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FINANCIAL POLICY

Krinichansky K.V., Rubtsov B.B.	
Financial Sector Regulation on the Agenda of Economic Policy Reforms	
FINANCIAL MANAGEMENT	So
Patel R.	
Examining the Portfolio Diversification Benefits with Selected Developed,	
Emerging and Frontier Markets	
Atrokhova A.N.	
Improvement of Methods of Quality Assessment of Financial Management of Chief Administrators of Budgetary Funds	- 1
Singhal S., Gupta S., Gupta V.K.	
The Impact of Firm Size, Leverage, and Profitability on the Disclosure Level of Intellectual Capital	
Lapina M.A., Zav'yalov M.M., Gurinovich A.G.	
Commercialization of Public Finance Management: Modern Realities and Organizational and Legal Modernization	
BANK SECTOR	
Almanaseer S.R.	
Internal Factors Affecting Commercial Banks Profitability in Jordan	
Banking Regulation and Banking Crises Probability in European Countries90	
MONETARY & CREDIT POLICY	
Egorova N.E.	
Features of Decision-Making in the Process of Lending to Small Businesses: The BDI Model and Confidence Indices	
FINANCIAL LITERACY	
Sangeeta, Aggarwal P.K., Sangal A.	
Determinants of Financial Literacy and its Influence on Financial Wellbeing — a Study of the Young Population in Haryana, India	
CORPORATE FINANCE	
Koklev P.S.	
Business Valuation with Machine Learning	
Gupta I., Raman T.V.	Е
Shareholder's Reaction to Merger and Acquisition Announcement: Evidence from India's Manufacturing Sector	
Skokov R. Yu.	
Features and Patterns of Functioning of Financial Resources of Digital Companies	
Which Shareholders are Interested in the ESG-indicators of the Company?	
INTERNATIONAL FINANCE	
Dorofeev M.L.	
Impact of the Quality of the Institutional Structure of the Economy on Income Inequality of Households: Results of a Cross-National Study	
TAX POLICY	
Milogolov N.S., Berberov A.B.	
The Problem of Double Economic Taxation of Distributed Profits and Reform Scenarios in Russia	
DIGITAL FINANCIAL ASSETS	
Krylova L.V., Lukashenko I.V.	Р
Cryptocurrencies vs Central Banks' Digital Currencies: The Role of Financial Literacy 220	
INSURANCE SYSTEM	,
Donetskova O. Yu.	(
The State of the Russian Bank Insurance Market	

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Scientific and practical journal Vol. 26, No. 5, 2022

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Financial Sector Regulation on the Agenda of Economic Policy Reforms

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ABSTRACT

The aim of the research is to identify trends that set the agenda of the structural reforms of OECD countries, as well as of the organization's partner countries, in the context of the place of financial sector reforms in it. The authors apply the following methods: content-analysis of sources, monitoring of directions and instruments of economic policy in the financial sector, analysis of approaches used by international organizations in order to determine reform priorities (benchmarking), and decomposition of the components of the financial sector reform agenda. The paper shows that the agenda of financial liberalization, formulated in the 1970s, is mostly exhausted, although a certain gap remains between countries with developed and emerging markets in terms of the financial liberalization index. Financial regulatory reforms focused on the goal of building a more resilient global financial system, formulated in the aftermath of the 2007–2009 crisis, are affecting all countries and are also ending. Reforms are now coming to the fore, focusing on areas of the structural transformation agenda such as inclusive growth and an environmental perspective. The paper concludes that the main components of financial reforms in an inclusive context are financial inclusion, financial and digital literacy. In terms of the environmental agenda, the countries are focusing on the tasks of directing financial resources to the implementation of the UN sustainable development goals, introducing ESG investment principles for financial institutions, and developing and implementing principles for issuing green financial instruments.

Keywords: financial regulation; financial market; financial institutions, financial sector; structural reforms; economic growth; ESG; green finance; financial stability; international organisations; OECD

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INRODUCTION

Reforms in the financial sector have been the focus of researchers' attention for many years, while becoming the subject of lively academic and political discussion. They are an integral part of the general agenda of economic reforms, in the development of which the largest international organizations take part — the International Monetary Fund (IMF), the World Bank (WB), the Organization for Economic Cooperation and Development (OECD).

A number of organizations — the Bank for International Settlements (BIS), the Financial Stability Board (FSB), the International Organization of Securities Commissions (IOSCO) — operate with a narrower focus on the functioning of the financial market and its sectors. There are a sufficient number of works summarizing the directions for

reforming the financial sector developed by international organizations with such a narrower "specialization" [1-3, etc.]. At the same time, the question is of interest: how have certain aspects of financial sector reforms been reflected and are being reflected in the broader agenda of economic policy reforms? The answer to this question will help to place financial reforms on the economic agenda, trace their path, identify the relationship between reforms affecting different policy areas — commodity market, labor market, ESG issues, financial market, etc., and determine the factors that accelerate or hinder reforms, etc. This paper attempts to do this by looking at the economic reform agenda promoted by the OECD. To do this, we use a large number of sources, the main ones are regular studies of relevance and progress in OECD countries and partner countries of this

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organization of economic policy reforms, carried out under the auspices of the OECD secretariat, united by a series of publications "Going for Growth".

FINANCIAL LIBERALIZATION AND ITS COMPONENTS

It is not easy to review academic research on financial sector reform. Among the first authors who started a discussion about the role of the financial system, the awareness of which actualizes the issues of its development and reform, we single out J. Gurley and E. Shaw [4, 5]. The authors linked the level of development of the economy with the level and structure of the financial system, showing how the economy is moving from a self-financing model (when investment projects are financed from operating income and company reserves) to bank financing, to a model that involves a significant share of equity financing. Thus, a certain logic of the evolution of the financial sector was set, the implementation of which in practice required reformatory decisions from governments.

Considering that the "financial intermediaries plus stock markets" model is the most advanced one, one should ask the question: what are the conditions for its development and limitations? J. Gurley and E. Shaw, and later on the basis of their results, V. Bencivenga and B. Smith [6] showed that transaction costs, as well as monetary factors, are significant drivers of financial development and financial inclusion. This led to the conclusion, addressed in particular to emerging markets, that the cost of accessing banks and their services should be reduced,² as well as to the revision of monetary policy, which often led to high inflation and high nominal interest rates.

Two other significant works that outlined the contours of financial reforms in subsequent years were published by R. MacKinnon [7] and E. Shaw [8]. The authors drew attention to the fact that there was a policy of "financial repression", the components of which were ceilings on interest rates on savings (set under the pretext of providing banks with cheap resources for their subsequent transfer to firms and the government); state ownership of banks and financial institutions; high reserve requirements; control over the domestic market of public debt, carried out, in particular, by imposing requirements on financial institutions to hold public debt obligations, caused economic stagnation and crises in a number of countries. Based on these arguments, R. McKinnon and E. Shaw suggested that politicians implement a number of countermeasures united by the idea of financial liberalization.

Financial liberalization began to be seen as a state policy aimed at deregulating credit, removing control over interest rates, removing barriers to entry into financial services markets (including for foreign players), and privatizing financial institutions. In addition to these directions, in many works, financial liberalization began to include a policy of removing restrictions on transactions recorded in the capital account of the balance of payments (although this classification is disputed by a number of authors). In theory, such a policy was supposed to ensure the restoration and strengthening of the role of the price mechanism in the financial sector, improve the conditions for market competition with an eye to the benefits that these measures could bring to economic activity and growth. [9]. However, in practice, the measures taken in the indicated direction have not led to the desired success in all countries. In publications, there is significant criticism of the financial liberalization policy regarding the premature opening of the economies of weak countries to external capital flows, as well as in connection with the increased vulnerability of banking systems to crises [10, 11]. Even without addressing the oft-discussed issue of capital account openness, financial liberalization policies have proved vulnerable for a number of reasons, in particular the failure

OECD Library. URL: https://www.oecd-ilibrary.org/economics/economic-policy-reforms 18132723 (accessed on 15.08.2022).

² At that time, 13% of families in the US did not have a transactional bank account, the reason for which about half of them indicated high commissions and other costs associated with using such an account [6].

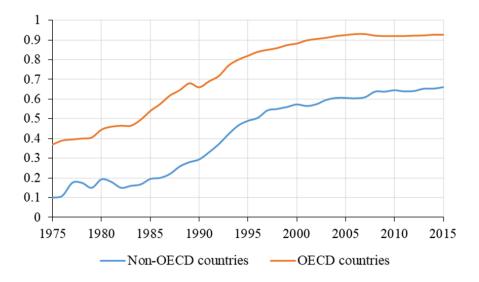


Fig. 1. The history of aggregate financial liberalization index

Source: O. Denk, G. Gomes [15].

to address asymmetric information problems [12, 13], which do not necessarily result from government intervention; can lead to an increase in moral hazard; may become the reason for a more aggressive and risky policy of banks seeking to compensate for lost profits with an interest margin [14], etc.

However, the benefits of financial liberalization outweigh its costs and disadvantages, which has shaped the course of incremental reforms affecting financial institutions and markets. An assessment of the dynamics of such reforms over a long period since 1975 in the form of an aggregate index, which takes the value of "0" for countries that have not progressed towards financial sector liberalization, and "1" for countries that have achieved full liberalization, is shown in *Fig. 1*. Components of financial reforms reflected in the Aggregate Financial Liberalization Index are disclosed in the *Table*.

Fig. 1 shows that countries of different groups over the past 40 years have advanced quite powerfully along the path of financial reforms. OECD countries have made the most progress

in the areas shown in Table 1. Non-OECD countries, on average, moved at the same pace of reform but from a lower starting position. The gap in the level of liberalization of the financial sector between OECD countries and non-OECD countries remains, which determines the relevance of continuing the course towards financial liberalization in non-OECD countries. We also note that the pace of financial reforms in the period from the mid-1990s slowed down in both groups of countries, and since about 2003 they have come to naught. This can be explained by the well-known rigid positions of the establishment of countries (including developed countries) on some painful reform issues, most often associated with privatization and liberalization of the foreign direct investment regime. The evolution of financial sector reforms over the past 12 years is analyzed below.

FINANCIAL SECTOR REFORMS ON THE OECD ECONOMIC REFORM AGENDA

Going for Growth, a series of reports, will be used as one of the main sources of information, summarizes the experience of OECD countries in implementing structural reforms in various areas of economic policy.⁴ Let us start by

³ Removing the interest rate ceiling may seem counterintuitive, as depositors whose assets were protected by state-sponsored deposit insurance programs (or brokerage services) lost the incentive to follow the choice of a bank or other type of financial intermediary while they were protected by fees in excess of the set rate on government bonds.

⁴ We emphasize that the choice of this source is due to the desire of the authors to place the problem of financial regulation in the context of a broad agenda of structural reforms. Another

Table
Basic aspects of the financial sector reforms and framework approaches to their operationalization

No.	Policy focus	How policy content is disclosed in a specific indicator
1	Credit control	The relative severity of bank reserve requirements, the presence of mandatory credit requirements or credit subsidies for certain sectors are measured
2	Interest rate control	The extent to which regulations restrict banks from setting rates on loans and deposits is determined
3	Barriers to entry into the banking sector	The existence of barriers to entry of foreign and domestic banks into the national banking system is recorded; restrictions on the geographical region in which banks can operate; restrictions on the scope of banking activities are highligted
4	Capital account control	The degree of restrictions on the international movement of capital is assessed
5	Privatization	The degree of direct participation of the state in banking activities through the ownership of the bank's assets is assessed.
6	Regulation of securities markets	The policy pursued by the authorities to deregulate and encourage the development of markets for shares, bonds and derivative financial instruments is assessed
7	Prudential Regulation and Banking Supervision	The compliance of the country's capital adequacy rules with the Basel standard is outlined; the independence and scope of responsibility of the banking supervisory authority, the effectiveness of bank inspections are assessed

Source: compiled by the authors based on O. Denk, G. Gomes [15, p. 8–9]; A. Abiad, A. Mody [16, p. 681].

Note: a study by A. Abiad and A. Modi [16] is considered basic in relation to areas of financial reforms. It suggests 6 of those directions listed in Table 1. At the same time, we find that before A. Abiad and A. Modi, a similar list of areas for financial reforms was formulated by M. Edey and K. Hviding. [17].

analyzing the 2009 report with the intention of finding the extreme point in it, when the degree of relevance of financial sector reforms was the greatest (in relation to the subsequent, but not the previous period). First, the measures taken during the crisis, as a rule, are associated with the deepening of state intervention, which requires subsequent policy adjustments to restore the operation of the market price mechanism [18]. Second, economies facing shocks of unprecedented magnitude (in the form of major bankruptcies, asset price collapses, credit market stalls, etc.) have exacerbated the need to develop a set of measures aimed at ensuring financial stability.

Indeed, the report states that the financial crisis of 2007–2009 revealed serious problems with the functioning of financial markets, demonstrated the inability of previous

more specialized annual OECD report on the financial sector, The OECD Business and Finance Outlook, has been published since 2016 and does not contain a broader context that we are interested in.

approaches to regulatory and supervisory structures to ensure market stability. 5 The crisis exposed weaknesses and failures in financial regulation and supervision, which contributed to increased risk appetite, private sector overleveraging, and eventually recession. The authors stated that the financial sector is an area that will require major reforms in the coming years.⁶ The financial sector reform program that was taking shape at the time⁷ was designed to reduce the likelihood of financial catastrophes in the future. It covered the reform of regulatory and supervisory structures, the improvement of the functioning of financial markets and was aimed at ensuring the restoration of economic growth and improving living standards in the long term.

⁵ OECD. Economic Policy Reforms 2009: Going for Growth: Structural Policy Indicators, Priorities and Analysis, OECD Publishing, Paris, 2009, p. 4.

⁶ Op. cit. P. 35.

⁷ FSB. Improving Financial Regulation: Report of the Financial Stability Board to G20 Leaders, Financial Stability Board, Basel, September, 2009. URL: https://www.fsb.org/2009/09/r_090925b (accessed on 15.08.2022).

Further presentation requires additional methodological explanations. We point out that in the OECD documents studied, the authors resort to a comparative cross-country efficiency and policy analysis, on the basis of which a set of five structural policy priorities is determined for each OECD country and the European Union.8 Policy priorities are selected based on standardized criteria and expert judgment from more than 150 possible ones. Earlier reports use the US economy as the benchmark, while more recent reports use the upper half of the distribution given by the OECD group of countries. Each country is compared with the benchmark based on the criterion of GDP per capita, and the size of the gap of this indicator in relation to two countries (one of which is always taken as a benchmark) serves as a guide and at the same time a working tool for measuring the effectiveness of adopted policy measures.

An additional step in the analytical procedures is to consider the GDP per capita gap in the countries included in the sample compared to the benchmark, broken down into two components representing the contribution of labor productivity and labor utilization, respectively. Hence, when considering the directions of structural policy, it is proposed to group them into two areas — a policy aimed mainly at increasing labor productivity, and a policy that ensures (expands) the use of labor.

In addition, starting from the 2017 edition, the scope for reform prioritization has been expanded to include a dimension of inclusion, and in the 2019 and 2021 reports, the environmental component is an additional dimension. In

Reforms affecting the financial sector are in the area of productivity. The range of policies that affect productivity is extremely broad. It covers various options that contribute to the accumulation of physical and human capital, intangible assets, increase the efficiency of their use and distribution. The relationship between financial development and economic growth in the context of the impact of financial development on productivity is considered in a number of studies, in particular [19–21].

Analyzing the data and other theoretical and empirical studies, one can point to the consistency of the conclusions that productivity is the dominant channel for transmitting financial development into long-term output growth. This is a good reason to consider the level of development of the financial sector as an important factor in determining the rate of productivity growth at the country level.

In the following, we will continue to explore the directions and policies for the financial sector contained in the Going for Growth reviews. Thus, in the 2009 review, it was proposed to consider the following areas:

- deepening the integration of financial markets and improving the mechanisms of financial stability, addressed to the European Union as a whole;¹¹
- removing restrictions on foreign direct investment (FDI) (meaning not even the immediate benefits of these investments, but rather the side effects), addressed to the governments of Canada, Iceland, Japan, South Korea and Mexico:¹²
- privatization (this efficiency-enhancing tool should be used once financial markets "function normally");¹³
- \bullet improving financial oversight, as noted in the case of the US; 14
- \bullet financial openness 15 as a general recommendation for countries with barriers to capital flows and investment.

 $^{^{\}rm 8}$ In some cases, the authors offer a vision for more than 5 policy priorities.

⁹ OECD. Economic Policy Reforms 2017: Going for Growth, OECD Publishing, Paris, 2017. URL: https://doi.org/10.1787/growth-2017-en

¹⁰ OECD. Economic Policy Reforms 2021: Going for Growth: Shaping a Vibrant Recovery, OECD Publishing, Paris, 2021. URL: https://doi.org/10.1787/3c796721-en

¹¹ OECD. Economic Policy Reforms 2009: Going for Growth: Structural Policy Indicators, Priorities and Analysis, OECD Publishing, Paris, 2009. P. 35.

¹² Op. cit. P. 34.

¹³ Op. cit. P. 35.

¹⁴ Op. cit. P. 48.

¹⁵ Op. cit. P. 34.

Note that recommendations related to the financial sector were not included in the top five priority areas in 28 out of 31 country or unions. The exceptions are Iceland, the US and the EU as the regions most affected by the financial crisis of 2007–2009.¹⁶

Thus, despite expectations that financial sector reforms will be predominantly at the forefront, we find that they are among the priorities only in those countries whose financial markets have been hit hardest by the crisis. More recent reports add the caveat that financial market reforms are generally not among the top five priorities and are treated separately, as they are an urgent task in many OECD countries requiring extensive international coordination.¹⁷ Our explanation for this fact is that the financial sectors of a large number of countries have become deeply dependent on the state of the financial markets that distribute the capital of financial centers, and the supply of financial services in these countries is provided by global players representing these centers. This dependence reduces the role of domestic financial sectors in many countries, shifting the focus to regulatory issues related to the use of financial services on the principles of outsourcing. From this, in particular, it follows that the most common recommendations (apart from those that really affect the reform of financial markets and institutions agreed within the framework of international cooperation at the level of the BIS or the FSB) are incentives to open national financial markets for non-state residents, reduce the share the state in the capital of financial institutions, etc.¹⁸

The 2010 report continues to highlight the importance of reforms affecting financial market regulation, adding that the financial response to the crisis has created new challenges in the form of moral hazard and reduced competition.¹⁹ An even more significant concern has been raised about the possible conflict between the demands for tighter regulation in the financial sector for the sake of stability and the primacy of competition, referring to the possible pressure on the competition when regulation is tightened (through channels to enter the market or satisfy participants — especially those who do not belong to the category large players — with more stringent standards). The conclusion is that, apart from a few specific areas of regulation, there is no evidence of conflict between the stability of the banking sector and the objectives of competition. Thus, the necessary regulatory strengthening in the financial sector is expected to maintain competitive advantages in terms of access to and prices for financial services.²⁰ Moreover, some areas of prudential regulation, primarily banking supervision, as the analysis showed, can increase competition in the banking sector²¹ due to the fact that strict supervision helps to level the playing field for all competitors. An important conclusion is also that the impact of prudential regulation on competition in the banking sector depends on the strength of supervision.²²

With regard to the long-term macroeconomic effects of the recent (2008) financial shock, the report shows that OECD countries are facing contraction in potential output. At the same time, 2/3 of this reduction will be caused by an increase in the cost of capital, 1/3 — by a decrease in employment. Fixed capital accumulation is one

¹⁶ We did not take into account cases where structural policy measures were addressed to governments in connection with the need to reform the pension system, since the goal of such reforms was declared to increase the efficiency of the public sector (Czech Republic) or improve the use of labor (Luxembourg, Turkey). Op. cit. p. 46–48.

¹⁷ OECD. Economic Policy Reforms 2012: Going for Growth, OECD Publishing, Paris, 2012, p. 43. URL: https://doi.org/10.1787/growth-2012-en.

¹⁸ See, for example, similar recommendations for Brazil and India, "where bank credit is not fully allocated by the market", with the proviso that realizing the benefits of such liberalisations should be gradual and accompanied by strong prudential. OECD. Economic Policy Reforms 2011: Going for Growth, OECD Publishing, Paris, 2011, p. 32.

¹⁹ OECD Economic Policy Reforms 2010: Going for Growth: Structural Policy Indicators, Priorities and Analysis, OECD Publishing, Paris, 2010, p. 5. URL: https://doi.org/10.1787/growth-2010-en (accessed on 15.08.2022).

²⁰ Op. cit. P. 13.

²¹ This conclusion, unfortunately, is not comprehensive. In some areas, such as entry restrictions, measures to strengthen prudential regulation do weaken competition.

 $^{^{\}rm 22}$ Strong supervisors have been seen to mitigate the anti-competitive impact of tougher barriers to entry.

of the most vulnerable positions in the postcrisis period, when the level of risk aversion and premiums embedded in rates turned out to be high. This is a wake-up call, as lower investment growth (or even negative investment growth) weakens the foundation for future productivity growth.

Another concern is associated with the negative consequences of the measures that countries were forced to take to eliminate the financial shock and prevent an even deeper recession — the "nationalization" of some banking operations (Iceland, Ireland, the Netherlands, Portugal, UK, USA), the purchase of toxic assets (Germany, Ireland, Korea, Switzerland, UK, USA).²³ Indeed, long-term direct participation of the state in financial markets is fraught with negative consequences for competition, leads to a distortion of the price mechanism, including an incorrect assessment of risks, and in post-crisis conditions hinders the possibility of structural changes, reducing the potential for long-term growth.

The authors show that the future regulatory landscape is being shaped by proposals to reform prudential regulation put forward by the Financial Stability Board (FSB), IMF, Bank for International Settlements (BIS)²⁴ to strengthen financial stability (while maintaining competition objectives). The main directions here are changes in capital requirements for banks (including the introduction of a countercyclical buffer), new minimum global liquidity coverage standards designed to increase banks' resilience to system-wide liquidity shocks and strengthen management of this risk, the formation of requirements for systemically important players to reduce moral hazard in their behavior, initiatives to expand the regulatory

perimeter and develop international cooperation between regulators, increase the stability of the derivatives market, improve accounting standards (including accounting for financial instruments, standards for creating reserves and depreciation recognition, standards affecting off-balance sheet operations), improving remuneration models.

Among the policies and measures aimed at the financial sector proposed in this review are the removal of restrictions on foreign direct investment (Canada); deepening and accelerating the integration of retail financial markets, updating and improving the system of financial regulation (EU); strengthening financial supervision (EU, Hungary, South Korea); anchoring housing finance guarantee mechanisms that create excessive incentives for excessive investment in the housing sector (Iceland, USA); improving macroprudential and microprudential supervision (Japan and other countries); reforming bankruptcy legislation (Hungary); increased privatization of financial institutions (South Korea); changes in prudential standards for systemically important financial institutions (USA).

Regarding the inclusion of financial sector reforms in the top five priorities, in this study this refers to three countries or unions — the EU, the USA, Japan, and if we add such a political priority as lowering barriers to foreign investment and expanding the number of priorities considered to eight, Iceland, New Zealand, Poland and South Korea will be added to the list.

The 2011 report continues to highlight the urgency of reforms in the financial sector "necessary to restore stability and protect living standards over the long term". ²⁵ In addition to changing capital requirements, the main directions were:

- developing macroprudential policies to mitigate the procyclical buildup of systemic risk and prevent credit-driven asset price bubbles;
 - reducing moral hazard from systemically

²³ Op. cit. P. 21.

²⁴ See, in particular, BIS. Basel III: A global regulatory framework for more resilient banks and banking systems. Bank for International Settlements, Basel, December 2010 (rev June 2011). URL: https://www.bis.org/publ/bcbs189. htm, and more recent recommendations: IMF, FSB and BIS. Macroprudential Policy Tools and Frameworks, Update to the G20 Financial Ministers and Central Bank Governors, February 2011. URL: https://www.bis.org/publ/othp17.htm (accessed on 15.08.2022).

²⁵ OECD. Economic Policy Reforms 2011: Going for Growth, OECD Publishing, Paris, 2011, p. 18. URL: https://doi.org/10.1787/growth-2011-en (accessed on 15.08.2022).

important institutions and the associated economic damage; changes in financial infrastructure that reduce the risk of infection;

- introduction of a mandatory leverage ratio standard (maximum leverage ratios applicable to all types of assets);
- introduction of mechanisms for managing cross-border crises;
- reforming non-banking financial institutions (including insurance companies and pension funds) aimed at preventing the accumulation of systemic risk;
- implementation of reasonable compensation methods in large financial institutions to discourage excessive risk taking;
- improvement of accounting standards (including improvement and simplification of accounting for financial instruments, provisioning and recognition of impairment).²⁶

The inclusion of financial reforms among the priorities this year was due to Brazil, India and the EU. In addition, easing barriers to foreign direct investment has been ascribed as a structural policy priority to Australia, Canada, New Zealand and Japan.

An analysis of the 2012 review shows the following. Structural reform priorities for Brazil, India and the EU aimed at improving the efficiency of financial markets remained the same. Reforms to improve regulation and supervision of the financial sector have been a priority for Iceland. Improvement and rationalization of financial regulation has been identified as a priority for the US. Australia and Japan have been ordered to ease restrictions on FDI.

In the 2013 review, the authors continue to prioritize reforms to improve the efficiency of financial markets and reduce the state's share in banks, taking into account Brazil's recommendations. The weakening of state control over financial markets (including the deregulation of rates on deposits and loans, the liberalization of foreign investors' access to domestic stock and bond markets) was recommended by the PRC.

One of the priorities for the EU remained the reform of financial regulation and supervision in order to create a more stable and integrated financial system within the Union.

India was recommended to ease restrictions on the banking portfolio, including by gradually reducing the share of government bonds held by banks, phasing out priority lending; allow greater participation of foreign investors in the financial services sector and facilitate the entry of new private banks into the market. Easing restrictions on foreign direct equity investors is recommended for countries such as India, Canada, Mexico, Russia, and South Korea.

Financial sector reform remained a priority for Brazil, China and India in 2014.²⁷ In general, it can be seen that for these three countries, financial sector reforms were considered a priority during the period under review. As these countries moved along the path of liberalization, the recommendations changed. Thus, the 2015 report notes that liberalized financial systems in these countries should be supported by stronger macroprudential regulation and supervision.²⁸ In addition, the PRC recommended building a more balanced regulatory framework covering alternative banking sectors, since grassroots liberalization has led to the emergence of financial institutions that compete with banks that are not subject to heavy banking regulation (the so-called "shadow" banking sector). A vulnerability that needed to be addressed was also found in the presence of implicit government guarantees that prevented correct risk assessment. The authors of the 2017 review note that although these countries have managed to address a number of issues that improve the efficiency of domestic financial markets, the pace of financial sector liberalization in these countries has slowed down.²⁹

²⁶ Op. cit., P. 21.

²⁷ OECD. Economic Policy Reform 2014: Going for Growth Interim Report, OECD Publishing, Paris, 2014, p. 40. URL: https://doi.org/10.1787/growth-2014-en

²⁸ OECD. Economic Policy Reforms 2015: Going for Growth, OECD Publishing, Paris, 2015, p. 65. URL: https://doi. org/10.1787/growth-2015-en

²⁹ OECD. Economic Policy Reforms 2017: Going for Growth, OECD Publishing, Paris, 2017, p. 27.

The 2017 review contains a slightly larger list of countries for which financial sector reforms are recommended. Thus, the authorities of Argentina and China were recommended to reduce state intervention in the work of financial markets. Italy and Portugal are among the first countries where delaying resolution of problem bank loans threatens both to undermine confidence in financial stability and hold back economic growth. Increasing financial literacy is a priority for China.³⁰ India is encouraged to take steps to remove restrictions on the banking portfolio.³¹

The 2019 report states that the priorities of financial sector reform are addressed to Brazil (recommended to expand the range of financing models, including syndicated loans, structured finance instruments, project financing and infrastructure bonds), India and China (the recommendations of previous years have been duplicated to the authorities), Russia (in relation to which it is said that it is expedient to reform the regulation of the banking sector in terms of creating equal conditions for public and private banks and financial intermediaries).

Finally, the 2021 report highlights measures that could play a role in dealing with a potential wave of bankruptcies that could be a negative shock from the pandemic.³² With many companies vulnerable to lockdowns and fluctuations in demand, economies may need bankruptcy regime reforms that "could be deployed with tools to support equity financing to recapitalise firms and mitigate debt overhang via measures such as equity and quasi-equity injections (e.g. preferred stocks), phasing in an allowance for corporate equity and debt-equity

In terms of the areas of financial reform already highlighted above, the 2021 report points to the need to:

- removing barriers to entry in the financial sector and restrictions on business conditions for non-resident firms, improving financial literacy through financial education from an early age (PRC):³⁴
- implementing a strategy to address the problem of deferred tax credits and bad loans threatening bank balance sheets (Greece);
- improving the management of stateowned banks, intensifying efforts to address the problem of bad loans, improving insolvency and bankruptcy legislation and judicial practice in this area (India and other countries).

OF INTERCONNECTEDNESS OF STRUCTURAL REFORMS

An essential aspect of the analysis of financial sector reforms in the context of their significance for achieving the main policy objectives is the interconnectedness of these reforms with reforms affecting other policy areas. Two points can be touched upon: the importance of financial sector reforms for other priority policy areas and, in fact, the interdependence of reforms.

While discussing the importance of financial sector reforms (and therefore the quality of financial systems they achieve) when looking at other policy successes, let us look at some illustrations. For example, tax and product market reforms aimed at lowering costs and increasing corporate profits or achieving higher productivity are most effective when corporate successes are reflected in stock prices. This is important because, on the one hand, it creates a wealth effect and spurs consumer demand,

swaps".³³ These reforms aim to preserve viable and productive firms that would otherwise go into liquidation, while at the same time encouraging the timely restructuring of unviable firms.

³⁰ Since this recommendation is based on the changes taking place in many countries — the expansion of digital financial services, the "spread of illegal schemes for attracting external financial resources, and the default of peer-to-peer financial service providers" (Op. cit., p. 130), the corresponding recommendation can be applied in a much wider range of countries.

³¹ OECD. Economic Policy Reforms 2017: Going for Growth, OECD Publishing, Paris, 2017, p. 28.

³² OECD. Economic Policy Reforms 2021: Going for Growth: Shaping a Vibrant Recovery, OECD Publishing, Paris, 2021, p. 15.

³³ Op. cit., P. 32.

³⁴ Op. cit., p. 99.

and on the other hand, it encourages companies to expand investment. It is fair to say that the transformation of expected income and profits into current consumer or investment spending is possible only with the correct functioning of financial markets, which is determined by the correct valuation of financial assets and the possibility of credit expansion when using these assets as collateral.³⁵

Returning to the question of the interdependence or interconnectedness of reforms, it is often difficult for countries to succeed in reforming the financial sector without progress towards strengthening the rule of law, developing the judiciary, etc. Indeed, an analysis of the Going for Growth reports shows that that a priority place on the reform agenda in a number of countries, such as Argentina, India, Indonesia, Italy, China, Mexico, Russia, South Africa, is assigned to such areas as strengthening the rule of law, strengthening the fight against corruption, improving the management of companies with state participation, increasing the efficiency of financial sector and bankruptcy procedures, prompt resolution of problem loans in the banking system.³⁶

A significant relationship is found when analyzing the impact of financial markets on global imbalances. It is known that global imbalances were one of the main causes of the 2007–2009 crisis. Their formation is associated, among other things, with different levels of development of financial markets in partner countries of international commodity exchanges. Regarding the role of financial reforms in correcting disparities, one should pay attention to the fact that household consumption in a number of countries (mainly emerging markets)³⁷ is constrained by a lack of competition and fragmentation of financial markets, which determine a higher savings rate with a

FINANCIAL SECTOR ECONOMIC REFORM AGENDA: TIME FOR CHANGE?

As noted above, in recent years the focus of economic policy reforms has shifted towards inclusiveness and sustainability. In this regard, the view on the role of the financial sector in the economy and the policy pursued in relation to it may change (*Fig. 2*). However, before considering the role of the financial sector in achieving a more inclusive society and a cleaner environment, it is necessary to focus on its work quality in the context of traditional functions.

We believe that the financial sector needs more attention in terms of restoring its functionality. The greatest concern is his ability to qualitatively implement the allocative function. Empirical analysis indicates that there are problems with the performance of this function. Many studies show that the efficiency of OECD economies has been declining for more than two decades, so the potential growth in per capita output in the late 1990s and early 2020s decreased by about half. The reason for this lies in the slowdown in the growth of total factor productivity (TFP) and the fall in investment (mainly private). Confirming this, D. Andrews et al. report on the deviation of performance indicators of lagging firms from the global productivity frontier [22]. This effect is associated with the presence of barriers to the dissemination of knowledge and Schumpeter's idea of "creative destruction". 39 Although financial markets are designed to perform the

relatively smaller scale of household lending. Therefore, reforms that increase competition in financial markets in these countries (with proper prudential regulation and supervision) can stimulate consumption, lower the domestic saving rate, and weaken current accounts, creating new conditions for balancing the flow of goods and capital on a global scale.³⁸

³⁵ This is highlighted in the report: OECD. Economic Policy Reforms 2009: Going for Growth: Structural Policy Indicators, Priorities and Analysis, OECD Publishing, Paris, 2009, p. 21.

³⁶ For example: OECD. Economic Policy Reforms 2017: Going for Growth, OECD Publishing, Paris, 2017, p. 6.

 $^{^{\}rm 37}$ With certain reservations, this also applies to other countries, such as Japan.

⁵⁸ OECD, 2011, p. 13. It should be added that success in this direction will also depend on reforms in other areas, primarily in pensions and health care. OECD Economic Policy Reforms 2010: Going for Growth: Structural Policy Indicators, Priorities and Analysis, OECD Publishing, Paris, 2010, p. 44.

³⁹ OECD. Economic Policy Reforms 2021: Going for Growth: Shaping a Vibrant Recovery, OECD Publishing, Paris, 2021, p. 19.

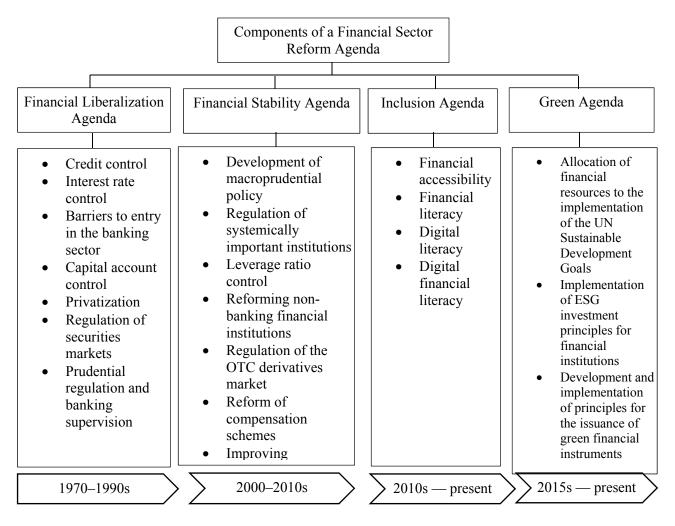


Fig. 2. Financial reforms agenda development

Source: author's design.

function of allocating resources, they do so with varying efficiency. In particular, countries whose financial markets are predominantly bankbased are less flexible in this respect. In addition, significant criticism of the functioning of financial systems arises in connection with the excessive accumulation of risks and the weakening of economies due to the chronic threat of a crisis.

In addition, the problems of dysfunctionality of the financial sector are implicitly articulated in the scientific literature, which examines the relationship between financial development, on the one hand, and economic growth and inequality, on the other. At the same time, there is practically no discussion of ways to overcome such dysfunction in this literature. Indirect evidence of the troubles in the financial sector should include those results of empirical studies

that reveal a negative relationship between financial development and economic growth [23], the "vanishing effect" of the impact of deepening financing on growth [24] or linearity, the assessment of the parameters of which testifies in favor of that many countries (primarily those with developed financial markets) have exhausted the resource for increasing the rate of long-term economic growth by increasing the depth of credit [25].⁴⁰

It is extremely difficult to track the role of financial reforms in overcoming inequality.

⁴⁰ While the role of the financial sector in spurring economic recovery and productivity growth is important, it is not critical. Achieving growth goals requires not only free access to capital, but also the supply of labor, skills development, infrastructure development, and, finally, the willingness of politicians to carry out structural reforms and quality state institutions is of great importance.

Initially, this can be explained by the non-triviality of the problem of identifying the relationship between financial development and inequality. Let us pay attention to some conclusions obtained by the authors in their studies. Thus, J. Greenwood and B. Jovanovic [26] showed that financial development and inequality are connected by a U-shaped relationship: when countries are just starting to build their financial sectors, only a small part of society wins, and income inequality increases. Once a certain level of financial development has been reached, an increase in external financing helps to reduce income inequality.

M. Brei et al. [27] conclude that this relationship is inversely U-shaped: up to a certain level, deeper financial systems are associated with less income inequality, but beyond that level, further financial development is correlated with higher income inequality. In addition, the results are sensitive to the financing model of the economy, so this finding only applies to countries with a predominantly market-based financing model of the economy and does not work in countries with a bank-based model.

Disappointing from the point of view of liberalization supporters, the results in their study were obtained by J. De Haan et al. They found that financial liberalization leads to increased inequality, and financial development exacerbates this effect [28]. On the contrary, I. Hasan et al. [29] argue that financial development is a particularly important determinant of wealth inequality between countries, therefore sound financial systems help to reduce wealth inequality.

In fact, there are several paths that can help tackle inequality through the financial sector (as well as mitigate the contribution of the financial sector to rising inequality). First, it is financial availability. A number of studies show that expanding access to credit for low-income groups creates incentives for entrepreneurship, equalizes educational opportunities, etc. Expanding the population's access to financial services (including through cost reduction),

such as remittances, savings, and insurance, is considered necessary to reduce poverty and income inequality, and reduce barriers to resource allocation; this makes financial systems more stable and leads to inclusive growth [30, 31].

Second, is to improve financial literacy. Indeed, there is influential literature arguing that more advanced financial knowledge is positively associated with wealth for the general population.⁴¹ For example, experiments performed by I. Choi et al. [32] showed that financial knowledge is positively associated with return on investment. A. Lusardi et al. [33] find a positive relationship between education (and financial education as its component), on the one hand, and income-normalized accumulated wealth, on the other. Specifically, we point out that the income received is capitalized with a much greater return by the category of persons who have deeper financial knowledge. The same authors argue that financial literacy is an endogenous variable so the ultimate distribution of income depends on how people invest in their financial knowledge over the life cycle. This conclusion is universal and does not depend on the type of economy. Translating the conversation into the language of politics, we emphasize that the results shown require more systematic work on the accumulation of financial knowledge by the population of different social groups, and therefore the policy in this direction should be strengthened in all countries without exception.42

Third, increasing digital literacy is becoming a critical factor in creating the conditions for smoothing inequalities. In the context we are considering, digital literacy is a characteristic of a user of financial services, like financial literacy, indicating their ability to derive appropriate

⁴¹ One can even talk about the wider impact of financial literacy — its positive role in terms of more efficient allocation of resources, reducing the risks associated with episodes of financial instability, and, ultimately, participation in improving public welfare [35].

⁴² In the Russian Federation, the task of increasing the financial literacy of the population is a national priority. The study by O. Kuznetsova et al. is dedicated to the issues of increasing the efficiency of organizational measures to improve the level of financial literacy. [36].

benefits from some available pool of such services. Digital literacy is essential as there is a growing number of financial technologies (and players) in the market creating (offering) digital financial services and products. At the same time, access to both these services and traditional financial services is carried out via digital channels using remote access to the client's personal account or connection using a smartphone application⁴³ [36]. It should be noted that the COVID-19 pandemic has accelerated the transition of a significant part of the financial services market to digital channels. All this means that governments need a comprehensive program to achieve digital inclusion, which is a condition for reducing inequality.

Next, we consider the aspect of ecology. 6 of the 17 UN Sustainable Development Goals⁴⁴ are related to the solution of environmental (including climate) problems. The pandemic has sharply increased the relevance of the climate agenda. Environment-related priorities are featured at the top of Going for Growth 2021 publications. These include combating pollution (and its attendant public health problems), taking action against biodiversity loss, and reducing clean water supplies. etc. "Left unaddressed, environmental pressures seriously threaten current wellbeing: each year well over 4 million people die from air pollution, natural disasters have more than doubled in the past two decades".45

Solving the problems of sustainable development in the field of ecology, especially within the framework of the climate agenda, is in first place among dozens of countries in the world, including all EU states. In this regard, the OECD recommends that countries, especially

The OECD Financial Markets Trends "OECD Business and Finance Outlook 2020" is thematic and dedicated to the development of a sustainable financial system, and sustainable investment, defined by the abbreviation ESG (environmental, social, corporate governance).⁴⁷ The central place in this triad belongs to the first letter.

Mobilization of financial resources for adaptation and mitigation of climate change and the fight for environmental conservation requires the development of new strategies at the state and corporate levels, the launch of new tools, and the development of new markets [37].

According to OECD estimates in 2017, to achieve the UN Sustainable Development Goals and the Paris Agreement on climate change by 2030, annual infrastructure investments of USD 6.9 trillion are required, while current investments at the end of the decade amounted to USD 3.4-4.4, depending on the measurement metrics used.⁴⁸ The mobilization of such huge funds is impossible without restructuring the financial system. A set of ways to finance technological processes, projects, and companies related to environmental protection, as well as financial products/instruments and services (loans, bonds, shares, funds, etc.) with an environmental component, are collectively referred to as green financing (derivatives or closely related to it — environmental finance, climate finance, green finance, green investments, green banking, green insurance, etc.) [37–41].

The "greening" of the financial system, along with its digitalization, has become a key topic for the development of financial markets and their regulation even in the "pre-COVID" period. In 2020–2021, these trends have only intensified.

in the early stages of post-COVID recovery, pay special attention to environmental public investment and subsidies.⁴⁶

⁴³ OECD. G20/OECD INFE Policy Guidance on Digitalisation and Financial Literacy, OECD Publishing, Paris, 2018. URL: https://www.oecd.org/finance/financial-education/g20-oecd-infe-policy-guidance-digitalisation-financial-literacy-2018. htm (accessed on 15.08.2022).

⁴⁴ UN. URL: https://www.un.org/sustainabledevelopment/ru/sustainable-development-goals/ (accessed on 15.08.2022).

⁴⁵ OECD. Economic Policy Reforms 2021: Going for Growth: Shaping a Vibrant Recovery, OECD Publishing, Paris, 2021, p. 26.

⁴⁶ Ibid.

⁴⁷ OECD. OECD Business and Finance Outlook 2020: Sustainable and Resilient Finance, OECD Publishing, Paris, 2020. URL: https://doi.org/10.1787/eb61fd29-en

⁴⁸ Financing Climate Futures: Rethinking Infrastructure OECD. The World Bank, UN Environment, 2018, p. 20.

In the spotlight is a set of issues related to the issuance of green financial instruments (primarily green bonds), the development and implementation of green taxonomies (they already exist and are used in the EU, China; in 2021, taxonomy for the Russian market was developed by VEB.RF); development of general requirements for non-financial reporting; creation of special indexes and ratings. The most important issue on the climate agenda is the inclusion of environmental factors in pricing (especially in relation to issues related to greenhouse gas emissions).⁴⁹

CONCLUSIONS

The era of financial reform since the 1970s is now at its tipping point. The reforms of the 1970s-1990s were mainly associated with the need to implement liberalization, more fully incorporate market mechanisms into the work of the financial sector, increase competition, create a wide variety of financial services, products, and instruments, and fill the market with sufficient liquidity. In the 2000s-2010s against the backdrop of increased turbulence and major losses incurred by the economy as a

⁴⁹ OECD. OECD Business and Finance Outlook 2020: Sustainable and Resilient Finance, OECD Publishing, Paris, 2020. URL: https://doi.org/10.1787/eb61fd29-en result of the financial and economic crisis, we saw a different vector of reforms, set by the requirement to ensure the stability of financial markets and achieve proper stability of financial institutions. We are currently witnessing the formation of a modified financial reform agenda. Its most important components are the goals of inclusive and sustainable growth. This determines the need to develop appropriate reform instruments. At the same time, first of all, the environmental component of the agenda requires close international cooperation both in terms of developing tools and implementing the reforms themselves. In this regard, the role of the OECD is growing as an organization that has made a huge contribution to studying the experience of countries in terms of carrying out structural reforms and determining the broad agenda for such reforms. While other international organizations have been the main drivers of financial regulatory innovation, we highlight the important role of the OECD in the identified reform areas due to their complex and multi-component nature. In other words, the corresponding financial reforms are intended to complement a broader program of economic policy changes aimed at building a more inclusive society and maintaining a clean environment.

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Examining the Portfolio Diversification Benefits with Selected Developed, Emerging and Frontier Markets

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ABSTRACT

The financial market integration is important for the investors to have the portfolio diversification of their investment. The investors do the portfolio diversification to the market where they can have higher return with lower risk. **The purpose** of the paper is to analyse portfolio diversification opportunities among Asian Developed, Emerging and Frontier markets. The study is performed using various **methods** such as Correlation, Granger causality test, Johansen cointegration test, Portfolio diversification analysis using various diversification strategies. The study examines portfolio diversification opportunities by comparing non-diversified portfolio (home market) with diversified portfolios (Equal Weighted Portfolio, Minimum Variance Portfolio and Maximum Sharpe Portfolio). The gain from the portfolio diversification was also analyzed to measure the benefits of the diversification. The study found that the lack of integration among many markets proves the existence of the portfolio diversification opportunity. Study is unique in a nature that it examines the portfolio diversification benefits for the investors in developed, emerging and frontier markets, as past studies were limited to developed markets only. The study **concluded** that the investors can gain better return, lower risk and higher Sharpe with portfolio diversification in international market. The researchers can examine in future the portfolio diversification benefits with other frontier and emerging markets for the investors of the developed markets.

Keywords: international diversification; portfolio diversification benefits; Asian markets; time-varying integration; gain in Sharpe; assets allocation; market integration; investors

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INTRODUCTION

The portfolio diversification opportunities with respect to financial market integration remain an important topic for research in the field of finance. Investors are interested in financial market integration due to the potential benefits of portfolio diversification [1]. Investors look at diversification as an opportunity to get a better risk-return tradeoff and improve the performance of their portfolio. Due to globalisation, trade and investment rise, which increases the integration among financial markets. With the increasing correlation and integration among the markets, the diversification opportunities remain limited and investors find it difficult to reduce the risk. As recently reported by [2] the integration among the markets increased after the financial crisis, which narrows the diversification opportunity. Despite the integration, the frontier and emerging markets show low integration with other markets due to different economic phases. As emerging and frontier markets are in the developing and less-developed economy phase, such markets can offer diversification opportunities. According to the MSCI market classification framework 2019, Japan and Singapore are the developed markets; China, India, Korea, Pakistan, and Taiwan are emerging markets; Sri Lanka and Vietnam are the frontier markets in the Asia region. The present study focuses on all these above-mentioned markets. As per the International Monetary Fund (IMF), World Economic Outlook Database, July 2021 the share of these countries in the World GDP (PPP at current international US\$) is estimated to be 43.26%. The past studies have not covered the potential gain in the diversification benefits with respect to emerging and frontier Asian markets. Hence, the present study focuses on examining the portfolio diversification opportunity and potential gain in the wealth of investors with respect to developed, emerging, and frontier Asian markets.

The rest of the paper proceeds as follows: Section 2 covers the literature review. Section 3 outlines the research methodology. Section 4 covers empirical findings. Section 5 shows the conclusion and implication of the study.

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REVIEW OF PAST STUDIES

The portfolio diversification opportunities and benefits in financial markets have been studied over many years. The early studies conducted in the 1970s and 1980s reported low integration and hence a portfolio diversification opportunity existence. H.G. Grubel [3] has used the ideology of [4] and found the benefits of portfolio diversification. P.B. Kenen [5] found portfolio diversification benefits. A study conducted by [6] found increasing integration and reducing portfolio diversification opportunity. Salem et al. [7] found that the Middle East emerging market investors can have diversification opportunities in developed markets due to weak integration among the markets. Nguyen and Elisabeta [8] found weak to moderate integration among Asian markets from 2004 to 2014. Using the Wavelet approach, Ali, Uddin, Chowdhury, and Masih [9] found Saudi Arabia Investors could have portfolio diversification benefits in the USA, Japan, Germany, and Indian markets. Using data from 1975-2013, Lu and Vivian [10] found the portfolio diversification opportunity in developed and emerging markets for US investors.

Few researchers found that due to an increase in the market integration, the portfolio diversification opportunity reduces and hence the investors cannot get diversification benefits. Pätäri et al. [11] studied the emerging and frontier markets from June 2002 to December 2016 and found that the increase in the integration between the frontier & emerging markets leads to a decrease in portfolio diversification opportunities. Some researchers have found mixed results that diversification opportunity due to weak integration among the markets partially exists. Meric et al. [12] studied the benefits of portfolio diversification in the UK, USA, Germany, France, and Japan markets from 1997 to 2002. They found that investors could have higher benefits of diversification in the bull market and lower during the bear market period.

CONTRIBUTION TO EXISTING EMPIRICAL LITERATURE

Screening literature, I have identified certain shortcomings in the past studies. First, the majority of the past studies were conducted examining the market integration and portfolio diversification opportunities in emerging and developed markets. Very few studies were

conducted on frontier markets. However, such studies (of frontier markets) are conducted for the Europe and Africa region. Second, the past studies were focusing on America, Europe and Africa region mainly. Further, the majority of such studies were limited to portfolio diversification opportunity and the examination of diversification benefits remain uncovered. Third, the majority of the past studies were done using weekly or monthly return series and not daily return series.

This study differs from the previous studies in the following manner. First, the present study is conducted on developed, emerging, and frontier markets of Asia. The past studies have focused on America, Africa, and Europe region, but the present study focuses on the Asia region. The present study is performed on 9 Asian markets (2 developed markets, 5 emerging markets, and 2 frontier markets). The markets are selected as per the MSCI market classification 2020. Second, the present study focuses on examining the portfolio diversification opportunity (through short and long-term market integration) and evaluating the portfolio diversification benefits. The study is examining the portfolio diversification benefits for the Investors of all the selected countries. The portfolio diversification benefits are examined using Equally Weighted Portfolio (EWP), Minimum Variance Portfolio (MVP), and Maximum Sharpe Portfolio (MSP). Further, the study is also examining the gain in the Sharpe ratio for international diversification with respect to the home portfolio. Third, the present study is examining the market integration using daily return series from January 2001 to December 2021.

EMPIRICAL FRAMEWORK

The present study has two objectives. 1) examining the static and dynamic integration among developed, emerging, and frontier Asian markets and 2) evaluating the portfolio diversification benefits using different portfolio diversification strategies. The study is undertaken using the daily return series covering a period from January 2001 to December 2021. Many past studies used weekly or monthly data but in order to get robust results the present study uses daily return series. Further, the study covers data until 31 December 2021 to get the latest results. The selection of the markets for the present study is done as per the Morgan Stanley Capital International (MSCI) market index 2020. The markets are reported as below:

- 1) MSCI Developed Asian Markets: Japan and Singapore;
- 2) MSCI Emerging Asian Markets: China, India, Korea, Pakistan, and Taiwan.
- 3) MSCI Frontier Asian Markets: Sri Lanka and Vietnam In this study, the stock returns are calculated using the following indexes:
- 1. the Bombay Stock Exchange Index (BSE) for India;
- 2. the Colombo stock exchange All-Share (CSE) Index for Sri Lanka;
- 3. the FTSE Singapore Index (FTWISGPL) for Singapore;
- 4. the Korea Composite Stock Price Index (KOSPI) for Korea;
- 5. the Karachi Stock Exchange Index (KSE) for Pakistan;
 - 6. the Nikkei 225 Index (Nikkei) for Japan;
- 7. the Shanghai Stock Exchange Composite Index (SSE) for China;
- 8. the Taiwan Weighted Index (TWII) for Taiwan; and
- 9. the Vietnam Ho Chi Minh Stock Index (VNI) for Vietnam.

Here, the data is collected for all the markets from January 2001 to December 2021. These indexes are selected as all the indexes are calculated based on the capitalization-weighted method. The data of daily series for all the indexes are collected from Investing.com database. As per [13], "the currency does not require to be in same currency for examining the market linkages." Hence, the present study ignores the currency issues and all the selected indexes are denoted in local currency only. All the selected markets have observed some public holidays, which leads to a missing value. The missing data affects the results and implications negatively. A study by [14], in the context of Occam's razor, has given a suggestion to use the previous day's data to fill in the missing values. Considering this, the missing data in the present study is filled with the previous day's price. All series are transformed into natural logarithms.

The short-term and long-term integration among the markets is measured using correlation, the Granger causality test, and Johnson Cointegration test. The portfolio diversification benefits are examined using three different diversification strategies, *i.e.*, Equally Weighted Portfolio (EWP), Minimum Variance Portfolio

(MVP), and Maximum Sharpe Portfolio (MSP). The three-diversification strategies-based risk-return outcomes are compared with the risk-return of the home market portfolio, in order to determine diversification benefits. The equally weighted portfolio is a strategy to diversify the investment by making equal investments into different markets. The securities can hold the minimum variance portfolio when the securities hold low or no correlation with each other. The minimum variance portfolio is a well-diversified portfolio, which gives the lowest possible risk at the expected level of return. The maximum Sharpe portfolio is a well-diversified portfolio, which gives an optimal solution to maximize the Sharpe ratio. The results of the market integration and diversification benefits are reported in the empirical findings section.

EMPIRICAL FINDINGS

The empirical findings cover the 1) examination of short and long-term integration among the markets and, 2) evaluation of the portfolio diversification benefits.

Market Integration analysis

Prior to performing the integration, the normality of the data set is examined with descriptive statistics. The results of the descriptive statistics using daily return series are reported in *Table 1*.

