changes in the analyzed variables**

Source: compiled by the authors.

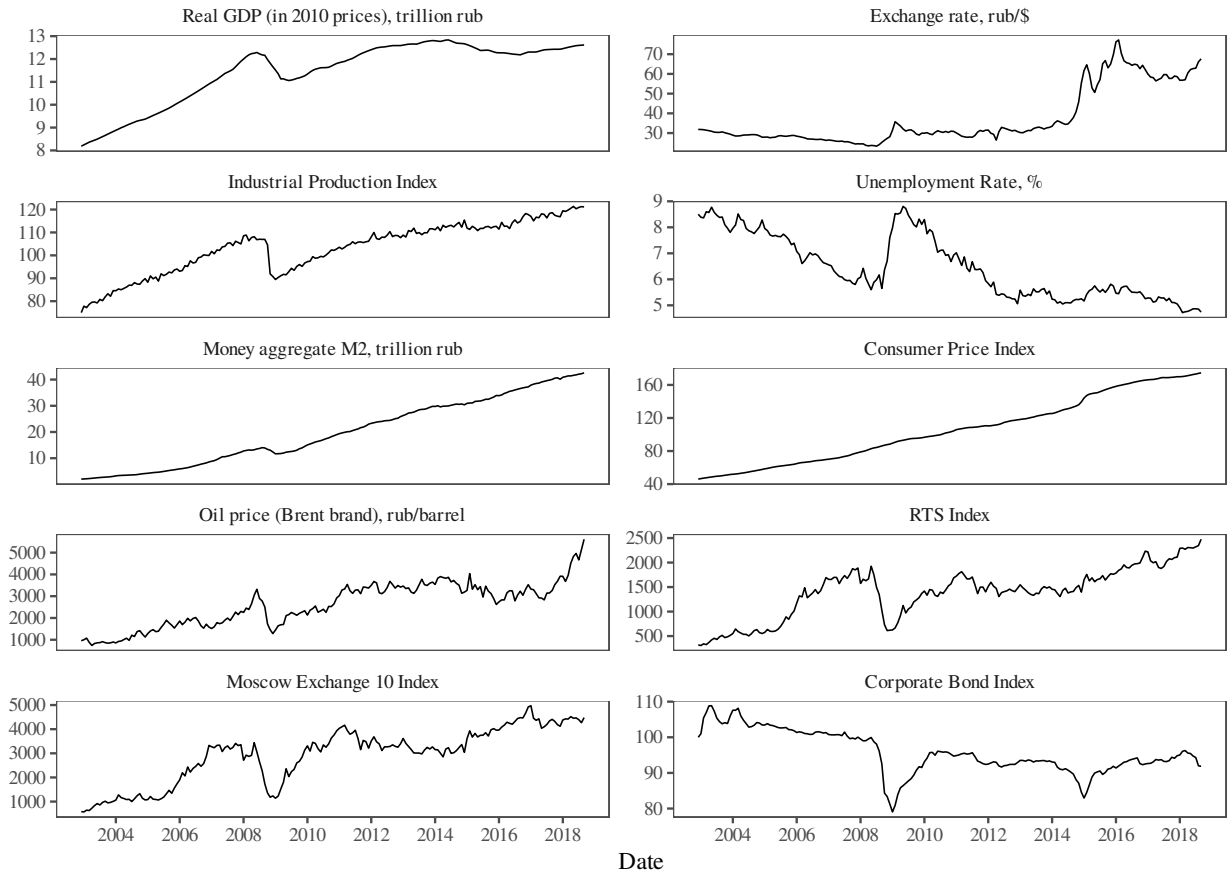

Fig. 2. **Dynamics of changes adjusted for the seasonality of the analyzed variables**

Source: compiled by the authors.

Table 2

Variance decomposition for 12 months in advance, % (hypothesis 1)

Month	GDPR	ER	IPI	UR	M2	CPI	OIL	EX_RTS
1	91.4	0.2	1.3	0.3	4.6	0.0	0.0	2.1
2	86.9	0.2	2.3	0.5	7.5	0.1	0.0	2.5
3	79.7	0.2	2.7	0.9	12.9	0.2	0.2	3.1
4	72.4	0.2	4.4	1.0	16.2	0.3	0.3	5.2
5	66.0	0.6	4.1	1.4	20.3	0.2	0.5	7.0
6	57.5	1.1	3.5	1.4	26.4	0.2	0.7	9.3
7	50.7	1.5	3.1	1.8	30.7	0.3	1.4	10.5
8	43.0	1.4	2.6	2.9	36.0	0.4	3.0	10.6
9	35.3	1.5	2.1	4.1	40.6	0.7	4.6	11.1
10	28.4	1.6	1.6	5.0	45.0	1.5	6.2	10.6
11	22.5	1.7	1.3	5.4	47.6	2.2	9.1	10.2
12	18.1	1.8	1.1	5.3	47.8	2.7	13.2	9.9

Source: calculated by the authors.