Descriptive statistics

Table 1 shows the results of descriptive statistics for all the selected markets. The average daily returns of the markets were 0.0536%, 0.0515%, 0.0161%, 0.0356%, 0.0741%, 0.0182%, 0.0202%, 0.0261% and 0.0592% respectively for India, Sri Lanka, Singapore, Korea, Pakistan, Japan, China, Taiwan and Vietnam. All the markets have witnessed positive returns, where Pakistan witnessed the highest daily return of 0.0741% and Singapore observed the lowest daily return of 0.0161%. The average daily return standard deviation of the markets was 0.0144%, 0.0112%, 0.0113%, 0.0138%, 0.0131%, 0.0150%, 0.0154%, 0.0127%, and 0.0175% respectively for India, Sri Lanka, Singapore, Korea, Pakistan, Japan, China, Taiwan and Vietnam. Among all markets, Vietnam has the highest standard deviation of 0.0175% whereas Sri Lanka has the lowest standard deviation of 0.0112%. The financial theory on higher the risk in the market, the higher the return is failing in case of many markets. It reveals that higher risk does not gives always a higher return. The positive value of

Table 1

Descriptive statistics

Particulars	BSE	CSE	FTSE Singapore	KOSPI	KSE	NIKKEI	SSE	TWII	VNI
Mean	0.053	0.051	0.0161	0.035	0.074	0.0182	0.020	0.026	0.059
Maximum	0.173	0.200	0.0718	0.119	0.088	0.1415	0.098	0.067	0.112
Minimum	-0.1315	-0.1297	-0.2511	-0.1201	-0.0744	-0.1140	-0.0884	-0.0667	-0.1898
Std. Dev.	0.0144	0.0112	0.0113	0.0138	0.0131	0.0150	0.0154	0.0127	0.0175
Skewness	0.0600	0.092	0.0280	0.0349	0.0240	0.0195	0.0246	0.0146	0.0999
Kurtosis	13.82	12.46	18.35	9.93	6.66	9.42	7.98	6.43	5.26
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	4772	4772	4772	4772	4772	4772	4772	4772	4772

Source: author's compilation.

skewness reveals a higher probability to earn positive returns in the markets. The value of Kurtosis is more than three revealing that the data is suitable for further study.

Unit root test

A Unit root test (ADF and PP) is performed to examine the suitability of data for performing bivariate causalities. The data need to be stationary to perform further tests [15]. The ADF [16, 17] and PP test [18] are performed in EViews 9. The null hypothesis of the ADF and PP test is accepted at a 1 percent level of significance. However, the null hypothesis can be rejected at first difference which further concludes that all the series are stationary and integrated in the same order, that is, I(1). Hence, the data was found to be appropriate to perform the further study. Here, the table of the unit root test is not presented due to word limits.

Correlation

The short-term integration is measured with correlation. The results of the correlation are reported below (*Table 2*).

Table 2 shows the Correlation results for the daily return series of all the selected markets. India has a partial positive correlation with Singapore (0.502), Sri Lanka (0.399), Korea (0.399), Pakistan (0.425), Japan (0.519), and China (0.451). These markets are partial positively correlated with India as the coefficient is of average size in magnitude. India does not have a significant positive correlation with Taiwan and Vietnam.

Sri Lanka holds positive correlation with India (0.399), Singapore (0.425), Pakistan (0.394), and Vietnam (0.415). Sri Lanka has a lower positive correlation with Korea, Japan, China, and Taiwan where the magnitude of the coefficient is very small. Singapore has a partial positive correlation with India (0.502), Sri Lanka (0.425), Japan (0.449), China (0.415), and Taiwan (0.402). Singapore has a lower positive correlation with Korea, Pakistan, and Vietnam. Korea holds a partial positive correlation with India, Japan, China, Taiwan, and Vietnam. Pakistan holds a partial positive correlation with India and Sri Lanka. Japan has a partial positive correlation with all the markets except, Sri Lanka (0.094) and Vietnam (0.058). China is correlated with all the markets except, Sri Lanka (0.073), Pakistan (0.076). Taiwan holds a very low correlation with India, Sri Lanka, and Pakistan. Vietnam is positively correlated with all the markets except India, Pakistan, and Taiwan.

Here, many markets hold a partial positive correlation with other markets, representing the average level of significance. Further, each market has a low correlation with some other markets, revealing an insignificant correlation among the markets due to the low magnitude of the coefficient. Few markets also hold no correlation (coefficient value near value 0) with other markets, revealing the lack of correlation among the markets. The majority of developed, emerging and frontier markets are not strongly correlated with each other. The insignificance and lower level of correlation reveal the lack of significant and strong integration among developed, emerging and frontier markets. This reveals

Correlation Analysis

Markets	BSE	CSE	FTSE Singapore	KOSPI	KSE	Nikkei	SSE	TWII	VNI
BSE	1								
CSE	0.399	1							
FTSE Singapore	0.502	0.425	1						
KOSPI	0.399	0.011	0.012	1					
KSE	0.425	0.394	0.001	0.005	1				
Nikkei	0.519	0.094	0.449	0.394	0.036	1			
SSE	0.451	0.073	0.415	0.471	0.076	0.479	1		
TWII	0.093	0.008	0.402	0.408	0.010	0.423	0.515	1	
VNI	0.024	0.415	0.081	0.396	0.008	0.058	0.445	0.032	1

Source: author's compilation.

the existence of portfolio diversification opportunities among the markets.

Granger causality test

Table 3 shows the results of the Granger causality test [19]. India has a bidirectional relationship with Singapore, Japan, and China. India does granger cause to Sri Lanka, Korea, and Pakistan. Sri Lanka has a bidirectional granger cause with Vietnam. Singapore holds a unidirectional granger cause to Sri Lanka, Japan, and Taiwan. Korea holds a bidirectional granger cause with Japan and China markets. Pakistan holds a unidirectional relationship with Sri Lanka. Japan has a bidirectional granger cause with India, Korea, and China. Japan has a unidirectional granger cause with Taiwan. China holds relationships with all the markets, except Pakistan. Taiwan does granger cause to Korea.

Here, among those markets that hold the granger cause, the majority holds a unidirectional relationship. Some of the markets hold bidirectional relationships with other markets. Further, some of the markets are not integrated with each other. Each developed, emerging, and frontier market is not integrated with other markets and hence offers a portfolio diversification opportunity. Among all the markets, Pakistan (Emerging markets) and Sri Lanka (Frontier markets) are the least integrated with other markets and offer more diversification opportunities. The lack of integration among some markets provides a portfolio diversification opportunity for investors.

The Johansen Cointegration test [20] is applied to measure the long-term integration among the markets. The results of the Cointegration test are reported (Table 4). Here, the H0 of no co-integration among the markets is rejected at a 1 per cent level of significance for many instances. India holds long-term Co-integration with all the markets, except Taiwan and Vietnam. Sri Lanka does not have long-term Cointegration with Korea, Japan, China, and Taiwan. Singapore is integrated longterm with all the markets except Korea, Pakistan, and Vietnam. Korea has long-term co-integration with India, Japan, China, Taiwan, and Vietnam. Pakistan is the least integrated market, holding long-term integration with India and Sri Lanka. Japan holds long-term integration with all the markets, except Sri Lanka, Pakistan, and Vietnam. China is the most integrated market among all the markets. China holds long-term integration with all the markets, except Sri Lanka and Pakistan. Taiwan has long-term integration with Singapore, Korea, Japan, China, and Vietnam. Vietnam holds long-term integration with all the markets, except India, Pakistan, and Taiwan.

The market, which holds long-term integration with other markets, has a significant value of trace statistics and Maximum Eigen Statistics. In all such market integration, the trace value is more than the critical value. This reveals the existence of a long-term relationship among the markets. However, each market

Table 3

Granger causality test results

Markets	BSE	CSE	FTSE Singapore	KOSPI	KSE	Nikkei	SSE	TWII	VNI
BSE	-	→	←→		→	←→	←→	≠	≠
CSE	≠	-	≠	≠	≠	≠	≠	≠	\longleftrightarrow
FTSE Singapore	←→		-	<i>≠</i>	≠		≠	→	<i>≠</i>
KOSPI	≠	≠	≠	-	≠	←→	←→	≠	≠
KSE	≠		≠	≠	-	≠	≠	≠	≠
Nikkei	←→	≠	≠	←→	≠	-	←→	→	≠
SSE	←→	≠	→	←→	≠		-	\longleftrightarrow	→
TWII	≠	≠	≠	→	≠	≠	←→	-	≠
VNI	≠	←→	≠	→	≠	≠	≠	≠	-

Source: compiled by the author.

Notes: The Symbol ← → shows bidirectional relationship among the markets. The Unidirectional relationship among the markets is indicated by — →. The symbol ≠ indicates no integration among the markets.

Johansen Cointegration test results

Table 4

Markets	BSE	CSE	FTSE Singapore	KOSPI	KSE	Nikkei	SSE	TWII	VNI
BSE	-	=	=	=	=	=	=	≠	≠
CSE	=	-	=	≠	=	≠	≠	≠	=
FTSE Singapore	=	=	-	≠	≠	=	=	=	≠
KOSPI	=	≠	≠	-	≠	=	=	=	=
KSE	=	=	≠	≠	-	≠	≠	≠	≠
Nikkei	=	≠	=	=	≠	-	=	=	≠
SSE	=	≠	=	=	≠	=	-	=	=
TWII	≠	≠	=	=	≠	=	=	-	=
VNI	≠	=	=	=	≠	=	=	≠	-

Source: compiled by the author.

Notes: Here, = Indicates the integration among the markets, ≠ Indicates the no integration among the markets.

is not integrated with some of the selected markets, and hence the portfolio diversification opportunity exists for the investors. The lack of long-term integration among some markets provides a diversification opportunity for investors.

Portfolio Diversification Benefits

Table 5 shows the portfolio diversification for the investors of all the countries based on the integration

analysis. The portfolio for each market is constructed using the daily return series (converted into annual returns) from January 2001 to December 2021. I then compared the non-diversified portfolio (home market) with the diversified portfolios (Equal Weighted Portfolio (EWP), Minimum Variance Portfolio (MVP), and Maximum Sharpe Portfolio (MSP). The objective of this analysis is to examine whether the diversification benefits exist or not.

The Indian Investors could not gain from the EWP strategy. The investors could earn a higher Sharpe ratio with the MVP (4.26) & MSP (4.59) as compared to the home market (3.72). The portfolio allocation as per MVP strategy consists of higher allocation in Taiwan (51.7%), India's home market (30.5%) and Vietnam (17.8%). The MSP consists of the investment holdings in India's home stocks (41.1%), Taiwan (30.7%), and Vietnam (28.2%).

The Sri Lankan Investors could gain in return for a unit of risk in the MVP (4.96) & MSP (5.32) as compared to the home market (4.60). The investors could have the lowest risk portfolio with major investment holdings in Japan (48%), Sri Lanka home stocks (18%), Taiwan (17%), and Korea (12%). The investors could achieve MSP with investment holdings in Sri Lanka home stocks (55%), Japan (21%), Korea (18%), and China (6%). Here, it is observed that Taiwan does offer the diversification opportunity to the investors of Sri Lanka but does not give the highest Sharpe ratio. The portfolio diversification could result in better return and Sharpe ratio for investors of Singapore. The Investors could earn the highest return per unit of risk with a value of 6.66 as per the MSP strategy. The Investors could have the lowest risk with the investment allocation of 46%, 34%, and 20%, in Singapore's home market, Korea and Pakistan, respectively. The investors could gain maximum Sharpe with the investment allocation in Pakistan (62.3%), Vietnam (22.2%), and Korea (15.5%).

The diversification could result in lower risk, better return, and a higher Sharpe ratio for Korean investors. The investors could have the lowest risk-based portfolio with an investment allocation in Pakistan (31%), Singapore (26%), Korea (25%), and Sri Lanka (18%). The investors could have the highest Sharpe of 9.44 with major investment holdings in Pakistan (57%), Sri Lanka (21%), and Singapore (15%). The Pakistani Investors could not gain from the EWP. However, the investors could earn better Sharpe in the diversification (MVP -5.89 & MSP - 6.15) as compared to the home market (5.65). The investors could reduce the risk to the lowest level of 2.70% with the investment allocation in Pakistan's home market (45%), Japan (25%), China (22%), and Singapore (8%). The MSP would consist major investment holdings in Japan (42%), Singapore (23%), Pakistan home stocks (16%), Taiwan (11%), Vietnam (8%). China and Korea offer diversification opportunities to Pakistani investors but can't offer the highest Sharpe ratio.

The Japanese investors could have higher returns, lower risk, and a better Sharpe ratio on the diversification of

investment. The investors could have a higher Sharpe ratio in diversification, i.e., EWP (3.56), MVP (5.68) and MSP (6.67) as compared to the home market (1.21). The portfolio allocation results of the Japanese investors show that the largest percentage of the investment holding would consist of Sri Lanka (37.7), Japan's home stocks (24.3%) and Pakistan (23.4%) in MVP. The investment holdings in the MSP consist of Pakistan (56.3%), Vietnam (22.1%), Japan's home market (8%), and Sri Lanka (21.6%).

The results reveal that Chinese investors could earn higher returns and Sharpe ratio in the diversification of investment. The equally weighted Portfolio with 17.56% could have guaranteed the highest average return. On the other hand, the maximum Sharpe portfolio would have been providing the highest return for a unit of risk as indicated by its Sharpe value of 6.23. The investors can have the maximum Sharpe ratio with investment allocation in Sri Lanka (57.7%) and Pakistan (42.3%). The portfolio allocation results for the MVP show that the largest percentage of holding would consist of Sri Lanka (57.2%), China home stocks (24.3%), and Pakistan (18.5%).

The outcome shows that Taiwanese investors could gain better in return and Sharpe ratio with the diversification of the investment. The Investors could earn higher return in the diversification strategies i.e., EWP (18.73%), MVP (10.94%) & MSP (20.59%) as compare to home market (9.53%). The investors could have the lowest risk of 1.99% as per MVP with major investment allocation in Taiwan's home market (36.1%), Sri Lanka (35.2%), Pakistan (19%), and India (9.6%). The investors could have the highest Sharpe ratio of 6.56 with major investment allocations in Pakistan (42.7%), Sri Lanka (31%), Taiwan's home market (19.2%), and India (7.10%). The Vietnam investors could gain better Sharpe in the diversification as compared to the home market. The investors could have the lowest risk of 3.00% with MVP. The portfolio allocation results show that the largest percentage of holding would consist of Taiwan (39.8%), Pakistan (35.1%), Vietnam's home market (18.3%), and India (6.8%). The diversification as per MSP could results in the highest Sharpe of 6.79, with major investment allocation in Pakistan (56.3%), Vietnam home stocks (24.3%) and Taiwan (19.50%).

The outcome reveals that the Investors could gain wealth with the diversification of investment portfolios to international markets. The investors could have better returns, lowest risk, and highest Sharpe with the

Table 5

Portfolio diversification benefits

			Home	Market		E	qually We	ighted Portfolio
Market	Return (%)	SD (%)	Sharpe Ratio	Portfolio Allocation (%)	Return (%)	SD (%)	Sharpe Ratio	Portfolio Allocation (%)
BSE	19.56	5.26	3.72	BSE - 100	16.73	5.38	3.10	33.33% in each market – India, Taiwan & Vietnam
CSE	18.80	4.09	4.60	CSE – 100	11.06	4.98	2.21	20% in each market — Sri Lanka, Korea, Japan, China, and Taiwan
FTSE Singapore	5.88	4.13	1.42	FTSE Singapore – 100	16.88	5.09	3.31	25% in each market — Singapore, Korea, Pakistan, Vietnam
Kospi	12.99	5.06	2.56	Kospi – 100	18.17	4.51	3.58	20% in each market — Korea, Sri Lanka, Singapore, Pakistan
KSE	27.05	4.79	5.65	KSE – 100	12.93	5.13	2.51	14.2% in each market — Pakistan, Singapore, China, Korea, Japan, Taiwan, Vietnam
Nikkei	6.64	5.49	1.21	Nikkei – 100	18.52	5.19	3.56	25% in each market – Japan, Sri Lanka, Pakistan, Vietnam
SSE	7.37	5.65	1.30	SSE — 100	17.56	4.79	3.66	33.33% in each market – China, Sri Lanka, Pakistan
TWII	9.53	4.64	2.05	TWII – 100	18.73	4.69	3.99	25% in each market – Taiwan, India, Sri Lanka, Pakistan
VNI	21.61	6.42	3.36	VNI – 100	19.43	5.27	3.68	25% in each market – Vietnam, India, Pakistan, Taiwan
		Min	imum Var	iance Portfolio		M	aximum S	Sharpe Portfolio
Market	Return (%)	SD (%)	Sharpe Ratio	Portfolio Allocation (%)	Return (%)	SD (%)	Sharpe Ratio	Portfolio Allocation (%)
BSE	14.74	3.46	4.26	BSE - 30.5, TWII - 51.7, VNI - 17.8	17.06	3.72	4.59	BSE - 41.1, TWII - 30.7, VNI - 28.2
CSE	10.12	2.04	4.96	CSE - 18.0, Kospi - 12.0, Nikkei - 48.0, SSE - 5.0, TWII - 17.0	14.52	2.73	5.32	CSE – 55.0, Kospi – 18.0, Nikkei – 21.0, SSE – 6.0,
FTSE				1 7711 — 17.0				TWII - 0.0
Singapore	12.53	3.01	4.16	FTSE Singapore – 46.0 Kospi – 34.0, KSE – 20.0, VNI – 0.0	23.66	3.55	6.66	FTSE Singapore — 0, Kospi — 15.5, KSE — 62.3, VNI — 22.2
Singapore Kospi	12.53 16.54	3.01	4.16 7.86	FTSE Singapore – 46.0 Kospi – 34.0, KSE – 20.0,	23.66	3.55	6.66 9.44	FTSE Singapore — 0, Kospi —
				FTSE Singapore – 46.0 Kospi – 34.0, KSE – 20.0, VNI – 0.0 CSE – 18.0, FTSE Singapore – 26.0				FTSE Singapore — 0, Kospi — 15.5, KSE — 62.3, VNI — 22.2 CSE — 21.0, FTSE Singapore — 15.0,
Kospi	16.54	2.10	7.86	FTSE Singapore — 46.0 Kospi — 34.0, KSE — 20.0, VNI — 0.0 CSE — 18.0, FTSE Singapore — 26.0 Kospi — 25.0, KSE — 31.0 FTSE Singapore — 8, Kospi — 0, KSE — 45, Nikkei — 25.0, SSE — 22.0,	21.16	2.24	9.44	FTSE Singapore — 0, Kospi — 15.5, KSE — 62.3, VNI — 22.2 CSE — 21.0, FTSE Singapore — 15.0, Kospi — 7.0, KSE — 57.0 FTSE Singapore — 23, Kospi — 0, KSE — 16, Nikkei — 42.0, SSE — 0, TWII — 11.0, VNI — 8.0 CSE — 21.6, KSE — 56.3, Nikkei — 8, VNI — 22.1
Kospi	16.54	2.10	7.86	FTSE Singapore — 46.0 Kospi — 34.0, KSE — 20.0, VNI — 0.0 CSE — 18.0, FTSE Singapore — 26.0 Kospi — 25.0, KSE — 31.0 FTSE Singapore — 8, Kospi — 0, KSE — 45, Nikkei — 25.0, SSE — 22.0, TWII — 0, VNI — 0.0 CSE — 37.7, KSE — 23.4,	21.16	2.24	9.44	FTSE Singapore — 0, Kospi — 15.5, KSE — 62.3, VNI — 22.2 CSE — 21.0, FTSE Singapore — 15.0, Kospi — 7.0, KSE — 57.0 FTSE Singapore — 23, Kospi — 0, KSE — 16, Nikkei — 42.0, SSE — 0, TWII — 11.0, VNI — 8.0 CSE — 21.6, KSE — 56.3,
Kospi KSE Nikkei	16.54 15.92 18.18	2.10 2.70 3.20	7.86 5.89 5.68	FTSE Singapore — 46.0 Kospi — 34.0, KSE — 20.0, VNI — 0.0 CSE — 18.0, FTSE Singapore — 26.0 Kospi — 25.0, KSE — 31.0 FTSE Singapore — 8, Kospi — 0, KSE — 45, Nikkei — 25.0, SSE — 22.0, TWII — 0, VNI — 0.0 CSE — 37.7, KSE — 23.4, Nikkei — 24.3, VNI — 14.5 CSE — 57.2, KSE — 18.5,	21.16 17.40 24.07	2.24 2.83 3.61	9.44 6.15 6.67	FTSE Singapore — 0, Kospi — 15.5, KSE — 62.3, VNI — 22.2 CSE — 21.0, FTSE Singapore — 15.0, Kospi — 7.0, KSE — 57.0 FTSE Singapore — 23, Kospi — 0, KSE — 16, Nikkei — 42.0, SSE — 0, TWII — 11.0, VNI — 8.0 CSE — 21.6, KSE — 56.3, Nikkei — 8, VNI — 22.1 CSE — 42.3, KSE — 57.7, SSE —

Source: compiled by the author.

Gain in Sharpe ratio

Mauline	Equally Weig	ghted Portfolio	Minimum Vari	ance Portfolio	Maximum Sharpe Portfolio		
Market	ΔSR	Δ SR%	ΔSR	Δ SR%	ΔSR	Δ SR%	
India	-0.62	-16.69%	0.54	14.48%	0.87	23.35%	
Sri Lanka	-2.39	-51.92%	0.36	7.92%	0.72	15.75%	
Singapore	1.89	132.73%	2.74	192.49%	5.24	368.27%	
Korea	1.01	39.42%	5.29	206.10%	6.87	267.63%	
Pakistan	-3.14	-55.58%	0.24	4.25%	0.50	8.85%	
Japan	2.35	194.11%	4.47	369.26%	5.46	451.04%	
China	2.36	180.62%	3.85	294.87%	4.93	377.67%	
Taiwan	1.94	94.47%	3.46	168.55%	4.51	219.73%	
Vietnam	0.31	9.32%	2.81	83.58%	3.42	101.70%	

Source: compiled by the author.

Note: The Δ in Sharpe Ratio (SR) and the Δ % in Sharpe ratio (SR) represents the change with respect to home portfolio.

diversification of investment. During the analysis, it was observed that the market has diversification opportunities with other markets, but not all such markets could give diversification benefits. The investors could have the lowest risk and highest Sharpe with the diversification strategies but the investors do not require diversifying their investment to all the markets. In other words, few markets that offer diversification opportunities could not offer diversification benefits. The analysis of the gains from the portfolio diversifications is shown below.

Gains from the International diversifications

Table 6 shows the results of gains from the international diversification from perspective of investors. Here, the Sharpe ratio of EWP, MVP & MSP is compared with the Sharpe ratio of home markets, to examine the gains from the international diversifications.

The Indian investors could not gain from diversification by adopting the EWP strategy. The investors could have gained in the Sharpe ratio by 14.48% on adopting MVP and 23.35% on adopting the MSP strategy. The Sri Lankan investors could gain in Sharpe ratio by 7.92% and 15.75% on adopting MVP & MSP strategies, respectively. The EWP strategy leads to wealth loss (in Sharpe ratio) of –51.92% for Sri Lankan investors. The investors from Singapore could have gained significantly by adopting the diversification strategies. The Singapore investors could have increased

their Sharpe ratio by 1.32, 1.92 & 3.68 times on adopting EWP, MVP & MSP, respectively. The Korean Investors could have gained the Sharpe ratio by 39.42% on adopting EWP, 206.10% on adopting MVP, and 267.63% on adopting MSP as a diversification strategy. The investors of Pakistan could have a loss of 56% in the Sharpe ratio on adopting EWP as a diversification strategy. The investors could gain in Sharpe ratio by 4.25% on adopting MVP & 8.55% on adopting MSP as a diversification strategy. Japanese investors could have gained in the Sharpe ratio by 1.94, 3.69 and 4.51 times, by adopting EWP, MVP & MSP strategies, respectively. The Chinese investors could gain in Sharpe significantly by adopting diversification as compared to investing in the home market. The Investors of China could have gained the Sharpe of their investment by 1.80, 2.94 & 3.77 times by adopting EWP, MVP & MSP diversification strategies, respectively. The Taiwan Investors could have gained a Sharpe ratio of 94.47% by adopting EWP, 168.55% by adopting MVP, and 219.73% by adopting MSP as a diversification strategy. The Investors from Vietnam witnessed an increase in the Sharpe ratio from all the strategies. However, the investors do not gain significantly from the EWP Strategy. The Investors could increase the Sharpe ratio of their investment by 83.58% on adopting MVP Strategy and 101.70% on adopting MSP Strategy.

The outcome reveals that the investors could gain from the diversification of portfolios. The EWP

remains beneficial for the investors of all the countries, except India, Sri Lanka & Pakistan. The investors of all the countries could have gained significantly in the Sharpe ratio by adopting MVP & MSP strategies. The diversification of the investment as pre-MVP and MSP strategies could result in significant gains in wealth for the investors. Diversification can result in a better risk-return tradeoff for the investors.

CONCLUSION AND IMPLICATIONS

The objective of the study was to examine the existence of portfolio diversification opportunities and measure the diversification benefits. The study is performed on 9 indexes (2 developed markets, 5 emerging markets, and 2 frontier markets) covering a period from January 1, 2001, to December 31, 2021.

Many markets hold a partial positive correlation with other markets, representing an average level of significance. Each market has a very low magnitude correlation with some other markets. Few markets do not have a correlation with some other markets. The insignificance and lower level of correlation reveal the lack of significant and strong integration among the markets, which reveals the existence of portfolio diversification opportunity. The study measured short and long-term integration among the markets. The outcome of the Granger causality and Johansen Cointegration test reveals majority of the markets are integrated with each other. However, still some of the markets do not have short and long-term integration with other markets, which proves the existence of portfolio diversification opportunities. The integration measurement reveals the portfolio diversification opportunity for the developed markets in frontier and emerging markets. The frontier

market can diversify its investment to emerging markets. The emerging markets have limited diversification opportunities within emerging and frontier markets due to integration with each other.

The study has implications for the investors with respect to their investment portfolio. Based on the lack of integration among the market, the potential benefits of the portfolio diversification for the investors of all the markets are measured. The non-diversified portfolio (home market) is compared with the diversified portfolios (EWP, MVP, MSP) to measure the potential benefits of diversification. The result reveals that investors can have significant gain in wealth with investment diversification. The investors could earn better returns, lowest risk, and highest Sharpe with the diversification of investment. Investors can have diversification opportunities in many possible markets but the diversification benefits realize in certain markets only. Hence, the investors should invest in such markets where the diversification benefits can actually be realized. The diversification strategies can result in a significant gain in the Sharpe ratio and a better risk-return tradeoff for the investors. Among all, the minimum variance portfolio (MVP) and maximum Sharpe ratio strategies can give the maximum benefits to the investors. The investors can allocate their funds in a particular proportion to different markets to get the best risk-return tradeoff out of their investment.

The present study is limited to the Asian region only. The emerging and frontier markets offer better diversification opportunities due to the growing economic phase. Thus, in future, more such studies can be conducted to measure the portfolio diversification opportunity and potential benefits by adding the emerging and frontier markets of other regions.

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Improvement of Methods of Quality Assessment of Financial Management of Chief Administrators of Budgetary Funds

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ABSTRACT

The quality of financial management is one of the key factors in achieving the goals and objectives of both commercial organizations and public sector organizations. The subject of this study is the relationship between the budget process participants, arising as a result of organizing and conducting an assessment of the quality of financial management in accordance with the budget legislation of the Russian Federation. The degree of scientific development of the topic is assessed as low since at the moment there is no consistent approach to assessing the quality of financial management from the point of view of financial management, and therefore this issue is relevant. The aim of the study is to substantiate the need to improve the methodology for assessing the quality of financial management of the chief administrators of budgetary funds. The issue of assessing the quality of financial management in the public administration sector is controversial and fairly new in the theory of public and municipal finance. The author used the following methods in the paper: an abstract-logical method, analysis and synthesis, induction and deduction. As a result of the study, a number of problems have been identified related to the reliability of the assessment of the quality of financial management of the chief administrators of budgetary funds, its significance, comparability, and objectivity, and the quality of legal and methodological support for the assessment. It is concluded that it is necessary to clarify the current budget legislation and eliminate legal conflicts, separate the results of assessing the quality of financial management of federal ministries, services, and agencies, adjust the formulas for calculating the values of indicators in the direction of "budget expenditures management", and also introduce disciplinary responsibility of the head of the chief administrator of budgetary funds. The **novelty** of the study lies in the proposal of specific measures to improve the assessment of the quality of financial management of the chief administrators of budgetary funds in the framework of developing measures to improve the efficiency of the budget process.

Keywords: quality of financial management; public sector finance; effective management concept; budget process; budgetary powers; public sector organizations; chief administrator of budgetary funds

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INTRODUCTION

Management of public and municipal finances is designed to achieve established socio-economic goals through the efficient use of limited financial resources. The quality of financial management carried out by the chief administrators of budgetary funds largely determines the effectiveness of the ongoing budget policy in the country.

The issue of assessing the quality of financial management in the field of public administration is debatable and fairly new in the theory of public and municipal finance. There are a number of publications of domestic researchers: theoretical and practical aspects are considered in the studies by A.M. Lavrov [1], A. G. Siluanov [2, 3], S. S. Bychkov [4, 5], L. I. Pronina [6], A. G. Zhukova [7–9], N. S. Shmigol' [10], etc. This topic is largely based on the current federal regulatory legal acts, including the legal acts of the Government of the Russian Federation and the Ministry of Finance of the Russian Federation.

The objectives of this study:

- 1. Determine the content of the assessment of the quality of financial management of the chief administrators of budgetary funds.
- 2. Analyze the legal framework for assessing the quality of financial management of the chief administrators of budgetary funds.
- 3. Study foreign experience in assessing the quality of financial management of the chief administrators of budgetary funds.
- 4. Develop recommendations for improving the methodology for assessing the quality of financial management of the chief administrators of budgetary funds.

The object of the study is the theoretical, methodological, and legal aspects of the methodology for assessing the quality of financial management of the chief administrators of budgetary funds as a tool for improving the efficiency of public finance management. The subject of the paper is the activities of authorized bodies for assessing the quality of financial management in accordance with the budget legislation of the Russian Federation.

CONTENT OF THE METHODOLOGY FOR ASSESSING THE QUALITY OF THE FINANCIAL MANAGEMENT OF THE CHIEF ADMINISTRATORS OF BUDGETARY FUNDS

Since the beginning of the budget reform in the 2000s in Russia in the field of public (municipal) finances, the term "financial management" began to be used. Some authors define financial management in state bodies as "the process of implementation by the participants of the budget process of budget procedures in the exercise of their budgetary powers, which are established by the budget legislation of the Russian Federation, and taking measures to improve the quality of their execution" [1]. Financial management should ensure the prevention and mitigation of negative consequences affecting the execution of budgetary powers.

According to the generally accepted concept of effective management, the main focus in public financial management is not on the process, but on the results of management. The transition to the principles of effective management was set as the main goal of the budget reform launched in 2004. The Budget Message of the President of the Russian Federation to the Federal Assembly "On Budget Policy in 2004" set the task for 2004 and the medium term to introduce modern methods of budget planning, focused on the final result and stimulate the most efficient use of budget funds. The quality of management as a whole reflects the level of perfection of management processes [11].

Taking into account the positive experience of approbation of the program-targeted budgeting mechanism in 2004–2006 the financial authorities have been tasked with implementing a quality control system for financial management. Monitoring of the quality of financial management began to be introduced into the budget process of the

 $^{^{\}rm l}$ Section 29 p / 2 of the Budget Message to the Federal Assembly "On Budget Policy in 2008–2010".

Russian Federation in 2007–2008 as part of the implementation of the concept of performance-based budgeting.

Despite the extensive experience in introducing effective management tools into the budget process, at present, the meaning of the term "financial management" is not established by the Budget Code of the Russian Federation. In order to fulfill paragraph 6 of Art. 160.2–1 of the Budget Code of the Russian Federation by Order of the Ministry of Finance of the Russian Federation dated November 14, 2019 No. 1031 "On approval of the methodological guidelines for controlling the quality of financial management" (hereinafter referred to as the Guidelines approved by Order No. 1031), financial management is defined as "an organization and execution by the chief administrator (administrator) of budgetary funds, the recipient of budgetary funds, the financial body (management body of the state non-budgetary fund) of budgetary procedures in order to exercise budgetary powers.²

The concept of "the chief administrator of budgetary funds" is applied to the subjects of budgetary legal relations, is of a general nature, and refers to the chief managers of budgetary funds, the chief administrators of budget revenues, and the chief administrator of sources of financing the budget deficit.³ The definitions of these terms are enshrined in Art. 6 of the Budget Code of the Russian Federation.

According to paragraph 6 of Art. 160.2–1 of the Budget Code of the Russian Federation, the quality control of financial management is carried out, including quality control of the execution of budgetary powers, as well as the quality of asset management, procurement of goods, works, and services to meet state (municipal) needs. Monitoring the quality of financial management of the chief

administrators of budgetary funds is a form of control aimed at assessing the achievement of the established target values of indicators of the quality of execution of budgetary powers assigned to the chief administrators of budgetary funds in accordance with the legislation of the Russian Federation [12]. Methodological recommendations approved by Order No. 1031 define monitoring of the quality of financial management as the analysis and assessment of the implementation of budgetary powers by the object of monitoring, including the results of the implementation of budgetary procedures carried out by the subject of monitoring.

Monitoring the quality of financial management is characterized by dynamism, as it is an assessment of the quality of financial management, carried out on an ongoing basis for years. It should be noted that the process of its implementation is usually decentralized [13].

The results of monitoring the quality of financial management of public administration organizations are used to improve the quality of implementation of budgetary procedures, timely assessment and mitigation of budgetary risks, and improve the quality of financial discipline [14]. In addition, it is advisable for the state financial control authorities to use them to apply the risk-based method when planning control measures [15, 16].

Thus, the assessment of the quality of financial management of the chief administrators of budgetary funds can be defined as a set of analytical procedures implemented by a specially authorized organization in the public sector in the form of quarterly and annual monitoring, the result of which is to identify the degree of achievement of established indicators and the fulfillment by the chief administrators of budgetary funds of the budget powers entrusted to them in accordance with the budget legislation of the Russian Federation.

At the moment, the assessment of the quality of financial management of the chief administrators of budgetary funds is carried

 $^{^{\}rm 2}$ Clause 4 of the Guidelines approved by Order of the Ministry of Finance of Russia dated 14.11.2019 No. 1031.

 $^{^{\}rm 3}$ Paragraph 1 of the letter of the Ministry of Finance of Russia dated 15.10.2015 No. 02–01–10 / 59024 [On the clarification of the concept of "chief administrator of budgetary funds" and on the exercise of the powers and functions of the chief administrator of budgetary funds].

out on the basis of quarterly and annual monitoring in the following areas: "budget expenditure management" (0.5), "budget revenue management" (0.2), "accounting and budget reporting" (0.1), "organization and conduct of internal financial audit" (0.1) and "asset management" (0.1).

When calculating the assessment of the quality of financial management of the chief administrators of budgetary funds, two types of indicators are used:

- 1) indicators assessed according to a certain criterion (non-compliance with the procurement planning rules, violation of the deadlines for bringing budget allocations, the availability of an approved methodology for forecasting budget receipts, etc.);
- 2) indicators evaluated according to formulas that determine the value of the assessment depending on the deviation of the indicator value from its optimal interval (as a rule, the optimal interval is not some range of acceptable values, but the only value the target one).

Each indicator is evaluated in points. Based on them, the characteristic of the indicator is carried out. The higher the score, the better the quality of the chief budget administrator's financial management. Low scores indicate "weaknesses".

REGULATORY SUPPORT FOR ASSESSING THE QUALITY OF FINANCIAL MANAGEMENT OF CHIEF ADMINISTRATORS OF BUDGETARY FUNDS

In general, a retrospective of the regulatory legal acts of the Russian Federation governing the organization and conduct of an assessment of the quality of financial management of the chief administrators of federal budgetary funds is as followы:

• Order of the Ministry of Finance of the Russian Federation dated December 10, 2007, No. 123n "On the organization of control over the quality of financial management carried out by the chief administrators of federal budgetary funds";

- Order of the Ministry of Finance of the Russian Federation dated April 13, 2009, No. 34n "On the organization of quality control of financial management carried out by the chief administrators of federal budgetary funds";
- Order of the Ministry of Finance of the Russian Federation dated December 29, 2017, No. 264n "On the preparation of a report of the Ministry of Finance of the Russian Federation on the results of quality control of financial management carried out by the chief administrators of federal budgetary funds (chief administrators of federal budgetary funds, chief administrators of federal budgetary revenues, chief administrators of sources of financing the federal budget deficit)" (hereinafter referred to as the Regulation approved by Order No. 264n);
- Order of the Ministry of Finance of the Russian Federation dated June 18, 2020, No. 112n "On Approval of the Procedure for Quality Control of Financial Management by the Ministry of Finance of the Russian Federation" (hereinafter referred to as the Procedure approved by Order No. 112n).

According to paragraph 6 of Art. 160.2–1 of the Budget Code of the Russian Federation, control over the quality of financial management is carried out by:

- financial body (the governing body of the state non-budgetary fund) in relation to the chief administrators of budgetary funds;
- the chief administrators of budgetary funds in relation to the managers of budgetary funds subordinate to him.

A retrospective of the regulatory framework indicates that initially, all areas of assessment at the federal level had an equal share in the calculation of the final assessment, however, in 2010, differentiation of specific weights was introduced depending on the significance of each component.⁴

A new stage in the development of the methodology for assessing the quality of

⁴ Appendix 1 of Order No. 192n of the Ministry of Finance of Russia dated December 29, 2010 "On Amendments to Order No. 34n of the Ministry of Finance of the Russian Federation dated April 13, 2009".

financial management, characterized by linking the systems of internal financial control, internal financial audit, and the system for monitoring the quality of financial management, the redistribution of the specific weights of areas, the introduction of target values, the maximum allowable deviation of 25% from target values and a letter rating (from AAA to CC), began with the entry into force of the order of the Ministry of Finance of Russia dated December 29, 2017, 264n.

At the moment, the Procedure approved by order of the Ministry of Finance of Russia dated September 18, 2020, No. 112n is in force, in accordance with which indicators for assessing the quality of internal financial control are no longer calculated due to the exclusion of internal financial management from the budgetary powers of the chief administrators of budgetary funds.

Raising the issue of compliance with the deadlines for the submission of budget reports by the chief administrators, the author revealed the following. During the annual control, the chief administrators of budgetary funds must submit to the Ministry of Finance of Russia information on violations identified by the state financial control authorities in the reporting period before September 1 of the current financial year.⁵ Annual monitoring is carried out until June 1 of the year following the reporting year, respectively, information about identified violations should be received by officials of the Ministry of Finance of Russia as soon as possible before June 1, and not earlier than September 1, in connection with which the author determined the need to revise the deadlines.

The need for such information to be provided by the chief administrators indicates that there is no automated data transfer to calculate the financial management performance score. This entails a slowdown in the process of calculating the assessment and the human factor, therefore, in the future, it seems appropriate to perform the task of automating the organization of the assessment. An example of best practice is the introduction of the automated organization and calculation of estimates in Moscow: financial management quality control is carried out through the Automated City Finance Management System of the City of Moscow (ASU GF).⁶

INTERNATIONAL EXPERIENCE IN ASSESSING THE QUALITY OF FINANCIAL MANAGEMENT BY THE CHIEF ADMINISTRATORS OF BUDGETARY FUNDS

In foreign countries, as a rule, the system of public administration, including the financial management of public sector organizations, is arranged in such a way that the mechanisms for assessing its quality are built into the system of executive power.

The experience of Sweden is interesting, where "ministries and departments are annually ranked in four groups depending on the volume of budgetary powers within the budget process" [1]. Just like in Russia, in Sweden the introduction of such a rating is due to the implementation of the principles of effective management within the framework of the PB concept — performance-based budgeting, which, among other things, involves the decision-making by the authorities on the disposal of budget funds independently.

In Sweden, the quality of financial management is assessed by the Office of Economic Regulation, which is under the jurisdiction of the Ministry of Finance and is an expert body that provides expert assistance to public sector organizations in improving the quality of their financial performance.

The economic regulatory body has established that the assessment of the quality

⁵ Clause 10.2 of the Procedure approved by order of the Ministry of Finance of Russia dated 18.06.2020 No. 112n.

⁶ Clause 1.6 of the Procedure for monitoring the quality of financial management in relation to the chief administrators of budgetary funds of Moscow, approved by Order of the Department of Finance of Moscow dated December 31, 2020 No. 346.

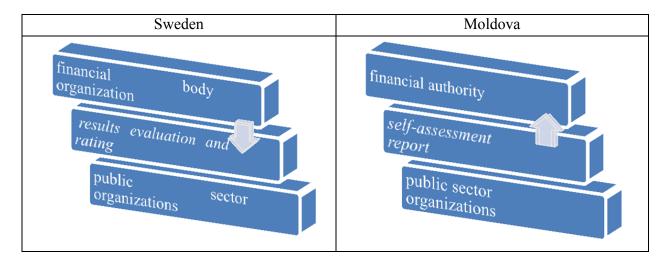


Fig. 1. Approaches to assessing the quality of financial management in Sweden and Moldova

Source: compiled by the author on the basis of the order of the Ministry of Finance of the Republic of Moldova dated April 26, 2012, No. 49 "On Approval of the Regulations for the Assessment, Reporting of the Financial Management and Control System and the Issuance of a Declaration of Good Governance".

of financial management may not be carried out if the body exists for a short time or if it is planned to be liquidated. In addition, if the potential object of assessing the quality of financial management has a large number of industry specifics, then the traditional assessment (in the form in which it is usually carried out) may also not be carried out due to its inappropriateness and the possibility of obtaining unreliable data. In this case, the assessment of the quality of financial management is aimed at identifying the ability to reliably and effectively manage financial resources.

The results of assessing the quality of financial management are recorded in the rating (on a scale from AA to CC) [17]. If the body or government agency complies with all financial and administrative regulations, then the assessment of the object is given a high score. Conversely, if the body acts unsatisfactorily in the framework of budgetary management, then in this case it receives a recommendation from the decisions on the need to carry out its financial activities. This approach has been implemented in the Russian Federation since 2018.

Assessing the quality of financial management in Sweden goes beyond aspects

of the financial activities of public authorities. Thus, in addition to public sector indicators, population registration systems are considered. Taking into account the population quality register system for assessing financial management in Sweden makes it possible to assess the economic activity of the population and them as users of public services, which, in turn, are provided on a budgetary basis.⁷

A different approach to the methodology for assessing the quality of financial management in Moldova. The main aspects of the financial management system are established by the Law of the Republic of Moldova of September 23, 2010, No. 229 "On State Financial Control". In pursuance of this law, by order of the Ministry of Finance, the Regulation on the evaluation of financial management was put into effect. Monitoring and evaluation of the phenomenon based on preliminary observation, self-assessment, and internal audit.

⁷ Student abstracts. Population register. URL: https://studref.com/422209/ekonomika/registr_naseleniya (accessed on 07.12.2021).

⁸ Order of the Ministry of Finance of the Republic of Moldova dated April 26, 2012 No. 49 "On approval of the Regulations for the assessment, reporting of the financial management and control system and issuance of a declaration on good governance".

This Regulation establishes the procedure for conducting a self-assessment of the quality of financial management by the authorized body or the head of the institution on the basis of an approved list of issues on financial activities. The head of the state entity is responsible for the process of self-assessment of the financial management system. The result of an individual self-assessment is the signing of a declaration of good governance, according to which the head of the body/ institution takes responsibility for the quality of financial management. The self-assessment form is built on the principles of the COSO model. It is simple because it consists of yes or no questions (for example, the existence of an internal control system, compliance with regulations, budget reporting, etc.). When interpreting the results of filling out the form, there are also no difficulties: if the share of "yes" answers is greater than or equal to 51%, then the quality of financial management is recognized as reliable. Further, based on the percentage of "yes" and "no" answers, a grade is given: from A (highest) to D (worst). The report on the results of the self-assessment of the quality of financial management is sent to the Ministry of Finance of the Republic of Moldova.

Let us consider the systematized information on the procedure for organizing the assessment of the quality of financial management in Sweden and the Republic of Moldova (Fig. 1). A vertical system is being introduced in Russia and Sweden, and a horizontal one is in the Republic of Moldova. A common point in the implementation of the results of assessing the quality of financial management is that the objects of assessment independently solve the problem of improving the quality of financial management, regardless of whether the assessment is carried out by a financial authority or in the form of self-assessment.

International experience can be useful in improving the methodology for assessing the quality of financial management in the Russian Federation based on an analysis of best practices in this area.

RECOMMENDATIONS FOR IMPROVING THE METHODOLOGY FOR ASSESSING THE QUALITY OF THE FINANCIAL MANAGEMENT OF THE CHIEF ADMINISTRATORS OF BUDGETARY FUNDS

At this stage, the methodology for assessing the quality of financial management of the chief administrators of budgetary funds does not allow to fully solve the tasks facing it. To date, the assessment reflects only the state of financial management but does not reveal factors affecting its quality [18]. The author identifies three groups of areas for improving the methodology for assessing the quality of financial management:

- improvement of the legal framework and the current methodology;
- improvement of organizational aspects (at present, there are no stimulating factors and responsibility for violating the deadlines for providing information to the Ministry of Finance of Russia on the objects of assessment, in addition, the methodology for assessing the quality of financial management by the Ministry of Finance of Russia has been approved, but is also an object of assessment, in connection with which it can be assumed that possible adjustment of the methodology for themselves);
- automation of the process (an automated program with built-in effective valuation formulas used by employees of the Russian Ministry of Finance to calculate the valuation is imperfect since in practice there have been cases of discrepancies between the valuation results calculated by the automated program and the valuation results obtained by recalculating it by the chief administrator).

Regulatory legal acts establish the methodology and procedure for assessing the quality of financial management of the chief administrator of budgetary funds but do not directly define this term. The author proposes to legislate this concept as a set of analytical procedures within the framework of quarterly and annual monitoring, the result of which is to identify the degree of achievement of established indicators and the implementation

Table 1
Planned values of the average indicator of the quality of financial management according to the
Program

Indicator	2018	2019	2020	2021	2022	2023	2024
Average indicator of the quality of financial management	50	55	60	70	71	73	75

Source: compiled by the author on the basis of the Decree of the Government of the Russian Federation dated April 15, 2014, No. 320 "On Approval of the State Program of the Russian Federation "Public Financial Management and Regulation of Financial Markets".

of budgetary powers by the chief administrator of budgetary funds are assigned to them in accordance with the budgetary legislation of the Russian Federation.

In addition to the gap in the definition, the existing methodology for assessing the quality of financial management is characterized by inaccuracies that need to be corrected in order to eliminate the conflicts they cause. Decree of the Government of the Russian Federation dated April 15, 2014, No. 320 approved the state program "Public financial management and regulation of financial markets" (hereinafter referred to as the Program). According to the Program, the improvement of the quality of public financial management is planned to be achieved through the implementation of tasks to improve the efficiency of public financial management, and the active introduction of digital technologies as part of the process of digitalization of the economy and other spheres of society.

Indicator 2.5. of the Program is designated as the "Average indicator of the quality of financial management of the chief administrators of federal budgetary funds". One of the directions of state policy within the framework of the Program implementation is the creation and provision of conditions for improving the quality of financial management of the chief administrators of budgetary funds and state (municipal) institutions.

The planned values of the average indicator of the quality of financial management of the chief administrators of federal budgetary funds are approved by the Program passport (*Table 1*).

According to the Procedure for Quality Control of Financial Management, the target value for each area (A) is calculated by the formula:

$$A = \frac{100 + AVGsp}{2},$$

where *AVGsp* — average financial management quality index for the corresponding year, established by the Program.⁹

However, this index has not been included in the state program "Public Financial Management and Regulation of Financial Markets" since 2019. It turns out that the Procedure approved by Order No. 112n referred to a non-existent indicator. There is a terminological inaccuracy: when calculating the target value, not an average index is used (outdated indicator 6 "Average indicator of the quality of financial management of the chief administrators of federal budgetary funds" 10), as established by the Procedure, but indicator 2.5 "Average indicator of the quality of financial management of the chief administrators of federal budgetary funds". This shortcoming remains in the Procedure approved by Order No. 112n. It is necessary to eliminate this terminological inaccuracy by correcting the commentary to the formula for calculating the target value for each direction in Appendix No. 1 to the Procedure approved by Order

⁹ Appendix No. 1 to the Procedure approved by Order of the Ministry of Finance of Russia No. 112n dated September 18, 2020.

¹⁰ Decree of the Government of the Russian Federation No. 320 dated April 15, 2014 "On Approval of the State Program of the Russian Federation "Public Financial Management and Regulation of Financial Markets"".

Indicator "Timeliness of making budgetary commitments"

Calculation of the value of the financial management quality indicator

When monitoring for the I quarter of the current financial year

$$E(P) = \begin{cases} 1, & \text{if } P \le 0.8 \\ 0 & \text{otherwise} \end{cases}$$

When monitoring for the II quarter of the current financial year

$$E(P) = \begin{cases} 1, & \text{if } P \le 0.6 \\ 0 & \text{otherwise} \end{cases}$$

When monitoring for the III quarter of the current financial year

$$E(P) = \begin{cases} 1, & \text{if } P \le 0.3\\ 0 & \text{otherwise} \end{cases}$$

During the annual monitoring

$$E(P) = \begin{cases} 1, & \text{if } P \le 0.1 \\ 0 & \text{otherwise} \end{cases}$$

Source: compiled by the author on the basis of the Order of the Ministry of Finance of the Russian Federation dated June 18, 2020, No. 112n "On Approval of the Procedure for Monitoring the Quality of Financial Management by the Ministry of Finance of the Russian Federation".

No. 112n: "average index of the quality of financial management" should be replaced with "average indicator of the quality of financial management".

Often, the leaders in the financial management quality rating are mainly federal services. This may be due to the fact that "expenditure management in federal services is relatively simple, since the largest amount of expenses falls on ensuring the organization of their activities" [1]. In this regard, for greater comparability of the results obtained and a correct comparison of the results between the objects of monitoring the quality of financial management, it seems appropriate to single out the results of federal ministries, services and departments under the jurisdiction of executive authorities. At the same time, the state program "Management of public finances and regulation of financial markets" should provide for several

planned values of the average indicator of the quality of financial management of federal ministries, services and departments.

Despite the fact that the regulatory framework for organizing and assessing the quality of financial management of the chief administrators of budgetary funds is gradually being improved, inaccuracies in the formulas still remain in the current methodology, causing difficulties in calculations [19]. To confirm this opinion, let us consider the calculation of the values of financial management quality indicators in the direction of budget expenditure management, which has the largest share in the final assessment.

First, the calculation of the value of the timeliness of making budgetary commitments indicator is incorrect (*Table 2*). According to the General Provisions of the Procedure, approved by Order No. 112n, the quality

Table 3

Indicator "Quality of execution of orders of the Accounts Chamber of the Russian Federation and the Federal Treasury"

Calculation of the value of the financial management quality indicator

$$E(P) = P = \frac{\left| Q_p + 0.5 * Q_c \right|}{Q_n}$$

where Q_n – the number of orders executed by the chief administrator, units;

Q – the number of orders partially executed by the chief administrator, units;

 Q_a – the number of orders sent to the chief administrator, units.

Source: compiled by the author on the basis of the Order of the Ministry of Finance of the Russian Federation dated June 18, 2020, No 112n "On approval of the procedure for monitoring the quality of financial management by the Ministry of Finance of the Russian Federation".

Table 4

The formula proposed by the author for calculating the value of the indicator "Quality of execution of the orders of the Accounts Chamber of the Russian Federation and the Federal Treasury of the Russian Federation"

Calculation of the value of the financial management quality indicator

$$E(P) = P = \frac{Q_p}{Q_n},$$

where Q_p – the number of orders executed by the chief administrator on time, units; Q_p – the number of orders sent to the chief administrator, units.

Source: compiled by the author on the basis of the Order of the Ministry of Finance of the Russian Federation dated June 18, 2020, No. 112n "On Approval of the procedure for monitoring the quality of financial management by the Ministry of Finance of the Russian Federation".

control of the financial management of the chief administrators of budgetary funds for the I and II quarters is not carried out separately. It is necessary to update the information reflected in Appendix No. 2 to this Procedure: to combine the formulas for calculating the values of indicators for the I and II quarters.

Second, the author considers it appropriate to change the calculation of the value of the indicator of the quality of execution of the orders of the Accounts Chamber of the Russian Federation and the Federal Treasury of the Russian Federation. The current formula uses data on the

number of orders sent and executed (*Table 3*). The quantity cannot be negative, so there is no need to use the module, which is why it is proposed to omit it. In addition, this formula has a drawback, which manifests itself in the fact that the orders are equally taken into account, executed both, for example, by 5% and by 95%, i.e. all partially fulfilled orders, according to the formula, are equalized for 50% fulfilled ones. On the one hand, this was done in order to simplify the calculation of the indicator, on the other hand, such a calculation incorrectly reflects the quality of financial discipline.

Table 5

Indicator "Presence of judicial acts of the Russian Federation and amicable agreements on compensation for harm caused as a result of illegal actions of the chief administrators or their officials"

Calculation of the value of the financial management quality indicator

$$E(P) = \begin{cases} \left(1 - \frac{P}{2}\right), & \text{if } P < 0.5\\ 0, & \text{if } P \ge 0.5. \end{cases}$$

Source: compiled by the author on the basis of the Order of the Ministry of Finance of the Russian Federation dated June 18, 2020, No. 112n "On Approval of the Procedure for Monitoring the Quality of Financial Management by the Ministry of Finance of the Russian Federation".

Table 6
Dependence of the value of the indicator *E(P)* on the variable *P*: current and proposed by the author of the formula

P	$E(P)=1-\frac{P}{2}$	$E(P) = 1 - \frac{P}{0.5}$
0	1	1
0.1	0.95	0.8
0.2	0.9	0.6
0.3	0.85	0.4
0.4	0.8	0.2
0.5	0.75	0
0.6	0	0
0.7	0	0
0.8	0	0
0.9	0	0
1	0	0

Source: compiled by the author.

When calculating the value of this indicator, the author also proposes to take into account only the orders fully executed by the chief administrator, since one of the most important characteristics of financial discipline is compliance with the established deadlines ($Table\ 4$). The current formula also does not make it possible to take into account the absence of orders sent to the chief administrators of budgetary funds in the calculation. The author proposes to introduce the condition E(P)=1 for $Q_n=0$.

Thirdly, the current formula for calculating the indicator of the presence of judicial acts of the Russian Federation and amicable agreements on compensation for harm unevenly distributes points (*Table 5*).

According to this indicator, a score that takes a value in the interval (0;0.75), cannot be set, which indicates irregularity (*Table 6*). The author suggests using the formula P < 0.5

under the condition of
$$\left(1 - \frac{P}{0.5}\right)$$
.

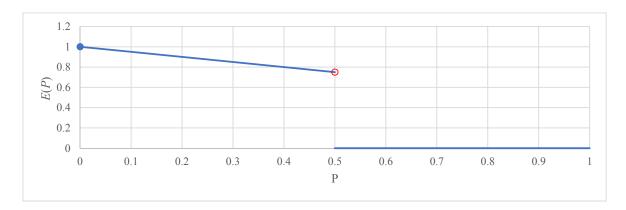


Fig. 2. The variability of the calculated value for the indicator "Presence of judicial acts of the Russian Federation and amicable agreements on compensation for harm caused as a result of illegal actions of the chief administrators or their officials". Current assessment methodology

Source: compiled by the author on the basis of the Order of the Ministry of Finance of the Russian Federation dated June 18, 2020, No. 112n "On approval of the procedure for monitoring the quality of financial management by the Ministry of Finance of the Russian Federation".