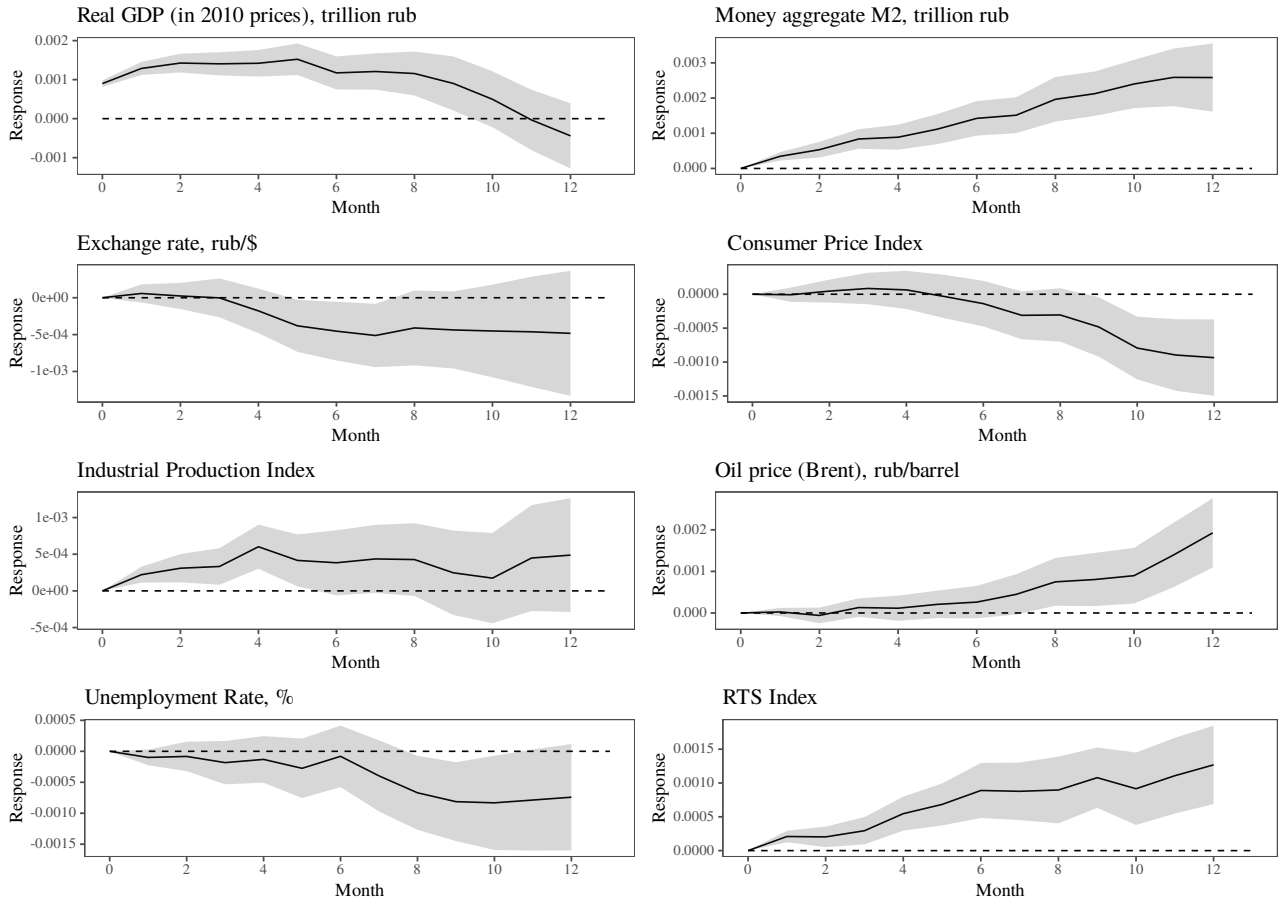

Fig. 3. **GDP impulse response function to one-unit shock of variables (hypothesis 1)**

Source: compiled by the authors.

Table 3

Variance decomposition for 12 months in advance,% (hypothesis 2)

Month	GDPR	ER	IPI	UR	M2	CPI	OIL	EX_LIQ
1	92.3	0.2	1.4	0.5	3.9	0.0	0.1	1.7
2	88.0	0.1	2.4	0.6	6.7	0.1	0.0	2.0
3	81.3	0.1	2.9	1.1	11.4	0.1	0.4	2.6
4	73.9	0.2	4.7	1.3	14.1	0.1	0.6	5.1
5	67.3	0.7	4.3	1.7	17.2	0.1	1.0	7.6
6	59.2	1.3	3.8	1.5	21.8	0.2	1.6	10.6
7	52.5	1.8	3.3	1.7	24.7	0.6	2.7	12.6
8	45.3	1.8	2.7	2.4	28.4	1.0	5.2	13.2
9	38.0	1.9	2.1	3.2	31.3	1.6	7.4	14.4
10	31.3	2.3	1.8	3.9	33.7	2.8	9.7	14.6
11	25.0	2.6	1.4	4.0	34.6	3.9	13.5	15.0
12	20.1	2.9	1.1	3.7	33.4	4.7	18.6	15.5

Source: calculated by the authors.

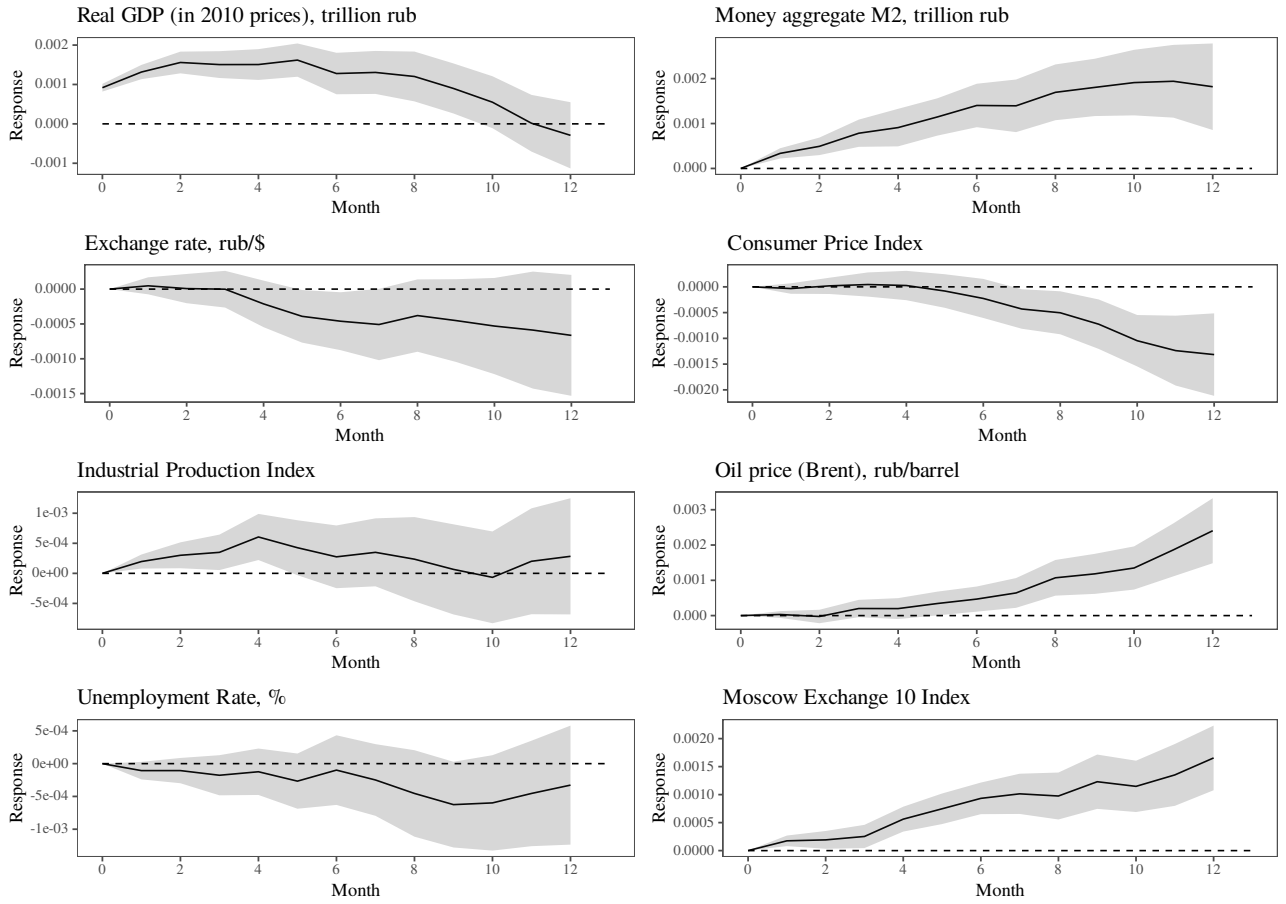

Fig. 4. **GDP impulse response function to one-unit shock of variables (hypothesis 2)**

Source: compiled by the authors.

capitalization of domestic issuers and investor interest in the Russian market.

Based on the impact of the stock market dynamics on real GDP established and confirmed by empirical analysis, we can conclude that ensuring economic growth requires measures on stimulating stock market development, however, the maximum contribution of this impact will only be observed in 9 months.

Hypothesis 2

We check whether the MOEX index of the ten most liquid companies affects GDP and add only EX_LIQ to the control variables. Data sampling for the period from December 2002 to September 2018 (190 observations).

Fig. 4 shows GDP impulse response function to one-unit shock of variables (one dispersion amplitude) indicated in the heading of the graphs, with a 95% confidence interval and a period of 12 months in advance.

Table 3 and *Fig. 4* show that the positive shock of the MOEX index of the ten most liquid companies leads to a steady and statistically significant 5% increase in real GDP over the next 12 months. The contribution to the dispersion of GDP in 1 month is 1.7%, and in 6 months -is already 10.6%. The maximum contribution takes place in 12 months after the shock and amounts to 15.5%. Thus, the growth of quotations of the ten most liquid companies has a positive effect on GDP growth.

Compared to the test results of the previous hypothesis, we revealed a stronger impact, i.e. GDP depends on the most liquid, rapidly developing and efficiently functioning domestic companies more, than on the general state of the stock market as a whole.

Table 4

Variance decomposition for 12 months in advance,% (hypothesis 3)

Month	GDPR	ER	IPI	UR	M2	CPI	OIL	EX_RTS	EX_CBI
1	90.6	0.0	2.1	0.0	4.6	0.1	0.3	2.3	0.1
2	87.5	0.3	2.8	0.1	5.8	0.1	0.3	3.0	0.1
3	81.4	0.8	2.8	0.1	9.5	0.0	0.8	4.4	0.2
4	72.1	2.7	4.3	0.3	10.7	0.0	1.0	7.7	1.2
5	60.4	6.2	4.4	0.4	12.3	0.1	1.4	10.2	4.7
6	47.6	10.1	4.0	1.0	15.9	0.6	2.5	12.8	5.5
7	37.9	14.3	4.3	0.9	17.7	1.9	3.9	14.4	4.8
8	29.7	15.5	4.1	0.8	21.2	3.2	6.7	14.9	3.9
9	23.6	16.2	3.4	0.8	23.3	4.8	8.9	15.8	3.2
10	20.2	16.5	2.8	0.7	24.7	7.0	11.0	14.6	2.6
11	18.7	15.7	2.5	0.6	24.3	8.9	14.0	13.3	2.0
12	18.7	15.0	2.5	0.4	22.6	9.8	16.8	12.4	1.7

Source: calculated by the authors.