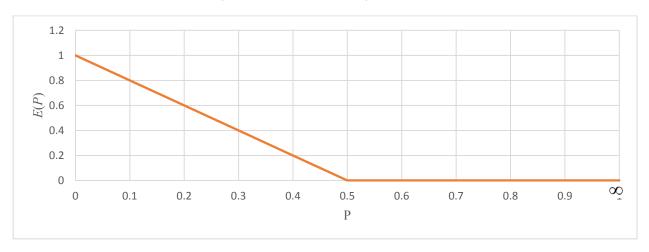


Fig. 3. Methodology for assessing the indicator "Presence of judicial acts of the Russian Federation and amicable agreements on compensation for harm caused as a result of illegal actions of the chief administrators or their officials", proposed by the author

Source: compiled by the author.

The current methodology for calculating the indicator "Presence of judicial acts of the Russian Federation and amicable agreements on compensation for harm caused as a result of illegal actions of the chief administrator or their officials" does not allow for a rhythmic distribution of points (Fig. 2).

The use of the formula
$$\left(1 - \frac{P}{0.5}\right)$$
 proposed by

the author makes it possible to evenly distribute the values of the indicator E(P) (*Fig. 3*).

The disadvantage of the current methodology is also manifested in insufficient completeness

and complexity. Sources of financing the budget deficit are not included in the assessment of the quality of financial management, and therefore indicators for such budget classification codes are not calculated. This is a drawback from the point of view of the methodology for assessing the quality of financial management of the chief administrators of sources of financing the budget deficit, which, in turn, affects the unreliability of the result obtained during the assessment. The author proposes to consider the development of a new direction: "Management of sources of financing the budget deficit".

The second group of issues is related to the peculiarities of the organization of assessing the quality of financial management of the chief administrators of budgetary funds. Turning to the explanatory note to the reports on the results of monitoring, one can note the duplication of the same abstract conclusions from year to year. On the one hand, this is justified by the fact that employees of the Ministry of Finance of Russia, based on the results of assessing the quality of financial management, cite general factors that contribute to obtaining one or another final average rating, and are not able to identify the reasons for a possible negative result for each chief administrator; on the other hand, the lack of detail on each object of assessment creates difficulties for the chief administrators in determining measures to improve the quality of financial management based on the results of the assessment. The author proposes to increase the efficiency of interaction between employees of the Ministry of Finance of Russia and chief administrators in terms of interpreting the final assessment obtained in order to better understand the objects of assessment of their "weaknesses". Such bilateral cooperation will improve the quality of budget management.

When analyzing the methodology for assessing the quality of financial management, the author noted a discrepancy between the timing of the submission by the chief administrators of information about the violations identified by the state financial control bodies and the timing of the annual control, which requires this information. The author proposes to revise the deadlines for sending information about detected violations: to designate the maximum period until June 5, as provided for in the Regulations approved by Order No. 264n. At the same time, it is proposed to conduct annual monitoring until July 1 of the year following the reporting one, respectively, employees of the Ministry of Finance will have a sufficient time range to include information received from the chief administrators in the

calculation of the financial assessment of the quality of management. Along with such changes, the author proposes to consider the issue of empowering the transfer of this information not to the chief administrators, but to the state financial control authorities, since they are the primary sources of information about detected violations. This innovation will eliminate the conflict of interest, since in order to obtain a higher score, the chief administrator may deliberately distort the data in the form to transmit such information.

The author proposes to revise the deadlines for sending information about detected violations: to designate the maximum period until June 5, as provided for in the Regulations approved by Order No. 264n.

At the moment, the methodology for assessing the quality of financial management by the chief administrators of budgetary funds is characterized by the absence of a system of incentives and sanctions. Thus, failure to comply with the deadlines for providing the necessary information to the Ministry of Finance of Russia or steadily deteriorating assessment dynamics are not factors for conferring disciplinary or other responsibility on the head of the chief administrator of budgetary funds. The author proposes to put on the agenda the question of the system of incentives and sanctions in the field of assessing the quality of financial management.

In terms of assessing the quality of financial management of the chief administrators of budgetary funds, the third block of problems associated with automation is due to the lack of a developed information space [20]. The use of an automated mode in organizing the assessment and obtaining operational information for further actions would speed

up the assessment process, reduce additional labor costs and minimize errors caused by the human factor. It is necessary to organize access to such a unified system that would integrate the assessment of the quality of financial management with calculations carried out by employees of the Ministry of Finance of the Russian Federation.

CONCLUSION

The essence of the quality of financial management is manifested in the achievement of planned performance results through continuous improvement of current processes. The results of assessing the quality of financial management by the chief administrators of federal budgetary funds make it possible to identify their "weaknesses" and budgetary risks arising in the course of budgetary procedures.

To date, the methodology for assessing the quality of financial management of the chief administrators of budgetary funds is imperfect, which is confirmed by the results of the analysis carried out in the article. The author suggests the following ways to improve the methodology for assessing the quality of financial management of the chief administrators of budgetary funds:

- legislative consolidation of the concept of "assessment of the quality of financial management of the chief administrators of budgetary funds";
- elimination of a legal conflict, expressed in a discrepancy between the Procedure approved by Order No. 112n of the Ministry of Finance of Russia dated June 18, 2020, and the passport of the state program, approved by Decree of the Government of the Russian Federation No. 320 of the Russian Federation dated May 15, 2014;
- separating the results of assessing the quality of financial management of federal ministries, services, and agencies administered

by executive authorities and adding planned values of the average quality indicator of financial management of federal ministries, services, and agencies;

- development of the direction "management of sources of financing the budget deficit";
- adjustment of the formulas for calculating the values of indicators in the direction of "management of budget expenditures";
- revision of the deadlines for reporting on detected violations (until June 5), annual monitoring (until July 1 of the year following the reporting one);
- increasing the efficiency of interaction between employees of the Ministry of Finance of Russia and the chief administrators of budgetary funds in terms of interpreting the final assessment of the latter;
- introduction of disciplinary responsibility of the head of the chief administrator of budgetary funds for the refusal of annual final assessments of the quality of financial management;
- transferring the financial management quality assessment organization to an automated mode in order to minimize errors caused by the human factor, as well as reduce labor costs and increase the efficiency of this process through the development of a single budget system portal.

The practical significance of the paper is due to the possibility of implementing proposals to improve the methodology for assessing the quality of financial management of the chief administrators of budgetary funds as part of the development of measures to improve the efficiency of the budgeting process. Improving the quality of financial management, possible by increasing the importance of evaluation, will contribute to the timely identification of "weaknesses" and budgetary risks arising in the course of budgetary procedures.

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ORIGINAL PAPER

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The Impact of Firm Size, Leverage, and Profitability on the Disclosure Level of Intellectual Capital

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ABSTRACT

The transformation of the economy from a production-based economy to a knowledge economy has increased the relevance of Intellectual Capital (IC). With the emergence of the Integrated reporting framework, the corporates have started reporting intellectual capital in annual reports, business responsibility reports. The present study **aims** to examine the relationship between the IC disclosure (ICD) and variables like Firm Size, Leverage, and Company Profitability. To find the relationship, a sample of 30 Bombay stock exchange-listed non-financial firms have been taken into consideration for three years, 2018–2020. The study **concludes** that firm size positively impacts the disclosure of IC. It can be inferred that the medium and small firms will not disclose much information related to Intellectual capital than large corporations. However, leverage negatively affects the disclosure of IC. It is rightly supported as higher the leverage; low disclosure will be there as investors wouldn't be willing to invest in the organization. To attract investments, organizations wouldn't disclosure the debt level. There is no influence of profitability on the ICD. The authors believe that the government should spread awareness about the disclosure of Intellectual Capital at the macro level and train the employees and management at all levels and sizes to increase the disclosure level. **Keywords:** disclosure; intellectual capital; content analysis; leverage

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1. INTRODUCTION

Enterprises' adoption of innovative and knowledge-based organizational techniques has heightened competitiveness among today's firms. This competitive edge is generated by the effectiveness of internal processes, corporate culture, information exchange methods, employee efforts, customer relationships and satisfaction, and other comparable assets. Together referred to as intellectual assets, these assets comprise a firm's intellectual capital (IC).

Nowadays, IC is viewed as a backbone for ensuring enterprises' value creation, maintaining competitive advantage, and achieving business goals 1. Since traditional financial disclosures do not include intangible assets, stakeholders have expressed concern for the voluntary disclosure of information about their non-physical assets to more accurately analyze organizational performance and future growth pathways. To meet stakeholders' expectations and maintain relationships, corporations have

disclosed IC information via financial statements, business responsibility reports, and corporate social responsibility (CSR) reports [2]. However, it is worth emphasizing whether these documents contain information about IC or overlook the relationship between a firm's intangible and tangible assets. While allowing for the inclusion of (IC) [3], the framework suggested by the Global Reporting Initiative (GRI) falls short of explaining how intangible information interacts with physical assets and adds to a company's business strategy [4]. However, this model does not directly address IC information, which corporations merely include in integrated reporting.

However, in recent years innovation has evolved in the realm of Integrated Reporting disclosure. More precisely, the International Integrated Reporting Council's (IIRC) introduction of integrated reporting provided a new method for corporations to communicate IC information [5]. Based on the integrated reporting, the organization effectively started representing six forms of capital divided

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into three tangible capitals: financial, natural, and manufactured capital, and three intangible capitals, namely, human, social, and relationship capital.

The present study is a modest attempt to examine whether the Firm Size, Leverage, and Profitability impact ICD under the three heads, human, internal, and external capital. To capture this impact of the variables on Intellectual Capital Disclosure (ICD), Bombay Stock exchange (BSE) 30 non-financial firms have been considered for 2018–2020. BSE is regarded as one of the world's top security exchange platforms [6]. The S&P BSE Index is a basket of 30 companies representing a sample of large companies, popularly known as blue-chip companies. The companies selected for the study are as per market capitalization value on 31.03.2021.

The structure of the study is as follows. The second section of the study outlines the review of the literature. The third section provides information related to Research Methodology, followed by the Discussion and Results in the fourth section. The last section of the study presents the conclusion, limitation, and future scope.

2. LITERATURE REVIEW

Since 2000, companies' annual reports have included disclosures of their intellectual capital (ICD) [7-9]. Content analysis as a research method to better comprehend intellectual capital disclosure [7] According to their findings, content analysis is one of the most commonly utilized methodologies for determining the frequency and kind of IC reporting. To communicate to their stakeholders that their company's resources are of high value, management teams, including those at IC, will include more IC information in their financial statements. As a result, the stock's value will rise due to investors' reactions to this information. Disclosure of IC information can also help investors better assess the company's value in the future, which could boost the stock price on the market [10]. The signal hypothesis was proposed, which stated that companies are encouraged to provide prospective investors with complete information about their companies to raise stock prices [11]. Using this principle as a guide, companies would use various means, such as financial statements and annual reports, to send signals to the market [12]. Therefore, disclosure of intellectual capital can aid in the company's value and lessen investors' perception of investment risk. It is suggested that information's significance can be judged by its ability to provide positive news to increase investment [13].

F. Cerbioni et al. [14] investigate the relationship between a company's corporate governance qualities and its disclosure of insider information. Their research indicates that CEO duality, the percentage of independent directors, and board structure contribute significantly to the IC disclosure presented in annual reports by European biotechnology businesses. Additionally, firm-specific variables like ownership structure, firm size, country-related variables, leverage, age, and profitability substantially impact IC disclosure. G. White et al. [15] quantify intellectual property disclosure in the biotechnology sector of Australia and extend their findings by comparing the form and amount of intellectual property disclosures in the UK and Australian biotechnology sectors [16]. The two analyses share a common denominator: the link between IC disclosure and several critical business-specific factors, including ownership concentration, size, board independence, leverage, and firm age. The findings indicate that board independence, leverage, and size all significantly impact the level of IC disclosure [15]. Additionally, a strong leverage impact is proven regarding the type of intellectual property disclosure in the United Kingdom and Australia's biotechnology sectors [16]. A previous study on IC disclosure in initial public offerings has been conducted in Denmark [17], Italy [18], India [19], and Singapore [18].

2.1. Meaning of ICD and its Components

Intellectual Capital Disclosure (ICD) is a report intended to meet the information needs of users who cannot prepare reports about Intellectual Capital [20]. The ICD report is tailored to meet all of the information requirements by stakeholders [20] specifically. Intellectual Capital Disclosure is a methodology for quantifying intangible assets and describing the outcomes of a business's knowledge-based activities.

It is important to note here that, while much emphasis has been placed on IC, there are no

Table 1

Definition of IC Components

IC Components	Substitute Names	Meaning
Human Capital	Employee Competence	Means the set of knowledge, skills, education, the experience of workforce/employees
External Capital	Relational Capital External Relations Customer Capital	Refers to the relationship with customers, suppliers, government, competitors
Internal Capital	Structural Capital Internal Relations Organisational Capital	Comprises information that stays with the organization like database, processes, structure

Source: Schneider A., Samkin G. Intellectual capital reporting by the New Zealand local government sector [21].

standard methods for disclosing it. It is a voluntary and unregulated practice in nature throughout the world. As the concept gained traction, particularly among knowledge-intensive firms, management of several large firms deemed it beneficial to disclose IC. As a result, the models, nature, and extent of disclosure varied significantly between firms, industries, and countries.

The research on the relationship between firm variables and disclosure extent also concludes that firm size, management composition, leverage, and type of ownership all affect the pattern and amount of disclosure. It was pointed out that one of the most challenging aspects of reporting is reaching a consensus on three critical issues: the need for reporting, what to report, and how to report (*Table 1*).

2.2. Firm-Specific Contents 2.2.1. Firm Size

According to previous research, the company's size is a significant factor that positively affects corporations' level of IC disclosure[18, 19, 22]. As a result, it has been asserted that big corporations have a high level of disclosure than small corporations. In addition, large corporations can afford information preparation for reporting, have better internal and management processes, and are mandated to do social responsibility. In the absence of a scientific theoretical foundation for determining the size of a company, total assets,

sales, and market capitalization are frequently utilized to estimate the size of businesses in the marketplace. Revenue has been employed to measure the business size in this study since it is unaffected by accounting rules and can be used as a proxy for size. In light of this argument, the current study investigated if there is a positive association between the size of the organization and the degree of ICD. The hypothesis is mentioned below:

 $\rm H_{\scriptscriptstyle I}$: Size bears a significant positive association with ICD.

2.2.2. Profitability

Profitability is one of the key measures of firm performance. The present study has used Return on Assets (ROA) as a proxy to measure profitability. Studies have suggested this as an important factor in determining ICD. For example, [19, 23] witnessed no association between ICD and firms. On the contrary, [24, 25]. observed a positive association between ICD and profitability. Many studies have used ROA as the proxy for profitability, calculated using Earnings Before Tax (EBT) divided by Total assets. In the current study, the alternate hypothesis for profitability is:

 $\rm H_2$: ROA bears a significant positive association with ICD.

2.2.3. Leverage

The level of leverage used by a company is regarded as an essential variable in examining the level of disclosure. Enterprises willing to take on the additional debt will be subjected to increased disclosure as per International standards [16]. According to the findings of [4, 16], leverage has a negative yet significant relationship with ICD. However, studies [8, 11] have no relationship between leverage and a firm's disclosure level. In past research, the ratio of the book value of total debt to the book value of total assets was frequently used to measure the level of leverage in a company. The current study used this ratio as a proxy for a firm's leverage, and it looked into whether there was a relationship between a company's Leverage and ICD. The hypothesis is as follows:

H₃: Leverage bears a significant positive association with ICD.

3. RESEARCH METHODOLOGY

This section explains the sample information, data gathering procedures, and variables calculation.

3.1. Sample Information

The research conducts the study on BSE-listed non-financial top 30 firms. The author has used annual reports for collecting data, as annual reports are the primary tool for organizations to report relevant information. The study has been conducted from 2018 to 2020.

3.2. Formulation of the disclosure index

The items for the disclosure index have been formulated using a two-step process.

- **3.2.1.** Step 1: In this step, a list of 52 items was gathered based on prior literature. The list of the items is mentioned in *Table 2* below.
- **3.2.2.** Step 2: Then, a questionnaire was formed to take the opinion of the stakeholders on the relevance of the items. A five-point Likert scale was used to take the opinion where one represents not relevant to disclose, and five represents highly important to disclose. The stakeholders suggested removing a few items or merging a few items. The suggestions were discussed with all the stakeholders. After incorporating the suggestions, a list of 42 items was formed. The list of items is mentioned in *Table 3* below.

3.3. Scoring of the disclosure Index

Numerous past studies on IC disclosures have used content analysis [19, 26]. The study codes the items mentioned (*Table 3*) for calculating disclosure scores. For the calculation, a score of 0–1 is used. Score 1 is given when the item is disclosed in annual reports, and 0 is given if it is not disclosed in the annual report. The disclosure score is calculated by dividing the number of items disclosed by the total number of items.

Disclosure Score =
$$\frac{\Sigma d}{N}$$
.

Where d denotes the score of 1 if the item is disclosed and 0 if not disclosed, N denotes the total number of items, i.e., 42.

3.4. Variables Calculation

This section gives details about the variables that have been used in the present study with their calculation. The details are mentioned in *Table 4*.

3.5. Research Framework

Figure comprehends the study's objective and provides information related to the hypothesis development.

3.6. Regression Equation

$$ICD_{it} = \alpha + \beta_1 (SIZE_{it}) + \beta_2 (ROA_{it}) + \beta_3 (LEV_{it}) + \varepsilon_L$$

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The results of the descriptive are presented in *Table 5* below. It can be observed that size has the maximum average value of 3.96, whereas ROA has the minimum average value. The average disclosure score of three years is 0.57, which is moderately high. However, the minimum disclosure score is 0.28, which is very low. However, the highest disclosure is 0.86, which is very high for the organization. This can be inferred from the analysis that the maximum number of firms are moderately reporting the items of IC in the annual reports.

4.2. Correlation

Table 6 represents the correlation matrix which denotes that there is no explanatory variable that

Table 2

List of items based on prior literature

Internal Capital	External Capital	Human Capital
1. Intellectual Property (17)	1. Business collaborations/ partnership (16)	1. Know-how (17)
2. Management processes (16)	2. Customers (16)	2. Education (15)
3. Networking System (16)	3. Brands (16)	3. Training and development (14)
4. Corporate culture (16)	4. Distribution channels (16)	4. Employees (12)
5. Management philosophy (13)	5. License/contract/agreement (16)	5. Entrepreneurial spirit (12)
6. Financial relations (12)	6. Customer satisfaction and loyalty (14)	6. Employee Expertise (3)
7. Infrastructure Assets (4)	7. Company names (8)	7. Employee satisfaction (2)
8. R &D (4)	8. Market Share (5)	8. Knowledge sharing (2)
9. Information technology (3)	9. Corporate reputation/images (3)	9. Safety and Health at Work (2)
10. Innovation (3)	10. Stakeholder Relationship (2)	10. Employee Remuneration & incentive schemes (1)
11. Research projects (3)	11. Research collaboration (2)	11. Equality (1)
12. Business Model/Strategy (2)	12. Goodwill (2)	12. Management Team (1)
13. Corporate Governance (1)	13. Government & other relationship (1)	13. Employee communication (1)
14. Knowledge-based infrastructure (1)	14. Market presence (1)	14. Working Environment (1)
15. Leadership (1)	15. Environmental (1)	
16. Organisational & management structure (1)	16. Brand recognition (1)	
17. Quality (1)	17. Brand development (1)	
18. Subsidiaries (1)	18. Suppliers (1)	
19. Communication system (1)	19. R&D (1)	

Source: author's compilation.

is highly correlated. Therefore, there is no problem of multicollinearity as no variable in the correlation matrix has a coefficient of more than 0.8 [30]. Also, the Variance Inflation Factor (VIF) is calculated to look for the issue of multicollinearity. *Table 7* shows the value of VIF and tolerance level. For multicollinearity to not exist, the VIF value should be less than 10, and the tolerance level should be 0.10 [31, 32]. In this data, the highest VIF value is 1.45, which is less than 10, and the highest tolerance level is 0.908, which is greater than 0.1. Therefore, the results confirm that multicollinearity is absent from the data.

4.3. Diagnostic Test

Before applying Ordinary Least Square or Panel Data, the following diagnostic test was run:

- 1. Stationarity Test To check the unit root in the data, Levin, Lin, and Chu test was applied. The p-value is less than 0.05, thus rejecting the null hypothesis, which means that the data is stationary.
- 2. Multicollinearity From *Table 6*, it can be witnessed that the mean VIF is less than 10, and the tolerance level is above 0.10 [31].
- 3. Heteroscedasticity To check the heteroscedasticity, Breusch pagan test was

Final list of items for the disclosure of IC

Internal Capital	External Capital	Human Capital
Infrastructure Assets	Licence/contract/agreement	Employees
Business Model	Corporate reputation/images	Entrepreneurial spirit
Financial relations	Market presence	Know-how
Information technology	Market Share	Knowledge sharing
Innovation	Stakeholder Relationship	Management Team
Intellectual Property	Suppliers	Training and development
Knowledge-based infrastructure	Brands	Working Environment
Leadership	Brand recognition	Education
Management philosophy	Brand development	Employee Expertise
Management processes	Customers	Employee communication
Organisational & management structure	Distribution channels	Employee Remuneration & incentive schemes
Quality	Environmental	Employee satisfaction
R &D	Business Partnership	Safety and Health at Work
Research projects		
Subsidiaries		
Corporate culture		

Source: author's compilation.

Variables Calculation

Table 4

Variables	Formula	References
Dependent Variable		
ICD	$ICD_{it} = \Sigma d_{it} / N$	[19]
Independent Variables		
Firm Size	Natural log of Total Sales	[27]
ROA	$ROA = \frac{Operating Income}{Total Assets} \times 100$	
Leverage	Total Debt / Total assets	[28, 29]

Source: author's compilation.

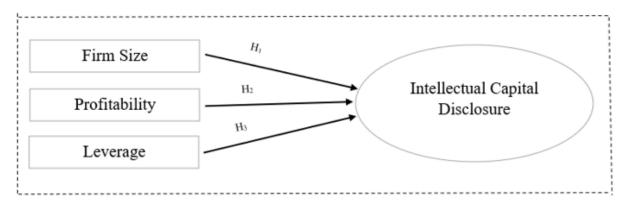


Fig. Hypothesis development

Source: author's compilation.

Descriptive Statistics

Table 5

Variable	Observations	Average	Standard Deviation	Minimum	Maximum
Size	90	3.96	0.54	2.50	5.53
ROA	90	0.25	0.16	-0.09	0.84
Leverage	90	0.39	0.55	0.00	2.41
ICD	90	0.57	0.12	0.28	0.86

Source: author's compilation.

Table 6

Correlation Matrix

	Firm Size	ROA	Leverage	ICD
Firm Size	1			
ROA	-0.0886	1		
Leverage	-0.2073	-0.4972	1	
ICD	0.3617	-0.1324	-0.0748	1

Source: author's compilation.

Table 7

VIF and tolerance level

Variable	VIF	1/VIF
Leverage	1.45	0.689
ROA	1.4	0.714
FirmSize	1.1	0.908
Mean VIF	1.32	

Source: author's compilation.

Panel Data Regression

		DV-Intellectual Capital Disclosure						
Independent	Fixed Effect				Random Effect			
Variable Variable	Coefficient	t value	Robust Standard Error	p-value	Coefficient	z value	Robust Standard. Error	p-value
Constant	-0.085	-0.26	0.329	-0.26	0.312	2.18**	0.143	0.029
Firm Size	0.187	2.22	0.084	2.22	0.079	2.36**	0.033	0.018
ROA	-0.181	-0.92	0.196	-0.92	-0.127	-1.12	0.113	0.261
Leverage	-0.102	-2.76	0.037	-2.76	-0.060	-2.12**	0.028	0.034
R Square (Within)	0.3765					0.3	571	
Hausman Test	Prob>chi2 = 0.154							
Model Appropriate	Random Effe	ct						

Source: author's compilation.

applied. The p-value is less than 0.5, thus accepting the alternate hypothesis. Hence, there is the problem of heteroscedasticity.

- 4. Serial Autocorrelation To diagnose autocorrelation, the Wooldridge test is applied. The results show that the p-value is more than 0.05. Thus, null hypothesis was accepted. Thus, there is no problem of autocorrelation in data.
- 5. Poolability Test To check whether OLS needs to be applied or Panel Data, the poolability test was applied. P-value is less than 0.5, thus rejecting the null hypothesis. Thus, panel data regression was applied.

To address the problem of heteroscedasticity, robust standard errors were shown in the results.

4.4. Panel Data Regression

The effect of Size, ROA, and Leverage was examined on ICD using panel data regression. The results show $\rm H_1$ has been accepted as the p-value is less than 5%, thus accepting the alternate hypothesis. It means that the firm size has an impact on ICD. $\rm H_2$ has been rejected in our case, which shows that the null hypothesis has been accepted. It means that

profitability has no impact on the disclosure level of the organizations. H₃ has been accepted, that leverage impacts the disclosure level. This finding supports the hypothesis that high-leveraged firms will adopt voluntary value-added IC disclosures to meet current and future debt providers [16]. Also, the companies with high leverage costs will have high agency cost due to the risk [33]. Hence, the external parties or the debt providers demand disclosure to reduce information asymmetry. As witnessed in Table 8, The value of R2 is 0.371, which shows that the explanatory variables explain the observed variable by 37%. It means that some of the variables that explain the observed variable lie in error terms. The low R square doesn't mean that the model is unfit. Sometimes, unexplained variables are not easy to calculate, thus giving a low R2.

5. CONCLUSION

The paper's objective was to examine the disclosure of IC in the top 30 BSE indexed non-financial firms for a period of three years ranging from 2018–2020. The results were obtained by applying Content Analysis to the 30 firms

on Annual Reports. The disclosure score was calculated, and the panel data regression was used in the analysis. The Firm Size is positively related to ICD, as confirmed by studies [19, 34]. It can be concluded that larger firms disclose more IC content than medium or small firms [19]. There is a need to develop a proper framework for disclosing IC in their annual reports. The results show that the leverage is negatively related to the disclosure of IC, which is confirmed by [4, 16]. Another important factor is to examine whether profitability impacts the disclosure of IC. The results revealed that profitability measure ROA has no impact on the disclosure of IC, which is confirmed by [19] in the Indian Study. The findings reveal that not much information is being disclosed in annual reports; only information beneficial for the organization is revealed.

The most disclosed items in Internal Capital were "R&D", "Knowledge-based infrastructure" and "Financial relations" in all three years. In the case of external capital, the best three reported were "Corporate reputation/images", "Market Presence"

and "Stakeholder Relationship". Finally, the three best-disclosed items in the case of human capital are "Employees", "Training & Development" and "Working Environment".

The academia, management, regulators, and policymakers will benefit from the present study. This study is an addition to the existing literature as a new list of variables has been introduced. Results indicate that the disclosure level is not very high in the Indian Scenario. The policymakers will understand that voluntary reporting on IC is not benefitting the stakeholders. Only information that will benefit the organization is being disclosed. Hence a proper framework needs to be designed for the reporting of IC.

The research offers room for improvement by carrying out cross-country comparisons and examining each country's level of disclosure. Even the researchers can use the information available on websites, business reports, internet to examine the impact of disclosure on IC. The proposed list of IC items can be used to study the disclosure practices in other countries along with the weighted index.

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- **S. Singhal** identified the problem, developed the framework, review of literature, collected data, performed analysis, and wrote the conclusion.
- **S. Gupta** discussed the research results and wrote the conclusion.
- **V.K. Gupta** discussed the analysis techniques.

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ORIGINAL PAPER

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Commercialization of Public Finance Management: Modern Realities and Organizational and Legal Modernization

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ABSTRACT

The subject of the research is a substantive study of the modern realities of commercialization of public finance management and the possibility of its organizational and legal modernization. The purpose of the research is to establish the current state of commercialization of public finance management and to identify emerging problems in managing the liquidity and debt of the state, together with the possibilities and ways of leveling them and hedging risks through the organizational and legal modernization of public finance management. The relevance of scientific research and its scientific novelty are based on the absence in the Russian Federation of fundamental research on the current state of public finance management and its commercialization factors. The domestic scientific and practical literature touches on certain aspects of the issue under study, which does not allow us to establish cause-and-effect relationships of problems arising in the course of public finance management. The research is based on general scientific and special methods containing elements of comparative jurisprudence, system analysis, structural and functional approach, as well as a comprehensive and complete study and critical analysis of domestic and foreign fundamental scientific research, containing a number of studies in the field of legal regulation, public administration, econometrics, and macroeconomic forecasting. The collection and analysis of the material for the preparation of scientific research was carried out by a scientific group taking into account the quantitative and qualitative indicators of the authors' citations, as well as the significance of their individual research. The authors **conclude** about the need to hedge risks when exercising the authority to manage liquidity and debt as integral elements of macroeconomic policy, with the elimination of the fragmented organizational structure of the authorities. Based on international experience, a number of authors' recommendations have been developed to create, within the framework of organizational and legal modernization, a unified effective commercialized public finance management system with the establishment of promising potential development options to ensure the achievement of the state's sustainable development goals stipulated by national projects. Keywords: liquidity management; public finance; macroeconomic policy; budgetary system; economic security

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INTRODUCTION

In the conditions of changing technological paradigms [1] and economic formations [2], as well as in connection with unfriendly actions of foreign states, the management of state (public) finances (hereinafter referred to as "the Public finance) is of particular relevance. By increasing the efficiency of spending money, and creating drivers of efficiency and cost-effectiveness, prerequisites are being created for revising the organizational and legal system of state power and revising managerial functions as the basis of economic sovereignty. The revision of the procedure and mechanisms for managing public finances should be carried out taking into account the principles of protecting revenue items of the budgets of the budget system and ensuring hedging of the risks of productive items of budget expenditures and expenditure obligations for human capital resources as a public obligation of the state.

In the Russian Federation (hereinafter referred to as "Russia"), public finance management is carried out by public authorities for various purposes and functions, extra-budgetary funds, state corporations, and public joint-stock companies with state participation (hereinafter referred to as "the Public finance administrators") who form and directly implement the financial and economic policy (hereinafter referred to as "the Macroeconomic policy") of the state.

The monetarist approach, which dominates macroeconomic legal relations, is based on increasing borrowed capital, attracting foreign investment, and creating import substitution mechanisms against the backdrop of regulating the money supply and inflationary indicators. The basis of the ongoing macroeconomic policy is the floating exchange rate of the national currency, which creates a high level of volatility and the need to reserve foreign exchange earnings, inflation targeting, limited by government reserves accumulated in the face of increased demand for energy resources, as well as improved

revenue management. The administration of budget revenue items with the definition of the main task in the form of increasing tax collection and reducing the administrative burden [3] creates an unprecedented increase in tax revenues instead of the expected balance between administrative and incentive measures to the budget system of the Russian Federation that exceed the official inflation rate. Liquidity and market volume are important for analyzing the dynamics of volatility, which is changeable in the context of changing economic formations when all variables show significant susceptibility [4]. The policy of attracting foreign borrowed capital and investments in the face of unfriendly actions of foreign states has led to a significant outflow of financial resources from strategic sectors of the economy. These consequences actualized the issues of commercialization of public financial management.

The reduction in the administrative burden under sanctions pressure from unfriendly states and international organizations, in turn, is expressed in the declaration of a quantitative reduction in tax audits. However, in fact, a risk-based approach and mechanisms of "pre-audit analysis" [5] are being introduced into the work of tax control authorities in symbiosis with multiple increases in the average amount of additional taxes and fees. Thus, when a chain of counterparties is identified whose actions contain signs of violation of the legislation on taxes and fees, a tax audit is carried out in relation to a person who has sufficient assets to recover the arrears. Measures of tax control with the subsequent prosecution of a person with a resource and property base cause the latter to optimize production and logistics costs in order to find the amounts payable to the budget system, based on the requirement of the tax authority issued as a result of a tax audit. The law provides for the possibility of appealing tax control measures, but this right, as a rule, is accompanied for the taxpayer

by the appearance of signs of insolvency (bankruptcy)¹ (hereinafter referred to as "the Bankruptcy"), job cuts, and a reduction in the medium term of taxes and fees to the country's budget system.

At the same time, it should be emphasized that the declarative recommendations of the International Monetary Fund² and the World Trade Organization,³ aimed at establishing common principles and mechanisms for managing public finances in the global economy have been embodied in national legislation. However, they pose a threat to the national security of the state and contradict the conceptual goals of its development⁴ and the strategy of economic security.⁵

The scientific novelty and relevance of the study lies in the lack of current research at the intersection of financial law, public administration and economic theory, the subject of which is the study of the commercialization of public finance management, taking into account the possibilities of leveling the risks (threats) arising from the legal modernization of public administration during the period of changing economic formations. The scientific and practical significance of the research topic is substantiated by the need to conduct an interdisciplinary analysis of the current situation and vectors for the development

of public finance management, including liquidity and debt management, to identify financial and legal triggers that lead to problems in the macroeconomic situation, a comprehensive study of functioning mechanisms for the commercialization of public finance management with the definition of conditions and opportunities for hedging risks (threats) to ensure the economic security of the Russian Federation.

The authors note the low degree of scientific and practical development of the research topic due to the interdisciplinary nature and a significant amount of econometric and macroeconomic data. This finds fragmentary reflection in the fundamental research of domestic and foreign practitioners and theorists in the field of comparative law, macroeconomics, econometrics, public administration, financial and budgetary legal relations.

The practical basis of the scientific work contains references to various studies and legal acts. The research methodology is based on general scientific and special methods containing elements of comparative law, system analysis and synthesis, structural-functional approach and critical analysis.

Among the main goals of the scientific study, the authors single out the identification and description of the problems that accompany the process of commercialization of public financial management with the establishment of opportunities for their leveling, the identification of drivers of macroeconomic stability that can ensure the economic security of the state. The team of authors pays special attention to establishing vectors for the development of the public finance management system and the need for modernization based on the centralization of a disparate system of state authorities in the field of macroeconomic regulation in order to effectively manage public finances.

The main objectives of scientific research are:

¹ Federal Law No. 127-FZ as of October 26, 2002 (as amended on July 2, 2021) "On Insolvency (Bankruptcy)". Legislation of the Russian Federation. 28.10.2002. No. 43, art. 4190.

² Articles of the Agreement of the International Monetary Fund (adopted on July 22, 1944) (as amended on December 15, 2010) (approved by Resolution of the Supreme Court of the Russian Federation as of May 22, 1992 No. 2815–1).

³ Marrakesh Agreement Establishing the World Trade Organization (as amended on November 27, 2014). Legislation of the Russian Federation. 10.09.2012. No. 37 (Appendix, part V). P. 2019–2031.

⁴ Decree of the Government of the Russian Federation No. 2816-r dated 06.10.2021 "On approval of the list of initiatives for the socio-economic development of the Russian Federation until 2030". Legislation of the Russian Federation. 11.10.2021. No. 41, art. 7051.

⁵ Decree of the President of the Russian Federation of May 13, 2017, No. 208 "On the strategy for the economic security of the Russian Federation for the period up to 2030". Legislation of the Russian Federation. 15.05.2017. No. 20, art. 2902.

- 1. Establishing the current state of commercialization of public finance management.
- 2. Identification of problems and financial and legal opportunities for leveling them in the field of public finance management and ensuring the economic security of the state.
- 3. Development on the basis of the author's approach, taking into account domestic and international practices, the optimal model of public finance management.

The need to harmonize macroeconomic policy with public debt management [6] is due to the importance of ensuring the economic security of the state in the face of macroeconomic instability and uncertainty due to unfriendly actions of foreign states and international organizations that damage economic growth and increase operating costs in liquidity and debt management [7].

In classical economic studies, effective liquidity and debt management makes it possible to level the lack of tax revenues and builds an investment-attractive system of taxes and fees [8]. At the same time, liquidity and debt management makes it possible to secure government obligations [9] and satisfies the demand for liquidity by providing flexible tax rates [10]. However, in various states, public authorities provide pumping of markets with liquidity through the issuance of government bonds, which may lead to macroeconomic crises [11], accompanied by inflation.

Macroeconomic policy, including monetary and fiscal regulation, is interdependent and needs to be coordinated. In the absence of macroeconomic policy coordination and public financial management, various liquidity and debt management options can create threats to inflation and fiscal deficits. Certain aspects of monetary policy can affect the cost of financing the budget deficit through liquidity management, as well as the cost of servicing public debt and its size [12]. A high level of coordination and centralization of macroeconomic policy and

public finance management allows reducing government spending on servicing public debt [13]. In turn, the fragmentation of macroeconomic management and the public financial management system contains the risks of a high budget deficit and obligations to systematically increase the volume of government borrowing.

An up-to-date example of the impact of monetary policy on liquidity and debt management is the change in the volume of foreign currency debt that occurs against the background of exchange rate and interest rate adjustments. Researchers argue that to ensure financial stability, broad coordination of the macroeconomic policy of the state and the public financial management system is necessary [14].

The importance of strategic interaction, coordination, and centralization of macroeconomic regulation and ensuring the effective functioning of the public financial management system against the backdrop of an investment-attractive fiscal policy is confirmed by a number of empirical studies [15]. In the conditions of changing economic formations, there is an interdependence between monetary and fiscal policies, which directly affect budget financing [16].

The interdependence of the elements of public administration requires the creation of a single body responsible for the implementation of macroeconomic regulation, the functioning of the public financial management system, including liquidity and debt management with a long planning horizon, taking into account the structure of the debt portfolio and the use of various financial instruments.

In a broad sense, public finance management is a manifestation of the function of systemic management of the treasury to achieve sustainable development goals and implement national projects by covering expenditure obligations based on the distribution and investment of free cash using short-term instruments to finance

cash gaps in the budget system and generate profitability through account balances. Effective management of public finances makes it possible to level the risks of cash gaps and the need to attract borrowed funds by the subjects of the Russian Federation and municipalities [17], including unfriendly foreign states and international organizations. The conceptual task of public finance management is to be able to fully cover current government obligations at the lowest cost based on forecasting the movement and investment of funds in order to increase the speed of their turnover in the economy and ensure the financial stability of the state.

Effective management of public finances is complicated by a fragmented organizational structure and bureaucratic coordination of public debt and liquidity management. The need to create a unified state body with the legal capacity to form and ensure macroeconomic policy in a systemic crisis, changing economic formations and unfriendly actions of foreign states and international organizations is based on a decrease in the rate of turnover of funds in the economy, a decline in the purchasing power of people and a significant revision in the assessment of the liquidity of assets. This creates the risk of cash gaps in the execution of budget expenditures, a slowdown in economic growth and the impossibility of implementing national projects.

The main elements of public finance management are laid down in the works of generally recognized economists and are based on the key characteristics of modern liquidity management practice [18] and public money management methods [19]. These include: centralization of budget balances and the creation of a single treasury account (hereinafter referred to as "the STA"), planning and forecasting the movement of funds, accounting for operations, information exchange between the financial authority and administrators of the revenues of the budget system, the use of short-term financial

instruments, the integration of debt and liquidity management [20], as well as the introduction of liability mechanisms.

Due to the change in economic formations, a number of states (the United States of America, Portugal, Canada, and Hungary) have recognized liquidity management as a necessary function of treasury management [21] in order to cover public expenditures and investments in the conditions of an outflow of foreign capital. In light of the epidemiological restrictions caused by the COVID-19 pandemic, there was a decrease in business activity and the level of budget revenues. The subsequent policy of unfriendly foreign states, aimed at curtailing economic relations between countries, further updated the mechanism for the commercialization of liquidity management and budgetary control through "money rationing" [22].

COMMERCIALIZATION OF PUBLIC FINANCIAL MANAGEMENT

The commercialization of public financial management is a process that includes liquidity and debt management of the state. It is designed to ensure the availability of funds to meet the spending obligations of the budget system and achieve national goals, as well as to minimize gaps between incoming and outgoing cash flows. The key to guaranteed budget execution is forecasting the movement of funds in the budget system, covering spending obligations without the need to implement borrowing mechanisms, and attracting foreign investment through effective management of public finances, which allows you to create additional profitability of the budget system without the risk of going beyond the corresponding budget of the budget system when making payments.

Liquidity and debt management are not part of the budget cycle or an instrument of budgetary control. The impossibility of covering expenses from available funds makes it necessary to reconsider priorities in the budget execution process, including adjustment, control of obligations, and rationing of budget funds to control limits. In this regard, in a number of countries, liquidity management is considered a part of the budget process, as evidenced by the full inclusion (Chile) or partial transfer of assigned functions (Ghana, Seychelles, Eswatini, Lesotho, Nigeria, Gambia) units of the Ministry of Finance or the Treasury [22]. Particular attention is paid to the combined management of liquidity and public debt (Colombia, Peru, Romania, Slovenia, South Africa, and Thailand), as well as their combination and integration in the countries of the Organization for Economic Cooperation and Development (hereinafter referred to as "the OECD") [21].

The economic security of the state is the basis of its viability, however, in the context of the fragmentation of responsibilities and powers of macroeconomic regulation and public finance management, the stability of the national currency, the growth of real disposable incomes of the population and the implementation of state planning⁶ is minimal. Despite the functional affiliation of the definition of "state planning" to the socialist economic formation, its mechanisms and principles are implemented in a number of capitalist states: Japan, France, South Korea, and Germany. The unity and continuity of macroeconomic policy create conditions for maintaining economic stability, opportunities for building up state reserves and stimulating economic growth. The need for continuity is due to the length of economic cycles and supply chains in the production of final products. Complex science-intensive industries require capital investments for several decades to come, and the lack of confidence of the state and private investors in the payback and relevance of investment projects causes risks of completeness of

financing and insolvency (bankruptcy). The threat of bankruptcy of knowledge-intensive sectors of the economy inevitably becomes a factor that must be taken into account when making decisions and implementing government programs.

The priority of scientific research in the process of training personnel and creating new promising models of devices and mechanisms is leveled by insufficient funding. Effective management of public finances creates incentives for private financing, which has a special place in infrastructure projects [23].

The management of public finances through the STA is a common practice and is carried out in the national currency in connection with the receipt of taxes and fees into it, followed by most expenditure transactions. However, in many countries, there is a practice of opening STA subaccounts in foreign currency for foreign economic transactions (Albania, Angola and Colombia). Inefficient allocation of financial resources can lead to cash gaps and overor under-borrowing. Therefore, to hedge such risks (threats) in the public financial management system, there is forecasting, the timing of which varies from daily (for one month) to annual (for the current year and the planning period). It is considered optimal for the public finance authority to receive a daily forecast for three months in advance.

The building blocks of public financial management and their level of commercialization depend on the effectiveness of budget planning and execution, and coverage is critical to determining the range of cash flow forecasting and liquidity and debt management. Depending on the degree of decentralization of management and the legal and regulatory compliance of accounting and control systems, coverage can be extended from the central government level to all public authorities, trust accounts [24], and local governments, as, for example, in France. In addition, despite the isolation of state corporations and state

⁶ Decree of the Government of the Russian Federation as of October 22, 2021, No. 2998-r "On approval of the strategic direction in the field of digital transformation of public administration". Legislation of the Russian Federation. 01.11.2021. No. 44 (ч. III), art. 7467.

joint-stock companies with state participation, they are responsible for the stable functioning of the economic system, directly affecting the effectiveness of the commercialization of public financial management. The state, through credit legal relations, state guarantees, and obligations, including in the implementation of public-private partnerships, bears potential obligations to them.

The level of commercialization of public financial management is interdependent with the planning horizon and its accuracy. A number of states use the forecasts of tax departments when managing public finances, but there is a positive example of independent forecasting by liquidity and debt departments (Peru), as well as other departments of ministries and departments (Fiscal Policy Department — Thailand; Macroeconomic Forecasting Department — Seychelles).

Given the ceiling on spending commitments in the budget and the predictability of nondiscretionary spending patterns, forecasting is generally easy. At the same time, when managing public finances, it is rational to use historical data based on traditional operations, seasonality, and legal regulation. Recognized as an effective cash flow forecasting strategy for large national projects and programs without the need for full forecasting. However, in countries with an appropriation calendar and a "spend it or lose it" budgeting approach at the end of the financial year, a significant number of spending commitments are recorded in the last months of the year. Thus, forecasting difficulties are created due to the lack of complete specialized information from public finance administrators. In this regard, it seems rational to involve the relevant sectoral ministries and departments — budget allocation managers, capable of providing expert forecasts for adjusting the public finance management program.

As a conceptual framework for forecasting and analyzing cash flows, you can use an analytical system based on big data on the movement of financial flows with disaggregation of accruals, which has a lot of meaningful information [25]. Moreover, the analysis of profit aggregation in debt and liquidity management distorts the real contribution of each item of income, and as a result, the breakdown of profits into cash flows and disaggregated accruals allows for a more accurate analytical system.

A high-quality analytical forecasting system is essential for efficient public financial management and increased commercialization through the use of advanced financial tools. International experience is based on various financial instruments for managing liquidity and public debt, which are presented in *Table* 1.

With effective debt and liquidity management, special attention should be paid to instruments for balancing cash gaps during the financial year, including on the basis of a short-term overdraft, which, in conditions of macroeconomic instability, can become a tool that can raise the required amount of funds for STA without deteriorating monetary policy indicators [26].

Liquidity management, based on raising funds through intergovernmental transfers and loans, provides mutual benefits for both parties. One of the parties does not have professional competencies in managing public finances with the need for high commercialization, and the other, helping the first, seeks to extract additional profitability while retaining part of the additional income.

A special place is occupied by a contractual loan (overdraft), thanks to which many public finance administrators have the opportunity to attract additional financing in order to increase commercial attractiveness, as a rule, with restrictions on the term and volume (used, for example, by India, Eswatini and Uruguay).

To cover the lack of liquidity, it is possible to use REPO transactions with flexible terms and collateral that reduce the risk of the borrower, which justifies their low cost

Table 1

Financial instruments for liquidity and debt management

	Intergovernmental transfers and loans					
Liquidity	REPO transactions	Lending in commerc	ial organizations	Commercial securities		
management		C	urrent loan			
	- Treasur	y bills	Liquidity buffer			
	Fixed Rate Treasury Bo					
Debt management	Internal loan bonds Indexed floating rat		bonds	Sukuk	Thematic	
	Commercial lending	Government bonds of foreign countries (example of Eurobonds)		(equivalent to bonds in the Islamic world)	bonds (note "green")	

Source: compiled by the authors.

compared to unsecured borrowing and a high level of use in countries around the world, including OECD members, including the USA, Great Britain, France, Hungary, Sweden, etc. It should be noted that when carrying out REPO transactions, countries with a low level of commercialization of public financial management use the practice of issuing treasury bills to cover the liquidity deficit [19]. The use of the treasury bills in public financial management is associated with an optimal ratio of cost of service and risks, combined with meeting the need for financing in the absence of diversification. The issue of securities is possible with reference to the level of inflation, a fixed rate, or any other market indicator, including a stock index. With comparative disadvantages, a reverse REPO is also a rational financial instrument due to collateral, however, instead of counterparty risks, there are credit risks of the collateral issuer, which entails a low risk and level of return. Among the advantages is the ability to cancel the transaction in the event

of default, which technically reduces the size of the public debt (at a neutral net present value).

The main financial instruments in a number of the above states are also commercial loans in organizations without collateral, with a high degree of flexibility and costs, including due to legal restrictions (Romania and Equatorial Guinea).

Standardized commercial securities issued on the financial markets of the USA, the European Union, etc., on the basis of an agreed emission program, allow diversifying the investment portfolio of a public finance administrator and attracting financing to cover the expenditure items of the budget system and debt, which is often used by EU and OECD countries.

The pooling of financial resources of public finance administrators in the STA through interbudgetary transfers and borrowings makes it possible to use unique mechanisms to attract funding to cover cash gaps and implement large infrastructure and

Liquidity management tools

	Deposits in the Central Bank	Deposits in commercial banks	Government securities	Other securities	Reverse REPO transactions
Albania					
Brazil					
Chile					
Colombia					
France					
Hungary					
India					
Peru					
Slovenia					
Sweden					
Turkey					
Great Britain					
USA					

Source: data from national bureaus and agencies for public debt management.

national projects by extra-budgetary funds, local governments, state corporations, and others. Consolidation of financial resources of public finance administrators makes it possible to go beyond the standard effect of the commercialization of public finances and provide financing on special conditions for large strategic projects that are not able to be implemented by every person, even thanks to budget subsidies and the state and private partnerships. Domestic government borrowing is possible, including through attracting funds from specialized funds, including those created by countries to accumulate financial resources that receive "surplus" income from the sale of natural resources (copper, oil, gas, and others). This allows maintaining a high level of liquidity of specialized stabilization

funds and extracting profitability into the budget system.

In conditions of limited financial markets and liquidity, it is also necessary to indicate the possibility of using deposits, corporate and government securities, which is often accompanied by significant drawbacks. Placing funds on deposits in the public finance department in reality often generates income that exceeds inflation. Investing in corporate securities is associated with a high level of risk and the need to hedge possible restrictions on financial transactions due to the unfriendly actions of foreign states. At the same time, government securities for public finance administrators can be equivalent to "moving" funds between different accounts of the budget system when borrowing at home

and the emergence of a conflict of interest and sanctions restrictions in transactions with foreign government securities.

Based on the analysis of open information, we can present the following system of tools that are used in the framework of liquidity management (*Table* 2).

In the countries of the world, the minimum balance and the procedure for determining it differ. Despite the absence of official consolidation, the researchers note that in Brazil this is an estimated amount sufficient to refinance domestic debt within six months, and for external debt, the principle of an extended period of one and a half thousand banking days applies. The nominal amount of the balance is set in Ghana and Romania at \$ 170 million and € 200 million. There are examples of linking the amount of the balance to the term of expenditure commitments. For example, in Thailand, the minimum balance must cover a two-week period, and in Uruguay, 12 months, based on historical volatility and forecasts. In the Republic of Turkey, the mechanism is more complex. It assumes a liquidity buffer equal to a percentage of the amount of debt due in the coming months, taking into account the weighted average market demand.7

There is no single formula for the commercialization of public financial management due to the volatility of market conditions, the difference in the position of public finance administrators in financial markets, the dependence on the investment attractiveness of the economic system, and the professional competencies of officials who make final decisions and bear responsibility. The difference in the constituent elements of public financial management necessitates the creation and integration of a liquidity buffer (reserve or minimum balance) to cover spending obligations and reduce the

risks associated with liquidity and debt management due to market volatility and the possibility of unforeseen expenses associated with the "black swan" [27] or "gray rhinos" [28]. Reducing the cost of maintaining a minimum balance can be minimized by introducing a system of justification and calculation of the required amount.

International experience shows that the choice of various financial instruments is directly related to the availability of infrastructure and market participants, as well as the existence of an agreed financial plan for the commercialization of public financial management. Effective management of public finances is possible only as a result of systemic reforms of the state apparatus and modernization of the system of public authorities responsible for macroeconomic policy and liquidity and debt management, with further active investment and a high level of commercialization of public finances, which are preceded by the creation of incentive mechanisms, factors, and attraction competent officials in the early stages of reform [18].

MODERNIZATION OF THE SYSTEM OF STATE AUTHORITIES

In the above conditions, there is an urgent need to create a unified and coordinated mechanism for the commercialization of public finance management [29], which allows achieving the goals of sustainable territorial development. National projects as drivers of economic growth [30] create the fundamental foundations for improving the welfare of citizens and the gross domestic product within the country while increasing the share of knowledge-intensive and complex industries. The ability of their administrators to effectively manage public finances is of decisive importance in ensuring the economic security of the state in the face of changing technological patterns and unfriendly actions of foreign states and international organizations against the economic sovereignty of the country.

⁷ OECD Working Group on Public Debt Management study on liquidity buffer practices (2017) and international case studies presented at World Bank workshops on cash flow forecasting and liquidity management (2018 and 2019).

In domestic practice, there is a positive experience of professional management of public finances and a high level of their commercialization through the activities of the Federal Treasury (hereinafter referred to as "the Treasury"). However, due to the fragmentation of the public finance management system, their activities are subject to bureaucratization and opposition from the bodies that carry out macroeconomic regulation in Russia. In order to ensure the effective commercialization of public financial management, it is necessary to create a centralized coordinated system of macroeconomic regulation and forecasting, taking into account the analysis of cash flows, the implementation of national projects, and the coordination of fiscal and monetary policy, with liquidity and debt management to increase the level of commercialization and achieve goals of sustainable development.

It must be clearly understood that investment decisions are based on many interrelated elements, and the fragmentation of powers between public authorities significantly increases the risks of public financial management and reduces profitability. The public finance administrator needs to have information not only about the facts of unclaimed balances and other liquidity on the accounts but also to have data on the amounts, procedures, and terms of the planned financing of projects and the conditions for spending funds in accordance with budget planning, take into account industry specifics and the risks of unforeseen items of expenditure combined with mechanisms for leveling the risks of cash gaps in the process of budget execution.

The competence of public finance administrators should allow rational management of the state treasury, cover spending obligations and maintain a liquidity buffer (irreducible balance) at a minimum level in order to ensure a high level of additional profitability of the budget system. An example of effective commercialization

of public financial management can be found in Sweden, where the minimum balance after the completion of operations on the STA, after the completion of the daily investment, is zero, and short-term financial instruments are used to cover emergency liquidity shortages. Separately, it should be noted that recently there has been increased attention to the minimum balance, even in countries with a high degree of liquidity of government securities and developed lending, due to the change in economic formations and high market volatility, as a result of which a systematic increase in liquidity reserves is carried out (for example, in the US and France). An alternative to a minimum balance that allows you to reduce costs is to conclude an agreement with the Central Bank of the country on the calculation of interest on the balance of funds placed on the STA, which ideally corresponds to the market and exceeds inflation [31].

Despite the semantic similarity of the legal constructions "public finance" and "treasury", the latter does not have legal legislative consolidation in civil⁸ or budgetary⁹ legislation, which causes significant difficulties in the commercialization of public finance management and distribution of power. On the one hand, there is a distinction in terms of the degree of responsibility between public finances and the treasury, suggesting that the latter includes state property that is not assigned to business entities. In material terms, the connection between the treasury and finances lies in the content of the latter, characterized as public funds, while the former is characterized by identification with the property of public law entities, which is not assigned to persons on the right of operational management or

⁸ Civil Code of the Russian Federation (Part Two) dated January 26, 1996, No. 14-FZ (as amended on July 1, 2021). Legislation of the Russian Federation. 29.01.1996.No. 5, art. 410.

⁹ Budget Code of the Russian Federation dated July 31, 1998, No. 145-FZ (as amended on November 29, 2021). Legislation of the Russian Federation. 03.08.1998. No. 31, art. 3823.

economic management, including by means of the budgetary system.

Separately, it should be noted that the budget refers to the form of formation and spending of public funds that are used to cover spending obligations. However, on the basis of budgetary legislation in terms of regulating the execution of judicial acts on claims against the state for the recovery of funds from the treasury, execution is carried out only in accordance with the stipulated articles of the law on the budget. Thus, the treasury, which constitutes a significant property complex, is reduced by the legislator to the line of the budget list and is actually delimited from the budget, which is contrary to the law. Thus, a similar legal position was formed by the Supreme Arbitration Court of the Russian Federation when satisfying claims for the recovery of funds at the expense of the treasury of the relevant public legal entity, and not at the expense of the budget, since such a restriction is contrary to the Civil Code of the Russian Federation and the general rule on the responsibility of a public legal person with all the property belonging to him, constituting the treasury. 10 This casuistry causes a systemic crisis of law enforcement, since the real content of the treasury, of course, includes the budgets of the budgetary system. In order to regulate the boundaries and opportunities for the commercialization of liquidity management, it is necessary to consolidate the legal definition of the concept of "treasury" in order to restore a single vertical of power and determine decision-making centers for the following issues:

 a macroeconomic policy with the assignment of responsibility for its implementation;

- formation of revenue items of the budget system;
- determination of the limit of budgetary obligations;
- management of state property, liquidity, and debt;
- implementation of borrowings in the external and internal markets.

Based on the foregoing, it should be noted that the content of the term "treasury", which is not legally fixed, in a broad sense includes not only the property base but also funds from the budgets of the budget system, extrabudgetary funds, as well as other assets on the balance sheet of public finance administrators.

It is rational to assess current trends in public administration aimed at determining the actual legal boundaries and framework for the activities of the Treasury, in connection with the fundamental expansion of the authorities ¹¹ of state power. In addition to exercising the functions of state internal control (supervision) and exercising budgetary rights and obligations of a technical and legal nature, the Treasury powers included:

- liquidity management of public finances;
- support for the activities of the GIS "Trade" with the regulation and control of the auction;
- accounting support for the activities of the tax service;
- control over the completeness and efficiency of the implementation of national projects.

For reasons of the need to ensure a responsible, efficient, effective, and economical macroeconomic policy, it seems rational to form a single state treasury management body on the basis of the Treasury. The author's analytics based on open data¹² allows us to conclude that the Treasury's

¹⁰ Decree of the Plenum of the Supreme Arbitration Court of the Russian Federation as of June 22, 2006, No. 23 (as amended on May 28, 2019) "On Certain Issues of Application by Arbitration Courts of the Norms of the Budget Code of the Russian Federation". Bulletin of the Supreme Arbitration Court of the Russian Federation. 2006;(8).

¹¹ Decree of the Government of the Russian Federation as of December 1, 2004, No. 703 (as amended on December 28, 2020) "On the Federal Treasury". Legislation of the Russian Federation. 06.12.2004. No. 49, art. 4908.

¹² Information from the Federal Treasury website. URL: https://roskaz№ a.gov.ru (accessed on 14.12.2021).

liquidity management is highly effective, which, by the end of 2021, brought about 300 billion rubles to the budget system. Based on a retrospective analysis of profitability from liquidity management, it should be noted that in 2020 this figure amounted to 280 billion rubles, 13 and in 2019–181.4 billion rubles (107.9% of the planned indicators), which is 2.3 times more than the same indicator in 2018. The total return from the start of liquidity management by the fall of 2021 amounted to more than 1 trillion rubles according to the federal budget.

The difficulties of planning and forecasting funds and the need to find and implement effective liquidity management mechanisms are due to the reflection of the general macroeconomic situation [32]. Despite the fragmentation of management functions, leading to cash gaps, in Russia, there is a high level of profitability from liquidity management by the Treasury, as well as qualitative changes in the management of public finances and a quantitative increase in revenues entering the country's budget system.

The impossibility of direct financing of the real sector of the economy due to budget constraints significantly affects the development of liquidity management. This, in turn, causes a free outflow of excess liquidity to the real sector of the Russian economy for its non-inflationary financing. Funding through liquidity management without financial speculation allows you to simultaneously solve a number of government tasks:

- stimulating the growth of the revenue base of the budget system;
 - ensuring the safety of liquidity;
- increasing the rate of turnover of funds in the economy.

An example of stimulating the revenue base of the budget system through liquidity management is the provision of virtually free intra-annual treasury loans for up to six months to constituent entities of the Russian Federation, state extra-budgetary funds, and municipalities. This makes it possible to ensure uninterrupted financing of budgetary and public law obligations, together with leveling the need for market borrowings and conditional savings in total interest expenses by the above public law entities and extra-budgetary funds in the amount of more than 10 billion rubles compared to similar borrowing conditions in financial institutions.

The current level of liquidity managed by the Treasury increased on average per day and amounts to more than 1 trillion rubles, which makes it possible to speed up financial settlements and creates opportunities for public entities in the form of providing credit lines in excess of borrowing limits stipulated by budgetary legislation, which creates liquidity shortage conditions in the Russian regions and signs of technical bankruptcy. It is planned that in 2022, subjects of public law will receive their due part of the corresponding additional budget revenues that the Treasury receives from the effective management of public finances. In order to increase efficiency and neutralize the factors of fragmentation of liquidity management, the Treasury is transforming the organizational and functional model, moving away from the current management system in the constituent entities of the Russian Federation to one specialized functional structure that will optimize the resource potential of the department, completely depersonalize the interaction of officials with clients, which is essential reduces corruption factors and increases labor productivity, including through the full automation of a number of functional modules.

As part of developing approaches to determining the optimal level of liquidity

¹³ Conclusion "On the results of an external audit of the execution of the Federal Law "On the federal budget for 2020 and for the planning period of 2021 and 2022" and budget reporting on the execution of the federal budget for 2020 in the Federal Treasury" (approved by the Board of the Accounts Chamber of the Russian Federation on April 30, 2021).

buffer, the Treasury is looking for a balance between reliability, due to the ability to cover current unforeseen budgetary expenses, and profitability from liquidity management, taking into account high market volatility and market conditions. The minimum STA balance is proposed to be determined on the basis of fundamental scientific research with reference to a number of coefficients of the risk management model based on the Treasury forecasting system.¹⁴ In an idealized system, the profitability from liquidity management should fully cover the spending operations of the country's budget system, however, due to high market uncertainty and the possibility of a "black swan" or "grey rhino", it is necessary to ensure a minimum balance of the STA to cover current expenses in the short term (several trading weeks) to hedge budget management risks.

Based on the world's best practice, the creation of sections on the STA for sale in foreign currency on non-trading transactions is being implemented, with a conceptual request to expand the legal boundaries of the powers of the Treasury and vest the functions of a currency control agent. Particular attention is paid to improving the efficiency of cash execution of budgets through the interaction of the Treasury with credit, insurance, and microfinance organizations. In addition, on the material and technical basis of the Treasury, the state information system for municipal payments is being introduced into the processes of providing public services:

- "Digital enforcement proceedings"
- Notification and appeal of fines for violation of traffic rules and municipal improvement rules";
 - "Justice online";
 - "Labor migration online".

Reliable information is used and the time spent on legally significant actions is reduced with the further involvement of tax officials to improve the quality of tax administration.

Liquidity management is carried out through the use of various exchange mechanisms and financial instruments, including for the purpose of financing infrastructure projects¹⁵:

- REPO agreements, including on organized trades;
 - bank deposits and accounts;
- bank deposits with a central counterparty;
 - derivative financial instruments;
- budget lending to subjects and extrabudgetary funds;
 - purchase (sale) of foreign currency.

In order to manage the liquidity of the STA, the Treasury introduced a cash flow forecasting model, including automation of forecasting processes as part of the development of a cash planning module of the cash management subsystem of the state-integrated information system for managing public finances "Electronic budget" [33]. A wide range of financial instruments makes it possible to effectively ensure the profitability of budgets of the budget system.

On the issue of the possibility of a conflict of interest in connection with the commercial activities of public civil servants, it should be noted that the risk of its formation and the emergence of a corruption component is offset by existing legislative restrictions.¹⁶

The ambiguity of the commercial activities carried out by the Treasury goes into the historical aspects of the public administration of the French Republic and the Russian Empire, due to the function of searching for treasury revenues and conducting economic policy on behalf of the state.

¹⁴ Order of the Russian Treasury No. 13n dated March 31, 2020 "On the procedure for forecasting the movement of funds on a single treasury account" (registered with the Russian Ministry of Justice on June 19, 2020 No. 58722).

¹⁵ Strategic map of the Russian Treasury for 2021–2024 (approved by the Russian Treasury on December 31, 2020) (as amended on September 23, 2021).

¹⁶ Federal Law No. 79-FZ as of July 27, 2004 (as amended on July 2, 2021) "On the State Civil Service of the Russian Federation". Legislation of the Russian Federation. 02.08.2004. No. 31, Art. 3215.

At the same time, the currency risks of the Treasury and their hedging are implemented through the guarantee 17 of the Development Institute AO DOM.RF (hereinafter referred to as "the Development Institute") in the absence of venture capital investments, guarantee the sustainability of additional income to the budget system. However, there are total limits on covering losses and expenses of the Treasury, which cannot exceed the assets of a Development Institution, the sole owner of which is the state. This fact creates the risk of coincidence of the debtor and the guarantor in one person without the possibility of recovering losses, but due to the possibility of hedging through a credit default swap for a guarantee with a number of the largest taxpayers of the Russian Federation, and also taking into account the interests of national security, with international corporations, there is a real possibility of full coverage of risks and use of leverage for exchange transactions.

The effectiveness of liquidity management is a consequence of the lack of money in the economy, which arose due to the monetary policy of the Ministry of Finance of Russia and the Bank of Russia, confirmed by the budget law. Among other things, financing of the real sectors of the economy is offset by a systematic increase in the base rate, which makes it impossible to attract borrowed capital, as well as the withdrawal of funds from the country's economy by increasing the spending limit from the National Welfare Fund up to 10% of gross domestic product. In addition, the aforementioned law provides for the expansion of the reserve fund of the

Government of the Russian Federation to 1.4 trillion rubles with the transfer to it of the carry-over balances of funds not used by budget recipients and previously placed by the Treasury on bank deposits as part of liquidity management Against the backdrop of a budget surplus, an increase in the state's domestic debt is planned from 20.8 trillion rubles in 2022 to 26 trillion rubles in 2024, and external public debt — up to \$75.7 billion (about 5.5 trillion rubles) by 2025, with total debt service costs of about 2 trillion rubles (12% of budget expenditures).

The foregoing confirms the need to revise the system of public authorities with the centralization of powers and responsibilities in the implementation of macroeconomic policy in a single executive body based on the Treasury in order to prevent the default of the constituent entities of the Russian Federation, the likelihood of which is high against the backdrop of the ongoing economic policy. Moreover, not only the Republic of Ingushetia, 19 but also, other subsidized regions may be among the insolvent subjects of the country in the near future.

CONCLUSIONS

The authors of the scientific study established a high level of commercialization of public financial management through the activities of the Treasury, in line with the world's best practices. Fragmentation of powers between public authorities and inconsistency of macroeconomic policy vectors were noted as significant deterrent barriers to effective public financial management, creating a high level of uncertainty and risks of cash gaps, as well as the impossibility of achieving the goals of national projects and creating an attractive investment climate. In order to ensure the economic security of the state in the face of sanctions pressure, the authors propose to consider the feasibility of creating a body of macroeconomic regulation and

¹⁷ Decree of the Government of the Russian Federation of September 4, 2013, No. 777 (as amended on January 23, 2021) "On the procedure for managing balances of funds on a single account of the federal budget and a single treasury account in terms of the purchase (sale) of securities, not at organized trading under repurchase agreements and opening accounts for such transactions" (registered with the Ministry of Justice of Russia on August 20, 2021 No. 64732).

¹⁸ Federal Law No. 390-FZ as of 06.12.2021 "On the federal budget for 2022 and for the planning period of 2023 and 2024". Rossiyskaya Gazeta. 10.12.2021. No. 281.

¹⁹ Bukharova O. Time of debt. Rossiyskaya Gazeta. 08.11.2020.

public finance management on the material and technical basis of the Treasury, which is directly responsible for financially ensuring the powers and spending obligations of public law entities. As a promising direction in the development of public finance management, it is possible to empower the Treasury with the authority to manage unclaimed balances of funds of public finance administrators as an imperative or at their own discretion.

A dispositive mechanism for managing public finances can take place on the basis of an agreement, while an imperative one can take place through legislative consolidation of rights and obligations with the direction of income for the modernization of the production base and socio-economic projects, similar to the comprehensive plan for the socio-economic development of the Norilsk Territory with cofinancing (120 billion rubles: 24 billion rubles — funds from the federal budget, 14.8 billion rubles — funds from the consolidated budget of the Krasnoyarsk Territory, and 81.3 billion rubles — funds from PJSC MMC Norilsk Nickel).²⁰

In the future, effective management of the treasury will create a single state body responsible for implementing macroeconomic policy, managing public finances, collecting revenues, and achieving sustainable development goals reflected in national projects. The formation of a single center of legal regulation in the field of macroeconomic policy will make it possible to neutralize negative risks (threats) from unfriendly actions of foreign states.

In the conditions of foreign policy pressure against the background of changing economic formations, with the transition to state planning and regulation of economic processes on the basis of intersectoral balance, it is necessary to reform the organizational and legal system of public authorities. Significant

In turn, the powers of the Ministry of Finance of Russia, based on the inefficiency of the implementation of the state economic policy, must be brought to the historical and legal basis of the domestic experience of public administration with the empowerment of the accumulation and analysis of statistical and financial reporting.

costs in the process of commercialization of public financial management, arising from the fragmentation of powers and the lack of a single center for managing the treasury, create significant systemic and economic risks. The decrease in the efficiency of the processes of commercialization of public finance management, the growth of socio-economic tension within the country, and the lack of a rational macroeconomic policy that meets the challenges of our time determine the conceptual reasons for the implementation of organizational and economic legal modernization of the system of public authorities. To ensure effective management of public finances on the principles of commercialization and achieve high efficiency in the work of public finance administrators, it is necessary to consolidate the powers to manage the treasury and represent the macroeconomic interests of the state on the basis of the Treasury. The expansion of the powers of the state body while maintaining the system of checks and balances of public administration is possible on the basis of mutual control of the Accounts Chamber of Russia and the Treasury with the provision of officials with the last right to public critical discussion with representatives of the supreme audit body [34], which allows balancing its powers to carry out a comprehensive strategic audit and reviewing the activities of public authorities for compliance with legislation and best practices in public administration.²¹

²⁰ Decree of the Government of the Russian Federation of December 10, 2021, No. 3528-r"On approval of a comprehensive plan for the socio-economic development of the municipality of Norilsk". URL: http://government.ru/docs/44096/ (accessed on 14.12.2021).

²¹ Draft Federal Law No. 27388–8 "On Amendments to the Federal Law "On the Accounts Chamber of the Russian Federation"» (as amended by the State Duma of the Federal Assembly of the Russian Federation, text as of November 29, 2021). URL: https://sozd.duma.gov.ru/ (as of 29.11.2021).

In conclusion, it should be noted that the formation of a modernized organizational and legal model for the commercialization of public financial management and the fundamental regulation of macroeconomic policy in the context of liquidity management in order to hedge public risks should

provide for the Friedman real balance effect against the Mundell-Tobin asset substitution effect, with tracking and regulation of causal relationships between interest rates and inflation, as well as leveling the liquidity trap at zero or negative interest rates with positive inflation [35].

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M.M. Zav'yalov — research conceptualization, review and editing, verification of the research results' validity.

A.G. Gurinovich — references selection, analysis of international practice and theoretical provisions on the subject of the study.

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ORIGINAL PAPER

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Internal Factors Affecting Commercial Banks Profitability in Jordan

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ABSTRACT

The research **aims** to look into the factors that influence Jordanian commercial banks profitability. A **sample** of 13 commercial banks out of 16 listed on the Amman Stock Exchange for 2011–2020 was selected to achieve this goal. The study variables were **analysed** using the E-Views software for descriptive analysis, correlation analysis, and simple and multiple linear regression analyses. The study **shows** that when the independent factors had integrated, they impacted the dependents factor, reflecting on Return on Assets. The net credit interest to net credit facilities ratio positively affects, in contrast, the net interest and commissions income to total income ratio, the provision for credit facilities and interest in suspense to net credit facilities ratio, the bank size negatively affect the profitability measured by return on assets in Jordanian commercial banks.

Keywords: banks; credit facilities; credit interest; net interest; return on assets

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1. INTRODUCTION

The financial position of any nation depends on performing its various economic sectors, and because the economic sector, especially the banking sector, is one of the most important of these sectors, as there is a substantial relationship between the development and strength of the financial sector's and economic growth and its continuity. As the banking sector preserves people's savings and provides funding to various parties [1].

Where R.G. Rajan and L. Zingales [2] pointed to the importance of studying the banking sector because of its prominent and substantial role in advanced economies because of the association between the economic growth and the soundness of the banking sector, and this confirms the significant role it plays in the states development's economy. Also, P.H. Saona [3] pointed out that an efficient financial system helps to raise the profitability of banks, achieved by raising the efficiency of services provided to customers and increasing the volume of lending. Besides the role, that plays as a financial intermediary between savers (Surplus units) by good using their money and the borrowers (Defect units) by providing and meeting their financing needs [4].

Y. Altunbas et al. [5] showed that banks faced significant changes in their operations during the past two decades because of globalization and technological developments, which led to the emergence of new challenges for the financial sector and has reflected in revenues and costs. Because the profitability is one of the important goals that companies seek to achieve to survive, grow, continuity, and protect against the effects of expected losses, besides being a key target for investors, a key indicator for stakeholders, and a metric for measuring a company's success in using its capital [6, 7].

Although profits have considered cheap sources of financing [8], banks sometimes face difficulty in achieving appropriate profitability because of internal factors or external factors [9], which poses risks of using capital to finance their operations, which affects the primary function of banks in mediating between borrowers and savers.

Investors and financial institutions use many financial ratios to evaluate their business and investments, such as profitability ratios, including the gross profit margin ratio, the operating profit margin ratio, the net income ratio, the return on equity, and the return on assets. Where A.L. Alhassan et al. [10], O.J. Akotey et al. [11], W.H. Greene, D. Segal [12] used the return on assets ratio as a measure of the efficiency of operating assets, which is a measure of profitability, and therefore in this study, the return on assets was used as a measure of profitability in Jordanian commercial banks.

The banking sector in Jordan consists of 24 banks distributed among 13 Jordanian commercial banks,

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3 Jordanian Islamic banks, and eight branches of foreign banks operating in Jordan, including an Islamic bank branch (according to the Central Bank of Jordan). Although several previous studies examined the factors affecting the profitability in banks in general, the studies on the factors affecting the profitability in Jordanian commercial banks, in particular, are still limited and few, so the problem still exists and is an open topic for research and discussion. In addition to the differences in previous studies, for the study population and the sample, the independent and dependent variables, the measurement method, the period of the study, all of this made it difficult to adopt the results of these studies for generalization Jordanian commercial banks.

We can clarify the study problem by answering the following question:

Is there an effect of the combined independent variables on Jordanian commercial banks profitability?

Furthermore, branched out from them, the following sub-questions:

- 1. Is there an effect of the net interest and commissions to total income ratio on Jordanian commercial banks profitability?
- 2. Is there an effect of the net credit interest to net credit facilities ratio on Jordanian commercial banks profitability?
- 3. Is there an effect of the provision of credit facilities and interest in suspense to credit facilities on Jordanian commercial banks profitability?
- 4. Is there an effect of the bank size on Jordanian commercial banks profitability?

Based on the preceding, this research aim is to determine the internal factors affecting profitability in the Jordanian commercial banks' sector. By analysing time series data for several factors that no local research has ever studied and examined according to the researcher's knowledge, as we expect that this research will provide increasing in knowledge, helping researchers and bank administrations in knowing the factors affecting profitability, and help investors in planning and developing their investment policies.

This study has organized: the second section reviews the previous literature and explains the independent and dependent variables. The third section is the methodology, which includes the study hypotheses, the population and sample of the study, and the mathematical model. The fourth section is statistical analysis, hypothesis testing, and discussion of results. Finally, the fifth section is conclusions, recommendations, and limitations.

2. THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

Studies on the performance of banks during the late seventies to early eighties began by applying Efficiency Structure and Market Power theories to two industrial organizations [13]. A balanced portfolio theory has helped increase knowledge about bank profitability [14]. The relative-market-power hypothesis theory indicated that companies with a significant market share and a high and distinctive diversity in their products would possess sufficient power to price their products and achieve high profits. The efficient-structure hypothesis also indicated that companies with high efficiency could Increase their market share due to their high profits. N. Ayadi and Y. Boujelbene [15], C.K. Staikouras and G.E. Wood [16] they have indicated that Molyneux and Thornton (1992) were the first to examine the determinants of profitability in banks through their study on banks in 18 European countries from 1986–1989.

There is a difference in profitability between one bank and another, and this may be due to many reasons, including the difference in the size of the bank, the efficiency of asset and liability management, the bank's location and geographical distribution, and other reasons [17]. A significant decline in profitability leads to the decline of shareholders and depositors from carrying out banking activities, which decreases their ability to attract the capital needed to do business. Also, high profitability may be an indication of market strength, especially by large banks, which may be an obstacle for banks to exercise their role as financial intermediaries, as banks that have substantial market power will impose high-interest rates on facilities and, in return, grant low rates of return on deposits [18].

Evaluating the financial performance is done by analysing, interpreting and comparing the financial statements to follow up the company's activities, its economic and financial conditions, and the extent of their impact on it to help take the appropriate decision at the right time. There are many financial ratios used to evaluate financial performance, including return on

¹ Central Bank of Jordan. URL: https://www.cbj.gov. jo/ (accessed on 04.01.2022).

assets. Concerning the factors that affect the profitability, some focus on the operational aspect, others focus on the budget structure and others on organizational factors.

Furthermore, C.K. Staikouras and G.E. Wood [16] divided the determinants of banks profitability into internal determinants that can be controlled through bank management and external determinants related to the industry and the economy that cannot be controlled. While D. Yazdanfar [19] classified the variables that explain company's profitability into three variables. The first of which are variables related to the company's characteristics, secondly, variables related to the sector in which the company operates, and finally, variables related to the market, but the relationship between these factors and the banks profitability may differ due to the difference in banking environments [20].

2.1. Previous studies

Many parties, including researchers, academics, investors, managers and others, have conducted many studies and research in several countries and for various sectors and periods to determine the factors affecting the bank's profitability. Identifying these factors is an important matter to ensure the success and continuity of the bank [13]. Also, E. Sharma and M. Mani [21] indicated that the banks' performance had become a source of concern for policymakers and economic planners because the efficiency of banks in managing their assets and providing their services is reflected in the state's economy and on all parties who have interests in the company.

T. Shanko et al. [22] indicated in their study of the Ethiopian banks for 2010–2017 found that current deposit, loan and advance have a positive relationship, while market fixed-deposit has a negative relationship with banks profitability. M.A. Islam et al. [4] indicated in their study of 11 banks in Bangladesh for 2014–2015 that there is a positive impact of asset size and capital adequacy on profitability. A.S. Alshatti [23] indicated in his study on Jordanian commercial banks for 2005–2014 to the negative impact of asset quality, while there is no effect of the size of assets on the return on equity. Abel Sanderson and Le. Roux Pierre [24] as indicated in their study of 18 banks in Zimbabwean for 2009-2014, bank size negatively impacts profitability. M. Alalaya and S.A. Al Khattab [25] indicated in their study on 13 Jordanian commercial banks for 2002-2014 the negative impact of loans and size of

the return on assets. M.K. Al-Jafari and M. Alchami [26] indicated in their study of 17 commercial banks in Syria for 2004–2011 that bank size has a positive impact on the ROAA. X. Zhang and K. Daly [27] indicated in their study on 124 banks in China for 2004-2010 that there is a positive effect of size and a negative effect of loan loss provision to total loan and non-interest expenses to total assets on profitability. A.M. Alkhazaleh and M. Almsafir [28] indicated in their study on 14 Jordanian commercial banks in 1999-2013 that there is a negative impact of size on return on assets. C. Staikouras and G. Wood [29] indicated in their investigation of the performance of a sample of banks operating in 13 EU banking markets in 1994–1998 that return on assets is inversely related to loans to assets ratio and the proportion of loan loss provisions. H.A. Khrawish [30] indicated in his study of Jordanian commercial banks for 2000–2010 that there is a positive relationship between the return on equity, and the bank size and the net interest margin.

What distinguishes this study from previous studies? Many previous studies studied several internal or external factors and determined their impact on the commercial banks profitability for different periods. Examples of internal factors addressed in previous studies are liquidity ratios, ownership ratio and debt ratio, while external factors include inflation and output gross domestic product and market share. However, what distinguishes this study is that it deals with a set of internal factors that have not previously been studied collectively or independently in any of the previous studies, according to the researcher's knowledge.

2.2. Study variables

Dependent variables

Y: Return on assets

Return on assets is an indicator that appears in the form of a percentage that helps the investor, analyst, or management to indicate the company's profitability from its total assets, meaning the efficiency of the company's management in using its assets to generate profits [31]. So that the higher this ratio, the more this indicates the company's efficiency in managing its assets and are calculated by many equations, for example:

ROA = Profit margin on sales * assets turn over;

ROA = (net income/revenues) / (revenues/total assets). In agreement with many previous studies, the following equation was adopted:

ROA = net income / total assets.

Independent Variables:

X1: Net Interest and Commissions Income to Total Income ratio

The bank's income from net interest and commissions depends on the structure of the bank's assets and the maturity of liabilities and deposits in addition to changes in interest rates on loans and deposits, as the higher the sensitivity of the bank's assets to changes in interest rates, the higher the risks that the bank may be exposed to [32].

Because of technological and economic development, profitability decreased in traditional banks, which prompted them to diversify their activities to achieve more profits [33]. P.S. Rose and S.C. Hudgins [1] indicated that part of the bank's revenue comes from traditional services, such as commissions linked to accounts, prepayment commissions for loans, commissions for using various credit cards and other commissions for many services. Interest income is a significant source of operating income, and the increase in non-interest income leads to a decrease in the risks associated with achieving the return.

In addition, R. DeYoung and T. Rice [34] pointed to the increase in banks' exploitation of non-traditional activities to obtain income, reflecting the diversity in non-traditional activities and ways of obtaining income.

X2: Net Credit Interest to Net Credit Facilities ratio

Credit interest represents a source of income for banks, which appears in the income statement and is considered taxable income. Whereas, when individuals deposit funds with banks to invest and obtain interest, the banks, in return, use part of these funds in lending operations to various parties in return for a particular interest. This process depends mainly on the banks' operational processes and lending policies, changes in interest rates, and economic and political changes. For example, whereas in the case of economic recovery, banks raise interest rates and reduce restrictions and conditions on borrowing, which leads to a rise in income derived from interest on loans, in contrast, in the case of an economic downturn, banks work to tighten up in granting loans due to the high risk of failure to pay, which reduces the interest obtained from loans.

X3: Provision for Credit Facilities and Interest in Suspense to Credit Facilities

This ratio reflects the efficiency of asset management in the sense of the quality of loans granted by the bank, as the bank's revenues will rise as more loans are granted, and better customer deposits are employed, but this depends on the ability of customers to repay. Hence, banks allocate a percentage of these loans as doubtful loans, which affects profitability. So that the higher this ratio, i.e., the higher the value of the doubtful assets, increases the allowances for expected credit losses, which means a decrease in the quality of the loans granted, which raises the risks and reduces the profitability. E. Menicucci and G. Paolucci [17] pointed out S.M. Miller, and A. Noulas. L.J. Mester [35] that the more banks spend on the resources allocated to credit control, there will be fewer problems with loans, but at the same time, this will lead to higher operating costs. Moreover, S.M. Miller and A. Noulas [36] indicated that the higher the risks, the higher the percentage of outstanding loans, which leads to a decrease in profitability.

X4: Bank size

According to researchers in economics, finance and business, size is considered one of the essential features of firms in explaining profitability. R. Elsas et al. [37], M. Kosak, M. Cok [38], B. Jónsson [39] indicated that the company's size could express through total assets, sales, and employees. Moreover, the larger the company size, the greater the chance of obtaining better resources and greater diversity in its products, and thus more excellent sales are reflected in obtaining more significant profits. Also, F. Allen [40] indicated that large banks could achieve higher profits because they can impose a high lending rate and bear lower borrowing costs in return. Consistent with J.A. Niresh and T. Velnampy [41], M. Doğan [42], M. Pervan and J. Višić [43] measured the bank size by the natural logarithm of total assets.

3. METHODOLOGY

3.1. Study hypothesis

Main hypothesis:

H₀: There is no effect of the combined independent factors on Jordanian commercial banks profitability.

We derived the following sub-hypotheses:

 H_{01} : There is no effect of the net interest and commission income to total income ratio on Jordanian commercial banks profitability.

 H_{02} : There is no effect of the net credit interest to net facilities ratio on Jordanian commercial banks profitability.

 $\rm H_{o3}$: There is no effect of the provision of credit facilities and interest in suspense to credit facilities ratio on Jordanian commercial banks profitability.

Variable symbols and measurement

Symbol	Description				
	Dependent variable				
Υ	Return on assets = (net income / total assets) of the fiscal year i for bank t				
	Independent variables				
<i>X</i> 1	Net Interest and Commissions Income to Total Income of the fiscal year <i>i</i> for bank <i>t</i>				
X2	Net Credit Interest to Net Credit Facilities of the fiscal year i for bank t				
X3	Provision for Credit Facilities and Interest in Suspense to Net Credit Facilities of the fiscal year <i>i</i> for bank <i>t</i>				
X4	Bank Size = the natural Logarithm of the total assets of the fiscal year i for bank t				

Source: compiled by author.

H₀₄: There is no effect of bank size on Jordanian commercial banks profitability.

3.2. Study population and sample

The study population consists of 24 Jordanian banks listed on the Amman Stock Exchange from 2011–2020, while the study sample was limited to 13 Jordanian commercial banks. An exception was made for 3 Jordanian Islamic banks, and eight branches of foreign banks operating in Jordan, including an Islamic bank branch.

The research sample met the preceding criteria:

- 1. Access to all data needed to evaluate the parameters.
- 2. There was no merger of the bank.
- 3. Each year contract ends on December 31.
- 4. For the period under investigation and review, the financial reports of the sample population are available.
- 5. The bank's listings on the Amman Stock Exchange are still active throughout the investigation phase.

We got all data from the annual financial reports of Jordanian commercial banks listed on the Amman Stock Exchange.

3.3. Mathematical model

In line with several previous studies and line with the study hypotheses, formulated of the mathematical model has been:

$$Y_{it} = a0 + a1X1_{it} + a2X2_{it} + a3X3_{it} + a4X4_{it} + e_{it}$$
 (1)

And the sub-mathematical model:

$$Y_{it} = a0 + a1X1_{it} + e_{it}$$
 (1.1)
 $Y_{it} = a0 + a1X2_{it} + e_{it}$ (1.2)
 $Y_{it} = a0 + a1X3_{it} + e_{it}$ (1.3)

$$Y_{i,t} = a0 + a1X2_{i,t} + e_{i,t} (1.2)$$

$$Y_{..} = a0 + a1X3_{..} + e_{..}$$
 (1.3)

$$Y_{it} = a0 + a1X4_{it} + e_{it} (1.4)$$

where Y_{it} represents the dependent variable, and the X1, X2, X3, X4 are the independent variables defined in *Table 1, e_{ij}* represents the error term. The study uses the Cross-section fixed model.

4. STATISTICAL ANALYSIS

In order to achieve the research objectives and test its hypotheses, data entered and variables were prepared for analysis using Microsoft Excel, then the E-views program was used to analyse the study data. Several tests have been used:

- 1. Descriptive statistics, such as the arithmetic mean and the standard deviation.
- 2. Autocorrelation test between errors in the regression equation, expressed in the value of Durbin-Watson, where [44, 45] indicated that multicollinearity problems appear if the value of the correlation coefficient between the variables reaches 80% or more.
- 3. Pearson Correlation Matrix to measure the strength and direction of the relationship between variables.
- 4. A simple and multiple linear regression analysis test to study the effect of independent variables on the dependent variables.

4.1. Descriptive Analysis

It appears from (*Table 2*) that the average return on assets amounted to 0.011780, and this indicates a low return on assets for Jordanian commercial banks for the study period. The maximum was 0.106000, which means some banks within the sample achieved a good return on assets at a rate of 0.106000 JOD for every dinar invested in assets, indicating good investment in

Descriptive statistics of the study variables

	Υ	<i>X</i> 1	<i>X</i> 2	<i>X</i> 3	<i>X</i> 4
Mean	0.011780	0.864401	0.108163	0.078859	9.376386
Median	0.011450	0.869850	0.105700	0.068250	9.334260
Maximum	0.106000	0.968700	0.156600	0.552000	10.43439
Minimum	-0.001700	0.666300	0.084700	0.014600	8.557470
Std. Dev.	0.009811	0.053496	0.015619	0.064643	0.396862
Observations	130	130	130	130	130

Source: compiled by author.

Note: Y is the return on assets; *X*1 is the net interest and commission income to total income ratio; *X*2 is the net credit interest to net credit facilities ratio; *X*3 is the provision for credit facilities and interest in suspense to net credit facilities ratio; *X*4 is the bank size.

assets and efficiency of operating assets. In contrast, the minimum amount was -0.001700, which means some banks within the study sample did not achieve a good return. However, the return on assets has decreased significantly due to inefficiency in the exploitation and operation of assets, meaning that every dinar invested in assets achieved losses of -0.001700 dinars. Thus, this requires them to improve the assets management and operation to raise the rate of return on assets. While the standard deviation was 0.009811, which indicates a low variation in the rate of return on assets between the study sample banks for the study period.

As for the net interest and commission income to total income ratio, the average was 0.864401, and the median was 0.869850, indicating a higher net interest and commission income in Jordanian commercial banks. Furthermore, the standard deviation value of 0.053496 indicates an average variation in the net interest and commission's income received by Jordanian commercial banks, which means similarities and convergence in the commissions and interests obtained by Jordanian commercial banks because there is a convergence between net interest and commission income imposed by commercial banks on various types of transactions and facilities.

Also, the net credit interest to net credit facilities ratio, the average amounted to 0.108163, and the median was 0.105700, and this indicates a high percentage of credit interests obtained by banks. At the same time, the standard deviation reached 0.015619, and this indicates a decrease in the discrepancy between credit interest rates charged by commercial banks and this is related to the interest rates imposed by banks on various types of facilities, meaning that there is a convergence between credit interest rates in Jordanian commercial banks.

As for the provision of credit facilities and interest in suspense to net credit facilities ratio, the average was 0.078859. On the other hand, the median was 0.068250, and this indicates a low percentage, which indicates the quality of loans and facilities granted and the quality of credit policies followed by banks, which reflect on the absence of a high percentage of non-performing loans, which leads to a decrease. The risk of non-payment and the high ability of banks to collect their debts.

Also noted, the bank size had the highest mean, median, and standard deviation (9.376386; 9.334260; 10.43439), respectively, which indicates a large size of assets in the Jordanian commercial banks.

4.2. Correlation Analysis

In order to verify multicollinearity problems between the study variables, we used the Pearson correlation matrix, as shown in *Table 3*, the correlation analysis process results for the study variables during the study period 2011–2020.

Table 3 shows no correlation coefficient value over 0.80; hence, there is no multicollinearity problem between the study variables, confirming that the model used is valid and reliable [44, 45].

Table 3 shows a weak positive correlation between profitability measured by return on assets and the net credit interest to net credit facilities ratio by 0.260023, indicating that the net credit interest to net credit facilities ratio has a weak effect on return on assets.

Also, profitability measured by return on assets has a weak negative correlation with the net interest and commissions income to total income ratio; the provision of credit facilities and interest in

Table 3

Pearson correlation matrix among the study variables

	Υ	<i>X</i> 1	<i>X</i> 2	<i>X</i> 3	<i>X</i> 4
Υ	1.0000				
<i>X</i> 1	-0.251782	1.0000			
X2	0.260023	-0.155275	1.0000		
<i>X</i> 3	-0.053026	-0.130298	0.100829	1.0000	
X4	-0.064577	-0.015265	-0.324159	-0.144863	1.0000

Source: compiled by author.

Note: Y is the return on assets; X1 is the net interest and commission income to total income ratio; X2 is the net credit interest to net credit facilities ratio; X3 is the provision for credit facilities and interest in suspense to net credit facilities ratio; X4 is the bank size.

suspense to net credit facilities ratio; the bank size by -0.251782, -0.053026, -0.064577, respectively.

While, the net interest and commissions income to total income ratio has a weak negative correlation with the net credit interest to net credit facilities ratio; the provision of credit facilities and interest in suspense to net credit facilities ratio; the bank size by -0.155275, -0.130298, -0.015265 respectively.

The net credit interest to net credit facilities ratio has a weak positive correlation with the provision of credit facilities and interest in suspense to net credit facilities ratio by 0.100829 and a weak negative correlation with the bank size by -0.324159.

Finally, the provision of credit facilities and interest in suspense to net credit facilities ratio has a weak negative correlation with the bank size by -0.144863, indicating that the bank with a larger size will have a lower provision for credit facilities and interest in suspense ratio.

4.3. Hypothesis Testing

By applying multiple and simple linear regression, if the probability is less than 0.05, reject the null hypothesis and accept the alternative one. Also, the R^2 shows the ability to explain the change in the dependent variables by the independent variables.

Table 4 shows the correlation coefficient among the profitability measured by return on assets and independent variables as follows:

- (1) The correlation coefficient with the X1 is the net interest and commission income to total income ratio is -0.057852, and the probability is 0.0036, which indicates a negative impact on the profitability measured by return on assets.
- (2) The correlation coefficient with the X2 is the net credit interest to net credit facilities ratio is 0.085468,

and the probability is 0.3312, which indicates a positive impact on the profitability measured by return on assets.

- (3) The correlation coefficient with the X3 is the provision of credit facilities, and interest in suspense with net credit facilities ratio is -0.019407, and the probability is 0.2325, which indicates a negative impact on the profitability measured by return on assets.
- (4) The correlation coefficient with the X4 the bank size is -0.012348, and the probability is 0.3670, which indicates a negative impact on the profitability measured by return on assets.
- (5) The R^2 is 0.376241, indicating the ability of the independent variables to explain the changes in the profitability measured by return on assets by 37.6241%. Finally, the Durbin-Watson value is 2.455361, approving that no multicollinearity problem exists.
- (6) The Prob (F-statistic) of independent variables 0.000627, so we rejected the main null-hypothesis and accepted the alternative one, which is that the combined independent variables impact Jordanian Commercial banks profitability.

Sub-hypothesis Testing

As shown in *Table 5*:

(1) The R ² of the net interest and commission income to total income ratio is 0.356836, indicating the ability of the net interest and commission income to total income ratio to explain the changes in the profitability measured by return on assets by 35.6836%. The Durbin-Watson value is 2.394050, approving that no multicollinearity problem exists. The probability value was 0.0033, indicating that the net interest and commissions income to total income ratio negatively impact the profitability measured by return on assets in the Jordanian commercial banks listed on the Amman Stock Exchange. The assets are not the main activity of commercial banks. Thus, the effect of interest and

Table 4 Results of the multiple linear regression (Panel Least Squares- fixed-effect method) of Eq. (1)

Independent variables	Coefficient	Std. Error	t-Statistic	Prob.
С	0.169855	0.135749	1.251241	0.2137
<i>X</i> 1	-0.057852	0.019449	-2.974461	0.0036
X2	0.085468	0.087539	0.976345	0.3312
X3	-0.019407	0.016159	-1.201058	0.2325
X4	-0.012348	0.013630	-0.905982	0.3670

Source: compiled by author.

Notes: implies significance at 5%; $R^2 = 0.376241$; Adj. $R^2 = 0.226229$; F-stat. = 2.509240; D.W. = 2.455361; Prob (F-statistic) = 0.000627. Y is the return on assets; X1 is the net interest and commission income to total income ratio; X2 is the net credit interest to net credit facilities ratio; X3 is the provision for credit facilities and interest in suspense to net credit facilities ratio; X4 is the bank size.

commissions is very low or negative. In addition, the return on assets ratio is computed based on net income, while the net interest and commissions income to total income ratio is computed based on the total income. So, in this case, the profit items may affect the relationship between these two accounts. However, this result can be considered a new addition to this topic. Hence, we rejected the first null sub-hypothesis and accepted the alternative one.

- (2) The R² of the net credit interest to net credit facilities ratio is 0.31775, indicating the ability of the net credit interest to net credit facilities ratio to explain the changes in the profitability measured by return on assets by 31.7755%. The Durbin-Watson value is 2.324871, approving that no multicollinearity problem exists. The probability value was 0.1271, indicating that the net credit interest to net credit facilities ratio positively impacts the profitability measured by return on assets in the Jordanian commercial banks listed on the Amman Stock Exchange. Hence, we accepted the second null sub-hypothesis.
- (3) The R² of the provision of credit facilities and interest in suspense to net credit facilities ratio is 0.306492, indicating the ability of the provision of credit facilities and interest in suspense to net credit facilities ratio to explain the changes in the profitability measured by return on assets by 30.6492%. The Durbin-Watson value is 2.296353, approving that no multicollinearity problem exists. The probability value was 0.4447, indicating that the provision of credit facilities and interest in suspense to net credit facilities ratio negatively impact the profitability measured by return on assets in the Jordanian commercial banks listed on the Amman Stock Exchange. Hence, we accepted the third null sub-hypothesis.
- (4) The R^2 of the bank size is 0.303526, indicating the ability of bank size to explain the changes in the

profitability measured by return on assets by 30.3526%. Furthermore, the Durbin-Watson value is 2.276239, approving that no multicollinearity problem exists. Finally, the probability value was 0.7190, indicating that the bank size negatively impacts the profitability measured by return on assets in the Jordanian commercial banks listed on the Amman Stock Exchange. Hence, we accepted the fourth null sub-hypothesis.

5. CONCLUSION

This study aims to study the factors affecting Jordanian commercial banks profitability. A sample of 13 commercial banks out of 16 listed on the Amman Stock Exchange for 2011–2020 was selected to achieve this goal. We used the e-views program to perform descriptive analysis, correlation analysis, and simple and multiple linear regression analysis for the study variables. Initially, a multiple linear analysis to determine the independent factor's effect on the dependent factor represented by the return on assets. Then a simple linear regression analysis was conducted to find out the effect of each of the independent factors represented by the net interest and commission income to total income ratio; the net credit interest to net credit facilities ratio; the provision of credit facilities and interest in suspense to net credit facilities ratio; the bank size on the dependent factor represented by the return on assets.

The study concluded an effect of the combined independent factors on the dependent factor represented by the return on assets.

The study also finds:

1. The net interest and commission income to total income ratio negatively impact the profitability measured by return on assets in the Jordanian commercial banks

Table 5
The results of the simple linear regression Panel Least Squares- fixed-effect method of Eqs. (1.1–1.4)

Independent variables	Coefficients	R ²	D.W.	t-Statistic	Prob.
<i>X</i> 1	-0.057206	0.356836	2.394050	-3.001629	0.0033
X2	0.131158	0.317755	2.324871	1.537673	0.1271
<i>X</i> 3	-0.011340	0.306492	2.296353	-0.767052	0.4447
<i>X</i> 4	-0.004282	0.303526	2.276239	-0.360753	0.7190

Source: compiled by author.

Note: Y is the return on assets; *X*1 is the net interest and commission income to total income ratio; *X*2 is the net credit interest to net credit facilities ratio; *X*3 is the provision for credit facilities and interest in suspense to net credit facilities ratio; *X*4 is the bank size. Implies significance at 5%.

listed on the Amman Stock Exchange, that high-interest rates and commissions will decrease the return due to the customers' estrangement from transactions with high commissions and interests, and consequently, the low of net income.

- 2. The net credit interest to net credit facilities ratio positively impacts the profitability measured by return on assets in the Jordanian commercial banks listed on the Amman Stock Exchange, indicating that the higher the net credit interest resulting from the granted facilities, the higher the return on assets.
- 3. The provision for credit facilities and interest in suspense to net credit facilities ratio negatively impact the profitability measured by return on assets in the Jordanian commercial banks listed on the Amman Stock Exchange, indicates the high quality of loans granted by Jordanian commercial banks, in addition to the high ability of customers to repay and the low percentage of non-performing loans, which indicates that Jordanian commercial banks follow correct credit policies. This finding is inconsistent with [4, 13, 23, 26, 27]. In contrast, consistent with [29].
- 4. The bank size negatively impacts the profitability measured by return on assets in the Jordanian commercial

banks listed on the Amman Stock Exchange. However, this indicates a lack of good operation and exploitation of assets by Jordanian commercial banks. Also, this shows that larger banks can get a higher return on assets than smaller ones because the larger banks have a more significant asset, a more considerable diversification of services and a larger market share. This finding is consistent with [10, 13, 23, 24, 28]. In contrast, inconsistent with [4, 25–27, 30].

Recommendations

Based on the findings, we suggest:

- 1. Banks management and investors should consider these factors to raise profitability.
- 2. External factors can be used in future studies, such as GDP growth and inflation, internal variables such as interest price volatility.

Limitations

Since this research was limited to Jordanian commercial banks, it is doubtful that they can apply the findings to other sectors. Furthermore, since the research period is 2011–2020, we cannot use the results for different periods. Finally, only a few financial ratios were studied.

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Banking Regulation and Banking Crises Probability in European Countries

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ABSTRACT

The main hypothesis of the paper was the thesis that banking regulation is intended to minimize the probability of financial instability, including banking crises, which have long-lasting and destructive consequences for the economy. The **practical aim** of this investigation is to explore the impact of banking regulation instruments on the banking crisis probability. Despite a large and growing body of literature that has investigated the role of banking regulation in ensuring financial stability, only a few of them explored the aspect of this problem we are considering, and this constitutes the scientific novelty of the research. The results confirm the effectiveness of banking regulation in predicting periods of stability in banking systems. Based on the use of bibliometric analysis with the software tool VOSviewer v.1.6.10, the main patterns in the theory of banking regulation development have been identified. To conduct an empirical analysis, the author used a database of eleven European countries from 1998 to 2017, whose banking systems had manifestations of a systemic banking crisis. Binary modeling (logit model) was used as a scientific and methodological tool for statistical research. The conducted empirical analysis declared the need to tighten banking regulations in the field of non-performing loan control since it leads to an increase in the banking crisis probability. The results of binary modeling also emphasized the importance of macroeconomic and monetary factors, the neglect of which leads to the vulnerability of banking institutions and, consequently, to banking crises. An important conclusion of the analysis is that in order to minimize systemic banking crises, it is necessary to ensure the achievement of the target parameters of the main macroeconomic indicators, expressed in terms of the optimal level of inflation and annual GDP growth. The proposed binary model can be used to further study the causes of a banking crisis, as well as methodological and empirical clarification of the role of banking regulation in the probability of its occurrence.

Keywords: banking regulations; banking crisis; financial stability; systemic risk; monetary policy; bibliometric analysis; VOSviewer; binary modeling; logit model

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INTRODUCTION

Global financial crisis — one of the recent large-scale banking crises — has demonstrated extensive negative effects in the form of falling production and significant social costs. Compared to other financial crises (currency and debt), banking crises are the costliest for a country in terms of total output losses [1–3]. According to calculations Nakatani [4], done for 49 developing countries, the currency crisis causes a 4% drop in GDP, while the cost of banking crises is 6–7% of GDP.

Results of empirical research [5] show that the stability of the banking system ensures the economic sustainability of the country in view of the reduced volatility of value added in the real economy. For example, in countries with more developed financial and institutional systems, bank stability reduces the volatility of value added to a greater extent in sectors of the real economy that have significant external financial dependence. Bank sustainability in countries with weak competition in the banking sector is particularly important to mitigate economic instability. In this regard, theme identification the probability of a system banking crisis is very relevant from the point of view of regulatory policy. Detection of crisis situations, assessment of the effectiveness of regulatory interventions, including actions of central banks aimed at changes in capital

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adequacy and liquidity standards, give regulators more time to develop new or amend existing preventive measures

In order to avoid or minimize the devastating effects of further banking crises, financial conditions have been tightened in many countries through banking regulation. Several empirical studies have shown that weak regulation and supervision of banking activities are the factors leading to the crisis [6–11]. Therefore, the countries were significantly affected by the global financial crisis had weaker banking regulation and supervision than those that did manage better the situation during the turbulence crisis [12–14]. For this reason, the issue of the effectiveness of regulatory and supervisory approaches applied in the banking sector in the run-up to the crisis was actively studied in the world scientific literature, including in Russia [15–18] and Azerbaijan [19–21]. Thus, a statistical analysis conducted by M. Cihak et al. [22] showed that the crisis countries had a lower actual capital adequacy ratio, less strict regulation of non-performing loans, and regulators in these countries were unable to require banks to recapitalize, increase their reserves, modify compensation schemes and/ or suspend (cancel) management bonuses.

Significant research was also conducted in the area of forecasting banking crises, including in Russia [23, 24]. E.P. Davis and D. Karim [25] has been established Early Warning Systems (EWS) to calculate the probability of bank crises. According to these developments, a significant increase in borrowed financial resources and GDP are predictors of the banking crisis in the country. Based on machine learning, J. Buetel, S. List, G. von Schweinitz [26] also proposed a mechanism for forecasting bank crises, according to which credit expansion, asset price boom and external imbalances are the key warning indicators, require continuous monitoring by financial regulators.

Most existing empirical studies focused on the predictability and spread of financial crises estimate the probability that the banking system will go into crisis based on traditional probit/logit-models.

One of the first research to study the determinants of the occurrence of currency shocks in developing countries based on probitmodeling was conducted by J.A., Frankel and A.K. Rose [27] and make a decisive contribution to the development of the scientific literature on the development of early warning systems for crises. Most subsequent researches examine country-specific causes of financial market turbulence and the resulting financial crisis. Using a multi-dimensional regression logit-model, P. Laina et al. [28] developed a system crisis early warning system for eleven European Union (EU) countries according to which its best precursors are the ratio of loans to deposits and property prices. In later works use alternative modifications of binary estimation methods (logit-model with fixed effects, probit-model with random effects). Thus, the work of B. Gaies et al. [29] shows that the number of banking crises in developing countries decreases as the exchange rate stabilizes, real GDP grows, human capital improves and political institutions improve. Despite research increase, devoted to the study of the determinants of the banking crisis, only a few of them analyze the impact of regulatory policy on the probability of its occurrence [10, 30]. In particular, using data from 65 countries in the period 2000-2016, R. Nakatani [31] found that changes in the loan-to-value ratio (LTV) have a positive impact on the probability of a bank crisis in countries with inflation targeting, floating exchange rate regimes and/ or lack of capital controls.

BIBLIOMETRIC ANALYSIS OF EXISTENT LITERATURE

Despite the significant growth of researches, aimed at analyzing the role of banking regulation in financial stability, few empirical studies have analysed its impact on the probability of a banking crisis. On the basis of the use of bibliometric (VOSviewer v.1.6.10)

analysis, which is widely spread in the scientific sphere [32–35], the main regularities in the development of the theory of banking regulation have been identified.

In order to formalize the content analysis of research conducted by the scientific research community on banking regulation, 2006 scientific publications, indexed by the Scopus scientific database during 1910-2021, were selected.¹ The selection of relevant publications was made on the basis of keywords, and the basic concept was chosen "banking regulation", which is a common English-language analogue of the domestic concept of "bank regulation". The results of this block of bibliometric analysis are presented on Fig. 1. According to its results, a map of relationship of the concept of "bank regulation" with other categories was formed, which allowed to allocate five clusters of scientific research: they are indicated in blue, yellow, green, red and purple on Fig. 1.

In addition, should also be noted that the larger diameter of the circle means a greater frequency of mentioning the relevant concept as a keyword next to the banking regulation in scientific articles indexed by Scopus scientific database over more than one century. Generalization of the results of informational-contextual block of bibliometric analysis has revealed that the main bulk of scientific research is focused on identifying the relationships of banking regulation and other types of policies (monetary and macroprudential), financial stability and systemic risk (red cluster), financial crisis (yellow), methodical recommendations of the Basel agreements (blue), market environment banking activities (green), financial integration (purple). In addition, it should be noted that there are intersection and relationship between the identified clusters. Thus, the stability of the financial system and, consequently, the probability of financial crisis depends on the implementation of requirements to regulatory

capital, level of financial leverage and liquidity, developed by BCBS to improve the quality of risk management. The closeness of the relationship of concepts is also analyzed on the basis of the distance between circles, which characterizes the frequency of co-occurrence of concepts.

In the context of expanding the evolution-time perspective of this research it is advisable to analyze the results of context-time block of bibliometric analysis, Within the framework of which the main substantive determinants of research on banking regulation are ranked by temporal basis for the period 2007–2020.² In *Fig. 2* the gradient changes from purple (the earliest publications indexed by the Scopus scientific database) to yellow (modern works).

Analysis of the context-time research cluster on banking regulation revealed five stages during which the main focuses in this area changed. Thus, scientists considered the relationship of financial liberalization, in particular deregulation of banking activities, with the improvement of banking regulation system in 2007–2009; researchers focused on identifying the effects of the financial crisis due to the weakening of banking regulation and supervision in 2010–2012; the scientific work on the implementation of Basel III [in particular, individual requirements (regulations) of regulatory capital, leverage and liquidity] in response to the weaknesses of banking regulation revealed by the financial crisis came to the fore in 2013–2015, while in 2016-2018 the attention of scientists was focused on macroprudential regulation and issues of shadow banking sector; the research vector of scientists has changed towards the relationship of banking regulation, financial innovation and financial inclusion in 2019-2020.

In the context of the continuation of the temporal perspective of bibliometric analysis of studies on banking regulation,

¹ Scopus. 2021. Documents search. URL: https://www.scopus.com/search/form.uri?display=basic#basic

² Spectrum of analyses reduced compared to the contextual block of bibliometric analysis due to the small number of relevant research during the period 1910–2006 and 2021.