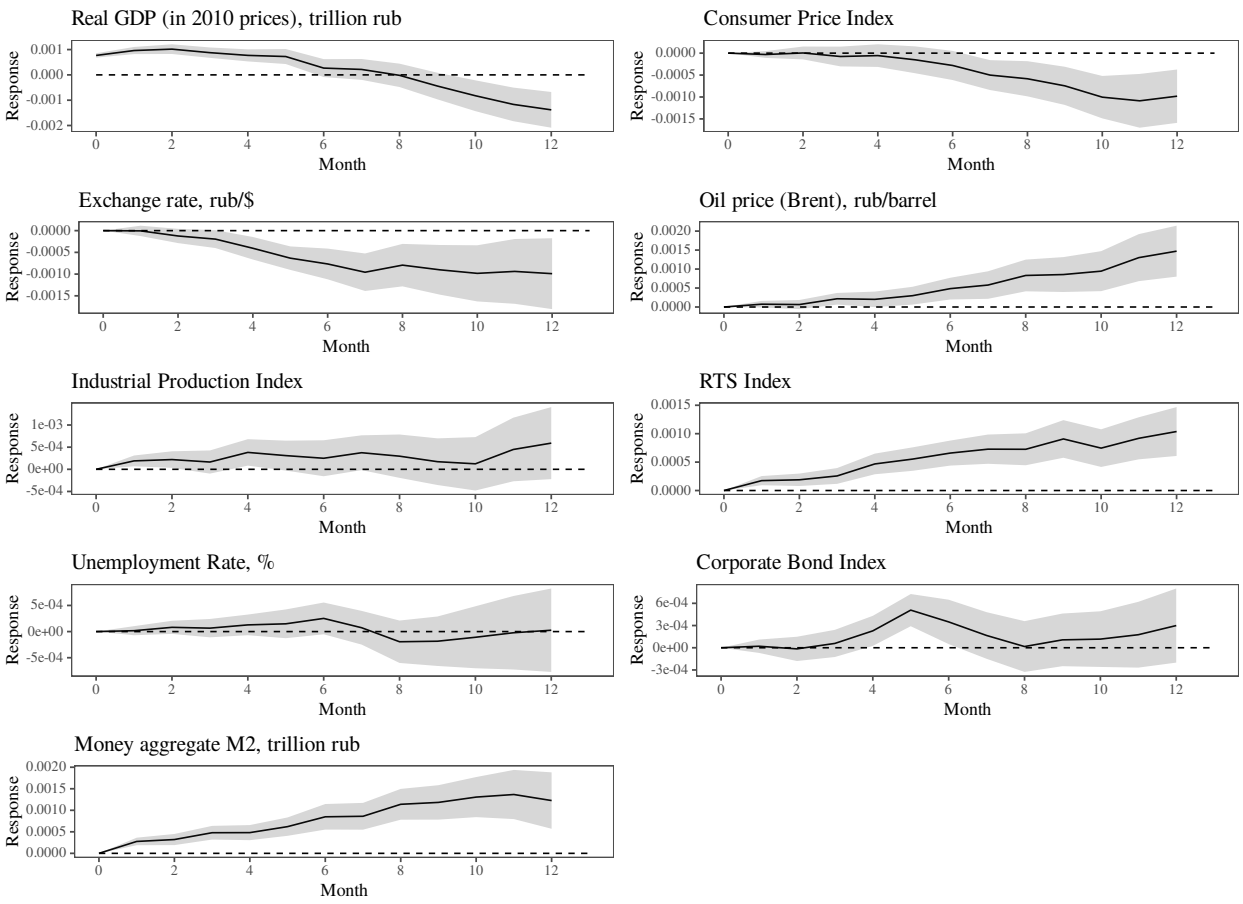

Fig. 5. **GDP impulse response function to one-unit shock of variables (hypothesis 3)**

Source: compiled by the authors.

Besides, the impact of the MOEX index of the ten most liquid companies is constantly increasing over the entire period of 12 months. It follows that the growth of capitalization of the most liquid issuers has a positive effect on GDP and leads to sustainable economic growth. Hypothesis 2 is substantiated.

Hypothesis 3

We check what affects GDP more: the RTS index or the corporate bond index. We add two corresponding variables EX_RTS and EX_CBI to the control variables. Data sampling for the period from December 2002 to September 2018 (190 observations).

Fig. 5 shows GDP impulse response function to one-unit shock of variables (one dispersion amplitude) indicated in the heading of the graphs, with a 95% confidence interval and a period of 12 months in advance.

Table 4 and *Fig. 5* show that the positive shock of the RTS index leads to a steady and statistically significant 5% increase in real GDP over the next 12 months. The contribution to the dispersion of GDP in 1 month is 2.3%, and in 6 months — is already 12.8%. The maximum contribution takes place in 9 months after the shock of the RTS index and amounts to 15.8%, followed by a decline. First, the response of real GDP to the shock of the corporate bond index occurs with a significant delay (the first statistically significant value of the response is observed in 4 months). Second, it is only seen in 3 months (from the 7th month the response is not significant at 5% level). In the indicated months, the contribution of the RTS index to the dispersion of real GDP systematically exceeds the contribution of the corporate bonds index (7.7% vs. 1.2% in 4 months, 10.2% vs. 4.7% in 5 months, and 12.8% vs. 5.5% in 6

months). Thus, we can conclude that real GDP is more affected by the stock market than by the corporate bond market. Hypothesis 3 is substantiated. In Russia, the corporate bond market is less developed than the stock market (significantly less capitalization and fewer companies of issuers). Given that the empirical analysis showed an insignificant contribution (maximum value of 5.5%) of corporate bond dynamics to the change in real GDP, as well as an extremely short period when this contribution is observed (3 months out of 12), it follows that today the corporate bond market is not a tool to stimulate economic growth. Investors prefer to invest in equity rather than debt securities, which may be associated with a high country risk due to the sanctions and the economic situation of Russia. Therefore, in terms of stimulating sustainable economic growth, it is necessary to increase the investment attractiveness of domestic issuers, with an emphasis on the stock market (to stimulate an IPO, etc.).

CONCLUSIONS

Based on testing three hypotheses, we revealed that the state of the stock market, reflected in the dynamics of changes in various stock indices, has a significant impact on economic growth. Since the capitalization growth of Russian companies reflects their efficiency, as well as investment attractiveness and trust of external investors, stock market development ensures the attraction of additional investments into the country's economy, which, in turn, is a factor for achieving economic growth. These conclusions are similar to those in studies [10–12], which, together with the results of economic and mathematical modeling, helps us conclude that ensuring the growth of stock indices is a condition for achieving stable growth in Russia's GDP.

Based on the analysis results, we found out that the greatest increase in GDP depends on the growth of the largest liquid companies trading on the Russian stock market. Unlike the general RTS index, the MOEX index of the ten most liquid companies shows a constant increase in the impact on GDP over a period of 12 months. Therefore, trade dynamism characterizes the positive mood of investors and encourages them to invest in Russian companies, which, in turn, has a positive effect on economic growth. The most liquid companies are characterized by high management efficiency, and that is why they are strategically important objects that allow for economic growth.

Moreover, we managed to reveal a possible unrealized potential of the Russian corporate bond market. Currently, the corporate bond market in Russia is less developed than the stock market, which is the least conducive to economic growth. However, a significant impact of this indicator was noted in a limited period of time that indicates the possibility of a positive effect for the economy through the development of this financial instrument.

In the era of globalization and the development of the international financial market, countries receive additional opportunities to stimulate economic growth through stock market mechanisms. Ensuring conditions for investment attractiveness and stable development of domestic issuers is one of the most important tasks of foreign and domestic policy aimed at achieving sustainable economic growth.

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Afanas'ev D.O. — introduction, research results, conclusions.

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ORIGINAL PAPER

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Impact of Intellectual Capital, Profitability and Dividend on Market Capitalization

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ABSTRACT

The **aim** of the study was to find out how strong the impact of intellectual capital, profitability and dividends is on the market capitalization of companies listed on the Indonesia Stock Exchange (IDX) and included in the LQ45 index from 2014 to 2018. The authors employ the multiple linear regression **method**. They measure the value of intellectual capital by the value added intellectual coefficient (VAIC ™), and the profitability — by return on assets (ROA) and return on equity (ROE). To calculate a dividend per share (DPS), they divide the annual dividend by the number of outstanding shares. The **results** of this study show that intellectual capital and return on assets (ROA) do not significantly affect the company's market capitalization, while return on equity (ROE) and dividends do. The authors **conclude** that by the level of efficiency and effectiveness of the company in capital management, one may see whether investors receive higher profits. Therefore, investors are more interested in companies that have a high level of dividend distribution.

Keyword: intellectual capital; return on asset; return on equity; dividend; market capitalization

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INTRODUCTION

In addition to the trend of the movement of the composite stock price index, an investor usually makes investment decisions on the development of market capitalization. Therefore, the market capitalization is an indicator describing the development of the stock market. Market capitalization is a synonym of the market value [1]. Investors who invest in the Indonesia Stock Exchange (IDX), in addition to considering the fundamental conditions and business prospects of one issuer, also take into account the development of the capitalization value of the relevant shares. The capitalization value per individual share determines the market capitalization value of one share. Thus, the market capitalization is an illustration of the market value of one company while it also reflects the market value of one share [2].

"Intellectual capital (IC) is a group of knowledge assets owned or controlled by organization which significantly impact value creation mechanisms for the organization stakeholder" [3]. "Intellectual capital will include all the processes and assets which are not normally shown on the balance sheet, as well as the intangible assets which modern accounting methods consider (mainly trademarks, patent and brands)" [4]. Intellectual capital is defined as "knowledge, intellectual material, information, experience and intellectual property that can be put to use to create wealth" by developing competitive advantage in an organization. When intellectual material is formalized and utilized effectively, it can create wealth by producing a higher value asset, called intellectual capital.

Intellectual capital is measured using the VAIC™ method. VAIC™ is sum of all HCE, SCE, and CEE ratios in the form of percentage units. HCE is a human capital efficiency in the company. Then, HC is the total salaries and wages of the company. Value Added (VA) is the difference between the input and output. The input is the total cost incurred, and the output is the total income. Moreover, SCE is the structural capital efficiency of the company. Structural Capital (SC) is the difference between VA and HC. Next, CEE is the Capital Employed Efficiency of the company. Capital Employed (CE) is the net book value of a company from its net assets [4]. The equations are as follows:

$$HCE = \frac{VA}{HC} \ (1); \ SCE = \frac{SC}{VA} \ (2); \ CEE = \frac{VA}{CE} \ (3).$$

So, the VAIC™ value is

$$VAIC™ = HCE + SCE + CEE.$$

In paragraph 9, PSAK 19 Aset Tak Berwujud, 2015, it is stated that intangible assets are non-monetary assets that are identified without physical form and are owned to be used in producing or delivering goods or services, leased to other parties or for administrative purposes and have economic benefits in the future. Intellectual Capital is a source of competitive advantage that can add value to the output of knowledge-based companies. Strong Intellectual Capital performance can lead to maximization of stakeholder wealth. The success of a company in achieving company goals can be seen by measuring its performance. Performance measurement is needed as information for internal and external parties to make decisions [5].