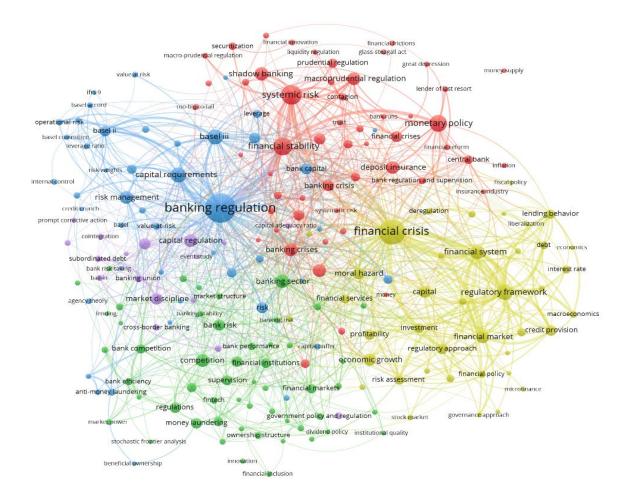


Fig. 1. Banking regulation relationship to other concepts from 1910 to 2021

Source: built by the author using VOSviewer v.1.6.10 based on Scopus data.

it is also advisable to carry out the spatial decomposition shown on *Fig. 3*.

As a result of the spatial and temporal bibliometric analysis, it is established that intensification of research on banking regulation occurs in the world during 2008–2020 within six consecutive time ranges, each with its own geographical centers. In general, the following pattern can be noted: earlier researches of various aspects of banking regulation have been conducted in industrialized countries with high per capita GDP, In the second half of time period under study, their geography expands to less economically developed countries.

However, some scientific interest is not only the spatial and temporal analysis of publication activity on banking regulation, but also the analysis of the geographical relationships in this field, which are presented at *Fig. 4*.

Based on the results of spatial clustering, five groups of countries were identified, the researchers of which have common publications on banking regulation. The first two clusters are intercontinental with a predominance of countries in the same subregion. For example, the first cluster has 19 countries. It covers the Northern (Mexico, Canada, USA) and Southern (Chile, Colombia, Argentina) subregions of the America, Australia, Oceania (New Zealand), and East (China, including Hong Kong, Japan, South Korea, Taiwan), South-East (Philippines, Indonesia, Singapore, Vietnam) and West (Jordan) subregions of Asia. The second largest cluster includes 18 countries with the prevalence of Africa (Egypt, Ghana, Nigeria,

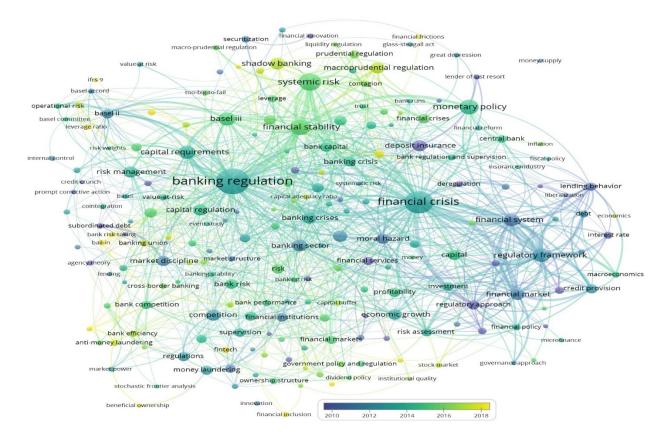


Fig. 2. A visual map of context-time analysis on banking regulation studies published in 2007–2020 in the Scopus journals

Source: built by the author using the Scopus journals database.

South Africa, Tunisia), subregions of Western (Belgium, France, Ireland, United Kingdom), Southern (Greece, Italy, Portugal, Spain) and Northern (Norway) Europe, and also Western Asia (Israel, Turkey, UAE). The third cluster consists exclusively of European countries in the three subregions of Europe: Western (Austria, Germany, Luxembourg, Netherlands, Switzerland), Eastern (Czech Republic, Hungary, Romania) and Northern (Denmark, Sweden). The fourth and fifth clusters consist, respectively, of four countries in South Asia (India, Malaysia, Pakistan, Saudi Arabia) and Eastern Europe (Poland, Ukraine, Kazakhstan, Russia). Thus, the analysis showed that there are links between researchers on bank regulation mainly by geographical proximity, but the two clusters also bring together representatives of the scientific community from different continents.

In this context, it should also be noted that out of the total amount of scientific publications indexed by Scopus scientific database, the most relevant work in the period 1910–2021 was recorded in the USA (576 scientific articles), the UK (284), Germany (138), France (116), Italy (102), Australia (74), Spain (69), Canada (59), Switzerland (56), the Netherlands (54), while in other countries the number of publications per period under analysis does not exceed 50 units.

BINARY MODELING: RESEARCH METHODOLOGY

The empirical goal of this research is to identify the impact of bank regulation tools on the probability of a banking crisis. For the construction of the forecasting model of manifestations of the system banking crisis, the method of logistic regression (logit-model) was chosen among the methods of statistical

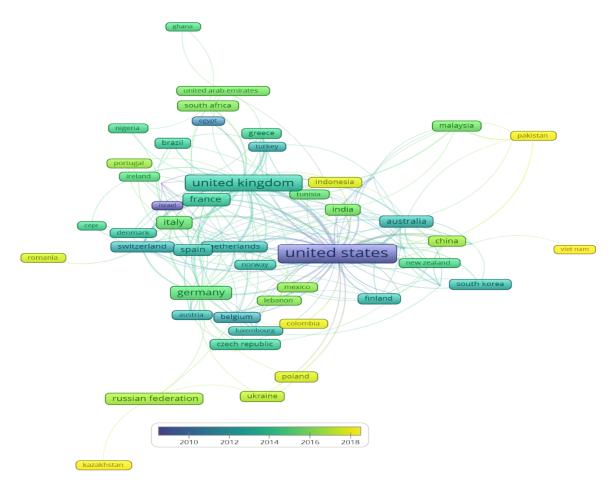


Fig. 3. A visual map of space-time analysis on banking regulation studies published in 2007–2020 in the Scopus journals

Source: built by the author using the Scopus journals database.

analysis — the model of binary selection based on the logistic function. Selected scientific and methodological tools allow predicting the probability of some event (in this case, a banking crisis) by the values of a set of features [36–45].

Estimation of total performance, probability of observed results, correspondence and diagnostics of accuracy of constructed logitand probit-models was carried out using the estimation of logarithm of likelihood (-2LL), p-value criterion, classification accuracy matrix, calculated on the basis of a general level of accuracy and more specific misclassification factors, and a curve ROC (Receiver Operating Characteristic).

The diagnosis of accuracy for comparison with other empirical models was conducted using a classification accuracy matrix. Based on the classification accuracy matrix, a general degree of accuracy, a type I error and a type II error (specific factors of the misclassification) were determined.

The overall level of accuracy helps analyze the ability of built logit-models to correctly classify the time of stability and the time of system banking crisis (*Table 1*). The following formula shall be used for its calculation:

Overall level of accuracy =
$$= (Correctly\ classified\ time\ /Total\ number\ of\ observations)*100 = $((TP + TN)\ /\ (TP + FP + TN + FN))*100.$ (1)$$

Type I error estimates the number of observations representing a system banking crisis that have been incorrectly classified, i.e. times of stability. Therefore, it is calculated as

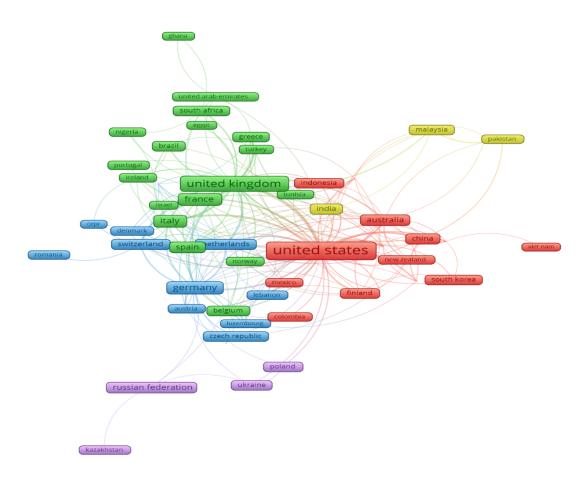


Fig. 4. A visual map of scientists' co-authorship (criterion — the country specified in the affiliation), whose joint publications on banking regulation were indexed by the Scopus journals database in 1910–2021 Source: built by the author using the Scopus journals database.

the ratio of false negative results to the sum of true positive and false negative results:

Type I Error =
$$(FN / (TP + FN)) * 100$$
. (2)

By contrast, a type II error estimates the number of observations representing the time of stability, which has been classified as the time of the system banking crisis. Thus, a type II error is calculated as the ratio of false positive results to the sum of false positive and true negative results:

Type II Error =
$$(FP / (FP + TN)) * 100.$$
 (3)

Another informative and generalizing metric used in the study is the area below the error curve (ROC). This graphical curve ROC is based on the estimated degree of accuracy, type I and type II errors. The ROC curve and

area below it (AUC) was used to estimate diagnostic accuracy.

The sample period for this research is 20 years (1998-2017). Annual data were collected from OECD, Eurostat and World Bank reports. Logit- and probit-regressions used for data processing and analysis were performed in STATISTICA computer system. The research includes 10 European countries with banking systems characterized by periods of stability and volatility (crisis), in particular: Austria, Belgium, Hungary, Greece, Denmark, Spain, Latvia, Moldova, Ukraine, France. The number of complete observations for the whole period of the research was 184, of which 46 (97.87% of the total) observations characterized crisis periods and 138 (90.19% of the total) observations characterized periods of stability of banking systems of European countries.

Table 1

Classification accuracy matrix for models assessment

Observed events	Predicted events			
Observed events	Time of stability (7)	Time of crisis (F)		
Time of stability (7)	True positive (<i>TP</i>)	False positive (<i>FP</i>)		
Time of crisis (F)	False negative (FN)	True negative (<i>TN</i>)		

Source: compiled by the author.

According to previous research, for the goal of this research, the process of selecting variables is based on indicators that best reflect bank regulation and those that clearly symbolize a systemic banking crisis in the country. As a basis in models of the probability of a system banking crisis, the original data set was generated from 25 independent variables, which were considered relevant in previous researches. After solving the multicollinearity problem, the final set of variables consists of four (narrow, Model I) and seven (extended, Model II) independent variables in two categories. The first group of indicators characterizes the instruments of bank regulation, they are represented by the following indicators: bank capital to total assets,%; bank nonperforming loans to gross loans,%; bank regulatory capital to riskweighted assets,%; Z-score of bank default probability. These indicators reflect banking regulation in the country according to BCBS requirements regarding capital adequacy, asset quality, level of risks accepted by the bank. In addition, the logit-model integrates Z-score of probability of bank default, calculated on the basis of non-consolidated data on individual banks from Bankscope (Bureau van Dijk — BvD), since this estimate relates the buffers (capitalization and profitability) of individual commercial banks to the volatility (instability) of these incomes.

The second set of indicators, which is included in the extended model type II (Model II), characterizes macroeconomic factors and monetary policy factors, in

particular: real GDP growth rate (%), real interest rate (%), inflation (%). These indicators describe commonly accepted monetary policy objectives and instruments.

Binary regressions were implemented according to model specifications, namely: logit and probit to test the hypothesis regarding the ability of banking regulation to prevent the probability of a banking crisis. In this type of model, dependent variables must be recoded as binary variables that can only take two types of values. In this research, the dependent variable is a dummy variable of the banking crisis (Banking Crisis Dummy), developed by experts of the IMF [46] based on expert-criterion definition. Therefore, this variable assumes a value of 1 in case of system banking crisis (time of crisis) or 0 — in the event of non-affection (time of stabilization).

When establishing the fact of the banking crisis as a system in different countries, IMF experts used criteria that reflect the signs of significant turbulence of the banking system, including information on the losses of the banking system, the number of financial and credit institutions liquidated and the degree of intervention of the financial regulator in response to the scale of losses of the banking sector.

RESULTS OF EMPIRICAL RESEARCH

In the course of this study, two types of models with two types of data sets (narrow and extended) were developed and tested using logit- and probit-regressions. Given that the developed probit-regression models

were statistically insignificant for all model performance indicators, the subsequent interpretation of the results will be carried out only for logit-regression models. Results of logit-modeling of probability of system banking crisis are presented in *Table 2*.

Results of binary modeling show the importance of banking regulation for forecasting the probability of a systemic banking crisis in European countries. According to the first type of model, the ratio of bank capital to total assets has a negative relationship with the probability of a systemic banking crisis in these countries. Thus, faster growth of bank capital over aggregate assets minimizes the probability of a banking crisis, as it is a critical and necessary element of economic self-sufficiency, profitability and financial sustainability of the banking system.

At the same time, the deterioration in the asset quality of the European banking system as the ratio of non-performing loans to total loans increases the probability of a systemic banking crisis. This fact confirms the hypothesis that aggressive credit policy and inadequate risk assessment, expressed by increasing the share of non-performing loans, not only worsens the profitability of banking activities, but also negatively affects the financial sustainability of the banking system as a whole. The negative effect is increased when there is insufficient supply for overdue and impaired loans, as well as inadequate formed credit risk reserves.

Increased equity to total risk-weighted assets reduces the probability of a banking crisis. This bank regulatory tool provides a buffer to protect the banking system from peak losses that exceed expected credit losses. In this context, the role of the Basel agreements in stabilizing the entire financial system and increasing bank capital is clearly evident.

According to early research, the coefficient for the Z-score of bank default probability assumed a negative value. This feedback on the probability of a systemic banking crisis can be explained by the economic interpretation of the Z-score of the probability of bank default. It shows how much of the standard deviation should be reduced by the current return value so that losses to the bank or the banking system as a whole, which are the result of negative factors, can exceed its equity capital. Thus, reducing the probability of insolvency of the European banking system, namely, the probability that aggregate assets will be lower than the value of total liabilities, reduces the probability of a banking crisis.

According to the assessment of the statistical significance of models (Model I — narrow and Model II — expanded) use of macroeconomic variables and monetary policy factors potentially allows to improve the predictive quality of the model of probability of system banking crisis. This conclusion is consistent with previous studies [47] which identified the inadequacy of traditional methods aimed at analyzing the bank's capital adequacy, liquidity and compliance with the Basel Committee on Banking Supervision (BCBS) compulsory economic standards.

Results of logit-modeling, given in *Table 2*, show importance of macroeconomic variables in forecasting probability of system banking crisis. For example, real GDP growth is significant with negative coefficient sign. This negative correlation shows that the growth of the economy is accompanied by an increase in financial welfare of all economic agents, which, accordingly, is reflected in the growth of liquidity of the banking system, a decrease in the number and volume of non-performing loans and, as a result, reduces the probability of systemic banking crises in European countries.

Empirical results of *Table 2* show that the monetary policy variable — the real interest rate — is statistically significant, and has an expected sign. Its negative ratio indicates that monetary tightening is with reduced chances of systemic banking crisis. This result makes sense, because soft monetary policy can lead

Table 2
Estimated logit probability model of systemic banking crisis occurrence

Variables	Model I (narrow)	Model II (extended)
b_0	4.31840	1.14853
Bank capital to total assets (%)	-0.39922	-0.87796
Problem loans to total loans (%)	0.26522	0.44900
Equity to total risk-weighted assets (%)	-0.15592	-0.06527
Z-score of bank default probability	-0.15047	-0.06052
Real GDP growth (%)		-0.53262
Real interest rate (%)		-0.05915
Inflation (%)		0.154
Statistical relevance of the r	model	
Chi2	23.42135	39.87975
p-value	0.00010	0.00000
Final loss	13.26965	5.04040
– 2*Log-likelihood	26.53930	10.08080

Source: compiled by the author.

to a credit bubble that often leads banking crises.

The last independent variable, which is at the same time a factor describing the macroeconomic situation in the country, also reflects the monetary policy target of ensuring the stability of the national unit — inflation. Calculated inflation rate is statistically significant at 5% and positive. Contrary to the view of some researchers that borrowers benefit indirectly from rising inflation as their debt burden is reduced, the conducted study records a significant positive impact of inflation growth on the probability of the banking crisis. This is also consistent with economic theory, as rising inflation creates instability in the economy, a fall in real incomes of all financial market actors, the propensity of households to borrow, respectively - growth of nonperforming loans in commercial banks' loan portfolios, which increases the likelihood of systemic banking crisis. Thus, monitoring and controlling inflation should be the main objective of monetary and fiscal policy.

CLASSIFICATION QUALITY METRICS

Table 3 presents the accuracy of the classification of models that predict the probability of a systemic banking crisis in European countries, both for narrow (Model I) and extended (Model II) datasets.

As seen from *Table 3*, calculated logit-model I (narrow) classifies the stability time with an accuracy of 95.65% and the system banking crisis with an accuracy level of 10.87%. The overall accuracy level of the evaluated Model I (narrow) is 74.46%. However, according to *Table 2*, *3*, the inclusion of additional macroeconomic and monetary factors in

the model improves not only the predictive quality of the probability model of a systemic banking crisis, but also the accuracy of the classification of the model. Thus, Model II (extended) gives a much higher overall level of accuracy, which is 86.96%, and therefore has a higher level of classification accuracy, both for periods of stability and periods of crisis, than Model I (narrow). Model II (extended) predicts stability time with an accuracy of 97.11%, which is 1.46% more than Model I (narrow). The feature of the Model II (extended) is also its better accuracy of forecasting the time of the banking crisis. Thus, it is able to predict the probability of a systemic banking crisis with an accuracy of 56.52%, which is 5 times more accurate than the previous model.

In general, the logit-models, unlike the probit-regressions, gave consistent results for all datasets. However, a comparison of the overall accuracy indicates that the level of accuracy of the assessed Model II (extended) is higher than that of the assessed Model I (narrow). This conclusion shows that Model II (extended) can be used to predict the probability of a systemic banking crisis in European countries.

Table 4 presents results for more specific misclassification factors. The data show a higher accuracy of the Model II classification (extended), as the probability of correct classification is highest (86.84%) compared to 60.88% of Model I (narrow). According to the results, when applying the logit-model to an extended data set, there is only 12.99% false negative classification and 13.33% false positive classification (lowest values among all models and datasets). Therefore, the highest values of true positive cases [sensitivity (Sensitivity (TPR) is 87.01] and true negative cases [specificity (TNR) is 86.67] which have been correctly identified by Model II (extended).

In addition to other tools for predicting the accuracy of the proposed models, curves ROC were constructed. Graphic illustration of the compromise between sensitivity and specificity of the classification table constructed for each data set (narrow and extended) is presented at *Fig. 5*.

As seen from *Fig. 5*, the area below the ROC curve representing the accuracy metric of the classification of the various cut-off points, for the extended dataset of Model II is larger than for Model I, which is represented exclusively by banking regulatory indicators. This visual comparison of ROC curves leads to the conclusion that Model II (extended) is the most effective for predicting the probability of a systemic banking crisis.

CONCLUSIONS AND SUGGESTION FOR FURTHER RESEARCH

Following the 2008 financial crisis, BCBS started discussing new regulatory approaches to address systemic risk and reduce the probability of further financial crises. New set of standards released by BCBS in 2010–2011, introduced a separate set of banking regulation tools. Since then, financial regulators in the EU and around the world have been actively working on its implementation. However, although bank regulation tools have become an accepted part of the financial regulation system, there is still a lack of systematic data that would allow them to study their effectiveness. As a result, assessment of effects of bank regulation measures on the probability of a banking crisis has become one of the most difficult challenges currently facing regulators.

Theoretical bases of revealing regularities in development of the theory of banking regulation and system banking crisis were developed on the basis of bibliometric analysis (VOSviewer v.1.6.10). This analysis allowed to identify and describe content and contextual (causes and periods of change of interest in banking regulation, dominant directions of scientific research in this area and cross-sectoral research), as well as evolutionary-temporal (in the coordinate system "period of research — contextual orientation — spatial geography") regularities, to carry out the

Table 3

Classification accuracy for logit models

		Predicted events		Classification	
	Observed events	Stability time (0)	Crisis time (1)	accuracy, %	
Model I (narrow)	Stability time (0)	132	6	95.65	
	Crisis time (1)	41	5	10.87	
	Overall level of accur	асу		74.46	
Model II (extended)	Stability time (0)	134	4	97.11	
	Crisis time (1)	20	26	56.52	
	Overall level of accuracy				

Source: compiled by the author.

Table 4

More specific misclassification rates for logit estimated models

	AUC	Sensitivity – TPR	False negative rate — FNR ¹	Specificity – TNR	False positive rate — FPR ²
Model I (narrow)	60.88	76.30	23.70	45.45	54.55
Model II (extended)	86.84	87.01	12.99	86.67	13.33

Source: compiled by the author.

Note: 1 False negative rate (FNR), corresponds to Type I Error; 2 False positive rate (FPR), corresponds to Type II Error.

clustering of research works regarding the affiliation of scientists.

The empirical objective of the study was to identify the impact of bank regulation on the probability of a banking crisis. The following conclusions can be done from the analysis. Bank regulation tools are important in predicting the probability of a systemic banking crisis in European countries. However, a model containing only indicators that characterize government interventions in banking is able to correctly classify stability times with an accuracy of 95.65%, and a systemic banking crisis — with an accuracy of only 10.87%. Ratio of bank capital to total assets, equity to total assets weighted for risk and Z-score of

bank default probability, the results of binary modelling of logistic regression are significant with negative coefficients. This indicates that trend of an increase in these indicators reduces the probability of a systemic banking crisis by providing a buffer to protect the banking system from peak losses that exceed the possible level of credit losses.

In this context, the role of the Basel agreements in stabilizing the entire financial system and increasing bank capital is clearly evident. At the same time, the deterioration in the asset quality of the European banking system as the ratio of non-performing loans to total loans increases the probability of a systemic banking crisis. This fact confirms

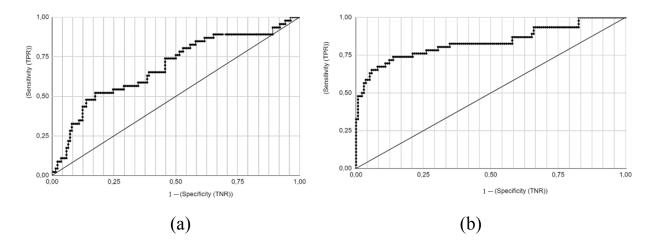


Fig. 5. ROC curves graphical illustration for (a) Model I (narrow) and (β) Model II (extended) Source: compiled by the author.

the hypothesis that aggressive credit policy and inadequate risk assessment, expressed by increasing the share of non-performing loans, not only worsen the profitability of banking activities, but also negatively affect the financial sustainability of the banking system as a whole.

Results of logit-modeling also emphasize the importance of macroeconomic and monetary factors, neglect of which leads to vulnerability of banking institutions and, as a consequence, to banking crises. The inclusion of additional macroeconomic and monetary factors in the model improved not only the predictive quality of the model of the probability of a system banking crisis, but also the accuracy of the classification of the model (accuracy of classification of stability of the banking system and crisis periods increased, respectively, by 1.46 and 44.65%).

Real GDP growth and falling inflation contribute to the economic stability of European countries and are adequately reflected in the growth of the financial well-being of all economic agents and the liquidity of the banking system, and reducing the number and volume of non-performing loans, which reduces the probability of systemic banking crises in European countries also. At the same time, tightening of monetary policy by regulating the real interest rate minimizes the risk of a credit bubble, which often leads to banking crises.

Further research should, in our view, be directed to an in-depth study of additional instruments of bank regulation, in particular, in the direction of the impact of capital preservation buffers, systemic risk protection, systemic importance buffer and countercyclical buffer, the probability of a systemic banking crisis, including the "lag" of some indicators. Another direction of promising development could be to address the issue of complementary impact of different types of financial policies in order to minimize potential threats in the financial sector of the economy and, reducing the probability of a banking crisis in European countries.

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Features of Decision-Making in the Process of Lending to Small Businesses: The BDI Model and Trust Indices

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ABSTRACT

The aim of the study is to identify the problems hindering the effective interaction of banks with SMEs and to determine the role of trust and other institutional factors in decision-making. Despite the recovery in the SME lending sector in 2019-2020, the needs of small firms in loans are not fully satisfied. The task of enhancing interactions between banks and the sectors under study requires a fundamental approach and is relevant. The BDI (Belief-Desire-Intention) model developed by M. Bratman was used as a method for investigating the decision-making process in the subject area under consideration. The place of this tool in the system of methods of analysis and support of decisionmaking processes is shown; the universality of the BDI model is substantiated and the main areas of its application are indicated. The scientific novelty of the paper is the modification of the BDI model, which is carried out by taking into account the trust factor and increasing the number of decision-making phases. The prospects of using the modified BDI model as a methodological basis for the formation of the architecture of banking ecosystems are considered. On the example of the experience of a quantitative assessment of the trust factor between banks and small firms, the possibilities of using the index method to measure other institutional factors of the modified M. Bratman model and determine the level of feasibility of a transaction planned in the area of lending are investigated. The author concluded that a necessary condition for enhancing the lending activities of banks interacting with small firms is the formation of an adequate institutional environment in accordance with the methodological principles outlined in this article.

Keywords: lending to SMEs; models and methods of decision theory; BDI model; trust index

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INTRODUCTION

Interaction of banks with small and medium Russian entrepreneurship for many years was characterized by very low credit and investment activity and many serious problems [1]. Over the last ten years, the situation has gradually improved, but the dynamics of lending to small and medium enterprises (SMEs) are characterized by significant unevenness. Analysis of data conducted in the work [2] allows to allocate three periods in the evolution of the indicator of the share of SME entities that attract credit:

- 1) relatively small growth of this indicator (2012–2015);
 - 2) moderate growth (2015–2019);
- 3) high growth in the share of lending firms (2019–2021).

Deserve special attention 2020–2021. During this period, despite the support of the SME through a national project "Small and medium enterprises and support individual entrepreneurial initiatives", ¹ SMEs development indicators are deteriorated [3]. In 2020 turnover due to quarantine measures decreased by 2.8 trillion rubles, or 6.0%.² According to the FTS, the number of SMEs subjects decreased from 2.51 to 2.36 million units, i.e. by 6.3%. The small and micro business segments, which account for 8.1 and 91.2% of the total number of SME, respectively, were most affected; and to a lesser extent medium enterprises (0.7%), whose turnover declined less significantly.³

Economic indicators of SMEs lending, by contrast, showed positive dynamics, while in some cases reaching record values. So, according to the information and analytical agency Frank RG, the share of companies attracting loans for their development has more than doubled compared to 2019 (from 3.3 to 8%) in micro business; from 10 to 14.8% — in small business and from 25.3 to 26.6% — in medium business. The actual weighted average lending rate (including benefits) was 6.29% for micro-firms; 6.4% for small firms and 7.62% — for medium firms [2]. According to the company "Expert RA", for 2020 banks issued SME entities loans totaling 7.6 trillion rubles and about the same (7.1 trillion rubles) in 2021 [3]. Positive dynamics of crediting SMEs was carried out against the background of consolidated state support of small business, the volume of which amounted to 2021-88.9 billion rubles.

Despite the high performance in the sphere of SME bank lending in 2020 and 2021, analysis of the situation shows that the problems of effective interaction between banks and Russian small businesses have not been solved.

First, this situation is temporary, situational conditions and is caused by, on the one hand, unprecedented low refinancing rates sustained a long period; on the other hand — extraordinary public support measures in conditions of a coronavirus pandemic (lending at preferential interest rates, credit holidays, etc.). The current high demand for loans is therefore not sustainable. Currently (summer-autumn 2022) the key interest rate is in the range of 7–9.5%, which is significantly higher than the average level of profitability of SME subjects. And if it continues to rise, the demand for credit will fall to the extreme. The same will be facilitated by a reduction in the volume of state support (including concessional

¹ National project "Small and medium enterprises and support individual entrepreneurial initiatives", 2018. URL: https://www.economy.gov.ru/material/directions/nacionalnyy_proekt_maloe_i_srednee_predprinimatelstvo_i_podderzhka_individualnoy_predprinimatelskoy_iniciativy (accessed on 17.12.2021).

² Kolobova M. Turnover is not there: small enterprises in 2020 lost 2.8 trillion rubles. Izvestia. 2021. 21 January. URL: https://iz.ru/1113935/mariia-kolobova/oborot-ne-tuda-malye-predpriiatiia-za-2020-god-poteriali-28-trln-rublei (accessed on 17.12.2021).

³ Segments of SMEs: microbusiness — companies with turnover to 120 million rubles per year and/or with a number of employees up to 15 people; small business— companies with turnover from 120 to 800 million rubles per year and with the number of employees from 16 to 100 people.; medium business— companies with turnover from 800 million rubles

to 2 billion rubles per year and with the number of employees from 101 to 250 people.

lending), which should be expected due to the special military operation on the territory of Ukraine, the imposition of largescale economic sanctions and the growth of inflationary processes.

Second, the demand for loans from SME entities was not fully satisfied. According to research conducted by NAFR (National Association of Financial Research), on average, one in four small enterprises required credit, 10% of small firms required long-term resources and 14% — medium, but in the short-term — 19% small and 25.4% medium enterprises. For now, these targets have not been met.

Third, the banks' potential to lend to SMEs was far from exhausted. At present, the credit market for SMEs is a duopoly: high level players — Sberbank and VTB. For other banks, small businesses remain persona non grata.

Fourthly, in the short time of more intensive interaction between banks and small firms, it has not been possible to form a sustainable relationship and partnership model characteristic of foreign enterprises [1, 4, 5]. In this regard, it is not clear how loyal the attitude of banks to SME subjects in a crisis situation will be. According to the forecasts of the agency "Expert RA" the expected percentage of overdue debt will be significantly higher than 13% [3]. Banks may be reluctant to restructure debt and, in some cases, will exercise their flexibility to change credit rates unilaterally, thus putting small firms in a difficult position. ⁵

Thus, the task of ensuring effective interaction of Russian banks with the small business sector requires not situational, a fundamental approach consisting in the complex analysis of problems, the use of a wide range of economic and mathematical

methods and the formation of the most favorable infrastructure for lending to SMEs.

REVIEW OF MODELS AND METHODS FOR ANALYSING DECISION-MAKING PROCESSES

Decision-making processes occupy an important place in the theory of strategic planning and development of economic objects, including — SMEs sector. When the interaction of economic entities is characterized by a low level of activity (as it happens between Russian banks and small firms), it is necessary to identify the causes of the situation, in particular — the research of the factors and hypotheses, which are used decision maker (DM) in current of its transactions. From this perspective, the following groups of models are distinguished:

- 1) rational decision-making models based on quantitative indicators and criteria;⁶
- 2) heuristic-individualistic models based on the theory of bounded rationality, based on the experience and intuition of DM [6, 7];
- 3) socio-behavioral models, also based on the bounded rationality hypothesis, but using norms, traditions and other behavioral institutional settings that are used in society [8–10].

These models are within two main scientific approaches: neoclassical and neoinstitutional (*Fig. 1*).

The neoclassical approach (which is by far the most developed and based on the hypothesis of rational behavior of the DM) is represented by three main directions:

- 1) find a solution based on different types of optimization tasks (including single criteria and multi-criteria);
- 2) decision-making based on statistical relationships (trend forecasting, Altman

⁴ Berezina E. The loan is out of reach. Russian Gazeta. 2016. No. 117 (6985). URL: https://rg.ru/2016/05/31/potrebnost-malogo-i-srednego-biznesa-v-kreditah-uvelichilas.html (accessed on 19.05.2020).

⁵ Korolev S., Esmanskiy A. Bank's unilateral interest rate increase: how to dispute if such a possibility is provided for in the contract. EJ Lawyer. 2019;19(102).

⁶ Chernyak V.Z. Methods of making management decisions. Textbook. Moscow: Academia; 2019. 296 p.; Golubkov E.P. Methods of managerial decision making. In two volumes. Moscow: Publishing in Yurayt; 2022. 183 p. URL: https://urait.ru/bcode/489387 (accessed on12.10.2022).

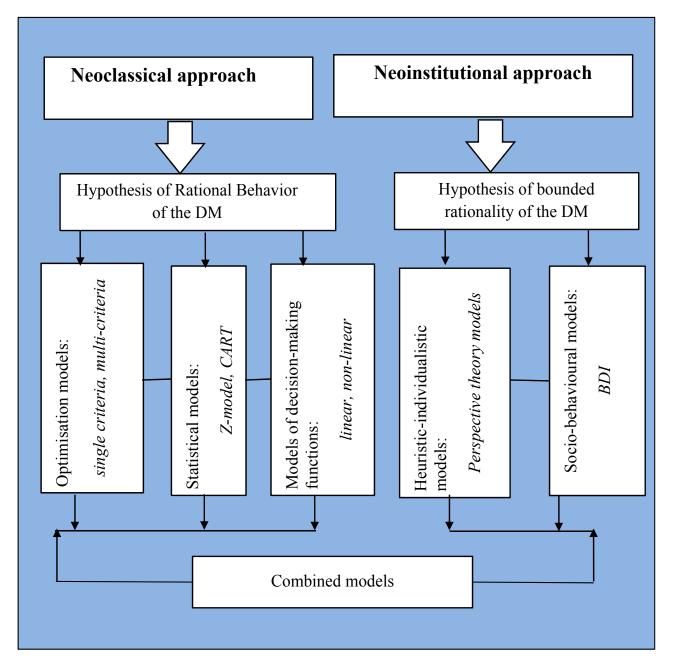


Fig. 1. Classification of models and methods for analyzing the decision-making process

Source: developed by the author.

Z-model for bankruptcy assessment, CART classification tree model (Classification Aggregation Regression Trees), etc.;

3) decision-making based on the determination of the utility function formed by algorithmic processing of decision archives, done previously by DM.

Methods for determining a utility function include — hierarchy methods (Saati), STEM etc., the most famous Zionts-Wallenius (ZW) method allows to determine weights of

criteria used from formed inequality systems [11-13].

Thus, if it is known that previously considered options are preferable $i = \overline{1, n}$

$$W_1 \succ W_2 \succ \dots \succ W_i \succ W_n$$
, (1)

where W_i — utility function by i-option and criteria were used in decision-making $f_1, f_2,...,f_m$, $j=\overline{1,m}$, weighting factors, reflecting the relevance of these criteria can

be found (under certain assumptions) by the following ratio system:

$$\begin{cases}
\sum_{j}^{m} (\widehat{f}_{1j} - \widehat{j}_{2j}) \xi_{j} \geq 0, \\
\dots \\
\sum_{j}^{m} (\widehat{f}_{ij} - \widehat{f}_{(i+1)j}) \xi_{j} \geq 0, \\
i = \overline{1, n-1},
\end{cases} (2)$$

where $\widehat{f_{ij}}$ — numerical value of criterion j by i-option; m — number of criteria; n — number of options to consider; ξ_j — required value.

ZW method, along with other similar methods, served as a methodological basis for the future construction of more complex artificial intelligence systems, algorithmically providing decision-making processes for cases of linear utility function. In determining non-linear utility functions (which are most characteristic of economic realities), more complex mathematical constructs, such as neural network models, are used.

The models described above are applied to solve a variety of tasks of development SMEs. So, optimization models can be used when substantiating the most effective combinations of different investment resources for the development of small firms; CART models and Z-model — for express analysis of economic status of a small enterprise; utility functions — for select options for the development of subjects SMEs, etc.

The main disadvantage of the neoclassical approach is that the decision-making procedure itself is not disclosed and is considered as a whole, and an entity participating in this procedure (DM) is "charged" with some set of criteria and conditions under which it operates.

The neo-institutional approach uses heuristic institutional and sociobehavioral models of decision-making analysis and process description using categories of institutional economy and behavioral characteristics by DM. So, H. Simon thought that the choice of a person depends on stereotypes, habits, his simplified representation of reality, which allows him to cope with uncertainty. As a result, the DM is not making optimal, but satisfactory, decisions commensurate with its level of claim [6]. Models of perspective theory [7] apply to the analysis of situations with very high uncertainty (for example, in cases where there is no opportunity to take advantage of social experience stereotypes). In particular, according to these models, DM tends to underestimate high risks and overestimate low risks when solving tasks in these situations. Modern research conducted in 2020 on large and representative data sets confirmed the presence of 12 of the 13 behavioral effects discovered and proven earlier by Daniel Kahneman and Amos Tversky. The formalized representation of these effects, demonstrating the bounded rationality of the DM, allowed us to obtain a heuristic perspective theory model [14].

Socio-behavioral models (which include the BDI model below) take into account social experiences; they are used primarily for qualitative analysis of the specific decisionmaking process under consideration.

The current trend in economic research is a tendency convergence between the two approaches.

On the one hand, there is a departure from the "rigidity" of formal models and the introduction of the hypothesis of bounded rationality of DM behavior. For example, formal models are supplemented by heuristic processes [15]; they introduce unclear variables [16] etc.⁷ In the same direction, simulation modeling are developed, suggesting that in key points of the model

⁷ According to many researchers, this modification of models makes them more realistic. So, T. Peters, R. Waterman consider that "the quantitative approach is accurate enough to become dangerously erroneous and, in the opinion of some, has already led us to serious errors" [17].

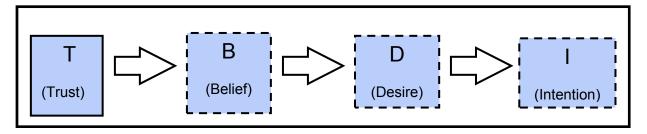


Fig. 2. Scheme of the modified TBDI model

Source: developed by the author.

the decision is made by the DM, using both formalized criteria and subjective preferences that difficult to formalize [18, 19].

On the other hand, the traditional qualitative analysis of decision-making processes through neo-institutional models is complemented by formal methods, the use of economic indicators, and the use of index methods and ordinal scales, etc.

The trend of convergence can be considered as one of the mainstream currents of modern economic science, which makes the issues of application and modification of models of decision-making processes, of course, relevant.

BDI MODEL AND ITS MODIFICATION

Among the models of decision-making processes known in the foreign literature is the three-phase mental model of M. Bratman, also called the BDI model [10]. It involves structuring decision-making according to three mental phases:

- 1) Belief;
- 2) Desire;
- 3) Intention.

According to M. Bratman, homo economicus is an "planning" economic agent whose activity involves the implementation of these phases [9, 20].

The theoretical significance of the BDI model is that it reflects, on the one hand, the main components of the decision-making process. These are, firstly, DM beliefs formed on the basis of knowledge (both true and false); as well as information from the external environment and his personal experience as presented in the first phase of

the model. Second, the motivational aspect that determines DM's interest in carrying out the proposed transaction, which is contained in the second phase of the model. Third — intentions reflecting the target component of the solution already in the final phase of the BDI model.

On the other hand, the separation of the decision-making procedure into phases, by M. Bratman, allows the analysis of this process to be carried out in detail and more efficiently to find the reasons for failure in the implementation of potential transactions.

The practical value of the BDI model is to identify the weakest link in the decision-making process. If the first phase is the weak link, then in order to activate the planned transactions between economic agents, the main efforts should be directed to the development of the information base on which reliable knowledge and beliefs are formed. If the second phase is the bottleneck, the motivation of actors in decision-making should be strengthened. Implementation of the third phase requires the establishment of the necessary organizational infrastructure.

In this regard, the BDI model is as much a strategic analysis tool as the well-known matrix of the Boston Consulting Group (BCG), operating market share and growth rates and linking the development stage of the facility with investment policy. At the same time, similar to the BCG matrix, the BDI model allows us to assess investment policy priorities at a qualitative level, as well as to substantiate the need to concentrate not only

investment, but also other resources on the most promising growth points.

The scientific hypothesis further developed in the article is that the BDI model should be modified by adding another institutional factor — trust [21, 22]. The need for such a transformation of the M. Bratman model is due to the fact that the trust factor is, first, a prerequisite for any business transaction and, second, a significant impact on the realization of other mental phases of decision-making.

S. Kripke's research supports BDI model modification, in which the thesis that beliefs, desires and intentions are linked to their attainability, which depends to a large extent on the level of trust [23]. When introduced into the Trust Factor model, the modified M. Bratman model is presented in the *Fig. 2*.

Especially relevant is the consideration of a modified version of the TBDI model in the context of the Russian economy, since Russia is characterized by one of the lowest levels of public confidence, measured in accordance with international methodologies by two main indices: ETB index (Edelman Trust Barometer), and the WVS index (World Values Survey). Thus, the WVS index was 27.8% in Russia in 2011–2013, while China—60.3%, Netherlands — 66.1%. Low levels of trust negatively affect all phases of decision-making: forming beliefs, motivations and intentions.

Application of the modified TBDI model is possible for a wide range of tasks arising in the Russian economy. However, it is most appropriate where trust factor plays a particularly important role. As shown in the works [1, 4], among these tasks is include enhancing interaction between the banking and small business sectors, which traditionally have a particularly low level of trust, while the scope of ongoing credit transactions requires increased mutual trust. The word "credit" comes from Latin credio — trust.

On Fig. 3 shows the dynamics of the volume of loans issued to all enterprises and

separately — SMEs (bottom curve), which indicates the predominance of bank lending to large companies. Even taking into account that large enterprises dominate the institutional structure of the Russian economy, the gap in the values of the economic indicators is obvious and too large.

The TBDI model is universal and can be used not only to analyze specific decision-making processes, but also to create a balanced architecture of different organizational systems. Currently, in the banking sector, there is an active process of creating banking ecosystems, including — in the segment of lending to SMEs, where the leaders are Sberbank and VTB. Common understanding of the banking ecosystem has not yet developed. Further, the ecosystem of the bank means such a subsystem, the purpose of which is the dynamic formation of its external environment on the basis of a powerful digital platform in order to solve the problems not only own, but also business partners interacting with it, ensuring coherence of socio-economic interests of all participants on the principles of Paretooptimality.

The potential of banking ecosystems (BE) in lending to SMEs is as follows:

- scope of coverage of small businesses, speed, convenience and efficiency of business decisions, which is achieved by the use of modern digital technologies;
- expansion of the range of services provided by the bank due to the so-called non-core banking services (which are in the most demand among small businesses), which additionally increases the contingent of bank customers;
- forming long-term relationships based on increased trust; improving the investment climate at the bank level small enterprises; ensuring a greater flow of funds to the SMEs sector, etc.

The analysis of BE objectives, functions and capabilities based on the TBDI model leads to the conclusion that its balanced architecture

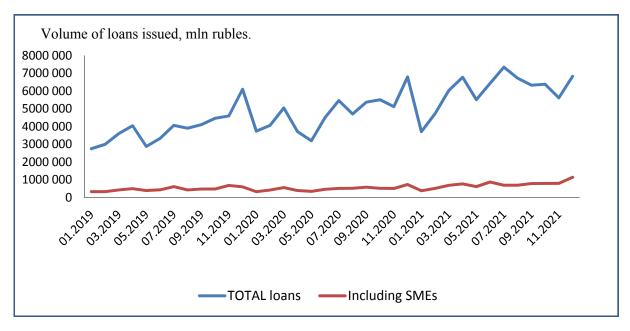


Fig. 3. The volume of loans provided by the 30 largest banks in 2019–2021 to their borrowers Source: data of the Central Bank of the Russian Federation, [5].

should correspond to the four phases of the decision-making process.

That is, BE according to the phases of the model should provide:

Trust — maximum openness and transparency of information in order to build trust relationship between bank and small firm.

Belief — advising a small firm on its development and prospects for changing the external economic environment; development of reasonable recommendations for crediting the client not only on the basis of standard banking products, but also with the possibility of individualized approach, including on the basis of the application of economic and mathematical tools (*Fig. 2*).

Desire — consistency of interests on a sufficiently representative set of criteria, which in addition to the volume, timing and value of the loan rate may include a list of additional non-core banking services (information support, legal support, accounting, inventory accounting and logistics, etc.). The formation of such "complex packages" of offers is advantageous both for the bank (obtaining additional profit from non-core services, income from accounting

and cash services of enterprises, etc.), and for small firms, who often have no business experience and are ready to transfer some of these managerial aspects to the bank on the principles of outsourcing.

Intention — the most favorable conditions for a small firm to implement a loan and repay debts. Including the possibility of credit holidays, debt restructuring to maintain and strengthen long-term relationships, etc.

Another important aspect of the analysis of the TBDI model is to investigate the possibilities of quantifying its mental phases using some parameter system, which will certainly widen the scope of its practical application. To this end, the model should be supplemented by some quantitative indicators reflecting the level of importance of institutional factors considered in the decision-making process. This can be achieved, for example, by using index methods. Synthetic indices characterizing the potential feasibility of the solutions in general may also be used.

So, if I^1 , I^2 , I^3 and I^4 — these are indices that reflect the level of trust in the relationship, as well as the level of information, motivation and organizational security of the potential contract,

Table 1

Results of decision evaluation based on the index approach and the TBDI model

Decision	Trust /¹	Desire /²	Belief Intention J ³ J ⁴		Synthetic Index / ^{int}
1	0.6	0.7	2	0.7	0.2351
2	0.6	0.5	0.4	0.5	0.06

and if their values are high (on some selected scale), that their multiplication I^{int} will reflect the high degree of realization of the proposed transaction, where

$$I^{int} = I^1 \cdot I^2 \cdot I^3 \cdot I^4. \tag{3}$$

In the *Table 1* as an example the results of assessment of two different solutions using the index approach and the TDBI model are given.

It is obvious that the first solution is more balanced in the phases of the TDBI model and more feasible than the second solution (due to higher index I^{int} value). The second decision is characterized by a barrier to its implementation, as evidenced by the low value of the index $I^3 = 0.4$. At the same time, there is another barrier in the decision-making process according to the index $I^2 = 0.5$. Thus, the chances of a second decision being taken are small.

Analysis of condition, developed over the last 10–15 years in the SMEs lending market, conducted in the article [4], leads to the conclusion, that the most common situation when making a credit decision is the option, presented in *Table 1* at number two. The bottleneck in the decision-making process is, firstly, the lack of motivation (unfavorable ratio of interest rate for credit to average profitability of small firms) and insufficient information security of partners involved in credit transactions.

However, a more accurate assessment of the situation could be made if the actual values of the indices given in the *Table 1*. Currently there is no method for calculating indices I^2 , I^3 and I^4 . Their development is the subject of special researches. It may be useful for these studies to be carried out by specialized information and analytical agencies through questionnaires and interviews with a wide range of respondents. Significantly better developed methods of index assessment of the level of trust in relations, but they (as shown in the paper [4]) need to improve, as well as to adapt them to the task under consideration of interaction between banks and subjects of the Russian SMEs. The fundamental possibility of an index method to describe the institutional categories under consideration is illustrated below by the trust category.

TRUST CATEGORY: PROBLEMS AND METHODOLOGICAL PRINCIPLES FOR ITS QUANTITATIVE MEASUREMENT

The interest in the problem of trust began in the 1980s last century and is related to the development of the concept of social capital presented in the works J. Coleman [21] and F. Fukuyama [22], who considered that trust was a prerequisite for long-term business linkages. In essence, trust is the expectation of good-faith (neo-opportunist) behavior of one economic entity towards another in a situation where the first has voluntarily subordinated the achievement of its interests to the actions of the second. Trust cannot be

Table 2
The level of trust in the WVS index and the level of development of the SME sector for selected countries in 2011–2013

Country	Level of trust, %	GDP per capita, in US dollars	The share of SMEs in the country's GDP, %		
Netherlands	66.1	49128	63.0		
China	60.3	6093	60.0		
Sweden	60.1	59 593	58.0		
Austria	51.4	48 348	58.0		
Germany	44.6	46 269	53.9		
Singapore	37.3	54007	51.0		
Russia	27.8	13324	21.2		

Source: compiled by the author according to the data of the Central Bank of the Russian Federation (the main economic indicators of SMEs) and [24] (values of the WVS trust index).

negotiated or reflected in the contract, it is an informal institution developing on the basis of the experience of interaction of agents. At the same time, it acts as a tool to compensate for uncertainty, reduce the complexity of the system.

The development and maintenance of successful long-term relationships based on the trust of the parties is a prerequisite for mutually beneficial inter-firm contacts, improving competitiveness, reducing the risk of opportunism, which is especially important in an increasingly dynamic and unpredictable business environment [24]. Trust helps DM to maintain cooperation with established partners and to keep it from entering into short-term alternative cooperative relationships. An analysis of the trust factor helps to understand why a relationship with similar economic data can be perceived by the parties as either successful or unpromising.

The level of trust has a significant impact on the economic growth of the entire national system and its individual sectors, including — small and medium enterprises. The analysis of statistical data makes it possible to establish an obvious link between the level of trust and the degree of development of the

SMEs (*Table 2*). This trend continues in the subsequent period (2013–2020).

At the same time for the development of the SME sector is important not only the indicator of public confidence in general (indices *ETB*, *WVS*), but also the level of mutual trust between it and the banking sector as a driver of growth.

In comparison with the countries of the West, where banking has been formed for more than a century and where there is a "partner" model of interaction between banks and SME entities (based on the principle of tolerance and a high level of trust), in Russia, the situation is quite different, with a low level of trust between these sectors. Much of this is determined by the history of the relationship between them, which is enshrined in the relevant informal institutions. At the same time, small enterprises and banks explain the situation in different ways. There are two "truths".

From the point of view of small firms, Russian banks — are "financial egoists" and "business sharks", who are interested only in their own profit. Communication with them is dangerous and can be destructive for the enterprise. In case of overdue debt, debts can be transferred to collectors. At the same time,

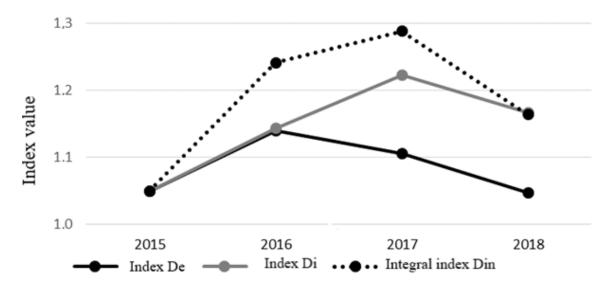


Fig. 4. De, Di and Din Mutual Trust Indices in 2015-2018

Source: Egorova N.E., Smulov A.M., Koroleva E.A. [4].

these are unstable financial structures: when the license is revoked and bankruptcy occurs, there is a freeze of the company's accounts, cash breaks, etc.

From the bank's point of view, SME subjects — are disadvantageous clients, as they are usually characterized by unstable financial position and low profitability, are often unscrupulous borrowers with a strong shadow component; the average amount of credit is low, and the labor intensity of the credit contract is high (including due to the low financial literacy of entrepreneurs), etc. Thus, according to the rating agency "Expert RA", the share of overdue debt of SME entities in 2015–2020 was on average 13–15% and was 3 times higher than that of large enterprises and 2 times higher than that of individuals [3]. It is for these reasons that small enterprises have for many years faced the refusal of Russian banks to issue credit.

Currently, there are a number of methodologies to measure the level of trust, including at the level of banks and SME entities. These include NAFR research (National Association of Financial Research), HSE, Levada-Center, Alfa Bank etc. They are usually based on survey data, less often economic indicators. In addition, unilateral trust is usually measured (one economic entity

or sector of the economy against another). However, decision-making requires, firstly, mutual trust; secondly, trust of economic agents is formed on the basis of both statistical indicators and on the basis of the past experience of their relationships, routines available in society, etc.

In the series of works conducted under the guidance and with the personal participation of the author, issues of quantitative measurement of the level of trust between the banking sector and SME on the basis of the proposed synthetic index were comprehensively considered. This index implies a convergence of rational and institutional approaches and reflects the duality of the process of building mutual trust between the sectors under consideration, that consists of using both economic indicators and institutional characteristics of interaction experiences, transparency, etc. [1, 4].

This is reflected in the following basic formula:

$$I^1 = Din = De \cdot Di , \qquad (4)$$

where *Din* — integral mutual trust index; *De* — economic index (emerging from selected set of economic indicators); *Di* — institutional index (based on surveys).

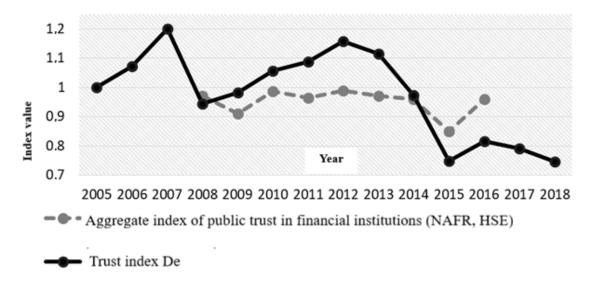


Fig. 5. Trust indices (De and the aggregate index of public confidence in financial institutions)

Source: Egorova N.E., Smulov A.M., Koroleva E.A. [4].

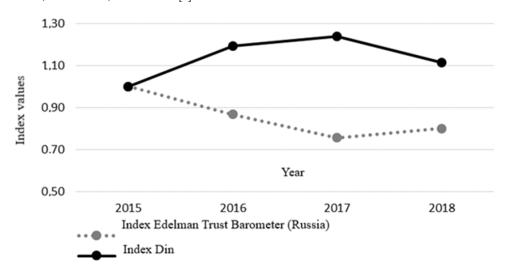


Fig 6. Dynamics of the Din and Edelman Trust Barometer indices in 2015–2018 Source: Egorova N.E., Smulov A.M., Koroleva E.A. [4].

The set of economic indicators used in the formation of the economic index *De*, includes five indicators that describe both the ratio of banks to lending to SMEs and the ratio of small and medium firms to banks as borrowers of financial resources.

Economic indicators characterizing the position of banks include:

- 4) share of SME loans in bank assets (the bank's activity intensity in the SME lending sector and its inclination to work with small firms);
- 5) ratio of SME loans to small business sector turnover (reflects banks' trust in

small and medium firms as it characterizes their growth potential through credit and investment);

6) average return on SME assets (key to the decision: the higher the profitability, the higher the trust of the bank to the SME subject).

Among the economic indicators characterizing the ratio of SME entities to banks are:

1) spread (difference) between the credit rate and the key rate of the Bank of Russia (the lower it is, the more favorable for small enterprises credit conditions and higher trust to the bank); 2) bank security of equity (the higher the security ratio, the more reliable the partner is and the higher the trust of SMEs).

The institutional component of the proposed mutual trust index is formed as a definite aggregate of results of surveys of high-rating agencies that have investigated the level of trust between the sectors under consideration.⁸

EXPERIENCE OF PRACTICAL CALCULATIONS OF MUTUAL TRUST INDEX BETWEEN THE BANKING SECTOR AND SMES

On the basis of available statistical information and survey data, calculations of the proposed integral index of mutual trust between the banking and business sectors were implemented and their verification was carried out on the basis of existing experience in computing similar indicators by other sectors highly rated analytical agencies. Verification was carried out both for the local components of this index (economic and institutional components) and for the integral index as a whole, which is presented at *Fig.* 4–6.

Verification of the developed index indicates about good interpretation of the results. In particular, this is confirmed by comparing the calculations with the results of similar studies on measuring trust, for example, with the aggregate index of public confidence in financial institutions (NAFR, HSE research). Since the index *D*i reflects general trends in trust due to its construction, the comparison was made for component *D*e, which is close in economic content to the total index of trust in financial institutions (*Fig. 5*). This comparison led to the conclusion that the results obtained from the above-mentioned tested methodology were very similar.

Uptrend and downward trends on charts generally match. Divergence of the curves on *Fig. 5* in 2008–2009 can be explained by

the fact that the aggregate index of public confidence in financial institutions did not fully reflect the impact of the crisis in the banking sector on small business, when credit resources became completely inaccessible to SME, which affected the decline of the index *D*in.

The obtained dynamics of the integral index *D*in was compared with the dynamics of the international trust index ETB — index Edelman Trust Barometer (*Fig. 6*).

Figure 6 illustrates the divergence of trends in the ETB and *D*in indices, which can be explained by the following hypotheses about the reasons for their different dynamics. The aggregate ETB index provides an assessment of trust not only in business and banks, but also in the media, the State and nongovernmental organizations. Apparently, in the period 2015–2017, trust in other institutions was much worse than in business and banks, which led to a downward trend, and in 2018 the opposite was true (trust in banks declined, while trust in other market players increased).

For more information on the calculation of mutual trust indices between banks and SMEs, contained in the works [1, 4].

CONCLUSION

Analysis of the problems of lending to SMEs has revealed a number of factors that hinder the active interaction of banks and small firms. These include: ratio between the level of profitability of small enterprises and the average interest rate, insufficient amount of state subsidy of this rate, absence or insufficient degree of other types of assistance to small business, etc. In addition to economic factors, there are institutional factors that also have a negative impact: absence of partnership model of relationships and stable relations between the economic agents under consideration, negative experience of their interaction in the past, established in "social memory", etc. The said features of the lending sector

⁸ The method of index construction is more detailed in the work [4]. The assessment of the effects expected from the growth of the trust level is also considered there.

of small and medium enterprises allow to formulate a conclusion about the need to study the decision-making processes in the subject area under consideration on the basis of attracting a wide range of methods. The article provides a classification of the main methods of decision-making theory, including models and methods based on both the hypothesis of rational behavior of DM and the hypothesis of bounded rationality, as well as combined models. Special attention is paid to the M. Bratman model BDI (Belief, Desire, Intention), which is considered in the appendix to its lending to small and medium enterprises. It has been substantiated that in the conditions of the Russian economy

(and in particular in the study of procedures of lending to SMEs) it is expedient to use an extended modification of this model with the inclusion of the trust factor. Methodical principles of using the modified model for assessing the feasibility of transactions implemented in the sphere of lending to small enterprises are developed, and to form an architecture of banking ecosystems focused on the small business segment. Prospects of using the index method for quantitative assessment of institutional factors included in the M. Bratman model have been formulated, which is confirmed by the experience of mutual trust indices between banks and small enterprises.

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ORIGINAL PAPER

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Determinants of Financial Literacy and its Influence on Financial Wellbeing — a Study of the Young Population in Haryana, India

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ABSTRACT

The **purpose** of this study — is to determine how financial knowledge, attitudes and behaviours (determinants of financial literacy) influence an individual's overall financial well-being. The **methodological basis** of the study was a survey of 115 respondents, for which a well-structured questionnaire was developed. Smart PLS version 3 software was used to conduct the PLS analysis. The authors applied a multivariate methodology called Structural Equation Modelling (SEM) to integrate characteristics that cannot be seen directly. It is **concluded** that both financial attitudes and financial behaviour affect financial well-being, with financial behaviour having a greater impact on financial well-being, while financial knowledge does not. The ultimate goal of financial literacy is to increase financial well-being among the population. The results of this study can be used by policy makers, government and educational institutions who should pay more attention to improving the very determinants of financial literacy that affect financial well-being.

Keywords: financial knowledge; financial awareness; financial behaviour; financial attitude; financial literacy; financial education; financial well-being

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INTRODUCTION

Due to the COVID-19 pandemic, the economy of all over the world are affected, this pandemic causes inflation, unemployment, poverty, and well–being are also declining. Due to lock down, financial hardship is having a harmful impact on mental and physical health. Stress, anxiety, sadness, and suicide are all problems that our society faces [1]. Financial literacy has become a hot topic in recent years as it relates to people's financial empowerment and their lives. It piques the interest of the average person who wants to meet their daily financial needs while also planning for a secure future. Financial literacy improves people's ability to access financial services, manage their budgets, and make the best use of resources, which promotes economic development. People's confidence and self-control improve as a result of financial literacy, which encourages them to participate in the formal economic system. It will boost your confidence and well-being. According to the literature, different researchers define financial literacy differently. The

OECD¹ explains financial literacy as "a mixture of understanding, expertise, ability, attitude, and action required to take sound decisions related to finance and eventually achieve individual well-being". "Financial literacy" is the ability to make sound decisions and make appropriate decisions related to the use and monitoring of financial assets and liabilities [2]. People who are financially literate make smart financial decisions and are less likely to be manipulated in financial matters [3]. Previous research on financial literacy has revealed that there is a global lack of financial literacy. Governments, non–profit organisations, and educational institutions are taking a variety of steps, such as financial education programmes, to enhance the community's level of financial literacy. It is necessary to construct financial

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¹ OECD. G20. Oecd Infe Core Competencies Framework on Financial Literacy for Adults G20. Oecd Infe Core Competencies Framework on Financial Literacy for Adults G20. Oecd Infe Report on Adult Financial Literacy in G20 Countries. 2017:1–80. URL: www.financial-education.org (accessed on 13.11.2021).

education efforts around the many parts of financial literacy, such as financial knowledge, financial attitude, and money management behaviour, in order for them to be successful. This will allow individuals to benefit more from financial literacy programmes. The OECD² has provided a comprehensive examination of financial literacy. Financial literacy is defined as "a combination of financial behaviour, financial conduct, and financial awareness". To improve public financial literacy, it is also necessary to focus not only on financial knowledge and awareness, but also on the analysis of financial attitudes and financial behaviour. Financial knowledge has the potential to influence both financial attitudes and financial behaviour. A link between financial attitudes and financial behaviour may also exist, as a negative financial attitude may lead to less favourable financial behaviour and vice versa. Therefore, it is important to understand how financial knowledge, financial attitude, and financial behaviour affect the financial well-being in connection to financial aspects of people's lives.

LITERATURE REVIEW AND RESEARCH GAP

Financial literacy has been studied in a variety of ways. In many nations, government entities, commercial organisations, and individuals have conducted studies to measure their country's degree of financial literacy. Njehia [4] "People's willingness to comprehend financial information and make logical judgments about financial saving, capital accumulation, debt, and pensions". Financial literacy, according to Atkinson and Messy [5], is "a mix of awareness, knowledge, skills, attitude, and conduct required to make smart financial decisions and ultimately attain individual financial well-being". According to Huston [2], "Financial literacy has created an implementation layer that enables individuals to have the competence and trust to utilise their financial abilities to make financial decisions". The concept of financial literacy is still being debated. In the present literature, financial literacy has many interpretations since financial literacy authorities have

given researchers and authors freedom to transmit and assess financial literacy [6]. Financial knowledge, financial behaviour, and financial awareness are all terms that should be used interchangeably [7–9]. To measure individual financial literacy, the majority of the studies used an objective evaluation technique. Various researchers utilised objective exams in various ways to measure an individual's financial literacy. Bhushan and Medury [10] evaluated financial literacy by asking objective questions on income, savings, investments, budgeting, and credit management. Other researchers studied the time value of money, risk and return, interest, diversification, and inflation [11]. In this study, researchers investigated the relationship between financial education, financial socialization, and money attitudes and found that financial education and financial socialisation have more influence on financial literacy. Previous research has found a poor degree of financial literacy among the low-income group, women, students, the less educated, the lower income group, and minorities [7, 12, 13] and NISM.3 According to a study of the literature, most research on the evaluation of literacy among the public considers just one component of financial literacy, namely financial knowledge, with other elements, such as financial attitudes and financial behaviour, being examined only in a few studies. As a result, the primary goal of the study is to investigate the relationship between financial knowledge, financial attitudes, and financial behaviour with financial wellbeing. According to the survey conducted by Standard & Poor's Financial Services, financial literacy is at 24%, which is poor as compared to the rest of the world, and approximately 76% of the adult population in India do not even have a proper understanding of basic financial concepts. But in India, Haryana is the only state with the maximum financial literacy centre in India. Haryana is classified into 6 divisions and 22 districts. Right now, 61 financial literacy centres are actively functioning in Haryana. Haryana is a state in northern India with 22 districts, and it is the seventeenth most crowded state. Haryana is on the path of development. The economy

² Organisation for Economic and Cooperation and Development. Measuring financial literacy: questionnaire and guidance notes for conducting an internationally comparable survey of financial literacy. URL: https://www.oecd.org/finance/financial-education/49319977.pdf (accessed on 13.11.2021).

³ NISM. Financial Literacy and Inclusion in India: Final Report — India. 2014.

⁴ Klapper L., Lusardi A., van Oudheusden P. Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey. Finance Lit around world. 2017;1–27. URL: http://www.openfininc.org/wp-content/uploads/2016/04/2015-Finlit_paper_17_F3_SINGLES.pdf (accessed on 13.11.2021).

of Haryana is also growing. Over the last few years, the financial literacy of Haryana has increased significantly. According to the report of Haryana Minister of State for Welfare of Scheduled Castes and Backward Classes, "Haryana's total literacy level is 75.55%. The literacy rate of males and females is 84.06% and 65.93%, respectively". Based on this, the researcheris compelled to investigate the relationship between financial knowledge, financial attitude, and financial behaviour and financial well-being.

DETERMINANTS OF FINANCIAL LITERACY

A variety of factors influence financial literacy, which have been identified through a review of prior studies.

Demographic Factors

There was a wide range of demographic parameters that were taken into account while evaluating the age and gender of the respondent. These variables contribute to the demographic profile of respondents, which influences financial literacy. Research shows that male respondents had a higher level of financial literacy than female respondents when gender is taken into account [14].

Socioeconomic Factors Socioeconomic

Occupation, personal income, position and education are examples of socioeconomic factors. Using socioeconomic indicators as a latent variable in determining financial literacy was the goal of the questionnaire.

Factors in the Background:

Factors such as familial upbringing, childhood memories, job stability, personal relationships, geographic location, major life events, health, and financial resources are all part of one's background. Financial literacy may be influenced by a person's upbringing and family, i.e., educated parents are more likely to teach their children about the importance of money management.

Behavioural factors

Self-confidence, self-esteem, future transformation, future prosperity, and other behavioural characteristics

are all important considerations in the decision process. Individuals' financial literacy is influenced by a variety of circumstances.

Financial Attitude

Financial attitude is one factor that encompasses themes such as whether a person can handle their own money or if they are interested in developing their thinking abilities or increasing their thinking capacity to enhance information on subjects of interest.

Financial influences

Financial influences are the effects of family, peers, friends, and others on an individual's ability to manage money or make sound financial choices. Influences may come from official sources such as financial experts or from informal sources such as family and friends. Influences may also come from a mentor.

Other factors

A sense of hopelessness, religion, and financial comfort may also have an impact on an individual's financial literacy. The term "hopelessness" refers to the negative impact on several aspects of financial behaviour and well-being. In other words, those who are deeply in debt often make hasty judgments. The degree to which a person clings to his or her religious ideas, morals, and so on is referred to as religiosity. The quantity of money generated and possessed by an individual to satisfy his or her living requirements is referred to as "financial contentment".

Financial Wellbeing

Previous research studies have defined financial wellbeing as one of the branches of well-being. Mokhtar et al. [15] describe financial wellness as an abstract notion used to explain an individual's or family's financial position. Financial well-being as a function of personal traits, objective qualities, perceived attributes, and evaluative features of the financial domain. According to the CFPB,6 "a person's financial well-being is defined as the ability to fulfil all present and future financial obligations and responsibilities, as well as making

⁵ Haryana Minister of State for Welfare of Scheduled Castes and Backward Classes, 2020.

⁶ Scale CFW. This statement describes me Completely. Very well Somewhat. Very little. Not at all: 3–5. URL: https://files.consumerfinance.gov/f/documents/bcfp_fin-well-being_full-scorecard.pdf (accessed on 13.11.2021).

decisions that allow for happiness and well-being". Joo [16] draws the concept of financial well-being from the notion of general well-being and specifically defines it as a prerequisite for financial health, pleasure, and worry-free living. It is crucial.

OBJECTIVES OF THE STUDY

In this study, the primary goal is to examine the impact of financial knowledge, financial attitude, and financial behaviour on an individual's entire financial well-being.

On the basis of objectives and framework, the following hypothesis has been drawn by the researcher (*Fig. 1*).

The Relationship Between Financial Knowledge and Financial Wellbeing

Financially literate people having the basic knowledge of the financial concept and financial product. OECD⁷ financial knowledge is the key determinants of financial literacy. Huston [2] defines After reviewing more than 71 research publications, author have identified four key components of financial literacy: concept of money, saving and investing as well as borrowing and protection are all covered. OECD⁸ include five concepts of financial knowledge — simple interest, compound interest, the time value of money, and the influence of inflation on investment returns and price levels. Riitsalu and Murakas [17] in this study researchers found that objective financial knowledge, having less effect of financial well-being as compare to the subjective knowledge of financial knowledge, in this study researchers found that socio-economic factors affect the financial well-being more. Gerrans at. el. [18] found that financial literacy not only influence financial behaviour, but also financial satisfaction. On the basis of above following hypothesis has been drowned and tested and Indicators of financial knowledge is general knowledge of personal finance, saving, loans, investment, insurance.

H01: Financial knowledge has no significant influence on financial well-being.

The relationship between financial attitude and financial well-being

Financial attitude can be defined as a personal tilt toward financial products, which is only possible if people have a positive attitude toward the financial product and create a positive attitude toward the financial product. Financial literacy plays an important role. Chijwani [19] determined that the emphasis should be on cultivating favourable financial attitudes among the people of this country in order to achieve good financial literacy. Only then can any financial education programme provide genuine benefits. Ajzen [20] Decision-makers' behaviour has been shown to affect financial attitudes, and their economic and non-economic perceptions will strengthen their attitudes. Ibrahim and Alqaydi [21] concluded in their study that education could change personal financial attitudes and further reduce credit card dependence. Yuesti et al. [22] also concluded that financial attitudes and financial behaviour variables positively affect financial literacy and financial wellbeing. Financial attitudes may also affect financial wellbeing along with financial behaviour. Previous research concluded that there is a correlation between financial attitudes, financial literacy, and financial well-being. Ibrahim and Alqaydi [21] found that if an individual had a strong financial attitude, they borrowed less from the bank and credit cards. Sohn et al. [16] found the financial socialisation agent, financial attitude, and financial literacy positively affects financial literacy. Haque et al. [23] concluded that a positive financial attitude and financial literacy help with financial well-being and women's empowerment. The following hypothesis has been developed based on the above literacy and for the purpose of the study. The financial attitude is revealed by record income and expenditure, take care of the budget you made, save money every month for the future, and pay off all of your debts each month.

H02: Financial attitude has no significant influence on financial wellbeing.

Financial Behaviour and its Relationship to Financial Well-Being

Financial behaviour refers to people's actual financial decisions in the financial market, linked to their savings,

⁷ Organisation for Economic and Cooperation and Development. Measuring financial literacy: questionnaire and guidance notes for conducting an internationally comparable survey of financial literacy. URL: https://www.oecd.org/finance/financial-education/49319977.pdf (accessed on 13.11.2021).

⁸ OECD. G20/OECD Infe Core Competencies Framework on Financial Literacy for Adults G20/OECD Infe Core Competencies Framework on Financial Literacy for Adults G20/OECD Infe Report on Adult Financial Literacy in G20 Countries. 2017;1–80. URL: www.financial-education.org (accessed on 13.11.2021).

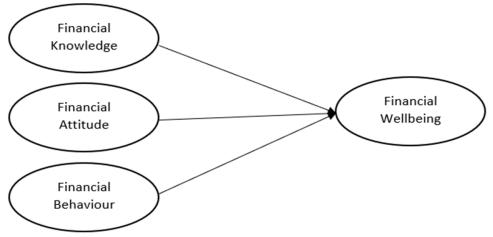


Fig. 1. Conceptual Model

Source: based on reviews of literature, a research framework developed by the authors.

debt, and expenditure levels. Atkinson and Messy [5] found that individuals' realistic financial attitudes, such as effective budget preparation and financial stability, improve their financial literacy, while negative financial attitudes, such as loans and credit, disrupt their financial well-being. Taft et al. [1] concluded that financial literacy and financial attitude can lead to positive financial behaviour, so it is necessary to consider the impact of financial literacy on financial behaviour. Gerrans et al. [18] examine the relationship between financial wellness and personal well-being. In this study, they found that financial literacy helps with change in behaviour and improves decision-making capabilities and living standards. According to the OECD, financial behaviour is very important and is a key component of financial literacy. Mokhtar and Husniyah [24] examined whether the work environment, financial stress, locus of control, and financial behaviour were all found to be strongly linked to financial well-being. Furthermore, financial stress was the most powerful factor influencing financial well-being, followed by the work environment. On the basis of previous studies, the following hypothesis has been developed and tested. Financial behaviour in this study is indicated by consumption, cash flow management, saving and investment.

H03: Financial behaviour has no significant influence on financial wellbeing.

RESEARCH METHODOLOGY

Sampling Technique and Sample Size

Ambala district, Haryana, was the target demographic area in this investigation. In a self–administrated questionnaire, a questionnaire was validated by three professors from different departments at Sharda University, Greater Noida (India). Data was collected via an online and offline mode. Because of the time restrictions, 115 respondents were identified in this study. Probability sampling was used for this study.

Instrumentation

Almost all the data that was examined by computer was collected via a self–administered questionnaire. The questionnaire was split into two. The demographic variables are in the first section, and the second section includes questions on independent and dependent variables. Previous research was used to develop the question. In this study, 20 questions were asked to check the financial knowledge and understanding, 10 questions related to financial attitude, 10 questions related to financial behaviour, and 10 questions were asked related to financial well-being. After factor analysis, a few questions from financial knowledge, financial attitude, and financial behaviour were dropped whose loading was less than 50. In this study, data was collected on a 5–point Likert scale.

Demographic and socioeconomic characteristics of the sample

The characteristics of the sample used for the analysis (*Table 1*). The questionnaire was sent to more than 400 people, but only 150 showed an interest in it. A total

⁹ Organisation for Economic and Cooperation and Development. Measuring financial literacy: questionnaire and guidance notes for conducting an internationally comparable survey of financial literacy. URL: https://www.oecd.org/finance/financial-education/49319977.pdf (accessed on 13.11.2021).

of 150 questions was coded in SPSS for analysis and during the data cleaning, 35 questions were found as outliers, so in this study only 115 respondents were taken into consideration, and of those, 55.65% were female and 44.35% were male. In the sample, there is no greater difference in marital status between males and females, i.e., 51.30% are married and 48.70% are unmarried. In the sample, the maximum respondents were graduates, masters, and professionals, with 29.57%, 31.30%, and 32.17%, respectively. In the sample, 5.22 percent were those who studied at school level, and 1.74% were illiterate. The sample consists of a maximum of respondents earning a monthly income between INR 25001 and INR 50000, i.e., 28.70%, 18.26% of the respondents earning up to INR 25000, 18.26% of the respondents earning INR 50001— INR 75000, 19.13% earning INR 75001 - INR 100000, and 15.65% earning above INR 100 000. 6.09% of the respondents were working as professionals, 60.87% of the respondents were salaried, 12.17% were still studying, 1.74% of the respondents were farmers, and 19.13% were unemployed. And the sample consisted of 54.78% of respondents from joint families and the rest, 45.22%, from nuclear families. The questionnaire was prepared with extreme seriousness, including all the relevant details on the 5-point Likert scale.

The reliability of all questions related to financial knowledge, financial attitude, financial behaviour and financial wellbeing is high. 83, which shows the high reliability of the questions and shows that all the questions are relevant for the study. The questionnaire was distributed online through the use of Internet-mediated surveys because of pandemic fears of people avoiding social gatherings for the safety of their families. For this study social distancing was taken into consideration, and maximum data was collected through online mode.

Since in this study, only three factors of financial literacy (financial attitude, financial behaviour, and financial knowledge) are taken into consideration for determining financial well-being. In this research, a multivariate approach known as Structural Equation Modelling (SEM) is taken into consideration, which uses latent variables that are indirectly assessed via indicators. Since abstract constructs cannot be measured directly, latent variables and constructs are needed, and since they are invisible, they must be detected using indicator variables and statements. The researcher utilised a variance–based

SEM technique known as PLS-SEM to accommodate a small sample size (Partial Least Square-Structural Equation Modelling). The PLS-SEM is capable of handling construct measures that are either single-item or multiitem in design, and is capable of handling both reflective and formative measurement models. The PLS-SEM and CB-SEM findings do not vary much, therefore the PLS-SEM outputs may be used as a reliable alternative to the CB-SEM outputs. Some of the most often cited reasons for using PLS-SEM include data features such as a small sample size, non-normal data, and scale of measurement (i.e., the use of various scaling types) [25–27]. A Smart PLS version 3 was carried out for the PLS analysis, which was accessible for a free trial of 30 days on the official website. The result of this research follows the two–step approach. First, the assessment of the adequacy of the measurement model and second, an evaluation of the structural model. The first step is to ensure that the measurement model is sound, and the second is to investigate the structural model.

ASSESSMENT OF MEASUREMENT MODEL

Examining reliability, convergence, and discriminative validity shows that the model is right for the job. The composite reliabilities are also shown (*Table 2*), and they're all above the 0.7 threshold, which thus indicates the acceptable limits of reliability. As a result, convergent validity may be measured by the square root of the average variance extracted (AVE), which is defined as the variance that is shared between a construct and the indicators of the construct. Due to the fact that each concept has an average variance equal to or greater than 0.5, convergent validity is proven.

ASSESSMENT OF THE STRUCTURAL MODEL

In order to test the hypotheses, PLS was used to evaluate the structural model. The path coefficient and R-Squared values of the model is also provided in *Table 3*. According to *Table 3* pevalue (P < 0.05) derived from the t-statistics it can be inferred that financial knowledge has no significant impact on financial well-being, hence we accept the null hypotheses at 95% of confidence. As per the *Table 3* financial behaviour has a strong impact on financial well-being. Similarly, the impact of financial attitude of financial well-being is positive because "P" value is less than level of significance. So, at 95%

Table 1

Demographic and Socioeconomic Details of the Respondents

Demographic and Socio-economic Variables	Attributes of Variables	Frequency	Percent
Condensations	Male	51	44.35
Gender of respondent	Female	64	55.65
Marital status of Respondent	married	59	51.30
Maritat status of Respondent	unmarried	56	48.70
	Illiterate/Uneducated	2	1.74
	School Level	6	5.22
Qualification of Respondent	Graduate	34	29.57
	Masters	36	31.30
	Professional	37	32.17
Area of Living	Rural	14	12.17
Area of Living	Urban	101	87.83
	Business/Professionals	7	6.09
	Salaried Employee	70	60.87
What is the occupation of the respondent	Students	14	12.17
	Farming	2	1.74
	Not Working	22	19.13
	Upto INR 25,000	21	18.26
	INR 25,001 — INR 50,000	33	28.70
Monthly Family Income	INR 50,001 — INR 75,000	21	18.26
	INR 75,001 – INR 100,000	22	19.13
	Above 100,000	18	15.65
Time of recognized and formally	Joint Family	63	54.78
Type of respondent family	Nuclear Family	52	45.22
	Illiterate/Uneducated	15	13.04
Education of respondent Parents	School Level	52	45.22
Education of respondent Parents	Under Graduate/ Post Graduate	39	33.91
	Professional Education	9	7.83

Table 2

Composite reliability, AVE & Cronbach Alpha (Output from Smart PLS v3.0)

Variables	Composite Reliability	AVE	Cronbach's Alpha	
Financial Attitude	0.882	0.600	0.838	
Financial Behavior	0.952	0.741	0.941	
Financial Knowledge	0.905	0.399	0.924	
Financial Well-being	0.934	0.592	0.920	

Source: compiled by the author.

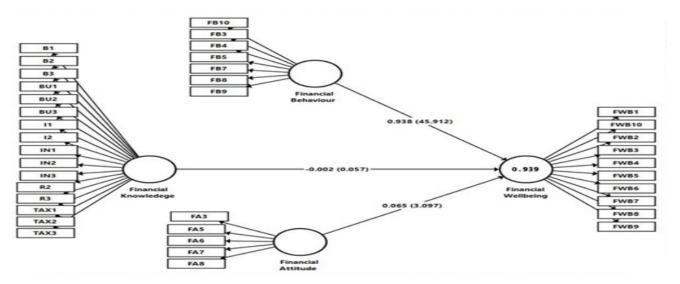


Fig. 2. Structural model

Source: compiled by the author, PLS Smart PLS.

level of confidence, we reject the H02 and H03. Hence model concluded that financial attitude and financial behaviour having significant influence on financial wellbeing and financial knowledge (*Fig. 2*).

The outcomes of the hypotheses have been summarized in below *Table 4*.

In the above conceptual model one latent variable identified that is financial well-being so we have only one R-square value. Though impact of financial behaviour as well as financial attitude of financial well-being significantly provides significant impact.

MANAGERIAL IMPLICATIONS AND ITS LIMITATIONS

This study has practical implications for the design of financial literacy programs. The primary goal of the research is to determine the relationship between the determinant of financial literacy and financial wellbeing. In this study, only three factors of financial literacy were taken into consideration, and it was found that only financial attitude and financial behaviour had a greater influence on financial well-being. This study partially supports the previous studies, as previous research found that financial knowledge also influences financial well-being, but as per the current research, only financial attitude and financial behaviour significantly influence financial well-being and among the financial attitude and financial behaviour, financial behaviour has a greater influence on financial wellbeing [1, 18, 28, 29] but we can't ignore the other factors which

influence financial literacy and financial well-being. As per the result, financial knowledge may be the important factor of financial literacy, it is not the important factor of financial well-being. So, governments, financial institutions, schools and colleges should focus on building the right attitudes and financial behaviour for the wellbeing of society.

CONCLUSION

The study identifies the important elements that influenced financial well-being. A favourable association was found between financial attitude and financial behaviour 95% level of confidence. In the case of financial knowledge in financial well-being was negligible influence. Financial behaviour is the main predictor of financial well-being and the result of the current study was supported in previous studies.

LIMITATIONS & FUTURE RESEARCH

We can't completely rely on this study because it's not free from the limitation. First limitation, this study was conducted on small sample size taking only one district of Haryana. Secondly, this study includes all working and non-working groups from urban and rural. And third one is only three factors included in this study; other important factors are ignored i.e., socio–economic factors, social networks, family socialisation and cultural influence should also take into consideration. For

Table 3

Path Co-efficient and R-squared (Output from Smart PLS v3.0)

	Path Co	efficient				
Variables	Original Sample	T-Statistics O/ STDEVI	P Value		R Squared	
Financial Knowledge — > Financial Well-Being	0.002	0.057	0.483		0.939	
Financial Attitude — > Financial Well-Being	0.065	3.097	0.002	Financial Well-being		
Financial Behavior — > Financial Well-Being	0.938	45.912	0.001			

Table 4

Summary of hypotheses testing

	Null hypotheses	Result
H01	Financial knowledge has no significant influence on financial well-being	Accepted
H02	Financial attitude has no significant influence on financial well-being	Not Accepted
H03	Financial behavior has no significant influence on financial well-being	Not Accepted

Source: compiled by the author.

further studies, researcher can try to minimise the other limitation of the study. That will help the government to

design the financial literacy program to achieve the end result that is financial well-being.

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Sangeeta — formulation of research ideas, depth study of related literature and finalizing the objectives followed by hypotheses with the validation from my co–authors. Identifying the appropriate dependent and independent variables, critical analysis by using SEM and validation of results.

P.K. Aggarwal — help in developing the preliminary research framework, finalizing the research title and objectives, validation of hypothesis according to research objectives followed by validation of analysis and conclusions as well. **A. Sangal** — developing the appropriate model and helping in using the appropriate research methodology, validation of analysis and results.

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Business Valuation with Machine Learning

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ABSTRACT

The aim of the article is to test the hypothesis about the applicability of machine learning methods to train models that allow to accurately predict the market capitalization of an enterprise based on data contained in three main forms of financial statements: Income statement, Balance sheet, and Cash flow statement. The scientific novelty of the study lies in the proposal of an alternative approach to the actual finance problem — business valuation. The conducted empirical study allows us to test the hypothesis under consideration. We train various models using the most popular machine learning **methods** (LASSO, Elastic Net, KNN, Random Forest, SVM, and others). To determine the best approach for assessing the value of a company, the effectiveness of different methods is compared based on the R^2 performance metric (86,7% for the GBDT). Financial statements data of NYSE and NASDAQ companies are used. The study also addresses the problem of the interpretability of the trained models. The most important features are identified - the forms of financial statements and their specific items that have the greatest impact on market capitalization. Three independent ways to determine feature importance indicate the significance of the information contained in the *Income statement*. In particular, Comprehensive income was the most important item for accurate predictions. Robust methods of variable normalization and missing data imputation are also highlighted. Finally, various ways of improving the developed models are recommended to achieve even higher accuracy of forecasts. The study **concludes** that machine learning can be applied as a more accurate, unbiased, and less costly approach to value a company. Feature importance analysis can also be used to understand and further explore the value creation process.

Keywords: business valuation; relative valuation; DCF; machine learning; artificial intelligence; big data; regression analysis; gradient boosting; decision trees

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INTRODUCTION

Artificial intelligence, which has a strong impact and completely changes the economic sectors and the field of scientific knowledge, is rightfully called the electricity of the 21st century.1 Artificial intelligence has also influenced the financial sector and the theory of finance. Machine learning, which embodies the most productive form of implementing the idea of artificial intelligence in practice, has long been used by financial institutions to solve various problems. The first studies on the use of neural networks to predict the dynamics of stock prices were published back in the 90s last century [1]. It is the financial sector that has become the main "testing ground" for testing new methods. The

most favorable factor for this has been the abundance and variety of data aggregated by financial institutions in their usual activities. In addition, it is financial markets that are considered the most attractive object of application of the intellectual efforts of leading specialists in the field of information and mathematical sciences, since the reward for the successful application of statistical methods in this area will be maximum.

Hundreds of articles are published annually, which record cases of successful application of artificial intelligence methods in the financial sector [2]. However, some topics are undeservedly ignored. Thus, aspects of using machine learning for business valuation are not sufficiently considered by the scientific community. This may be due to a number of reasons, one of which is the difficulty of modeling the subjective process of business

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¹ Stanford Business. URL: https://www.gsb.stanford.edu/insights/andrew-ng-why-ai-new-electricity (accessed on 29.11.2021).

valuation by an analyst. Some researchers believe that the valuation process cannot be formalized [3]. However, it is precisely the ability to include non-linear relationships between variables that are a property of complex processes (for example, the process of forming the value of an enterprise) that is one of the main strengths of machine learning. It has been proven that some methods of statistical learning allow one to approximate continuous functions of any type and complexity [4]. That is why the complexity and subjectivity of the business valuation process are not an obstacle, but a reason for using Machine Learning methods (ML) to predict the company's market capitalization.²

This paper is devoted to testing the hypothesis about the applicability of machine learning methods to predict the market capitalization of an enterprise. To do this, we conducted an empirical study and subsequent analysis that compared the effectiveness of different supervised learning approaches to predict/assign a company's market capitalization based on its financial statements for the last eight quarters. Thus, the data contained in the Balance sheet, Income statements, and Cash flow statements.

The first part of the main section is devoted to a brief review of the literature and the background of the application of machine learning in the context of the research problem. Next, the methodological aspects of empirical research are considered. Finally, the study itself is based on data from 3,945 *NASDAQ* and *NYSE* companies, and its results are discussed in the third part. As a result of comparative analysis, the most effective training methods were identified, which make it possible to predict the company's value with high accuracy. The effectiveness of the methods is compared based on out of sample

the R^2 metric, i.e. data not used in model training.

The high accuracy of predictions can be used to solve various problems. Estimating the value of private enterprises, determining the placement price of shares before an IPO, creating investment strategies, 3 and developing new approaches to reflecting investments in the capital of other enterprises in accounting are far from a complete list of possible points for applying research results. In addition to the models themselves, the analysis of the significance of features is also valuable, which makes it possible to single out independent variables — the forms of financial statements and their specific items that most strongly affect the final cost forecast. This allows you to identify the most valuable information contained in the financial statements, which, in turn, can be used both by companies to better disclose the most relevant information to investors, and by the regulator when developing new standards. In addition, the importance of attributes gives insight into the value-creation process of a company. Finally, in the course of the work, the author was able to determine the best methods for preprocessing financial statements data: independent variables normalization and missing data imputation.

1. MACHINE LEARNING FOR BUSINESS VALUATION

1.1. Prerequisites for ML Methods for Business Valuation

Let us consider the main factors that indicate that statistical learning can be successfully used to determine the market capitalization of a company. The term "machine learning" usually has the following meanings:

1. Application of a diverse set of nonparametric statistical forecasting methods

² In the framework of the study, a company's value is understood as the sum of the company's market capitalization and the book value of liabilities. Thus, in the presence of data on the book value of liabilities, the problem of forecasting the company's value is identical to the problem of forecasting market capitalization.

³ In the context of developing investment strategies, a positive difference between the forecast and actual cost will be interpreted as an undervaluation, and a negative difference as an overvaluation of the company.

that can take into account non-linear relationships between independent variables.

- 2. Using regularization is a way to punish complex models to prevent overfitting problems.⁴
- 3. The choice of the optimal set of hyperparameters among the many possible variants of the model specification. *Grid Search* and *Random Search* are the most popular algorithms for hyperparameter optimization. Hyperparameter fitting is typically performed using a validation set obtained from *k-fold cross-validation*.

In addition to applying advanced algorithms, machine learning focuses on validating a model through k-fold cross-validation and using test sets to provide an unbiased assessment of the quality of a model. Thus, the emphasis shifts from the estimation of the model parameters $\hat{\beta}$ to the result of the forecast \hat{y} . To assess the value of a company, the primary task is to determine the function h(x), which allows for a highly accurate prediction. It is the prediction, and not the estimate of the coefficients $\hat{\beta}$ that is of great practical importance. Specializing in prediction problems, machine learning is ideally suited to solve this problem. The multivariate nature of ML methods allows them to be much more flexible than traditional econometric approaches. This flexibility helps to better approximate the unknown function that represents the value creation process of a company.

Several properties of machine learning methods make them ideal for modeling processes with an unknown or indeterminate shape. Variety comes first. Even within the framework of one of the many dissimilar methods, the researcher has the opportunity to choose an infinite number of different model specifications. For example, the learning rate of a hyperparameter can take on an infinite number of values from the region of positive real numbers. In addition,

the selection of the best models through k-fold cross-validation allows you to control the problem of overfitting and avoid false discoveries resulting from unsupervised testing of many different model specification options (Gu, Kelly, & Xiu, 2020).

Despite their original specialization, analytics developed for big data are especially effective when working with small datasets (3,945 observations are considered a small dataset). They are noticeably superior to traditional social science methods: the *least squares method (OLS)* for regression problems and *logistic regression* for classification problems, which in their original form are not able to take into account the nonlinear influence of independent variables on the dependent one. The ability to take into account the multidimensional nature of data is the main reason for the superiority of non-parametric AI methods.

Another disadvantage of traditional methods is the tendency to overfit. The resulting *OLS* model tends to make highly inaccurate outof-sample predictions. In addition, the interpretability of the results is no longer considered an advantage of the OLS method. The use of the Tikhonov regularization method — *Ridge* regression [6], *Lasso* regression [7], as well as their combination — *Elastic Net*, allows increasing the quality of forecasting while maintaining the possibility of a straightforward interpretation of the obtained coefficients В. С учетом всех недостатков некоторые исследователи полагают, что использование простой линейной регрессии в социальных науках должно быть сведено к минимуму (Hindman, 2015).

Given all the shortcomings, some researchers believe that using simple linear regression in the social sciences should be minimized (Hindman, 2015).

The explanatory variables used in the study, the financial statement items, are often similar and highly correlated.⁵ The

⁴ Overfitting is a phenomenon when the built model explains well the value of a company from the training sample, but is not able to make high-quality forecasts for companies that are not involved in model training.

⁵ An example of correlated variables would be revenue and gross profit. A more extreme example is the balance sheet at the date of the last quarterly report and the balance sheet at

consequence of non-strict multicollinearity is a high standard error of the estimated coefficients, which deprives the *OLS* method of its main advantage — interpretability. Also, the *OLS* method stops working when the number of variables approaches the number of observations. Using *ML* allows you to successfully work with data that is pathological for traditional methods and select viable models.

Although machine learning has great potential for predicting the value of a company, it still has some drawbacks and limitations. The predictions made by applying the models are measurements. By themselves, the measurements do not indicate the fundamental mechanism that forms the market capitalization of a company. The process of assigning a prediction is often opaque. It is rather difficult even for specialists to describe the logic of the formation of a particular prediction in an accessible language. The complexity of communication is one of the barriers to applying machine learning to some financial problems. Fortunately, the problem of the interpretability of the results is given special attention in the literature. Modern methods for assessing the feature importance, considered in an empirical study, make it possible to mitigate the "black box" problem (Carvalho, Pereira, & Cardoso, 2019).

1.2. Literature review

An important issue is the definition of independent variables with the help of which cost forecasting should be carried out. The theory of asset valuation gives quite definite indications. Scientists and practitioners use a variety of approaches to assessing the value of a company. The leading researcher in this field, A. Damodaran, identifies four methods (Damodaran, Valuation approaches and metrics: a survey of the theory and evidence, 2007).

the date of the penultimate quarterly report. Due to the use of data from the last eight quarters, virtually every variable is highly correlated with the other seven variables in the $X-{\rm design}$ matrix .

The first approach is *Discounted Cash Flow* valuation, *DCF*. This approach determines value by discounting the expected cash flows generated by the assets of companies.

Another method, the accounting valuation method, uses data on the book value of assets.

The third and most commonly used method is relative valuation, which involves the use of market data on the value of similar companies [11]. Stock multiples are used to determine the value of companies.

Finally, the contingency method uses models to value financial options.

Due to the strong theoretical foundations, it is the discounted cash flow valuation that receives special attention in the scientific community. The basics of the approach were proposed by A. Marshall and E. Böhm-Bawerk, who considered the concept of present value in the first half of the 20th century. E. Böhm-Bawerk was the first to demonstrate the explicit calculation of the cost of an annuity [12]. The method is based on the assumption that assets with large and predictable cash flows should have a higher value than assets with low and volatile cash flows. In other words, the value of an asset is an increasing function of expected cash flows and a decreasing function of a discount rate that reflects the risk and uncertainty of the cash flows.

It should be noted that in practice, when applying the *DCF* method to determine expected cash flows, forecast their growth rates, return on equity, etc., financial reporting data is used. Therefore, the training of statistical models that predict the company's value must be carried out on these data.

This paper is linked to a number of studies from the 2000s on the application of machine learning to financial markets. In 2009, G. Atsalakis and K. Valavanisb reviewed the existing literature on the use of neural networks to predict stock market dynamics [13]. Later, in 2018, F. Xing, E. Cambria, and R. Welsch published a review of the application of NLP natural language

processing methods for financial forecasting (Xing, Cambria, & Welsch, 2018). Among the works directly related to asset valuation, the publication of 2015 by B. Park and J. Bae, devoted to the use of machine learning, in particular the *AdaBoost* algorithm, to predict the value of the residential real estate in Virginia, stands out (Park & Bae, 2015).

The closest in meaning to forecasting the capitalization of an enterprise by statistical methods are works devoted to forecasting stock multipliers. In one of the first publications on this topic, M. Kisor and V. Whitbeck used the data of the profit growth rate, the dividend payout ratio, and the standard deviation of the change in earnings per share (EPS) to determine the ratio of capitalization to net profit, the P/E (Whitbeck & Kisor, 1963). multiplier (Whitbeck & Kisor, 1963). The sample consisted of 135 companies. The regression equation, obtained in 1963, was as follows:

$$P/E = 8.2 + 1.5g + 6.7 (Payout ratio) - 0.2\sigma_{eps}$$
.

Forecasting of multipliers for Russian stock market companies is considered in (Коклев, 2020). The author prefers to predict the EV/Sales, multiple, arguing that a positive revenue value allows using as large a sample of companies as possible.

H. Joshi and R. Chauha used multiple determinants to predict the value of coefficients using *Ridge* and *Lasso* regression. The adjusted R-squared was 70%. A separate test sample was not used to check the results (Joshi & Chauha, 2020).

M. Le Claire, A. Alford, C. Penman, D. Nissim, A. Damadoran and many other authors have developed multiplier forecasting models (Liu, Nissim, & Thomas, 2002). Within the framework of these studies, independent variables, as a rule, are various coefficients, integral indicators characterizing the activity, financial stability and efficiency of the enterprise.

2. RESEARCH METHODOLOGY

To test the hypothesis under consideration, it is necessary to solve the following problem: to

train a model for assessing the market value of the company's equity capital. Without a priori information about the effectiveness of one or another approach, it seems appropriate to consider the maximum possible number of currently existing machine learning methods. Determining the best method can be done by comparing the accuracy of the predictions for the test set data. In the most general terms, we describe the forecast value of the company as:

$$\hat{y} = h(x),$$

where h — company value function obtained using machine learning; \hat{y} — the company's market capitalization forecast; x — the company's feature vector consisting of financial statement data.

2.1. Used machine learning methods

There is a wide range of high-quality literature that describes in detail each approach both in terms of describing the method and the computational algorithms themselves, which make it possible to obtain a model for a given training set (Hastie, Tibshirani, & Friedman, 2016). Therefore, we will not dwell on each of the methods considered in the work, but only briefly list them. *Table 1* shows twelve different approaches to represent the idea of using *ML* to value a company as representatively as possible.

The software libraries used to build models within each method are also listed: scikit-learn for traditional algorithms and CatBoost for gradient boosting. In addition to CatBoost, there are several other popular gradient-boosting libraries on decision trees: XGBoost, H2O and LightGBM from Microsoft. The choice in favor of the Yandex project is explained by the higher accuracy of the resulting models both with the default value of the hyperparameters and with their optimized value. Also, the learning process with CatBoost is usually faster (Prokhorenkova, Gusev, Vorobev, Dorogush, & Gulin, 2017). The last column shows the number of models tested under each method. To determine the best set of hyperparameters, a large number of possible

Table 1

Employed machine learning methods

Method	Method Algorithm Los		Number of specifications investigated		
Least Squares Method, OLS	scikit-learn*	MSE	10 000		
Ridge	scikit-learn	$MSE + \alpha \ w\ _2^2$	10 000		
Lasso	scikit-learn	$MSE + \alpha \ w\ _{1}$	2000		
Elastic Net	scikit-learn	$MSE + \alpha \rho \ w\ _{1} + \frac{\alpha (1-\rho)}{2} \ w\ _{2}^{2}$	2000		
Stochastic Gradient Descent, SGD	scikit-learn	MSE , Huber loss, epsilon insensitive, squared epsilon insensitive	2000		
Huber	per scikit-learn Huber loss		2000		
Support Vector Machine, SVM	scikit-learn	epsilon-insensitive	3000		
K-Nearest Neighbors, KNN	scikit-learn	-	2000		
Decision Tree, DT	scikit-learn	MSE, MAE, Poisson loss	10000		
Random Forest, RF	scikit-learn	MSE, MAE, Poisson loss	500		
Extremely Randomized Trees, ERT	scikit-learn	MSE, MAE	500		
Gradient Boosted Decision Trees, GBDT	CatBoost**	MSE	100		

Source: compiled by the author.

Note: * Scikit-learn is a library for machine learning in Python. URL: https://scikit-learn.org/ (accessed on 15.11.2021); ** CatBoost is a gradient boosting on decision trees library, developed by Yandex. URL: https://catboost.ai/ (accessed on 17.11.2021).

specifications must be tested. It should be noted that *Table 1* lacks *neural networks*. Due to the heterogeneity of financial reporting data,⁶ this method turned out to be ineffective ($R^2 = -8.0\%$).

2.2. Evaluation of the quality of models

There are good reasons to believe that regression results can often be the result of unsupervised testing of many model specification options [22]. To obtain the desired result, the researcher retroactively chooses the "best" model. The formation of a separate test sample deprives the

⁶ The heterogeneity of the data lies in the fact that different items of financial statements carry different economic meanings. Neural networks, on the contrary, are most effective when working with homogeneous data. For example, images, where each feature represents a pixel.

unscrupulous scientist of the opportunity to fit the model to the data to obtain sensational results. Within the framework of this study, the general population is divided into two incompatible populations: training and testing. The test sample consists of a random sample of 20% of the data — 788 companies. It is the R-squared calculated for companies i, included in the test sample τ , that will be a reliable indicator characterizing the quality of forecasts. A comparison of the effectiveness of various ML methods will be carried out using this indicator.

$$R_{oos}^2 = 1 - \frac{\sum_{i \in \tau} \left(y_i - \hat{y}_i \right)^2}{\sum_{i \in \tau} \left(y_i - \overline{y}_i \right)^2}.$$

Data from the remaining 3,155 companies will be used for model training and cross-validation in the hyperparameter optimization process using a random search algorithm. The essence of random search is to compare many different specifications within the method by randomly selecting hyperparameters from a given distribution (Bergstra & Bengio, 2012). The choice of the best model from many different specification options is based on the R-squared R_{cv}^2 , calculated for the test set, which is a dynamically changing part of the training set. For the test sample, a tenth of the training sample will be sequentially removed.

2.3. Feature Importance

Various ways of assessing the feature importance are designed to level the problem of interpretability, allowing you to evaluate the contribution of each independent variable — financial statement items both to the overall quality of the model and to a specific prediction. We will consider three different approaches:

- 1. Prediction Values Change.
- 2. Permutation Importance.
- 3. SHAP (SHapley Additive exPlanations).

In the framework of the first method, the importance of a variable is determined by calculating the average change in the prediction when the feature changes. The larger the average change in the prediction, the more importance is assigned to the feature. This process is performed for each variable.

The Permutation Importance method works as follows: the observations for the variable being evaluated are randomly shuffled. That is, one column of the X, plan matrix is randomly shuffled, the rows of which consist of company feature vectors. The rest of the columns remain unchanged. After the rearrangement, the predicted values of capitalization are calculated on the basis of the changed matrix. A variable is considered important if the accuracy of the predictions is significantly reduced compared to the original, unchanged matrix. On the other hand, a feature is considered unimportant if its permutation did not lead to a significant decrease in \mathbb{R}^2 . Thus, the process of random permutation is repeated three hundred times for each variable [24]. A high number of permutation iterations for each feature is necessary to obtain narrow confidence intervals for estimating the average quality degradation of the model.

The *SHAP* method is an approach motivated by the idea of Shapley value, a principle from game theory that allows you to calculate the optimal distribution of winnings between players, taking into account their contribution to the final result [25]. In the context of interpreting statistical learning models, SHAP allows you to get a local (for a particular observation x) addition of the contribution of each financial statement item to the final capitalization forecast compared to the baseline (the average prediction of the model). *Fig. 1* shows an illustration of the method for the biopharmaceutical company *Biogen Inc.*

The vertical axis lists financial statement items and their values, sorted in descending order of absolute *SHAP*. That is, the variables that had the greatest impact on *Biogen's* capitalization prediction are presented. Thus, according to the method, the value of *Net operating income* of \$ 2.36 billion three



Fig. 1. SHAP values based on feature importance for Biogen Inc. Numbers are given in US dollars. GBDT model

quarters ago (netIncomeFromContinuingOperat ions_t-3) increased the predicted capitalization of the company by \$ 7.95 billion compared to the base level.

The most negative impact was made by the value of *Comprehensive income* in the last quarter (*comprehensiveIncomeNetOfTa* x_t-1), which lowered the forecasted value of the company by \$ 2.23 billion. The total contribution of local values for the remaining 315 features that are not shown individually on the graph is \$ 10.76 billion with a positive sign (the last line in *Fig. 1*). The final capitalization forecast in this example was \$ 42.4 billion.

In addition to analyzing the forecast for a single company, it is also possible to assess the overall importance of each of the features by calculating the mean absolute *SHAP* value based on all observations. To assess the feature importance within each of the three

methods, a choice was made in favor of using the entire general population, consisting of the union of the training and test sets.

3. EMPIRICAL STUDY BASED ON NYSE AND NASDAQ DATA

3.1. Data

The independent variables used to calculate capitalization are quarterly financial statements (Form 10-Q) for the last eight quarters received in November 2021. The general population consists of 3,945 companies listed on the NYSE and NASDAQ. Financial statements provided by Alpha Vantage. In total, the plan X matrix contains 329 columns, 328 of which are items in the balance sheet, income statement, and cash flow. The set of predictors also includes information

⁷ Alpha Vantage — an API service financial data. URL: https://www.alphavantage.co// (accessed on 28.11.2021).

about the company's industry affiliation. Thus, the feature vector for a single company has the following form:

$$x = \begin{pmatrix} x_1 \\ x_2 \\ \dots \\ x_{329} \end{pmatrix} = \begin{pmatrix} \text{Total Assets}_{t=0} \\ \text{Total Current Assets}_{t=0} \\ \dots \\ \text{Cash at the end of the year}_{t=-7} \end{pmatrix}.$$

3.1.1. Missing data

For most companies, there are missing values for some characteristics. There can be several reasons for missing data. Thus, the level of disclosure of information may vary from company to company. On the other hand, the specifics of the company's economic activity may not imply the presence of a specific article. For example, a company that does not use finance leases will have missing data for the feature capital Lease Obligations in each of the eight quarters. Almost each of the considered ML methods cannot be used in the presence of missing data: model training and subsequent prediction are impossible. The obvious solution is to exclude corporations with missing data from the sample. An alternative option is to remove the variable with missing data. However, the disadvantages of such radical solutions significantly outweigh their main advantage — simplicity.

The presence of missing data for a given feature may be a unifying characteristic for a certain stratum of companies. For instance, for companies of the same industry. Therefore, removing companies with missing data makes the sample unrepresentative of the stock market as a whole. The results and conclusions obtained would extend only to a specific subset of companies — those with a low number of missing data. Obviously, the value of the results of such a study would be much lower. In addition, a decrease in the

number of observations leads to a noticeable decrease in the quality of the resulting models.

In the publication of 2001, M. Banko and E. Brill, using the example of the problem of natural language processing, showed that it is the amount of data for training, and not the choice of method, that is the main determinant of the effectiveness of machine learning [26]. Working with a small data set, there is every reason to believe that the exclusion of companies from the sample will significantly reduce the predictive power of the trained models. Taking into account the above factors, the removal of a company from the sample will be applied only in the most pathological cases — in the absence of data for ninety or more reporting items.

Replacing missing data with imputed values avoids deleting more companies. The most commonly used methods are measures of central tendency imputation: mean or median. This approach is also seen as insufficient for the task of company valuation, where even a small increase in the predictive power of the model is given with great difficulty.

Let us use a more complex imputation method — the *Iterative Imputation* algorithm. The essence of the method is to train a set of auxiliary models, where each feature is predicted using the rest. Thus, for each feature and for each company, the missing data are replaced by predictive values [27]. An important component is the definition of a training method for auxiliary models. With no reason to favor one or the other, GBDT seems to make the most sense. To date, GBDT is considered the most advanced method and the default choice for working with heterogeneous data (Munkhdalai, Munkhdalai, Namsrai, Lee, & Ryu, 2019). Iterative imputation was applied before training the final capitalization forecasting model within each of the twelve methods considered, with the exception of GBDT itself. The fact is that the implementation of this algorithm by the CatBoost library has native support for missing data. Thus, the imputation for this method

is optional. In addition, *GBDT* also does not require feature scaling/standardization.

3.1.2. Feature scaling

Feature scaling or standardizing is a necessary step in data preprocessing. The order of magnitude of financial statement items is quite high and varies greatly. Typical values for many articles can be in the billions. With rare exceptions, the effectiveness of ML methods is noticeably reduced if the dimensions of the features differ greatly. Many optimization algorithms and cost functions require the normalization of independent variables. There are a fairly large number of options for data standardization, the best of which is very difficult to determine in advance. In total, seven transformation options were considered and presented in the scikitlearn library. Experiments with the training set have shown that the most stable and preferred method of data transformation is the Quantile Transformation. This approach to data standardization uses the transformation of non-parametric features into a uniform distribution with values from zero to one. For example, after transformation, the maximum value of the *income* variable will be equal to one, and the minimum value will be equal to zero. The median company's income will be 0.5. For alternative standardization methods (Standard Scaler, Max Absolute Scaler, etc.), the R-squared R_{is}^2 for the final models, calculated on the basis of training data, was often in the negative zone and was noticeably inferior as a quantile transformation.

3.2. Results and discussions

The effectiveness of each of the considered methods is compared in *Table 2* and in *Fig. 2*. As expected, due to the inability to take into account non-linear relationships, traditional methods turned out to be relatively inefficient ($R_{oos}^2 = 20.8\%$ for *OLS*). For the same reason, the application of various regularization methods to the linear model did not lead to a significant improvement in the results.

Moreover, the effectiveness of *Lasso* and *OLS* turned out to be almost identical. Only with the help of *Ridge* regression was it possible to slightly improve the result — up to 22.5%. Changing the *MSE* loss function to *Huber* only worsens the quality of forecasts (17.0%).

The Huber loss function [29] is used for a large number of outliers, which is relevant for financial reporting in the raw format. After the variables were standardized, the dataset no longer included extreme observations. Therefore, the use of this loss function is not necessary. The use of stochastic gradient descent SGD with different loss functions did not lead to the desired result (17.6%). The SVM, used mostly for classification problems, has predictably proved to be inefficient for the regression problem. R-squared was only 21.7%. A significant improvement in the quality of models was achieved using non-parametric methods: k-nearest neighbors and decision tree. The share of explained variance for KNN is 44.3%, and for the decision tree -41.4%. The use of ensembles of decision trees made it possible to raise the accuracy of predictions to a new level of quality. For the classic Random Forest algorithm, the coefficient of determination is already 73.2%. For its even more randomized modification, the method of Extremely Randomized Trees, the R-squared turned out to be less: 64.9%. Finally, the Gradient Boosted Decision Trees method (GBDT) made it possible to obtain highly accurate predictions of the capitalization of companies from the test sample ($R_{oos}^2 = 86.7\%$).

Due to the fact that the latter model is able to give the most qualitative assessment of the company's value, it is of particular interest from the point of view of the analysis of the feature importance. The bar chart (Fig. 3) shows the most important reporting items, with changes in the values of which the prediction value of the company's value changes the most (the Prediction Values Change method). The information is presented in the context of each financial statement: Income statement, Cash flows, and Balance

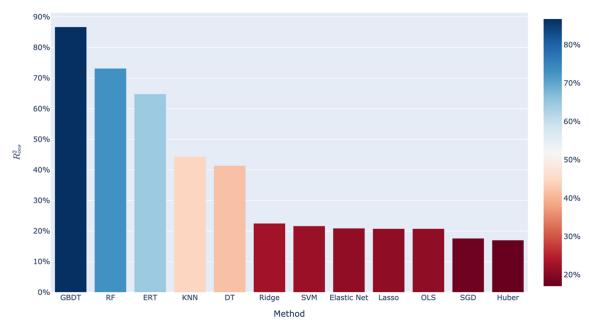


Fig. 2. Machine learning methods performance comparison based on the out of sample R-squared Source: compiled by the author.