Intellectual Capital affects the company's financial performance. Companies that have human capital with the ability, competence and high commitment will increase productivity and efficiency, which in general will increase company profits. The research by Puspita Sari & Srimindarti [6] shows factors that influence intellectual capital disclosure. Of the five factors examined — company size, company age, leverage, profitability and independent commissioners — it was found that company size and company profitability affected intellectual capital disclosure and intellectual capital disclosure affected market capitalization [7].

M. Almumani conducted a research to find out whether profitability affects market capitalization in commercial banks registered in Jordan [8]. The data used is data from the stock exchange in the period of 2010–2016. This study looks at the relationship of market capitalization with the variables ROE, ROA, EPS, PER, and DPR. The findings after the regression analysis show that ROE and DPR have the most significant relationship, while other variables such as ROA, EPS and PER do not have a significant relationship. Therefore, it is concluded that the return on equity and dividend payout ratios are the main determinants of market capitalization of the commercial banks registered in Jordan. M. Quraishi & M. Zahoor conducted a study to investigate the impact of profitability on the market capitalization of the Middle Eastern banks [9]. The result of the multiple regression has shown that no relationship was observed between market capitalization and the ROA, ROE in the Middle Eastern banks.

LITERATURE REVIEW

Stakeholder Theory

The stakeholder theory states that all stakeholders have the right to receive information about the

company activities that affect them (such as pollution, social movements and the company's efforts to work safety). These stakeholders may choose not to use the information and also they cannot directly play a role in building the company's business sustainability [10]. The stakeholder theory emphasizes organizational accountability far beyond simple financial or economic performance.

B. Kamath explains that the main objective of the stakeholder theory is to help the company's managers understand their environment and manage the relationships within their corporate environment more effectively [11]. However, the broader goal of the stakeholder theory is to help corporate managers increase the value of the impact of their activities and minimize stakeholders' losses. In fact, the whole point of the stakeholder theory is in what happens when corporations and stakeholders have their relationships. On a moral level, the stakeholder theory emphasizes that all stakeholders have the right to be treated fairly by the company and that the issue of the stakeholder power is not directly relevant [10].

This theory views the company not as a mechanism to increase the financial benefits of stakeholders or as a vehicle to coordinate the interests of stakeholders, but sees that management has a fiduciary relationship (pawn) not only with some stakeholders, but with all stakeholders. The normative approach to the stakeholder theory is that management must give balanced consideration to the interests of all stakeholders. If stakeholders have different perceptions, it creates a conflict of interest; managers must run the company properly to achieve the optimal balance between them.

PREVIOUS RESEARCH

Conducted in the period of 2008–2017 in Italian listed companies, the research by P. Pavone examines the effect of several independent variables, such as ROE and ROA, on market capitalization [12]. It reveals that market capitalization is negatively related to ROA, ROE and earnings yield.

The results of the research conducted by G. Virgiawan on the Indonesian stock Exchange (IDX) stated that partial intellectual capital has a positive effect on the market capitalization [13]. The research by A. Permatasari and A. Rohman conducted on the Indonesia Stock Exchange (IDX) using multiple regression analysis revealed that the disclosure of intellectual capital has a significant effect on market capitalization [14]. The research by A. Sudibyo and B. Basuki in the Indonesia Stock Exchange (IDX) proved that the company size, industry type and market capitalization are significantly related to Intellectual Capital Disclosure [15]. Furthermore, it was revealed that there was practically no significant difference in intellectual capital disclosure between companies with high profile and low profile.

The research by D. Prabowo and A. Purwanto in the Indonesia Stock Exchange (IDX) revealed that the company size and company profitability affected intellectual capital disclosure, and intellectual capital disclosure affected market capitalization [7]. The research by E. Rachmi and D. Ardiyanto conducted in the Indonesia Stock Exchange (IDX) shows that intellectual capital disclosure has a positive influence on market capitalization in manufacturing companies listed on the Indonesia Stock Exchange in the 2008 and 2012 periods [16].

The research by G. Gigante conducted in the selected European countries (Czech Republic, Denmark, Finland, Germany, Italy, Norway, Poland, Spain, Sweden) during the 2004–2007 proved that the VAIC method is a practical way to conduct research [17]. In the short term, a correlation between intellectual capital and market value was not found; however, a correlation was found between intellectual capital and the financial performance of some companies. Modern theory defines business activity as added value and wealth. Creating added value and wealth requires income and, as such, improving relationships with customers and the realization that the tangible form of value creation (income, added value) should also be associated with intangible forms of value creation in the long run (increasing time and communication efficiency, effective relationships, building and maintaining a good reputation). The key to a company's success is in creating a causal relationship between these two forms of value creation. It can be argued that one of the main challenges for managers is the creation of conditions that enable the successful generation of intangible values (knowledge, services, experience, benefits, speed, quality, and image) and the subsequent transformation into tangible value (income, profit, added value, shares and market value).

M. Mudliar's research conducted in the BSE-100 listed companies from Mumbai Stock Exchange in 2008–2010 revealed a significant correlation between intellectual capital disclosure and market capitalization value [18]. Analysis of the frequency of disclosure of intellectual capital components and their categories shows evidence of significant disclosure variations between companies within the sector and between sectors. O. Abraham and A. Ofusu examined the impact of intellectual capital on market capitali-

zation in the companies registered in Ghana [19]. In this study, all variables, except leverage, are positively correlated with MCAP. This finding also shows that after considering age, net income, and leverage, human capital, structural capital and relational capital are positively related to MCAP. Age and net income are positively related to MCAP, while leverage negatively affects MCAP. In combination with the three intellectual components (i.e. human, structural and relational), intellectual capital disclosure was also found to be significantly positively related to market capitalization.

The study by H. Prasad and K. Shrimal conducted in India, shows positive relationship between financial performance and market capitalization [20]. The company size is closely related to market capitalization. The impact of variables, such as advertising, research and development, dividends and intellectual capital, on market capitalization has been convincingly proven by many researchers. Customer equity-based strategies can reliably predict market capitalization.

HYPOTHESIS DEVELOPMENT

Impact of Intellectual Capital, Profitability and Dividend on Market Capitalization

IC has been recognized as a critical resource for business success in the modern economy. However, in the current accounting regime most business investments make ICs recorded as costs independent of future profit potential. Intellectual Capital is positively related to financial performance and is a key driver in the formation of market capitalization.

H1: Intellectual capital has a positive impact on capitalization

Return on assets (ROA) is an indicator of how profitable a company is relative to its total assets. ROA gives a manager, investor, or analyst an idea as to how efficient a company's management is at using its assets to generate earnings. Return on assets is displayed as a percentage. Some analytic studies have highlighted the close relationship between company performance and market capitalization.

H2: ROA has a positive impact on market capitalization

High ROE will produce high stock prices, and activities aimed at increasing ROE will increase market capitalization. It is also that attracts investors' attention to the company.

H3: ROE has a positive impact on market capitalization

Dividends and earnings are two important announcements in the financial information that investors use to make decisions regarding buying or selling company shares. Shareholder's earnings are the factors affecting dividend policy: the higher is the profit, the higher the dividend and the company's stock prices are.

H4: Dividends have a positive impact on market capitalization

RESEARCH METHOD

The data used is secondary data collected by data collection agencies and available to the public in the form of the annual report for 2014–2018 of the companies included in the LQ45 index of the Indonesia Stock Exchange (IDX).

This research employs multiple regression analysis to measure the power of two or more variables and to show the direction of the relationship between the dependent variable and the independent variable. The formula of multiple linear regression (multiple linear regressions) is as follows.

Equations:

$$MC = a + \beta SQRTIC + \beta SQRTROA + \\ + \beta SQRTROE + \beta SQRTDiv$$

MC: Market Capitalization
a : Variable Constants
β : Variable Coefficient
IC: Intellectual Capital
ROA: Return on Assets
ROE: Return on Equity
Div: Dividend.

RESULT AND DISCUSSION

One of the main indexes in the Indonesia Stock Exchange (IDX) is LQ45. LQ45 is an index that groups 45 companies that have high liquidity and the biggest capitalization followed by good corporate fundamentals.

Companies listed in the LQ45 index include companies engaged in various sectors. For example (*Table 1*).

The number of companies consistently indexed by LQ45 is 26. The sample was chosen based on purposive sampling with predetermined criteria. In the period of 2014–2018, the number of the research objects is 130 (firm x year) which is expected to represent the research population.

Descriptive statistics has to provide the description of the data under study. This study uses intellectual capital, return on assets, return on equity and dividends as independent variables and market capitalization as a dependent variable. The data are

Table 1

Company Name	Type of Company
PT. Indofood Sukses Makmur	Production of food and beverages
PT. Adaro Energy	Coal mining
PT. Bank Mandiri	Banking sector
PT. Unilever Indonesia	Cosmetics and household needs
PT. Lippo Karawaci	Property and housing sector
PT Waskita Karya	Construction

Source: compiled by the authors.

Table 2

Descriptive Statistics

	No.	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
IC	130	2.469	604.142	26.06818	81.321570
ROA	130	1.410	62.000	9.11631	8.725812
ROE	130	2.870	161.000	36.37031	185.663304
Dividend	130	.000	2600.00	242.6643	438.32186
MC	130	16124.00	447 551 984.00	102 294 852.5	119 504 654.2
Valid N (list wise)	130				

Source: compiled by the authors.

presented in the form of minimum value, maximum value and average value. The results of the descriptive statistics of the variables are as follows (*Table 2*).

The descriptive statistics shows that the value of intellectual capital in companies indexed in LQ45 in 2014–2018 for 130 observations ranged from 2.469 to 604.142, with the minimum value of 2.469 at PT Indofood Sukses Makmur Tbk in 2018 and the maximum value of 604.142 at PT Adaro Energy Tbk in 2017. The average intellectual capital value out of 130 observations was 26.068.

According to the descriptive statistics, the value of return on assets ranges from 1.41% to 62%, with the lowest value of ROA at Bank Mandiri in 2016 and the highest value at PT Unilever Indonesia Tbk in 2018. The average ROA of 130 observations is 9.116%. According to the descriptive statistics, ROE value ranges from 2.87% to 161%, with the lowest value of ROE at PT Lippo Karawaci Tbk in 2017 and the highest ROE value at PT Unilever Indonesia Tbk in 2018. The average value of ROE out of 130 observations is 36.370%.