 ${\it Table~2} \\ {\it Machine learning~methods~performance~comparison~based~on~the~out~of~sample~R-squared} \\$

Method	OLS	Ridge	Lasso	Elastic Net	Huber	SGD	SVM	KNN	DT	RF	ERT	GBDT
R_{oos}^2 , %	20.8	22.5	20.8	20.9	17.0	17.6	21.7	44.3	41.4	73.2	64.9	86.7

sheet. The horizontal axis measures the relative feature importance.

We note that the *Balance sheet* data are of the least value for the model. Interestingly, the book value of intangible assets is by far the most important variable of this reporting form. This contradicts the opinion of some researchers who consider the book value of intangible assets, in particular, the *Goodwill* item, to be the least informative when building *DCF* models. Within the framework of the cash flow statement, the most informative signs are changes in operating assets for different quarters.

Fig. 3 also shows that the total importance of the *Income statement* significantly exceeds the total importance of the other two reports.

Although subject to manipulation, depending on the accounting policy, it is the data at the bottom of the report that is the most important in assessing the value of the company. In accordance with the goals and objectives of financial accounting, *Comprehensive income*, *Net profit*, *EBITDA* can indeed be considered key indicators of an enterprise's performance, which are necessary when making investment decisions. *Sales revenue*, on the contrary, is not among the important features. These observations may also indirectly point to the benefits of using earnings-based stock multiples.⁸

 $^{^{\}rm 8}$ Contrary to popular belief about the preference for multiples calculated based on revenue.

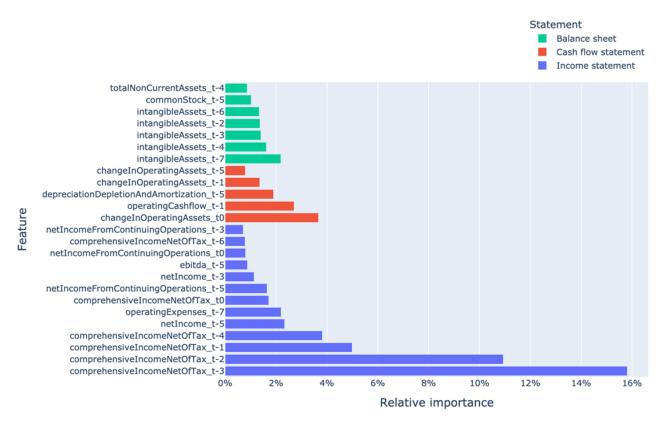


Fig. 3. Relative feature importance. Prediction values change method

Let us evaluate the influence of features by the *Permutation Importance* method. Important features are those whose random permutation led to a significant decrease in the quality of the model. The variables whose permutation resulted in the largest average drop in R-squared are shown in *Fig. 4*. The average decrease in the quality of the model is calculated based on three hundred random permutations for each feature. Confidence intervals are based on two standard deviations.

The main conclusions obtained by different methods for assessing the feature importance overlap in many respects, which increases their reliability. The low significance of the *Balance sheet* data is obvious: the cumulative significance of all seven report items does not exceed the value of the fifth most important *Income statement* item. Quarterly *Comprehensive income* data remains the key variable in each of the feature importance methods. For the *Cash flow statement*, the

main fields are *Changes in operating assets* and *Operating cash flow*.

Finally, we calculate the importance of variables using the *SHAP* method. *SHAP* values of each individual observation for the most important features are shown in (*Fig. 5*), which shows the influence of local feature values on the prediction. The features are listed along the vertical axis. Observations with a high value of a given feature are highlighted in red, and those with a low value are highlighted in blue. The position of the points along the horizontal axis shows the magnitude of the additive contribution of the value of the variable to the final prediction compared to the baseline.

The magnitude and sign of the influence for most items are natural: a high positive value of the item, as a rule, increases the value prediction. Once again, the item of *comprehensive income* turned out to be the most informative in the prediction formation. Note that the mean absolute

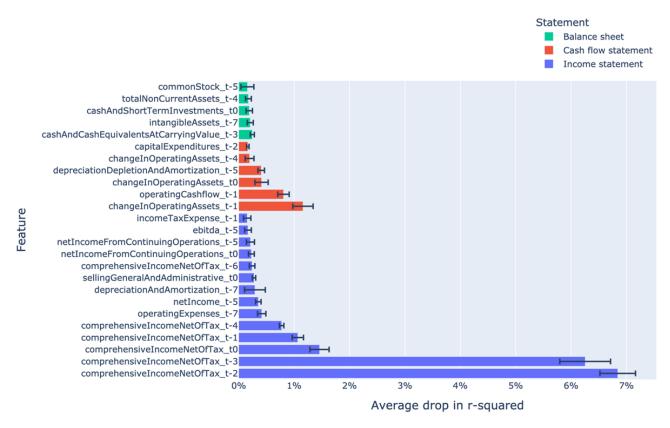


Fig. 4. Feature importance. Permutation importance method

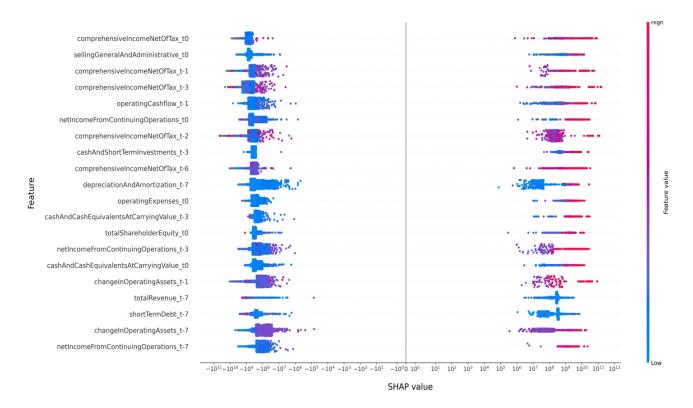


Fig. 5. SHAP values for the most important features

Source: compiled by the author.

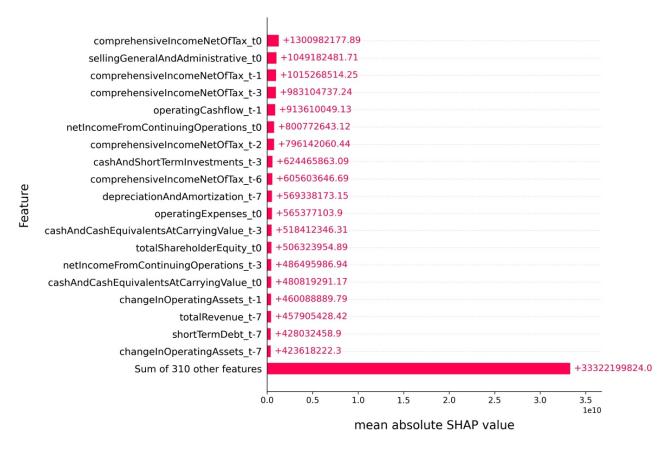


Fig. 6. Mean absolute SHAP values for the most important features Source: compiled by the author.

SHAP value turned out to be the largest for the *comprehensive income* data for the last period (closest to today). Conversely, the contribution of low values for most variables is associated with smaller capitalization. The exceptions are *Revenue*, *Short-term debt*, and *Total liabilities*.

Thus, the model, and hence investors, encourage low-leverage companies. This may indicate that, in practice, for most companies, the current value of the tax shield is lower than the loss in value from the risk of financial distress resulting from the use of borrowed funds.

The negative impact of revenue is more difficult to explain. This may be an artifact of the selected data set. The top twenty important factors included only revenue data for the seventh quarter. Revenue figures for other quarters were relatively unimportant. The contribution of the variable characterizing the company's industry was also insignificant.

Features sorted by mean absolute SHAP value are summarized in a bar chart (*Fig. 6*). It can be seen that the absolute importance of some features is quite high, but their relative contribution to the final prediction is, as a rule, small. The total average contribution of the nineteen most important features is incomparably lower than the contribution of the remaining 310 features (the last line of *Fig. 6*). Thus, to form a highly accurate prediction, not individual items are used, but the data of the entire financial statements for each of the eight quarters.

3.3. Ideas for further consideration of the problem

Improvement of models obtained using machine learning methods can be carried out in several directions at once.

- 1. Engineering of new features.
- 2. Search for new features.

3. Creation of a dynamic version of the model.

In theory, machine learning methods are able to extract the necessary information from financial reporting data on their own, without calculating auxiliary features. However, this is only applicable to large datasets (millions of observations). Working in the mode of several thousand observations, the calculation of liquidity, turnover, and profitability of assets allows you to extract more information from the existing data set.

In addition to financial statements, other data, including unstructured data, may be useful for valuation. Extraction of textual information from annual reports [30], the use of substitute variables describing corporate governance, and the company's dividend policy, also improve the quality of predictions [31]. Including financial statement data for companies in both developed and emerging markets will provide a larger sample and a more generalized model (capable of making predictions for companies of different sizes, sectors, and regions). As a result, the developed models can be applied to the complex task of evaluating companies in the Russian stock market (Abramishvili, Lvova, & Voronova, 2019).

Fluctuations in the stock market indicate a strong influence of macroeconomic factors on the market capitalization of companies. Creating a dynamic version of the model will take into account macroeconomic variables and significantly increase the sample. The idea is that a company at two different points in time represents two different observations. For example, a dataset might include ten observations from Apple Inc. at different points in time. Each of the ten observations will have its own feature vector, consisting of the company's financial statements for the last eight quarters. In addition, this approach will allow expanding the feature vector with macroeconomic data corresponding to the moment of observation. As a result of applying this procedure for each company, the sample size will increase by about

ten times. Together with taking into account macroeconomic factors, an increase in the sample will significantly increase the accuracy of capitalization predictions.

CONCLUSIONS

Let us list the main results and conclusions of the study.

- 1. Due to the ability to take into account non-linear relationships, machine learning methods significantly outperform traditional econometric approaches and are able to provide accurate estimates of the value of companies outside the training sample.
- 2. The economic benefits of using machine learning methods are enormous. *ML* allows you to digest a complex set of financial statement data and saves a lot of labor costs for highly qualified personnel. Instead of spending dozens of hours creating complex, multi-page *MS Excel* documents with the calculation of the value of a single company using the *DCF* method, an analyst can get an accurate and unbiased assessment of hundreds and even thousands of companies in a few seconds.
- 3. The resulting models can be used to solve applied problems of financial management, corporate finance, accounting, and investment analysis when creating trading strategies. A positive difference between the predicted capitalization and the actual one can be a criterion for including the company's shares in the portfolio.
- 4. Various ways of assessing the feature importance unanimously indicate the special value of the *Income statement* data and, in particular, the item's *Comprehensive income*. Further research on the feature importance will provide a better understanding of the company's value-creation process.
- 5. Improvement of the developed models can be carried out in the following areas: the use of a larger sample, and the creation, addition, and engineering of new features. The proposed dynamic version of the model will raise the already high accuracy of

company valuation to a qualitatively new level, presumably leaving the expert level far behind.

The results of the work confirm the considered hypothesis. The high value of R^2 for

companies from the test sample clearly indicates the great potential of using machine learning methods to assess the value of an enterprise by predicting its market capitalization based on financial statements.

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ORIGINAL PAPER

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Shareholder's Reaction to Merger and Acquisition Announcement: Evidence from India's Manufacturing Sector

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ABSTRACT

Mergers and acquisitions performance is akin to financial perplex that researchers have been trying to solve. The objective of the study is to examine the reaction of shareholders to the announcement of mergers and acquisitions in the pre-event, around the event and during the post-event period of the Indian manufacturing firms. The event study research methodology has been used for analysis along with parametric and non-parametric tests. The study shows that investors can earn a significant return if they purchase shares of the acquiring company one day before and sell them one day after the announcement day. The findings concluded that while the announcement of a merger or acquisition generates a positive reaction, this reaction is only temporary and is swiftly diluted. This shows that investors initially overreacted to these announcements and took immediate corrective action. The study recommends to investors, "Earlier the shareholders sell, more the shareholders gains".

Keywords: Merger and Acquisition (M&A); event study methodology; Cumulative Average Abnormal Returns (CAAR); manufacturing sector; India

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1. INTRODUCTION

Every economic event has a dynamic effect on the market due to the decision complexity in the valuation of unanticipated events. The more complex the event is, the longer the time the market will need to absorb new information. The reaction of shareholders to merger and acquisition announcements gives an unbiased measure of the acquirers' profitability, with the assumption that stock market information is efficient.

Mergers and acquisition announcements create value for the acquiring firm's shareholders in various ways. Firstly, M&A boosts efficiency gains through economies of scale, scope, and vertical integration. Secondly, through the dissemination of know-how and R&D, the firm can get synergistic gains. Thirdly, M&As also result in cost reductions through the rationalization process, which entails a more optimal reallocation of production across merging firms, increased purchasing power, and the creation of internal capital markets [1].

Short-term effects are intriguing because they provide for instant trading possibilities; also, the

reaction of the stock market towards mergers and acquisitions announcements can help in the prediction of mergers and acquisitions profitability. Event studies provide the most statistically reliable information on shareholder wealth creation in the event of a merger or acquisition announcement.

The present paper examines the impact of mergers and acquisitions announcements on shareholder's performance using the Event Study Approach. This paper is divided into six sections. Section 2 provides a detailed review of the literature. The sample selection and research methodology are described in section 3 and followed by section 4, in which empirical results of the study are presented. The conclusion of the study is presented in section 5 and the recommendation and findings are explained in section 6.

2. LITERATURE REVIEW

There is a substantial amount of research on the success of M&A activities. However, the objective of this paper is to primarily evaluate the performance of mergers and acquisitions from the perspective of the acquiring companies' shareholders. As a result,

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the assessment of existing research focuses mainly on studies examining the effects of mergers and acquisition announcements on acquirer shareholders' wealth.

Reference [2] examined the mergers of Japanese firms from Jan 1, 1977, to December 31, 1984, using the sample of 157 acquiring firms and 20 acquired firms. In the case of an unaffiliated and unrelated merger, the analysis indicates that acquiring firms have positive but insignificant returns following the announcement. They also use equity size to categorize data into small and large firms. The findings show that the higher the ratio of acquired acquiring firms, the greater the gain to acquiring firms' shareholder wealth.

Reference [3], using a multivariate framework, examines the empirical literature on the impact of various determinants of shareholder wealth creation to acquiring firms and target firms. The study concludes that the target firm's shareholders earn about 22% and acquiring firm's earnings is around 0.5%. The use of equity financing has a significant impact on the wealth of both the target and acquiring firm shareholders. The return of acquiring firm is influenced by numerous bidders and the type of acquisition, whereas regulatory changes and tender offers influence the return of targets.

Reference [4] analysed the sample of 666 M&A deals from 1975 to 1991. The event window of (-42,126) days shows that acquirers earn a significant CAAR (cumulative average abnormal return) of 1.4% while target firms earn a CAAR of 26.3%.

Reference [5] examined the wealth effects of 114 Swiss acquisitions from 1990 to 2001. The event window (-1, +1) exhibits a significant positive cumulative abnormal return of 1.13%, but this positive CAR declines when the observation period is extended. The results also conclude a negative and smaller CAR for deals announced in early 1990. The domestic deals have higher CARs than cross-border deals for the event window (-10, +10) whereas the results are reversed for short intervals. They conclude that domestic and cross-border mergers are not significantly different.

Reference [6] analysed the announcement of mergers and acquisitions of European firms from 1998 to 2002. The acquirers earn a cumulative abnormal return of 1.35%, 0.56% and 0.22% on the event window (-30, +1), (-30, +30) and (-1, +30) respectively. They

conclude that acquirers earn null on an average and target earns significant cumulative abnormal returns of 9% in (-30, +30). They also found that merger industries under government regulation result in the lower value creation than M&A announcements in unregulated industries.

Reference [7] examined the short-term effect of takeover bids on the announcement of European Merger and Acquisition deals from 1993 to 2000 including the sample of 228 deals. They found that announcements have a significant and positive impact on target and acquiring firms. An abnormal return of 9% is realized on the event day, with cumulative abnormal returns of around 23% over the event window starting two months before and including the event day. The study also found domestic bids create more significant returns than cross-border mergers and acquisitions.

Reference [8] has used meta-analysis methodology and found positive abnormal returns to acquiring and acquired firms on the event day (day 0). Initially, shareholders expect M&A activity will create synergy in the long term. However, the returns of acquired firms are significantly high, i.e., 0.70 whereas returns for acquiring firms in the same period are 0.09. The acquiring firms' returns are either insignificant or negative in the subsequent event days (day 1 and so on).

Reference [9] examines the sample of 4430 acquisitions made by US companies between 1985 and 1995. For 1985–1995 the cross-border effect is significant with –0.866% return, whereas the market-adjusted return for the three-day event window is 0.307% for cross-border acquirers and 1.173% for domestic acquirers. The cross-border effect is positive between 1985 and 1990, with a CAR of 0.310, however, it is not substantial. In contrast, for 1991–1995, the cross-border effect is 1.342% and highly substantial. They also discovered that domestic returns increased substantially in the second half of the sample period, while cross-border returns fell, albeit insignificantly.

Reference [10] analysed the cumulative abnormal returns of 1491 US companies from the period 1990 to 2003. In a three-day event window (-1, +1), there is a significant cumulative abnormal return of 1.02% to shareholders following the merger and acquisition announcement. The study also found that merger and

acquisition deal between unrelated companies generate significantly higher positive returns.

Reference [11] using the sample of 1177 merger and acquisition deals examined the shareholder returns of Indian firms from April 1996 to March 2008. The study examines the three areas: mode of payment, relatedness between target and acquirer, and listing effect. The study found that cash-financed deals perform better than stock-financed, relatedness between acquiring and target firms outperforms unrelatedness thus resulting in positive and significant abnormal returns to shareholders and lastly, the list of firms in case of domestic target firms provides more returns than unlisted target firms.

Reference [12] examined the merger announcement impact on the wealth of shareholders of the acquiring firm, acquired firm and combined firm. The findings of the study using the 34 firms conclude that shareholder of the acquiring firm earns 11.6% in an event window of 21 days. In contrast, the shareholders of the acquiring and combined do not earn significant positive returns.

Reference [13] examined the impact of cross-border mergers and acquisitions announcements on acquirers' performance. The findings of the event window, conclude that the shareholders have earned a significant abnormal return in the post M&A period.

Reference [14] used BSE-listed firms to examine the effect of domestic mergers on shareholder wealth between 2004 and 2014. Their findings show negative abnormal returns of 1.82 percent during the announcement time. The findings conclude that during the post-event short-run window period, Indian acquiring firms reduce shareholder wealth.

Reference [15] investigates the stock market's reaction to merger announcements for both the target and acquiring firms. The results show a preannouncement period price run-up for both the target and acquirer companies, indicating knowledge leakage or the expectation of positive news. The acquiring firms' prices, on the other hand, were reduced in the post-announcement period. Over 10 days, the trend pattern for target and acquirer companies is noticeably inconsistent.

Reference [16] examined the wealth effects of cross-border acquisition announcements on acquiring enterprises during the years 2001–2017. The study analysed the 553 and 125 foreign acquisitions made

by Indian and Chinese listed companies, respectively. On the day of the event, both Indian and Chinese investors reacted positively to the announcement of international acquisitions, with significant and positive average abnormal returns of 0.71 percent and 0.23 percent, respectively.

From the above review of literature, it has been observed that developed countries have been the focus of researchers and there are few studies in relation to emerging countries. This study contributes to the existing literature since many influencing factors in an emerging market differ significantly from those in developed markets. In this case, the acquirer and target are both from emerging markets (India). Previous research has focused on acquirers from developed markets and target firms from emerging and developed markets, therefore the current research is unique in terms of acquiring and target firms. Given the dearth of published work on this topic in the Indian context, examining the Indian capital market and industry context is opportune. Furthermore, the inconclusiveness of shareholders' positive returns or negative returns is the driving force behind this research. Thus, this study is a modest attempt to fill a research gap by analysing the impact of mergers and acquisition announcements on shareholder returns of acquiring firms. Based on the abovementioned literature review, the two following hypotheses are formulated:

Hypothesis I: There is a significant average abnormal return (AAR) during the event window due to the announcement of mergers and acquisitions.

Hypothesis II: There is a significant cumulative average abnormal return (CAAR) during the event window due to the announcement of mergers and acquisitions.

3. RESEARCH METHODOLOGY

3.1. Data Collection

The mergers and acquisitions that occurred from 2011 to 2020 has been collected from the daily closing price of the sample firms and the daily closing price of the market return. The market return has been measured by BSE SENSEX. The rationale behind selecting the BSE SENSEX as a market return is that the Bombay Stock Exchange is the oldest in Asia and the world's fastest stock exchange. It also ranks

among the top ten worldwide exchanges in market capitalization for its listed firms.

3.2. Sample Selection

The total number of deals that occurred from 2011 to 2020 is 913. The data has gone through various filters which excludes the following:

- 1. The deal purchase value is not disclosed,
- 2. Acquisition whose value is less than 50%,
- 3. Multiple acquisitions in one announcement,
- 4. If any confounding event and
- 5. Trading data is not available.

After using these filters, 105 manufacturing companies were selected for the study.

3.3. Mechanism of Event Study Methodology

The Event Study Approach has been used for analysis. They include techniques that are well-suited for evaluating the effect of numerous corporate events on stock returns and trading activities of publicly traded firms. They can also translate the flow of information into security pricing, thus focusing attention on the efficiency of the capital market.

3.3.1. Definition of Event

An event can be defined as an announcement of news from a company. This announcement passes on some information to the public which influences the reaction towards the stock. In this study, an Event can be defined as an announcement of a Merger and Acquisition.

3.3.2. Event Window

Firstly, the date announcement of Merger and Acquisition is identified as "Day 0". Day 0 is when the event is first announced to the public or made available in the domain of public information.

The 20 days before the event has been examined to capture the leakage effect because in a few cases the intent date is announced almost 10 trading days before the approval date. The event window analyzed also ensures that no confounding events occur during this period.

3.3.3. Estimation Window

The "Estimation Period" is the period used to estimate the "Normal Returns". These are the returns that occurred before the event and event window. The

estimation window in this study is from -200 to -20 means the period from 200 days to 20 days pre to the event. Thus, a total of 180 trading days has been studied to ensure that it is not impacted by event-related returns. *Figure 1* describes the event and estimation window diagrammatically.

After defining the Event window and Estimation window, the event window has been further divided into smaller windows for in-depth analysis. Previous studies have used various event windows and there is no evidence in the literature on the ideal event window (Mousa and Restum, 2020). Thus, the various window has been analyzed to capture the leakage effect namely, (-10,0), (-5,0), (-1,0), (0,0), (0,+1); (-1,+1), (-2,+2), (-5,+5), (-10,+10) and (-20,+20)

3.3.4. Definition of Abnormal Return

The term "Abnormal Return" is the difference between the expected return and actual return in the absence of the event associated with Merger and Acquisition. In mathematical terms, it can be written as:

$$AR_{it} = R_{it} - ER_{it},$$

where AR_{it} is the Abnormal Return of stock i at time t; R_{it} is the actual return of stock i at time t; ER_{it} is the expected return of stock i at time t.

This study uses the Market Model method for the calculation of expected returns.

In market model [17], the estimated return can be calculated using:

$$ER_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where α_i is the intercept coefficient; β_i is the market return coefficient; R_{mt} is the coefficient of market return of stock I; ε_{it} is the error term.

This model assumes that α_{i_i} , β_{i_i} and ϵ_{it} are assumed as perfectly correlated and thus becomes 0.

This model can be represented in other version which is called as "Market Adjusted Model" which can be expressed as:

$$AR_{it} = R_{it} - R_{mt}$$
.

The *AR* of a particular stock on a particular day using the above market model can be calculated.

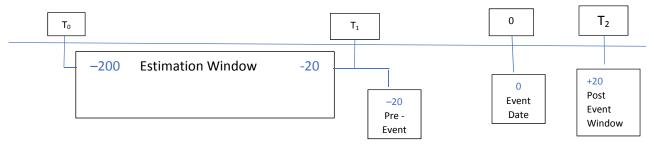


Fig. 1. Timeline of Event Window

Source: author's compilation.

Furthermore, since this study examines the impact of an event in the various window periods, from the aggregate of *AR* results, the average abnormal results (*AAR*) can be obtained.

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_{jt},$$

where AAR_t is the average abnormal return at time t.

The sum of the daily average abnormal return over an interval of one, two or more trading days begins with day T_1 and ends with day T_2 . Mathematically, the equation of CAAR is:

$$CAAR_{t1,t2} = \frac{1}{N} \sum_{j=1}^{N} \sum_{t=T1}^{I_2} 1^{AR_{jt}}.$$

3.3.5. Significance test for Event Study

The abnormal return robustness has been examined using the significance test i.e., parametric and non-parametric tests [16]. Five statistical tests were used to ensure that the results were reliable. As recommended, the three parametric and two non-parametric test statistics [18]. The tests are as follows:

- 1. Crude Dependence Adjustment test (CDA) [19];
- 2. Cross Sectional t-test [20];
- 3. Patell Z test [21];
- 4. Generalised Sign test [22];
- 5. Rank test [23].

4. EMPIRICAL RESULTS

This section reports the result of the merger and acquisition announcements impact on shareholder returns. It reports the average abnormal returns (AAR) and cumulative average abnormal return (CAAR) for each day with parametric and non-parametric tests (*Fig. 2*).

From Fig. 2 it can be inferred that in the preannouncement window i.e. 20 days before the event, the positive trend of abnormal returns has been observed from day to (-6) to t (-1). The AAR on event day, i.e., day (0), is 1.04%, the maximum in all the event days.

In the post announcement window, it is observed that the positive trend of AARs changes to a negative AAR trend. The AARs are positive till day (2) and that till day (20) there is a negative AAR pattern.

Thus, hypothesis 1 which states average abnormal returns are significant during the event window is accepted.

Furthermore, the returns are averaged over the event window to determine the net magnitude of the overall returns. The cumulative abnormal return (CAR) for each day over the 41-day event window is also shown in Fig. 3. The statistics indicate that CAAR becomes positive on day t (-6) and continues to be positive until day to (+21). The CAR value for day t (-6) starts at 0.12% and rises to about 2.22% on the day (0, 1) and 2.30% on the day (0, 2) which is maximum in the event window and then settles at 1.22% on the day (0, 20). This 1% drop in CAAR is attributable to the fact that AAR values are largely positive until the day (0, 2) and then turn negative for the most part during the post-announcement window.

The CAAR values for various before the announcement event window (-10, 0), (-5, 0) and (-1,0), are 0.69%, 1.39% and 0.53% respectively, which are quite impressive (*Table*). The CAAR for window (-5, 0) is 1.39% which is maximum and highly significant at a 5% significance level under the Crude Dependence Test, making it the most important event window. Furthermore, the various other event windows are

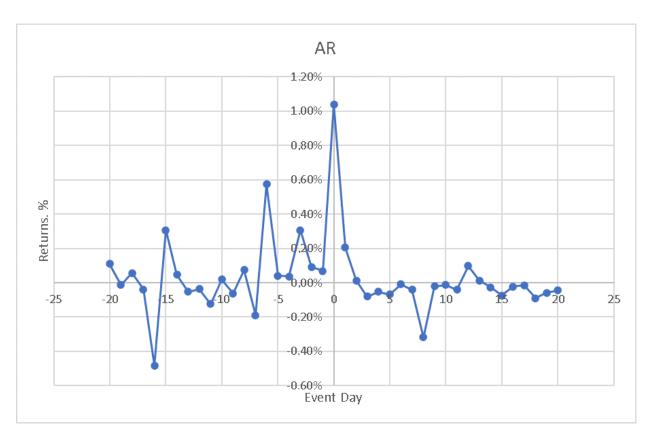
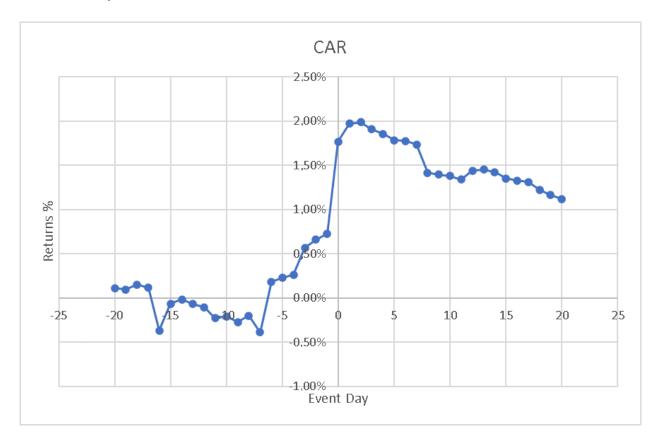


Fig. 2. Average Abnormal Returns during the event window

Source: author's compilation.



 $\it Fig.~3$. Cumulative Average Abnormal Returns during the event window

Source: author's calculation.

Table

Result of CAAR with Parametric test and Non-Parametric test

				Parame	tric test				Non-Parai	metric test	
Event Window	CAAR	CSSD	Prob	CDA	Prob	Patell Z	Prob	Sign Test	Prob	Rank Test	Prob
(-20,+20)	0.0005	-0.0327	0.3581	-0.2430	0.3878	0.0590	0.6848	0.1920	0.2210	0.4130	0.6130
(-10,+10)	0.0047	-0.5015	0.1257	-3.8180	0.0001*	-0.0135	0.5972	-0.5170	0.1140	-0.1130	0.5830
(-5,+5)	0.0041	-0.0229	0.1737	-2.2792	0.0206*	-0.1004	0.5997	-0.0550	0.3220	0.1820	0.338*
(-2,+2)	0.0122	0.0226	0.0218*	0.0115	0.1131	-0.0184	0.4614	-0.3320	0.5010	0.4130	0.9540
(-1,+1)	0.0036	0.3240	0.0231*	-2.7120	0.0000*	-0.0194	0.0124*	0.2950	0.241*	0.1910	0.6120
(0,0)	0.0026	0.1043	0.1387	-1.1267	0.3993	-0.0144	0.4806	0.3270	0.2410	0.1210	0.6170
(-10, 0)	0.0069	0.6024	0.1252	4.1038	0.0000*	0.0289	0.4849	-0.0410	0.3950	0.1250	0.6520
(-5,0)	0.0139	0.5389	0.2251	3.1590	0.0000*	0.0299	0.3841	0.1600	0.237*	0.4130	0.5910
(-1,+0)	0.0053	0.1043	0.2387	1.4679	0.0245*	0.0132	0.06745*	1.2100	0.009*	0.2130	0.322*
(0,+1)	0.0011	-0.0578	0.1941	-1.0915	0.0000*	-0.0220	0.0644*	3.2100	0.6100	0.1830	0.6510

Source: author's calculation.

used to assess the leakage effect of M&A. The CAAR of 0.11% on the day (0, 1) which is significant at a 5% significance level under the Crude dependence test and Patell Z test, indicate that an investor can earn a significant on purchasing shares of the acquiring company one day before the announcement day and selling them one day after the announcement day.

Lastly, in event windows (-20, +20), (-10, +10), (-5, +5), (-2, +2), and (-1, +1) the CAAR values of 0.36%, 1.22%, 0.41%, 0.47% and 0.05% respectively which are statistically significant at 5% significance level, indicate that M&A announcements have a significant short-term influence on investors. Thus, hypothesis 2 which states that there is a significant difference in cumulative abnormal returns during the event window is accepted.

These findings are in sync with the results drawn by [11–14, 16] and contrast with the findings.

From the abovementioned findings, it can be concluded that, while the announcement of a merger or acquisition generates a positive reaction, this reaction is only temporary and is swiftly diluted. Despite the fact that the findings of the announcement day are statistically significant, the reaction is not very strong and is quickly neutralized within a short period. This shows that the initial overreaction is followed by a significant correction.

5. CONCLUSION

The paper has examined whether merger and acquisition announcements create value for shareholders of the acquiring firms. To analyse this objective, an event study methodology which examines has been used which examine short-term shareholder gains. The merger and acquisition from the period 2011 to 2020 have been analysed. The findings of the paper infer that acquiring firm shareholders earns statistically significant positive AR on announcement day as well as statistically significant CARs over multi day event windows. Before the announcement, the market begins to react. Investors begin to respond as soon as the announcement information is made public, and the stock price rises dramatically, providing investors with positive abnormal returns. This reaction shows that investors perceive synergies in mergers and acquisitions as advantageous. The positive returns observed on the announcement day and during the pre-event window is consistent with Indian management expectations of synergies. This could be because corporations purchase other companies for strategic reasons, such as taking advantage of economies of scale and scope and leveraging available resources and competencies, thereby expanding the scope for value creation. In post-event window, the negative abnormal returns are supported by the behavioral hypothesis which presumes that shareholders of acquiring firms experience negative returns during the post-event window.

In a nutshell, initially, investors believe that the announcement of a merger and acquisition is favorable to them. Although the shift from positive reaction before and on the day of the announcement to the negative reaction after the announcement implies that investors originally overreacted to these announcements and took quick corrective action which can be observed from negative AARs.

6. RECOMMENDATIONS AND LIMITATIONS

The study has few recommendations for investors and managers. An investor can gain significant returns if they purchase the share on the event day and sells them one day post the event. "Earlier the shareholders sell, more the shareholders gains" is the main recommendation for investors. The preliminary findings presented here draw the attention of management, who may interpret the initial increase in stock price around announcement

dates as a sign of positive shareholder reaction. Still, in reality, it is an overreaction of investors towards the announcement.

Every study has certain limitation. This study considers only the Manufacturing Sector of Indian acquiring firms. Thus, results cannot be generalized for other sectors. Thus, this research can be extended to other sectors viz. service sector, construction sector, mining sector and electricity sector. Furthermore, due to complexity in data collection, only acquiring firm data has been analysed, thus target firm data has not been considered. Besides these limitations, this study provides a view of the behavioural perception of investors' reactions to mergers and acquisitions announcements.

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Features and Patterns of Functioning of Financial Resources of Digital Companies

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ABSTRACT

The relevance of the study is due to the monopolization of the markets for goods and services by transnational digital companies. The object of the study is the finances of the two world's largest digital and oil companies — Meta Platforms Inc. and Saudi Arabian Oil Company. The subject of the study is economic relations in the functioning and regulation of the economic behavior of traditional and digital companies in the context of the digital transformation of existing markets and the creation of new markets for digital goods. The purpose of the study is to identify the features of development and patterns of functioning of the system of financial resources of digital companies. The methodological base of the study is based on the financial analysis of a digital and oil company, including a comparative analysis of market capitalization, financial results and balance sheets (revenue, net income, assets, liabilities), financial condition, liquidity, profitability, and a comprehensive assessment of performance. It has been established that five manufacturers of digital goods by capitalization in 2020-2022 were among the 12 world leaders and significantly strengthened their positions against the backdrop of traditional business during the pandemic. The size of the largest oil company in 2014-2020 was more significant than that of a digital company, but the gap in dynamics decreased from 7 times in 2017 to 3 times in 2020. At the same time, the liquidity of the balance sheet of a digital organization is 4-7 times higher than that of an oil company, the financial condition is absolutely stable, and independence from external creditors is the highest. The oil company's cost-effectiveness indicators are still higher, as the digital one invests in network development and attracting new users. However, in dynamics, the oil company's profitability has halved over the past four years. The author comes to the **conclusion** that in the medium term, a digital company is projected to outperform an oil company in terms of size and efficiency. For the first time in international and domestic science, it is proposed to increase normative values of liquidity and financial stability indicators of a digital company by 4-7 times higher compared to traditional organizations, which determines the **scientific novelty** of the study.

Keywords: financial analysis; digital company; oil company; features; patterns; liquidity norms; financial stability standards

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INTRODUCTION

Digital goods, which are stored, delivered and used in digital format, occupy a central place in today's world market [1]. The objective structure of digital markets includes digital books, music, movies, games, software, social networks, instant messaging and voice services, search and information mapping services, e-mail services, multimedia services, etc. digital applications.

Coronavirus pandemic has forced the state and society to take a new look at digital goods. For all generations on self-isolation, they have become products of "essential" [2, p. 206], that the most important communication tool, the way of association, to solve the problems of both business and community.

The subject of political economy evolves with digitalization [3, p. 56]. Commodity and monetary relations and the market representing their forms acquire specific features compared to traditional concepts. Commodity and monetary relations — social relations arising between people in the process of production and sale of goods. At the same time, commodity and monetary relations and property relations as economic and legal categories refer to classical Marxist political economy.

The market economy is characterized most by the category of economic relations as objectively developing relations between people in the production, distribution, exchange and consumption of goods. It is obvious that economic relations are broader than commodity and monetary relations. Commodity, monetary and economic relations are characterized by such categories as cost of goods and services, price, profit, profitability, money, salary, loan, etc. These categories are deliberately used in the management of companies and in the planning system of their financial and economic activities.

The finances of companies are part of the economic relations arising in the process of economic activity, the principles of their organization are determined by the basis of the economic activity of enterprises, which is inextricably linked with their financial activity. The principles of financial activity organization are: self-sufficiency, self-financing, interest in outcomes, accountability for results, monitoring of activities.

The principle of self-financing is difficult to realize at enterprises producing products necessary for the consumer with high costs for its production. These include enterprises such as HCS, transport, AIC, MIC, etc.

Of interest is a comparative complex analysis of the financial activities of the digital and oil company, which is not in the scientific literature.

In this article are analyzes the change in the rating of market capitalization of the most expensive companies in the world, including oil, digital, electronic trading platforms, and others under the influence of the COVID-19 pandemic. In detail provides a comparative estimate of the scale of the largest digital Meta Platforms Inc. (activity of Meta Platform Inc. on the territory of the Russian Federation is prohibited in accordance with art. 4 "On mass media") and oil companies Saudi Aramco, their comparative financial analysis including financial results and balance sheets (revenue, net income, EBIT, assets, liabilities), financial condition, stability, liquidity, profitability, comprehensive assessment of the activities. The information base for financial analysis of Meta Platforms Inc. and Saudi Aramco is the data of the web-service and social network for traders TradingView¹ for 2014–2020, and to analyze the market capitalization of the most expensive companies in the world — data of trading platform for Forex-traders FXSSI² for 2020 and 2022. The analysis was done with built-in tools of MS Excel v. 2016.

¹ TradingView. URL: https://ru.tradingview.com/ (accessed on 02.02.2022).

² Top 10 most expensive companies in the world in 2021. URL: https://ru.fxssi.com/top-10-samyx-dorogix-kompanij-mira (accessed on 30.01.2021).

FEATURES OF FINANCIAL ACTIVITIES OF DIGITAL COMPANIES

The digital economy based on information and communication technologies has led to the emergence of a new type of enterprise — digital companies.

R. Bukht, R. Heeks are defined the digital economy as a "part of the total output, which is fully or mainly produced on the basis of digital technologies by companies whose business model is based on digital products or services" [4].

The digital economy segment is formed by digital companies, to which L. Kokh, Yu. Kokh, V. Prosalova identified those that create software or provide services based on information and communication technologies, serve the digital economy [5]. In their opinion, the company is digital if it operates exclusively using information and communication technologies.

Researches of the peculiarities of financial activities of digital companies and their analysis are still few. R. Büttner, E. Müller [6], H. Gebauer, E. Fleisch, C. Lamprecht, F. Wortmann [7], D. Schallmo, A. Rusnjak, J. Anzengruber, T. Werani and M. Jünger [8], M. Zollenkop, R. Lässig [9], C. G. Machado, M. Winroth, D. Carlsson, P. Almström, V. Centerholt, M. Hallin [10] are investigated the digital transformation of business models. V. Kogdenko developed and tested a methodology of financial analysis of digital companies based on the stakeholder approach [11]. U. Monastyrsky presented an analysis of the role of losses in the financial statements of digital companies [12]. L. Kokh, Yu. Kokh, V. Prosalova [5], M. Akhtyamov, E. Gonchar, N. Tikhonova [13], Yu. Dukhnich [14], K-E. Sveiby [15] are determined the essence of intellectual capital of digital companies and its management, analyzed its structure and methods of assessment, substantiated the expediency of disclosure of information about it to external users. V. Govindarajan, S. Rajgopal and A. Srivastava are justified the need to update financial statements in

the digital age [16]. S. Krishnan developed recommendations for improving the financial statements of digital companies [17].

Analysis of the submitted works allows us to highlight the following features of financial activities of digital companies compared to traditional:

- change the structure of assets towards a predominance of intellectual assets, a decline in production capital (fixed assets and reserves);
- significant intellectual capital value of digital companies is not reflected in official financial statements, intangible assets and ecosystems go beyond the company (the assets of a traditional company are physical in nature, owned by the company and are within it);
- gap between market and book value of assets (2–5 times) [5];
- key risk types are not financial but related to intellectual, human and social reputational capital [18];
- reduced reliability of financial analysis of indicators of non-current assets, capital, profits and the need to analyze cash flows, revenues, liabilities, current assets [11];
- during the initial stages of the creation and development of digital platforms, the income and loss report does not reflect the true financial situation, as the costs of creating and scaling up a digital platform tend to exceed the profits and high risks associated with the purchase of shares;
- start turning of profit digital company is a signal of passage of the initial investment phase, exit to the break-even level, probable transition to the principal trajectory "winner gets all" [19] (or "market domination", "monopoly or market power" [20]);
- current financial accounting does not reflect the inherent benefits of digital companies in increasing the value of intangible investment or in increasing the value of a resource when common network (so-called network effect concept) while assets in the physical form of a traditional

company depreciate as they are used (the socalled accounting concept of depreciation) [19];

- the value of intangible assets of digital companies increases as they are used, while the physical assets of traditional companies depreciate over time and as they are used;
- when assessing the investment attractiveness of digital companies, the most important criteria are not traditional integral financial indicators, such as current cash flows and profits, and differentiated financial values for ongoing and planned projects, ideas, payments and non-financial indicators, describing, for example, the potential of human capital, research and development, brands, organizational structure and strategies, networks of partners and suppliers, customer and community relations, computerized data, software[19];
- investment costs in the creation and development of digital companies are not capitalized as physical assets in conventional companies, but are mainly taken into account in the profit calculations;
- digital companies pay more attention to share-based management rewards and reduce profit-based cash bonuses to motivate managers more and eliminate opportunistic actions [19].

Based on the presented foreign and domestic researches, it should be concluded that modern financial reporting, traditional methods and techniques of its analysis, do not fully correspond to the realities (changing business environment) and features of digital companies (new business models).

THE IMPACT OF COVID-19 ON THE MARKET CAPITALIZATION OF THE MOST EXPENSIVE COMPANIES IN THE WORLD

The largest technology companies have changed the global business landscape. In 2020–2022 five manufacturers of digital goods — Apple inc., Microsoft, Alphabet Inc., Facebook, Tencent — were among the top 12

world leaders in terms of capitalization along with Saudi Aramco, Amazon Inc., Alibaba Group, Berkshire Hathaway Inc., Visa Inc., JPMorgan Chase, Johnson & Johnson, Tesla, Inc. (*Table 1*).

During the two years of the pandemic, the market capitalization of the twelve most expensive companies in the world increased by 44%. Total market capitalization of five companies specializing in digital goods — Apple inc., Microsoft, Alphabet Inc., Facebook, Tencent — in two years of the pandemic grew by 71%. Their total market capitalization amounted to 57% of all top 12 companies in 2022, increasing from 48% in 2020. In 2022, Apple Inc. doubled and for the first time in terms of capitalization ahead of Saudi Aramco oil company. This is followed by Microsoft and Alphabet Inc., specializing in digital goods markets, with an increase in market capitalization of 81 and 74%, respectively. Meta Platforms Inc. and Tencent rose by 32 and 14% respectively.

The total market capitalization of three Amazon Inc., Alibaba Group and Visa Inc., which largely entered the top 12 thanks to digital transformation, increased by 13% in two years of the pandemic. The world's largest e-commerce platform company Amazon Inc. increased capitalization by 58%. At the same time, the capitalization of Alibaba Group decreased by 2 times due to pressure from Chinese regulators, which tightened requirements for technology companies due to tensions between the United States and China, against which investors fear delisting of shares of Chinese companies from American exchanges, as well as a slowdown in the growth rate of the Chinese economy. In 2022, Alibaba Group left the top 12, taking 13th place. The transnational company Visa Inc., which provides payment services, maintained its tenth position in the rating with a capitalization increase of 9%.

In the context of the global energy transition, the capitalization of the world's largest oil company Saudi Aramco decreased

Table 1

Market capitalization of the most valuable companies in the world

		Market	t capitalizatio	n			
Company	as of 20	0.01.2020	as of 3:	1.01.2022	%	Digital goods business	
	bn \$	rating	bn \$	rating	70		
Saudi Aramco	1880	1	1870	3	99	No	
Apple inc.	1397	2	2780	1	199	Yes	
Microsoft	1274	3	2311	2	181	Yes	
Alphabet Inc.	1020	4	1770	4	174	Yes	
Amazon Inc.	924.52	5	1460	5	158	No	
Meta Platforms Inc.	633.49	6	839	7	132	Yes	
Alibaba Group	610.13	7	303	13	50	No	
Berkshire Hathaway Inc.	562.39	8	687	8	122	No	
Tencent	492.9	9	561	9	114	Yes	
Visa Inc.	441.61	10	480	10	109	No	
JPMorgan Chase	433.48	11	433	12	100	No	
Johnson & Johnson	392.6	12	452	11	115	No	
Tesla, Inc.			850	6		No	
Total top-12	10 062		14493		144		

Source: compiled by the author based on FXSSI data. URL: https://ru.fxssi.com/top-10-samyx-dorogix-kompanij-mira (accessed on 30.01.2021).

by 1%. Tesla, a manufacturer of electric vehicles and electricity storage solutions, entered the top 12 rating, taking 6th place in market capitalization in 2022. The market capitalization of the Johnson & Johnson Group, which produces medicines, hygiene products and medical equipment, increased by 15%. JPMorgan Chase financial holding moved from 11th to 12th place in the top 12, whose market capitalization has not changed in two years of the pandemic. Berkshire Hathaway Inc., which manages a large number of companies in various industries, added 22% of capitalization.

DIGITAL AND OIL COMPANY SIZE ESTIMATE

Below is a comparative financial and economic characteristics of the largest digital company

Meta Platforms Inc. and the oil organization Saudi Arabian Oil Company. Meta Platforms Inc. (2004) — American multinational holding company owning a technology conglomerate located in Menlo Park, California. It is the parent organization of Facebook, Instagram, WhatsApp and Oculus.

Saudi Arabian Oil Company (1933) — Saudi Arabia's national oil company. The largest oil company in the world in terms of oil production and oil reserves.

In *Table 2* provides an estimate of the size of the digital and oil companies.

Table 2 shows that the size of Meta Platforms Inc., a company specializing in digital goods and services, is growing annually and revenue in 2020 increased 2.1 times compared to 2017. The revenue of Saudi Arabian Oil Company, specializing in oil and

Table 2

Estimating the size of a digital and oil company

Indicator	2017	2018	2019	2020
Revenue:				
Meta Platforms Inc., B.USD	40.65	55.84	70.70	85.97
Saudi Arabian Oil Company, B.SAR	990.66	1347.02	1236.79	862.09
Currency ratios USD/SAR	0.27	0.27	0.27	0.27
Revenue ratio SAUDI/META	6.6	6.5	4.7	2.7
Net income:				
Meta Platforms Inc., B.USD	15.92	22.11	18.48	29.15
Saudi Arabian Oil Company, B.SAR	283.20	416.20	330.82	184.93
Net income ratios SAUDI/META	4.8	5.1	4.8	1.7

Source: compiled by the author based on TradingView data. URL: https://ru.tradingview.com/ (accessed on 02.02.2022).

gas production, processing, increased by 36% in 2018 compared to 2017 and then decreased annually, amounting to 64% compared to 2018. At the same time, it is obvious that the gap in the size of companies is significantly narrowing. In 2017, Saudi Arabian Oil Company was 6.6 times larger than Meta Platforms Inc., whereas in 2020 — it was 2.7 times. Net revenue of Meta Platforms Inc. in 2020 is 83% higher than in 2017, while Saudi Arabian Oil Company's net income decreased by 35% in 2020 compared to 2017. The Saudi Arabian Oil Company had a net income of 4.8 times that of Meta Platforms Inc. in 2017 and in 2020–1.7 times.

FINANCIAL ANALYSIS OF DIGITAL AND OIL COMPANIES

In Table 3 is presented a comparative analysis of the balance sheet structure of Meta Platforms Inc. and Saudi Arabian Oil Company on average for 2017–2020.

This data point to the following conclusions:

- cash and short-term investments account for more than 40% of the digital company's asset structure, that 3.5 times more than the oil company's;
- there are no inventories in the digital company's asset structure, which account for about 3% of the oil company's assets;
- over 65% of oil company assets are fixed assets, that 2.2 times more than in a digital company;
- over 16% of the digital company's assets are net intangible assets presented by business reputation, which is 5.7 times more than the oil company's;
- in the structure of liabilities of the digital company more than 80% is equity capital, which is 16% more than for the oil company, which has more accounts payable, profit tax, short-term and long-term debt, risk reserve, deferred tax liabilities.

In *Table 4* are presented analysis of liquidity of companies' balance sheets of Meta and Saudi.

Table 3
Comparative analysis of the balance sheet structure of a digital and oil company (average 2017–2020)

Description	Meta	Saudi	Divergence
Total assets	100.0	100.0	-
Cash and short-term investments	42.1	12.1	-30.0
Receivables	7.2	9.3	2.1
Inventory stocks	-	2.9	2.9
Advances received	-	0.2	0.2
Other current assets	1.4	0.1	-1.3
Long-term investments	1.4	4.8	3.4
Fixed assets	29.1	65.2	36.0
Deferred tax assets	-	0.9	0.9
Net intangible assets	16.6	2.9	-13.8
Other long-term assets	2.1	1.7	-0.4
Total liabilities	100.0	100.0	-
Short-term debt	0.6	2.8	2.2
Payables	1.4	2.3	0.9
Income tax payable	0.7	4.0	3.3
Other current liabilities	4.4	3.8	-0.6
Long-term debt	4.2	12.4	8.2
Risk and cost reserve		3.4	3.4
Deferred tax liabilities		2.2	2.2
Other long-term liabilities	5.1	0.1	-5.0
Equity	81.7	68.3	-13.4

Source: compiled by the author based on TradingView data. URL: https://ru.tradingview.com/ (accessed on 02.02.2022).

Meta Platforms Inc. data for 2014–2020 allow conclusions to be drawn about the liquidity of the company's balance sheet:

- equity, being the basis of stable operation of Meta Platforms Inc., fully finances non-current assets and partially current assets;
- the specificity of the digital company Meta Platforms Inc. is the lack of reserves. Long-term liabilities exist, but excess cash and accounts receivable over accounts payable and

short-term loans are sufficient to repay them;

- accounts receivable fully covers shortterm credits and loans;
- cash and short-term financial investments exceed accounts payable.

Based on the data obtained, it is possible to characterize the liquidity of the accounting balance of Meta Platforms Inc. as sufficient.

Comparison of results for each group of assets and liabilities of Saudi Arabian Oil

Table 4

Balance liquidity analysis

Assets and liabilities	Company	2014	2015	2016	2017	2018	2019	2020
1. Most liquid	Meta, B.USD	11.2	18.4	29.5	41.7	41.1	54.9	62.2
assets of A1	Saudi, B.SAR	no data	no data	no data	87.7	183.9	223.5	214.9
2. Implemented	Meta, B.USD	2.5	3.2	4.9	6.9	9.4	11.4	13.5
assets of A2	Saudi, B.SAR	no data	no data	no data	131.5	155.9	142.1	132.0
3. Slowly realizable	Meta, B.USD	-	-	-	-	-	-	-
assets of A3	Saudi, B.SAR	no data	no data	no data	34.0	43.6	42.6	52.0
4. Difficult realizable assets	Meta, B.USD	26.5	27.8	30.6	36.0	46.9	67.2	83.7
of A4	Saudi, B.SAR	no data	no data	no data	849.4	963.5	1085.9	1515.4
5. Most urgent	Meta, B.USD	0.7	0.9	1.4	1.8	3.1	4.6	7.1
liabilities P1	Saudi, B.SAR	no data	no data	no data	86.5	103.2	100.9	78.7
6. Short-term	Meta, B.USD	0.7	1.0	1.5	2.0	4.0	10.5	7.9
liabilities P2	Saudi, B.SAR	no data	no data	no data	62.5	81.2	114.7	164.6
7. Long-term	Meta, B.USD	2.7	3.3	2.9	6.4	6.2	17.3	16.1
liabilities P3	Saudi, B.SAR	no data	no data	no data	127.2	134.0	232.3	570.0
8. Permanent	Meta, B.USD	36.1	44.2	59.2	74.4	84.1	101.1	128.3
liabilities P4	Saudi, B.SAR	no data	no data	no data	826.3	1028.4	1046.2	1101.1
Balance	Meta, B.USD	40.2	49.4	65.0	84.5	97.3	133.4	159.3
DatailC	Saudi, B.SAR	no data	no data	no data	1102.6	1346.9	1494.1	1914.3

Source: compiled by the author based on IMF data. URL: https://data.imf.org/regular.aspx?key=41175 (accessed on 10.11.2021).

Company for 2017–2020 allow conclusions to be drawn about liquidity of the company's balance sheet:

- equity fully finances non-current assets and partially current assets only in 2018, 2017, 2019 and 2020 it is not enough for stable operation of Saudi Arabian Oil Company;
- the amount of reserves is significantly lower than the long-term liabilities for the entire period, so Saudi Arabian Oil Company

will not be able to repay the reserves as the reserves are naturally converted into cash;

- accounts receivable fully covers shortterm loans in 2017, 2018, 2019 and not fully in 2020;
- Cash and short-term financial investments exceed accounts payable throughout the period.

Based on the data received, the liquidity of the accounting balance of Saudi Arabian Oil

Balance liquidity analysis

Indicators	Company	2014	2015	2016	2017	2018	2019	2020		ed standard in ctice	
Indic	Com	20	20	20	20	20	20	20	domestic	international	
Absolute liquidity	Meta	7.89	9.55	10.23	11.09	5.86	3.65	4.15			
ratio	Saudi	no data	no data	no data	0.59	1.00	1.04	0.88	> 0.2	> 0.2	
	Meta	9.1	10.9	11.6	12.6	6.9	4.3	4.9			
Critical liquidity ratio	Saudi	no data	no data	no data	1.5	1.8	1.7	1.4	0.8-1.0	0.7-0.8	
	Meta	9.63	11.22	11.94	12.91	7.19	4.40	5.05			
Current ratio	Saudi	no data	no data	no data	1.70	2.08	1.89	1.64	2	2.0-2.5	

Source: compiled by the author based on IMF data. URL: https://data.imf.org/regular.aspx?key=41175 (accessed on 10.11.2021).