The descriptive statistics shows that dividend values range from Rp 0 to Rp 2600, with the lowest value at PT Adaro Energy Tbk in 2016 and the highest value at PT Gudang Garam Tbk in 2015–2017. Based on the observation of 130 companies, it is known that the average value of institutional dividends is Rp

Table 3

Estimated Regression Equation

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2707.722	1281.909		2.112	.037
	SQRT_IC	–51.441	119.479	.034	–0.431	.668
	SQRT_ROA	–308.886	572.793	.067	–0.539	.591
	SQRT_ROE	1309.708	398.592	.411	3.286	.001
	SQRT_Dividend	118.241	45.686	.218	2.588	.011
a. Dependent Variable: SQRT_MC						

Source: compiled by the authors.

242.66. According to the descriptive statistics, market capitalization proxies by market capitalization ranges from Rp 16,124,000,000 to Rp 447,551,984,000,000. The minimum value belong to PT AKR Corporindo Tbk in 2014, and the maximum value — to PT Telekomunikasi Indonesia (Persero) Tbk in 2017. The descriptive statistics shows that the average MC value is Rp 102,294,852,000,000 (*Table 3*).

The table above allows us to conclude that IC, ROA, ROE and dividends affect market capitalization:

$$MC = 27 - 7.722 - 51.441\sqrt{IC} - 308.886\sqrt{ROA} + \\ +1309.708\sqrt{ROE} + 118.241\sqrt{Dividend}.$$

The equation shows that if all x variables are equal to 0, then MC value is 2707.722. IC variable regression coefficient is –51.441, meaning that if all the other variables are considered to be constant, then every 1% change from IC will make MC decrease by –51.4441. The regression coefficient of the ROA variable is 308.886, meaning that if all the other variables are considered to be constant, then every 1% change in ROA will make MC decrease by 308.886. The regression coefficient of the ROE variable is 1309.708, meaning that if all the other variables are considered to be constant, then every 1% change in ROE will make MC increase by 1309.708. Dividend variable regression coefficient is 118.241, meaning that if all the other variables are considered to be constant, then every 1% change from dividend will make MC increase by 118.241. T-test was conducted to test the regression coefficient separately from the independent variable. The results of the t-test are presented in *Table 4*.

Hypothesis 1: Intellectual capital has a positive impact on capitalization

According to the test results, the impact of intellectual capital on market capitalization shows the value of t equal to –0.431, which means t arithmetic < t table (–0.431 < 1.656) and has a significance level of 0.668, and shows a number greater than 0.05. This proves that H1 is rejected. Since the value of t arithmetic is smaller than that of t table, and the significance value is greater than 0.05, it can be said that intellectual capital has no significant effect on market capitalization.

Hypothesis 2: ROA has a positive impact on market capitalization

According to the test results, the ROA impact on market capitalization shows the value of t arithmetic equal to –0.539, which means t arithmetic < t table (–0.539 < 1.656) and has a significance level of 0.591, and shows a number greater than 0.05. This proves that H2 is rejected. Since the t value is smaller than t table and the significance value is greater than

Table 4

T- test

Coefficients a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2707.722	1281.909		2.112	.037
	SQRT_IC	–51.441	119.479	–.034	–.431	.668
	SQRT_ROA	–308.886	572.793	–.067	–.539	.591
	SQRT_ROE	1309.708	398.592	.411	3.286	.001
	SQRT_Dividen	118.241	45.686	.218	2.588	.011
a. Dependent Variable: SQRT_MC						

Source: compiled by the authors.

0.05, it can be concluded that ROA has no impact on market capitalization.

Hypothesis 3: ROE has a positive impact on market capitalization

According to the test results, the ROE impact on market capitalization shows the value of t arithmetic equal to 3.286, which means t arithmetic > t table (3.286 > 1.656) and has a significance level of 0.001, and shows a number smaller than 0.05. This proves that H3 is accepted. Since the t value is greater than t table and the significance value is less than 0.05, it can be concluded that ROE has a significant impact on market capitalization. This shows that ROE has a significant positive impact on market capitalization as measured by market capitalization.

Hypothesis 4: Dividends have a positive impact on market capitalization

According to the test results, the impact of dividends on market capitalization shows the value of t arithmetic equal to 2.588, which means t arithmetic > t table (2.588 < 1.656) and has a significance level of 0.011, and shows a number smaller than 0.05. This proves that H4 is accepted. Since the t value is greater than t table and the significance value is less than 0.05, it can be concluded that dividend has a significant impact on market capitalization. This shows that dividends have a positive impact on market capitalization as measured by MC.

CONCLUSION

Based on the research results and earlier discussions, it can be concluded that intellectual capital (IC) in Indonesia does not significantly affect market capitalization. Return On Asset (ROA) does not significantly affect Market Capitalization.

Return on equity (ROE) significantly affects market capitalization, and the impact is positive. Therefore, we can conclude that investors are especially interested in companies with a high return on equity. We can say that the level of efficiency and effectiveness of a company in capital management is gaining increasing value for investors. Dividends significantly affect market capitalization and their impact is positive. Based on these results, we can conclude that investors are especially interested in companies with a high level of dividend distribution.

For the next research, we may suggest replacing the company's value calculation. Further studies may use abnormal income or firm value. Future studies are expected to expand the object of research by changing purposive sampling or expanding the research population.

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Author's declared contribution:
Putri S.A. — Theoretical part, methodology, research data collection, analysis of data processing results.
Azwardi — Modeling in analysis and conclusion of the research.
Sa'adah — Discusing of the research results and general conclusions of the research results.

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