Company is insufficient. It is also clear that the liquidity of the oil company is lower than the digital one.

Table 5 shows the calculation of financial liquidity ratios.

The most stringent criterion for the solvency is absolute liquidity ratio. Meta Platforms Inc. has a 2014–2020 average of 7, much higher than the standard. This means that short-term debt can be repaid immediately.

Critical liquidity ratio on average is above 8 at norm 1, indicating that Meta Platforms Inc. has a great ability to repay short-term liabilities with cash, high-rate securities and expected cash payments (account receivable).

During the period under review, current liabilities are sufficiently secured by current assets, as the average coverage ratio for 2014–2020 exceeds 8 at norm 2. The coverage ratio shows that for each ruble its short-term liabilities account for more than 8 rubles of current assets. This indicates high financial stability in case of simultaneous creditors.

Saudi Arabian Oil Company's absolute liquidity ratio averages 0.88 for 2017–2020, which is generally higher than the norm, but

much lower -7 times that of Meta Platforms Inc. for the same period (6.19).

Saudi Arabian Oil Company has a critical liquidity ratio of 1.6 on average against the norm — 1. Meta Platforms Inc. had a 7.2 in 2017–2020, that 4.5 times increase over Saudi Arabian Oil Company.

Saudi Arabian Oil Company's average coverage ratio was 1.83 in 2017–2020, 8.5% below the benchmark (2) and 4 times lower than that of Meta Platforms Inc. (7.39). Only in 2018 was the coverage ratio above the norm at 2.08. Saudi Arabian Oil Company is in danger of financial instability in case of simultaneous creditors.

The next important task is to research the indicators of financial sustainability of the enterprise (*Table 6*).

Based on the calculated three indicators of supply of reserves by sources of their formation for seven years in 2014–2020, financial condition of Meta Platforms Inc. should be described as absolutely stable, as the reserves are fully covered by its own current assets, i.e. the organization is completely independent of external lenders. Such a situation in the real economy in Russia is extremely rare.

Table 6

Sources back-to-back analysis

Indicators	Company	2014	2015	2016	2017	2018	2019	2020
1 Course of current assets	Meta, B.USD	36.1	44.2	59.2	74.4	84.1	101.1	128.3
1. Source of current assets	Saudi, B.SAR	no data	no data	no data	826.3	1028.4	1046.2	1101.1
2. Non-current assets	Meta, B.USD	26.5	27.8	30.6	36.0	46.9	67.2	83.7
2. Non-current assets	Saudi, B.SAR	no data	no data	no data	849.4	963.5	1085.9	1515.4
3. Availability of own current	Meta, B.USD	9.6	16.5	28.6	38.4	37.3	33.9	44.6
assets	Saudi, B.SAR	no data	no data	no data	-23.0	64.9	-39.7	-414.3
4. Long-term liabilities	Meta, B.USD	2.7	3.3	2.9	6.4	6.2	17.3	16.1
4. Long-term traditities	Saudi, B.SAR	no data	no data	no data	127.2	134.0	232.3	570.0
	Meta, B.USD	12.3	19.7	31.5	44.8	43.5	51.2	60.7
5. Availability of own and long- term borrowing sources	Saudi, B.SAR	no data	no data	no data	104.2	198.9	192.6	155.7
(Chart tarm barrening	Meta, B.USD	1.4	1.9	2.9	3.8	7.0	15.1	15.0
6. Short-term borrowing	Saudi, B.SAR	no data	no data	no data	149.1	184.4	215.6	243.2
7. Total number of main sources	Meta, B.USD	13.7	21.7	34.4	48.6	50.5	66.2	75.7
of stock formation	Saudi, B.SAR	no data	no data	no data	253.2	383.4	408.2	398.9
8. Total reserves	Meta, B.USD	0	0	0	0	0	0	0
o. lotal reserves	Saudi, B.SAR	no data	no data	no data	34	44	43	52
9. Surplus (+), deficit (-) of own	Meta, B.USD	10	16	29	38	37	34	45
sources of stock formation	Saudi, B.SAR	no data	no data	no data	-57	21	-82	-466
10. Surplus (+), deficit (-)	Meta, B.USD	12	20	32	45	43	51	61
of own and long-term loan sources	Saudi, B.SAR	no data	no data	no data	70	155	150	104
11. Surplus (+), deficit (-) of	Meta, B.USD	14	22	34	49	50	66	76
total sources of stock formation	Saudi, B.SAR	no data	no data	no data	219	340	366	347
12. Three component indicator	Meta, B.USD	(+.+.+.)	(+.+.+.)	(+.+.+.)	(+.+.+.)	(+.+.+.)	(+.+.+.)	(+.+.+.)
12. Three component mulcator	Saudi, B.SAR	no data	no data	no data	(+.+.)	(+.+.+.)	(+.+.)	(+.+.)

Source: compiled by the author based on IMF data. URL: https://data.imf.org/regular.aspx?key=41175 (accessed on 10.11.2021).

Analysis of three indicators of the supply of reserves by sources of their formation by the Saudi Arabian Oil Company on a four-year interval in 2017–2020 allows to recognize that the oil organization has a normal stability of the financial condition, guaranteeing solvency. Three years (2017, 2019, 2020) Saudi Arabian

Oil Company had insufficient own current assets for reserves and costs. And only in 2018 did Saudi Arabian Oil Company's financial position remain completely stable.

Along with absolute indicators, financial sustainability is also characterized by financial ratios (*Table 7*).

Assessment of relative indicators of financial stability

Indicators	Company	2014	2015	2016	2017	2018	2019	2020	Recommended standards
Ratio of availability current	Meta	0.70	92.0	0.83	0.79	0.74	0.51	0.59	> 0.1
assets of own funds	Saudi	no data	no data	no data	-0.09	0.17	-0.10	-1.04	I
Ratio of availability stock of	Meta	I	I	I	I	I	I	I	0.5-0.8
own funds	Saudi	no data	no data	no data	-0.68	1.49	-0.93	-7.97	1
Ratio of maneuverability of	Meta	0.27	0.37	0.48	0.52	0.44	0.34	0.35	0.5
equity	Saudi	no data	no data	no data	-0.03	90:0	-0.04	-0.38	
70 C	Meta	0.73	0.63	0.52	0.48	0.56	99:0	0.65	I
rixed daset midex	Saudi	no data	no data	no data	1.03	0.94	1.04	1.38	1
Ratio of long-term	Meta	0.07	0.07	0.05	0.08	0.07	0.15	0.11	I
leveraging of resources	Saudi	no data	no data	no data	0.13	0.12	0.18	0.34	ı
Octobration Code	Meta	0.10	0.12	0.13	0.16	0.25	0.34	0.35	> 0.5
אבמו באומרב ומווס	Saudi	no data	no data	no data	0.71	0.68	0.69	99.0	_
(i+c)	Meta	06:0	0.89	0.91	0.88	0.86	0.76	0.81	> 0.5
Equity latio	Saudi	no data	no data	no data	0.75	0.76	0.70	0.58	ı
Financial sustainability	Meta	0.10	0.11	0.09	0.12	0.14	0.24	0.19	I
index	Saudi	no data	no data	no data	0.25	0.24	0.30	0.42	_
Ratio of own and borrowed	Meta	8.85	8.52	10.26	7.30	6.37	3.13	4.13	> 1
funds	Saudi	no data	no data	no data	2.99	3.23	2.34	1.35	I
Datio of floring activity	Meta	0.10	0.11	0.09	0.12	0.14	0.24	0.19	< 1
Ratio di Ilialiciat activity	Saudi	no data	no data	no data	0.25	0.24	0.30	0.42	ı

Source: compiled by the author based on IMF data. URL: https://data.imf.org/regular.aspx?key=41175 (accessed on 10.11.2021).

Table 8

Analysis of profitability and other generalizing performance indicators

Indicator	Company•	2014	2015	2016	2017	2018	2019	2020
Return on sales	Meta	39.9	35.1	45.0	49.7	44.6	41.0	38.0
(EBIT),%	Saudi	no data	no data	no data	58.8	59.3	54.5	44.7
Return on total capital	Meta	12.4	12.7	19.1	23.9	25.6	21.7	20.5
(EBIT),%	Saudi	no data	no data	no data	52.9	59.3	45.1	20.1
Return on equity, %								
– based on profit from	Meta	13.8	14.2	21.0	27.2	29.6	28.7	25.5
sales	Saudi	no data	no data	no data	70.5	77.6	64.5	35.0
hd	Meta	8.1	8.3	17.2	21.4	26.3	18.3	22.7
– based on net profit	Saudi	no data	no data	no data	34.3	40.5	31.6	16.8
Return of cost	Meta	66.5	54.0	81.7	98.8	80.5	69.5	61.3
(EBIT), %	Saudi	no data	no data	no data	142.9	145.5	119.9	80.7
	Meta	0.18	0.16	0.14	0.13	0.17	0.18	0.19
Cost per dollar / riyal of sold products	Saudi	no data	no data	no data	0.38	0.38	0.42	0.50
	Meta	5.69	6.25	7.29	7.46	5.97	5.54	5.15
Return on investment	Saudi	no data	no data	no data	2.64	2.61	2.36	2.02

Source: compiled by the author based on IMF data. URL: https://data.imf.org/regular.aspx?key=41175 (accessed on 10.11.2021).

Meta Platforms Inc. can be judged by their importance in 2014–2020 by the following:

- the organization's own current assets are sufficient for financial sustainability for seven years, with an average ratio of 0.7, which is 7 times the norm;
- the organization does not need to divert its own sources or to borrow to cover inventories, as they are not needed;
- the maneuverability factor is relatively high averaging 0.39 over seven years, which reflects positively the financial health of the organization;
- non-current assets account for 61% of equity, showing the average fixed asset index;
- share of fixed assets in the value of the assets of the organization 10% in 2014 and

about 35% in 2020, as evidenced by the ratio of real property value;

- probability of financial difficulties for the organization is low, as the equity ratio is 0.86 for an average of seven years with a norm above 0.5:
- the equity capital of the organization is 7 times higher than borrowed funds, which shows the ratio of equity and debt;
- organization has low borrowed funds as demonstrated by financial leverage.

The following conclusions can be drawn from the financial coefficients of Saudi Arabian Oil Company in 2017–2020:

• the organization's current assets are sufficient for financial sustainability only in 2018, when the coefficient is 0.17, and in 2017, 2019, 2020 the coefficient is less than the norm;

- reserves are also sufficiently covered by own funds only in 2018, when the ratio is 1.49, in 2017, 2019, 2020 reserves are not sufficiently covered by own sources and need to leverage, as the ratio is significantly lower than the norm;
- maneuverability ratio is low, capital maneuverability is limited, which negatively characterizes the financial state of the organization;
- non-current assets account for about 100% of equity, which is the average fixed asset index;
- share of current assets and e Inventory in the value of the organization's assets, on average for four years is 68%, as measured by real value of assets;
- probability of financial difficulties for the organization increases as the equity ratio decreased from 0.75 in 2017 to 0.58 in 2020 with a norm of more than 0.5;
- the equity capital of the organization is 2.5 times higher than borrowed funds, which shows the ratio of its own and borrowed funds;
- the organization is actively attracted borrowed fund, as evidenced by an increasing ratio of financial activity.

Comparative analysis of the financial ratios of the organizations shows that the digital company Meta Platforms Inc. has greater independence from external creditors, compared to the oil company Saudi Arabian Oil Company.

Dynamics of profitability and other summary performance indicators of the organizations are presented in *Table 8*.

Meta Platforms Inc. indicators for 2014–2020 show the following:

- commercial activity for seven years profitable, which confirms the profitability of sales, indicating that on average profit from sales amounted to 41.9%;
- on average, 19.4% of the total assets of the organization are used efficiently;
- return on equity in net profits are amounted to average 17.5%;

- return of cost, calculated on realized profit averaged 73.2% of profitability;
 - the cost per dollar sold is 16 cents;
- For every dollar invested in the cost of production, on average, received 6.19 dollars revenue.

Effectiveness of Saudi Arabian Oil Company in 2017–2020 following:

- average sales profitability was 54.3%;
- negative trend in the efficiency of use of all property of the organization the return on total capital decreased from 52.9% in 2017 to 20.1% in 2020;
- net return on equity and costeffectiveness are also declining from 34.3% in 2017 to 16.8% in 2020 and from 142.9% to 80.7%, respectively
- cost per Saudi Riyal sold is 0.42 riyal 16 cents;
- an average of 2.41 riyal of revenue was received from each riyal invested in the cost of production.

CONCLUSION

Major technology companies have changed the global market. In the context of multiple objectives is interesting presented in the work comparative financial analysis of the activities of the classical oil organization Saudi Arabian Oil Company with the innovative digital company Meta Platforms Inc.

In 2020–2022 five digital manufacturers Apple inc., Microsoft, Alphabet Inc., Facebook, Tencent on capitalization were among the top 12 world leaders along with Saudi Aramco, Amazon Inc., Alibaba Group, Berkshire Hathaway Inc., Visa Inc., JPMorgan Chase, Johnson & Johnson, Tesla, Inc. During the pandemic, digital companies significantly strengthened their market position against traditional firms. Comparative financial and economic performance in 2014-2020 of the largest digital company Meta Platforms Inc. and the oil organization Saudi Arabian Oil Company showed that the size of the oil company is still larger than digital, but the gap narrowed

significantly from 7 times in 2017 to 3 times in 2020, with the digital organization's liquidity 4-7 times higher than the oil company. The financial condition of Meta Platforms Inc. is absolutely stable and the organization is completely independent of external lenders, while the oil organization does not have enough own current assets in all years to generate reserves and costs. The economic efficiency of the oil company is still higher than that of a digital company that invests huge financial resources in intangible investments for market dominance. However, in the dynamics of the profitability of Saudi Arabian Oil Company's operations in the past four years decreased almost by half. In the medium term, if the trend and market conditions are maintained, the digital company Meta Platforms Inc. may

outperform the oil company Saudi Arabian Oil Company in terms of size and efficiency. The liquidity and financial sustainability of the digital company significantly exceed the recommended in the scientific literature and in practice standards developed for traditional industries, and require an increase of 4–7 times for digital companies, what matters for internal and external users of financial analysis.

The identified features and patterns of functioning and development of the system of financial resources of digital companies should be taken into account by the state authorities when building regulatory policy and economic entities in the construction and implementation of strategy and tactics on relevant traditional and emerging markets in the context of digitalization.

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Which Shareholders are Interested in the ESG-indicators of the Company?

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ABSTRACT

Today Russian companies have a low level of compliance with the principles of sustainable economy, which can be largely determined by a weak interest of some corporate stakeholders to ESG (environmental, social and governance) indicators. It determines the relevance of studying the individual groups of stakeholders and determine the measure of their interest in ESG-strategy. The purpose of this work is to determine which shareholders are most interested in ESG indicators of companies whose securities are traded on the Russian stock market. The research is based on the data from Yahoo Finance and the website of the Sustainalytics, Inc. company as of the end of 2021. Cluster, variance, regression and correlation analyses were carried out and methods of descriptive statistics were used. Results of this work have revealed the presence of the features of ownership structure of Russian companies in comparison with companies of developed countries. The lack of insiders' interest in corporate ESG characteristics has been confirmed. At the same time, the increase in the share of institutional shareholders leads to decrease in the assessed risk of ESG but its rate is less than the change in the shares of institutional owners. The different importance of individual components of the ESG assessment for institutional shareholders has been noted. The novelty of this research is the study of Russian investors and issuers that have not been systematically studied before as well as the ascertainment of complex influence of insiders/outsiders and institutional/private investors. The scientific significance is determined by the development of a new approach to study the influence of the degree of investor responsibility on corporate characteristics. The practical significance of the results lies in obtaining the possibility of developing targeted incentive tools for company shareholders to increase their interest in corporate ESG-indicators and to increase the sustainability of the company and territories. This research will be of interest to investors, company managers, authorities, non-profit organizations and specialists in the field of ESG investment.

Keywords: ESG investment; responsible investment; environmental risk; social risk; managerial risk; insiders; institutional investors; social cost theory; the free rider problem; the "principal-agent" problem; institutional theory of the firm

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INTRODUCTION

As of 2021, almost four thousand investors from more than 60 countries with total assets of over \$ 120 trillion have joined the UN principles for responsible investment, calling for focusing on the ESG characteristics of companies.¹

The purpose of this research is to determine which shareholders are most interested in the ESG indicators of companies whose securities are traded on the Russian stock market.

The COVID-19 pandemic has led to a reduction in government spending on environmental protection and certain areas of social policy [1]. This trend regarding

environmental costs is expected to stay in the coming years [2]. At the same time the pandemic has significantly increased the volume of medical waste and some domestic waste, for example, related to the packaging of internet orders [3] and active use of disposable goods [4]. The above-mentioned increases the importance of investing funds in the mentioned areas by commercial companies. At the same time, it is noted that the ESG orientation of business has not become widespread in Russia, unlike in developed countries: over 80% of Russian companies rated by the "Expert RA" agency have not adopted the appropriate strategy [1]. Ascertaining groups of shareholders that show the greatest and the least interest in corporate ESG indicators will allow developing an effective targeted policy of supporting and stimulating the company's stakeholders to improve its

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¹ Principles for responsible investment. URL: https://www.unpri.org/download?ac=10948 (accessed on 28.02.2022).

sustainability characteristics. It determines the relevance of the study.

The research used data from Yahoo Finance and the website of Sustainanalytics, Inc. company as of the end of 2021. Methods of descriptive statistics, cluster, dispersion, regression and correlation analyses are used for the analysis part.

The novelty of the study is, firstly, the analysis of Russian investors and issuers that were not systematically studied before and, secondly, determination of the model of influence of institutional investors and insiders as well as the features of their complex impact on corporate ESG indicators.

The scientific significance of the research lies in the development of a new approach to the study of responsible behaviour of investors, taking into account the synthesized influence of the "free rider" and "principal-agent" problems. The results of the study will allow performing targeted stimulation of the company's stakeholders in order to increase their focus on corporate ESG indicators and increase in business sustainability. This is the practical significance of the study.

The research is of interest to investors, company managers, authorities, non-profit organisations and specialists in the field of ESG investment.

THEORETICAL REVIEW

1. The "ESG investment" Term

The "United Nations Global Compact" initiative was launched in 2000 and its purpose is supporting the sustainable behaviour of companies and providing the reports on their activities. Following a proposal by UN Secretary General Kofi Annan on developing principles and recommendations for integrating environmental, social and governance aspects into asset management, the "Who cares wins — connecting financial markets to a changing world" report was published within this initiative in 2004 and fixed the ESG (Environmental, Social and Governance) term.³

As a result, the concept of ESG investment has emerged, it refers to investments made taking into

account environmental and social risks as well as corporate governance practices. The main requirements of such investments were enshrined in the six principles of responsible investment created under the aegis of the UN and first introduced in 2006⁴ so the "responsible investment" term is widely used instead of ESG investment. Also, since ESG factors determine the sustainability of a business, ESG and sustainability are often used interchangeably. It should be noted that the most common understanding of sustainable development was first enshrined in the report of the World Commission on Environment and Development in 1987 as meeting the needs without reducing similar opportunities for future generations.

The concepts of ESCM (environment, society, corporate management) (see [5], for example) and ESM (ecological, social, managerial) ([6], in particular) were used in the meaning of ESG in Russia but the ESG term received much greater distribution.

The concept of ESG investing is close to the earlier "social investing" and "impact investing" terms but there is also a fundamental difference between them.

Social investing (SI) or socially responsible investing (SRI) characterizes investments made on the basis of ethical criteria [7]. ESG investor but not an SRI investor can buy shares in an alcohol or oil company operations of which meet sustainability standards. In their turn the SRI investor will invest in organizations that actively provide gratuitous assistance to others but are unable to influence the effectiveness of its implementation. Social investments in Russia are often considered those that correspond to the concept of corporate social responsibility [8].

Impact investing (investing of influence) means investments that are made to obtain a positive, measurable social and environmental impact at a given level of profitability (financial return).⁷ Thus, while ESG

 $^{^{\}rm 2}$ United Nations Global Compact. URL: https://www.unglobalcompact.org/ (accessed on 28.02.2022).

³ Who Cares Wins — Connecting Financial Markets to a Changing World. URL: https://d306pr3pise04h.cloudfront.net/docs/issues_doc%2FFinancial_markets%2Fwho_cares_who_wins.pdf (accessed on 28.02.2022).

⁴ Principles for Responsible Investment. URL: https://www.unpri.org/ (accessed on 28.02.2022).

⁵ International experience in the application of ESG standards ("Environmental, social, governance") and the possibilities of its use in Russia. URL: https://mfc-moscow.com/assets/files/analytics/doklad_ESG_june_2020.pdf (accessed on 28.02.2022). (In Russ.).

⁶ Report of the World Commission on Environment and Development: Our Common Future. URL: http://www.undocuments.net/our-common-future.pdf (accessed on 28.02.2022).

⁷ What you need to know about impact investing. URL: https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing (accessed on 28.02.2022).

investments are primarily aimed at minimizing the risks of sustainable development, the hallmark of impact investments is their focus on specific actions to solve existing problems. An example of such investments is green bonds.

2. Motives for Investors to Take into Account the Company's ESG Properties

Previous studies have shown that large investors [9] and those with a long-term horizon [9, 10] are more prone to invest in ESG companies. At the same time, they may have different motives for making responsible investments: some prioritize the results of the ESG policy for the environment and society; others prioritize the financial return due to this policy [11].

With regard to the first group of investors, it is assumed that the importance of social and managerial components in ESG will increase due to the COVID-19 pandemic [12]. Speaking about the relationship between the economic results of the company's operations and its ESG policy, it is worth noting that corporate social responsibility was accompanied by a low financial return back in the 1990s. In later periods, ESG programs began to increase the company's competitiveness by attracting more qualified employees and cheaper capital among other things, while corporate securities had a higher yield with less risk. It is noted that many ESG characteristics, although not all of them [13], are positively related to both the financial performance of the company and its value [14]. The paper [15] shows an increase in stock prices with an increase in at least environmental sustainability indicators and the relationship between the sustainability of an investment portfolio and its risk-adjusted return. It has been confirmed that a corporate policy aimed at reducing a company's exposure to environmental risks increases shareholder value [16]. Also, the disclosure of ESG indicators reduces the risks of corporate financial violations, especially with good external and internal supervision [17].

Companies with lower ESG indicators have lower earnings and risk-adjusted stock returns. In particular, this can be explained both by the interest of investors and consumers in the assets and products more sustainable companies and the weakening of the ESG policy when managers predict low financial performance [18]. At the same time, media reports about the inconsistency of the company's actions with ESG values lead to a significant decrease in its rating. Issuers with smaller capitalization

and less liquid stocks that have a good reputation and do not belong to "sinful" industries (production and sale of alcoholic beverages, tobacco products, organization of gambling, etc.) experience the greatest adverse impact [19].

Methodologically the connection between the disclosure of ESG characteristics and stock quotes can be explained by the increase in the informativity of the latter about the company's future earnings. At the same time, the study [20] shows that the disclosure of data on social development is more information content than data on ecology and corporate governance. The impact of the disclosure of ESG indicators on the informativity of the stock prices of those companies that have low sustainability is especially noticeable.

3. Interest of Private and Institutional Investors in Corporate ESG Characteristics

Social costs are the sum of private costs incurred by a particular economic agent and external costs imposed on its counterparties. As shown by Ronald Coase, when an agent, focuses only on their private costs without taking into account the external ones, the equilibrium achieved in the economic system may be inefficient: with small private costs, public costs will be quite high while the ratio of benefits received will be reversed [21].

At present, this inefficient economic balance is observed in relation to expenditures in order to ensure the sustainable development of territories. For example, companies that do not pursue environmental goals in their production and economic activities reduce their own costs but at the same time government spending on levelling their negative impact on the environment increases and economic entities that make environmental expenditures receive a lower relative private benefit. Similarly, investors who do not adhere to the principles of responsible investing reduce their costs for searching and verifying information as well as for changing the strategies of companies, hence increasing the costs of other actors in these areas.

Here we are faced with the so-called "free rider" problem. Let us recall that in economic theory this problem was presented by Mansur Olson who believed that members of large groups unlike small ones will not be engaged in the maintenance of a public good without an external enforcement mechanism even though they receive tangible benefits from using it [22]. The applicability of this problem to the behaviour of shareholders, namely

to the solution of the "principal-agent" problem and the control of the actions of managers by the owners was first shown in [23].

Let us note that all shareholders can be divided into private and institutional, investment organizations that professionally manage funds on behalf of their beneficiaries are called this way. In 1950 institutional investors owned 6.1% of all issued shares in the United States but in 2016 this figure turned into 70% and according to forecasts it will increase even more in the coming years [24].

Checking the compliance of the company's activities with ESG values is quite costly for private shareholders. Moreover, the individual shareholder has little leverage to improve this compliance. Therefore, given that other shareholders will enjoy the public benefits received without spending resources (according to the "free rider" paradox), a private investor can very likely refuse to try to change the company's activities.

Institutional investors, unlike private ones, have higher opportunities for influence. In recent years they have shown more and more interest in the ESG indicators of companies [24, 25], for example, in reducing the company's exposure to environmental risks [16]. At the same time, the influence of interests and beliefs of managers of institutional organizations on their involvement in ESG investment is observed. For example, mutual fund managers in the US who donate to the Democratic election campaign invest less in socially irresponsible companies (tobacco, weapons, the ones with poor attitude towards employees, etc.) unlike those who support the Republicans or do not donate at all [26].

According to institutional investors, climate risks are already having financial implications for companies. In this regard, many investors believe that the best method of levelling climate risks is not a refusal to invest but risk management [9]. It has also been confirmed that data on ESG indicators is most often used in investment organizations due to ethical, non-economic reasons, in particular, to predict future financial condition of companies and because of customer requirements [27]. Issuers that enhance perceived sustainability but do not create shareholder value are shunned by institutional investors [16].

Given the large proportion of shares owned by responsible institutional investors, in their activities managers have to take into account their position and strengthen interaction with other activist shareholders who have concerns about the ESG orientation [24]. Let us recall that activist shareholders have such a portion of shares in the company that allows them to participate in annual meetings and put resolutions up to the vote, although they boycott the proposals of others more often than they put forward their own proposals [28]. Activist shareholders have a long—term orientation unlike the corporate raiders that operated in developed countries in 1980s and sought to withdraw the largest sums of money from the company in a short time, for example, by using corporate assets as a bail and directing the loan itself for personal purposes [29].

At the same time, it is worth noting the peculiarity of behaviour among all institutional investors in hedge funds. Unlike other investment organizations, hedge funds are less regulated which allows them to use derivatives, short selling and credit leverage actively to increase returns and mitigate risks. Because of this hedge funds can earn in both rising and falling markets. Payouts to managers of these funds depend on the results of their activities. Moreover, managers often invest their own capital in hedge funds. These features increase the opportunistic interests of managers. Compared to other institutional investors, such funds have short period of existence (3.5 years on average) and it leads to a short-term planning horizon [30].

Thus, the specifics of hedge fund activity suggest their least interest in ESG indicators but in recent years the situation has changed. Unlike other institutional investors, hedge funds are more affected by the negative consequences of information asymmetries and have less access to company management. ESG orientation makes it difficult for them to predict corporate financial results. In this regard, in order to access the necessary information and support of other institutional investors in voting hedge funds also include ESG characteristics in their performance targets [24].

Sovereign wealth funds should also be singled out as a special type of institutional investors in relation to corporate ESG policy. They take into account ESG indicators when making a decision on investing in a company. At the same time, the characteristics of the company's sustainability do not change significantly after investment of the funds. Thereafter, it can be assumed that funds do not have a significant impact on corporate ESG strategies [31].

In order to increase their influence and coordinate their actions, institutional investors are currently uniting with organizations: Investor Stewardship Group (USA), Investor Forum (UK), etc. These organizations get direct access to the board of directors and organize closed meetings with directors to discuss their proposals [32]. Joint actions of institutional investors in order to improve the company's ESG indicators allow stakeholders to receive material benefits consisting of new resources and knowledge as well as time-saving [33].

4. Insiders' Interest in the Company's ESG Characteristics

Under Russian law, insiders are issuers; management companies; members of the board of directors; employees with access to insider information; those who have a direct or indirect right to dispose of at least 25% of votes of certain persons in the supreme governing body; securities trading organizers; representatives of authorities, audit, credit, insurance organizations, information and credit agencies, etc. This term is already being considered in the US: top managers of companies, members of the board of directors and shareholders owning more than 10% of shares are considered insiders. In this paper we will be guided by the latter approach since, firstly, it will make it possible to compare the obtained results with the conclusions of international studies and, secondly, it will allow determining the impact on the ESG indicators of the company of the most knowledgeable and numerous groups of insiders.

According to Oliver Williamson's discretionary management model, the separation of ownership and control in a corporate firm result in managers seeking to maximize personal utility rather than profit. At the same time, they are required to provide the owners with a minimum income [34]. William Baumol believed that managers seek to maximize revenue since it is the maximum revenue at the minimum required level of profit that best satisfies their interests [35, 36]. Robin Marris considered the growth rate of the firm to be the key indicator of managers and argued that in order to increase their managers agree to merge with another firm, even if this leads to a decrease in shareholder value [37]. From the point of view of Richard Cyert and James March, groups of individual actors (managers, employees, shareholders, etc.) are formed in large firms and their interests are realized depending on the strength of these groups and the compromises reached between them [38].

Adolf Berle and Gardiner Means, using the example of the US, showed that the separation of ownership and control and the dispersal of ownership among a large number of small shareholders without the possibility of their significant influence in developed countries in 1930s led to the fact that the largest corporations were actually managed by managers in their own interests [23]. Thus, a special case of the agent (principal-agent model) was observed, first described by Michael Jensen and William Meckling [39], that the principal (shareholder) is obliged to bear additional costs of control of the agent (manager) and may have costs of divergence (lost opportunities).

At the same time, taking into account the previously shown increase in the share of ownership of institutional investors, it can be concluded that there is a decrease in the opportunities for insiders to influence.

In relation to the implementation of the ESG policy, the actions of insiders should be considered from two points of view. According to the first one, insiders may seek to increase ESG indicators to achieve better corporate financial results, including increasing personal income through this. According to the second point of view, insiders pursuing opportunistic interests and manipulating the market based on the use of their private information want to derive personal financial gain.

It should be noted that laws prohibiting such manipulation exist both in Russia and in many other countries but their effectiveness is rather low [40, 41]. This is largely due to the lack of prosecution of violators [41]. The influence of insiders is especially strong in countries with weak state control [42]. At the same time, a number of researchers believe that it is necessary to legalize insider trading. Companies do not always disclose all corporate information as it is very expensive and the data may be seen as untrustworthy or may be misinterpreted. Thereafter, there may be a significant discrepancy between the market and fair prices of the company's shares. At the same time, insiders who have information will make securities quotes fairer by trading on the market and the effect of insider trading will depend on other market participants' ability to identify it [43, 44]. Moreover, insider trading can increase the manager's interest in the welfare of the company which, in particular, was confirmed by the example of managers whose contractual payments are tied to corporate revenue [45].

It has been shown that in a partially opaque firm, in contrast to a fully transparent one, positive information

Research Hypotheses

Days of show	a arrand harr	insid	ders
Part or Share	es owned by:	Small	Large
Institutional investors	Small	Average ESG indicators (hypothesis H ₁)	Low ESG indicators (hypothesis H _o)
	Institutional investors Large		_*

Source: author's calculation.

Note: * - case when large parts of shares are owned by both insiders and institutional investors at the same time is impossible.

that is not available to external investors can increase insiders' income [46]. As private information used in insider trading, data on R&D and the planned budget changes regarding it were considered. This data can provide insider trading advantage [47].

Both family and state enterprises regard their control as permanent, family enterprises deteriorating their environmental and social performance, and state enterprises enhancing their social performance. If the influence of outsiders is strengthened then there is an increase in both environmental and social characteristics of firms [48].

Thus, based on the above, considering the combined effects of insiders and institutional investors, let us suppose that:

 $\rm H_{0}$: Issuers with a large part of shares owned by insiders and a small part by institutional investors have low ESG indicators in the Russian stock market.

H₁: Issuers with a small part of shares owned by both insiders and institutional investors have average ESG indicators in the Russian stock market.

H₂: Issuers with a small part of shares owned by insiders and a large part by institutional owners have high ESG indicators in the Russian stock market (shown in *Table 1*).

MATERIALS AND METHODS

The methodology of the study is based on the institutional theory of a firm [49, 50], which assumes the presence of transaction costs in the interaction of agents and their proneness to opportunistic behaviour.

The research is based on the company's shareholder structure data as of the end of 2021 from Yahoo Finance as

well as corporate ESG estimates from Sustainalytics, Inc., one of the leading providers of corporate sustainability data that analyse more than 20,000 companies from 172 countries. 20 issuers were considered — Yahoo Finance contains data on the main stakeholders of all of them, while Sustainalytics, Inc. calculates the ESG rating (the representativeness of the sample in terms of property characteristics was confirmed using a z-test, the calculations is presented below). Let us note that the selected ESG rating consists of sustainability risk indicators in two dimensions: exposure and governance quality. 9

The following indicators were analysed in the study:

- part of shares owned by institutional investors (share of institutions);
 - part of shares owned by insiders (share of insiders);
 - overall ESG risk assessment (ESG);
 - environmental risk assessment (E);
 - social risk assessment (S);
 - governance risk assessment (G).

Descriptive statistical methods were used at the initial stage. Next, a hierarchical cluster analysis of the ownership structure characteristics was carried out — by part of shares owned by institutional investors and insiders. The analysis was carried out by the method of middle connection using the square of the Euclidean distance. Number of clusters are set based on the jump in the agglomeration coefficient.

After that, the existence of a relationship between cluster groups in terms of individual indicators of

⁸ Sustainalytics. Who We Are. URL: https://www.sustainalytics.com/about-us (accessed on 28.02.2022).

⁹ ESG Risk Ratings. A consistent approach to assess material ESG risk. URL: https://www.sustainalytics.com/esg-data (accessed on 28.02.2022).

Table 2

Indicators of issuers of the Russian stock market at the end of 2021

Indicator	Mean	Median	Мах	Min	S.D.
Share of institutions	14.31	6.92	83.60	1.85	19.77
Share of insiders	48.03	55.18	88.35	0.00	26.94
ESG	32.81	34.40	48.20	15.90	7.44
Е	10.32	13.90	22.00	2.20	7.49
S	8.73	9.95	16.60	7.00	5.03
G	7.15	8.15	15.80	3.00	4.72

Source: author's calculation.

the company's ownership structure and their ESG risk assessment (overall and for all components) was investigated using analysis of variance. A model was determined that best describes it in relation to the statistically identified significant dependence based on the performed regression analysis. Five models were considered:

- 1) linear;
- 2) reverse;
- 3) logarithmic;
- 4) quadratic;
- 5) exponential.

The accuracy of the model was determined by the R^2 determination coefficient (shows the proportion of change in the dependent variable explained by the independent) and the standard error (a measure of uncertainty; accuracy of predicting the dependent characteristic based on new independent data).

Next, the Pearson correlation coefficients between the various components of the overall ESG score are calculated. To test hypotheses about the mutual influence of low and high portions of institutional investors and insiders on corporate ESG characteristics, the following groups of companies were identified:

- the ones having low rates of participation in ownership of both institutional investors and insiders;
- the ones having low rates of participation in ownership by institutional investors and high rates of participation in ownership by insiders;

- the ones having high rates of participation in ownership by institutional investors and low rates of participation in ownership by insiders;
 - other companies.

The presence of dependence of this company classification and their ESG characteristics was investigated with the help of dispersion analysis.

FINDINGS AND DISCUSSION

Earlier it was noted that in the United States the predominant portion of shares today belongs to institutional investors. In the Russian Federation they play a much smaller role. On average, only 14.3% of assets of the studied issuers belong to institutional owners, 48% belong to insiders (shown in *Table 2*). Across 214 issuers of the Russian stock market these figures are 7.6% and 67% respectively. At a significance level of 95%, results of the z-test indicate that there are insignificant differences in the characteristics of the ownership of the issuers under study and all those whose data on the ownership structure is available too. Subsequently, the sample may be regarded as representative according to these indicators.

It is also important to note the overall significant level of ESG risks of Russian market issuers: on average, it is 32.8% which corresponds to a high level of risk according to the scale of Sustainalytics, Inc. At the same time, there is not a single issuer with a risk that would be less than

10 — which is considered to be an insignificant level. The worst average scores are for environmental risks, although they also have the largest standard deviation (scatter of risk levels). The latter may be due to the fact that environmental risks, unlike the others considered, are most relate to the industry specifics of the company.

The cluster analysis carried out in relation to each of the characteristics of ownership made it possible to determine whether it can be considered low or high (shown in *Table 3*).

Only the overall assessment of ESG depends on the indicators of the ownership structure, considered separately, namely, the portion of shares owned by institutional investors, there is no relationship with the insiders' part of shares (shown in *Table 4*).

Most accurately the relationship between the portion of ownership of institutional investors and the overall ESG assessment can be described using a quadratic model: an increase in the share of institutional shareholders leads to a decrease in the estimated ESG risk but its rate is less than changes in the portion of shares of institutional owners (shown in *Table 5*). At the same time, it is worth mentioning that although this model is statistically significant, its R^2 determination coefficient is only 0.312

Table 3
Average ownership of Russian stock market issuers by cluster groups at the end of 2021, %

Cluster group number	Share of institutions	Share of insiders
1	7.11	1.14
2	40.82	25.71
3	83.60	46.15
4	-	64.14
5	-	82.15

Source: author's calculation.

which indicates the presence of other factors that explain 68.8% of the changes in the dependent variable.

The presence of a relationship between portion of shares held by institutional investors and the overall ESG assessment, but not its individual components, can be explained by the low level of interrelation of the latter: a significant correlation exists only between social and managerial risks (shown in *Table 6*).

Table 4
Variance analysis of the ESG risk assessment from the portion of shares owned by institutional investors or insiders

Source of Variation	Type III Sum of Squares	df	Mean Square	F Statistic	Sig.		
	Overall ESG risk assessment						
Share of institutions	328.302	2	164.151	3.852	0.042		
Share of insiders	235.616	4	58.904	1.081	0.401		
Environmental risk assessment							
Share of institutions	68.552	2	34.276	0.956	0.410		
Share of insiders	143.555	4	35.889	1.009	0.444		
Social risk assessment							
Share of institutions	10.361	2	5.180	0.750	0.492		
Share of insiders	37.591	4	9.398	1.653	0.230		
Governance risk assessment							
Share of institutions	51.707	2	25.853	2.882	0.092		
Share of insiders	52.783	4	13.196	1.256	0.344		

Source: author's calculation.

Table 5 Interrelation models for portions of shares owned by institutional investors and ESG risk assessment

Model type	R ² determination coefficient	Fisher's F-criterion	Number of degrees of freedom1	Number of degrees of freedom2	Statistical significance
Linear	0.139	2.895	1	18	0.106
Reverse	0.204	4.626	1	18	0.045
Logarithmic	0.176	3.849	1	18	0.065
Quadratic	0.312	3.852	2	17	0.042
Exponential	0.146	3.069	1	18	0.097

Source: author's calculation.

Table 6

Pearson's correlation coefficient between the components of the ESG risk assessment

Indicator	Environmental risk assessment	Social risk assessment	Governance risk assessment
Environmental risk assessment	1		
Social risk assessment	0.393	1	
Governance risk assessment	0.273	0.659*	1

Source: author's calculation.

Note: * – correlation is significant at the level of 0.01.

The results of the following variance analysis have shown that when considering both selected indicators of the ownership structure in total: portions of shares owned by both institutional investors and insiders, they are not related to ESG risk assessments (shown in *Table 7*). Apparently, this is due to the previously confirmed lack of insiders' influence on the characteristics of the company's sustainability which in turn may be caused by other interests of this group of actors or by the divergence of their interest in ESG indicators: the presence of both strongly and weakly interested groups as well as those who are perceiving the company's contribution of its sustainability to its financial condition positively or negatively.

Thus, on the basis of the calculations carried out, all the assumptions previously proposed may be refuted.

Results of the research confirm the conclusions made in papers [24, 25] on the presence of interest in the ESG indicators of companies from the side of institutional investors. The previously shown interest in the environmental [16] (climatic [9]) risks of the company was not revealed which is probably due to the lack of priority attention of Russian institutional owners to one of the areas of ESG transformation.

Also, the study does not confirm that insiders can have a positive or negative effect on the increase in ESG characteristics [48]. Apparently, this is due to a weak connection between the implemented ESG strategies and the competitiveness and profitability of companies so far.

Given the above, further research should be aimed at analysing the interrelation between sustainability indicators and the financial condition of Russian market issuers. As shown in the paper [16], investors have no interest in securities if the improvement in perceived environmental friendliness occurs without an increase in shareholder value. Thereafter, the possibility that both institutional shareholders and insiders have a strong interest in the sustainability of companies cannot be ruled

Table 7
Variance analysis of the ESG risk assessment from portions of shares owned by institutional investors and insiders

Source of Variation	Type III Sum of Squares	df	Mean Square	F Statistic	Sig.
Overall ESG risk assessment	141.549	3	47.183	0.829	0.497
Environmental risk assessment	166.432	3	55.477	1.807	0.199
Social risk assessment	18.082	3	6.027	0.881	0.478
Governance risk assessment	68.838	3	22.946	2.767	0.088

Source: author's calculation.

out, however due to the fact that corporate ESG strategies have not yet brought significant financial benefits in the Russian market, responsible investment behaviour is not gaining ground.

LIMITATIONS

The limitation on the interpretation of study results is due to the methodological features of all rating estimates, in particular, opportunistic behaviour from the component side: in order for the issuer to "buy" the agency's assessment, they must like it [51]. It should also be understood that the nature of ESG estimates is subjective to a greater extent than financial ones [52]. Hence, the ratings of bonds are approximately the same with all rating agencies, while the ESG ratings diverge significantly [53]. This is especially evident in relation to social and managerial components [54]. To offset these limitations, this study chose one of the most recognized and widely used ESG ratings.

CONCLUSIONS

The conducted research showed low ESG indicators of issuers whose securities are traded on the Russian market. This may be due to the peculiarity of their ownership structure, namely, a small share of institutional investors. Due to the "free rider" problem, institutional shareholders are more motivated to

influence the adoption and implementation of corporate ESG strategies, since this way their opportunities are greater in comparison with private ones. Thus, in order to increase the sustainability of Russian companies, it is necessary, first of all, to strengthen the interest of institutional market players in ESG characteristics. It is also possible to do this with the help of legislative consolidation of the ESG orientation of non-state pension funds, financial institutions, etc.

Based on the shown neutral attitude of insiders ESG indicators, the presence of another feature of the Russian market can be assumed, namely, current lack of a connection between implemented ESG strategies and the financial results of companies. In this regard, it is worth recommending to actively include ESG indicators in the methods of banking institutions for determining the cost of a loan as well as in the requirements for obtaining different forms of support from the state; to expand the knowledge of employees and potential investors about the benefits of sustainable companies; to actively cover examples of ongoing corporate ESG policy in the media.

The development of targeted measures to increase the interest of company stakeholders in their ESG characteristics and, thereafter, the gradual ESG transformation of the Russian economy will increase its sustainability and environmental, social and economic security.

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Impact of the Quality of the Institutional Structure of the Economy on Income Inequality of Households: Results of a Cross-National Study

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ABSTRACT

Institutional quality and effectiveness of government institutions are important factors for sustainable and dynamic economic growth. These factors can have a significant impact on the dynamics of economic inequality and poverty in a country. The number of publications on this topic began to increase about 20-30 years ago. Scientists have been researching whether the government is able to influence the problem of economic inequality, which is growing since the 1980s, and on what factors it depends. This topic remains relevant today, as all the necessary answers have not been received yet. The purpose of this research article is to clarify the relationships between the institutional structure quality of an economy and the income inequality of households. The article uses such **methods** as analysis and synthesis, systematization, classification, and categorization of information; classical correlation analysis, as well as the method of analysis of qualitative pairwise correlation. The study highlights that there is high dependence between the analyzed variables in some countries if we look at them in separately. This dependency can take on both negative and positive values. At the same time, analyzing the full sample of countries, as well as in quartile groups classified by the level of income inequality, we did not reveal any pattern or special sign by which the dependence between the studied variables becomes more pronounced and distant from zero. The study shows that the correlation value between the variables is just below zero over the Pearson correlation coefficient. More unambiguous results were obtained when the list of countries was filtered by the indicator of the inequality transparency index. When analyzing this particular portion of our sample of countries, we obtained results with moderately negative dependence between the study variables. We concluded that for developed countries with an effective government and relatively low levels of income inequality, the decline in the quality of the institutional structure of the economy on average will be accompanied by an increase in income inequality and vice versa.

Keywords: economic inequality; income inequality; Gini index; government regulation; institutional structure of the economy; WGI; corruption; the effectiveness of government

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INTRODUCTION

The objective fact is that income inequality has been rising in most countries since the 1980s.¹ In this regard, the issue of managing economic inequality has become very relevant among academic research. The authors of various researches have been trying to understand what factors influence the level of economic inequality. Including in the scientific literature there is a direction of research related to the analysis of quality factors of the institutional structure of the economy and the potential of the

The problem of assessing the quality of government became relevant about 20–30 years ago and was developed in a number of researches in the field of public administration and public financial management [6–9]. The theories of "New Public Management (NPM)" and "Good Governance (GG)" became logical continuation of this trend and united the best corporate practices in the field of

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influence of public authorities on the level and dynamics of economic inequality. In this scientific debate, the authors are exploring whether the State can take effective measures to regulate problem of economic inequality and ensure shared prosperity and sustainable economic growth [1–5].

¹ Chancel L., Piketty T., Saez E., Zucman G. World inequality report 2022. URL: https://wir2022.wid.world (accessed on 29.11.2021).

management and financial management, which were adapted to the goals and objectives of the State.

In 1996, the World Bank developed and published in its databases integral indicators of progress in developing a system of public administration in countries worldwide on a regular basis [10]. This information allow to give a quantitative assessment of the quality of the institutional structure of different countries in six dimensions, among which corruption, accountability and alternation of power, efficiency of the government, effectiveness of legal institutions and others.

Cross-country comparisons of quality governance are conducted on selected indicators and authors often focus on corruption, its impact on economic growth and government effectiveness. In the scientific environment, there are differences in the interpretation and assessment of other indicators that have been proposed in the World Bank methodology in the context of the performance or efficiency of government or a system of public institutions [11–13].

Selected empirical researches show a positive relationship between institutional quality indicators and government effectiveness [14–16]. On average, an effective government can make a greater contribution to accelerating economic growth, encouraging innovative development and providing quality public goods to society. Thus, despite the divergence of approaches in the methodology of measuring the quality of public administration and the institutional structure of the economy, the topic remains relevant and should be further developed.

The quality of institutional structure and the effectiveness of government are important conditions for sustainable and dynamic economic growth. These factors can significantly influence the dynamics of economic inequality and poverty in a country [17]. Extractive adjustment of economic institutions contributes to the rapid enrichment of the upper 1% of households during periods of rapid economic growth. In periods of stagnation, by contrast, this type of institutional arrangement tends to impoverish the lower 90% of households. Thus, weak economic inclusiveness and inefficient public administration are provoke economic inequality, which in turn can increase political inequality, accelerate the degradation of the political system and negatively affect the sustainability of the financial system [1, 17].

Economic relations in extractive economies are built to benefit a limited number of people. Development examples of extractive economies show that they often lack the necessary support or become completely block of most innovative initiatives. Russia can also be cited as an example of extractive economy [17, 18]. Despite a large number of initiatives for transition to innovative development, today the Russian economy remains de facto highly dependent on raw materials² and grows relatively slowly (*Fig.*).

The purpose of the research is to test the hypothesis that the improvement of the quality of political and economic institutions in the country has a positive impact on the problem of income inequality.

In the review of the literature the key works in this field of scientific interests are considered, the most important results and conclusions are presented. The main part of this article presents the results of our own research, based on data from 159 countries for the period 1996–2020. The *Appendix* shows the results of calculations with estimates of relationships between the studied variables.

REVIEW OF THE LITERATURE

Empirical studies of the relationship between the institutional structure of the economy and economic inequality were conducted in a large number of scientific papers. Researches [19, 20] show that there is a relationship between these factors in which economic inequality can influence the quality of institutions and on the contrary.

The work of [21] analyzed data for 21 developed countries from the OECD list for the period 1990–2010. Authors examined the relationship between: (1) changes in the balance between public elites ("elitisation") and labor unions ("unionization")³; (2) institutional changes in the political and economic structure and (3) dynamics of income inequality. It was concluded that income inequality is more influenced by the factor of institutional changes in the economic and political structure

² Trading Economics. Russia Exports by Category. URL: https://tradingeconomics.com/russia/exports-by-category (accessed on 10.11.2021).

³ In the research, this was measured by estimating the share of factor income, namely the share of labour and non-labour income, primarily rental and capital income.

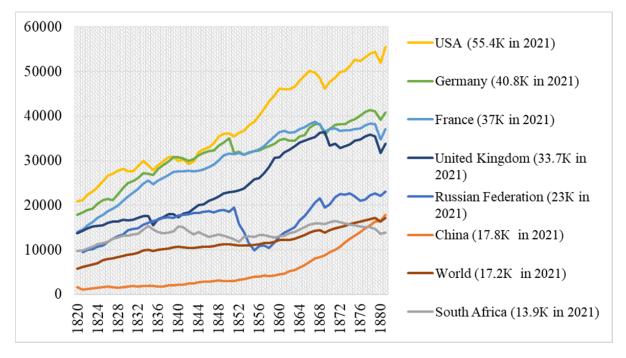


Fig. National per capita income in Russia and other countries, PPP based, in euros, in 2019 prices Source: compiled by the author on the basis of World Inequality Database. 2020. URL: https://wid.world/data/#countriestimeseries/anninc_p0p100_z/US; FR; DE; CN; ZA; GB; WO/1930/2019/eu/k/p/yearly/a (accessed on 07.11.2021).

of the country. This influence is non-linear and differs according to the level of income inequality in the country. The authors make assumptions that the low redistribution of market revenues is more related to the factor of institutional inertia (slowly changing legal and political institutions) than to the influence of the rebalancing between elitisation and unionization of the economy. No empirical work has been obtained with unambiguous description of the investigated relationships, and the results seem rather contradictory and unclear.

The institutional arrangements' quality of the economy in relation to economic inequality can be viewed in terms of two indicators: (1) quality of political institutions and level of democracy in the country and (2) level of corruption in the country [22]. Conceptually, in a more democratic society, the multiple political rights of each member and the ability of citizens to influence accountable government should help to strengthen public policies for income redistribution and lowering levels income inequality in the economy. Moreover, well-developed democratic institutions should have a greater impact on economic inequality in parliamentary republics than in presidential ones — for objective

reasons. However, these are not always supported empirically. In the world economy, there are many examples of countries where the development of democratic institutions is at an average level (Eastern European countries), as well as countries where the political rights of citizens are restricted by various factors (several Asian countries, including China and Singapore). Data on income inequality trends in these countries do not support the hypothesis of the inverse relationship between institutional quality and income inequality.

Problems with corruption, from a theoretical point of view, should lead to increased economic inequality, as corruption sets the stage for tax evasion, reducing the State's ability to financially regulate economic inequality. An inefficient government can keep to power long enough because inability of the political system to renew and voters' inability to influence the government. The extractive structure of the economic and political system reduces the progressivity of the tax system in favour of the lowest-income members of society, who tend to hold all power. All these factors together reduce the volume and efficiency of public expenditure and investment in the economy, slowing its technological development [23].

In article [24] conducted a research on the relationship between the quality of democratic institutions, the quality of economic institutions and economic inequality in 96 countries between 1970 and 2010. The authors wrote that economic inequality is a key factor that determines the effect of democratic institutions on the quality of the institutional structure of the economy. High levels of economic inequality are is characteristic for non-democratic regimes, where formally high levels of institutional quality may not work as well as in democratic regimes. Excessively high levels of economic inequality can worsen the institutional structure of economies even in democratic countries.

Most research on the quality of the institutional structure of the economy and economic inequality is based on an analysis of income inequality and corruption in the economy [25–29], while the rest of the indicators from the WGI⁴ indicator group are less covered. Most researches explains the negative impact of corruption on economic inequality to factors such as: (1) reduction of public spending on education, health, etc. of public goods; (2) inefficient tax systems and the problem of tax evasion [30].

In article by B. Blancheton and D. Chhorn [31] conducted a study of the relationship between public financial regulation of the economy and economic inequality for the period 1988-2014. In the paper analyzed data for a group of Asian and Pacific countries. Government intervention in regulating the economy measured as a share of government expenditure as a % of GDP. Economic inequality is represented by the share of income of the richest 1% of the population and through the Gini Index. The authors have reached the conclusion that this relationship has a negative dependence, which confirms the theoretical hypothesis about the expediency of using fiscal instruments to combat income inequality. In addition, the article found relationships between public expenditures, indicators of the quality of the institutional device of the economy (WGI group of indicators from the methodology of the World Bank) and the dynamics of economic inequality. The authors wrote that this dependence is non-linear. In the early stages of development of public administration, rising public spending increases income inequality. Over

time, rising public spending has led to an increase in the quality of institutional arrangements and the effectiveness of government. Subsequently, higher quality of institutional arrangements and efficient government become capable of reducing income inequality through increased public spending.

L. K. Chu and D. P. Hoang came to the same conclusion about the non-linear impact of institutional quality on income inequality in their research [32]. Thus, we see that there is an inverse relationship between institutional quality and income inequality, and the factor itself is important for effectively combating economic inequality. The authors conclude that the study has a number of limitations. First, the sample of countries for the research is limited to 8 from the Asian and Pacific regions. The authors did not consider the impact of each of the World Bank's six institutional factors on economic inequality. Higher average level of institutional quality of economy is possible while some WGI indicators grow and others fall. Perhaps a more in-depth analysis of the impact of individual components of WGI would lead to a better understanding of the relationships between the institutional qualities of the economy.

N. Adeleye et al. [33] are studied the impact of each of the 6 WGI indicators on income inequality in Africa. Their research shows that only corruption has a statistically significant impact on income inequality. The authors wrote that if corruption is sufficiently controlled, financial deregulation and credit growth will reduce income inequality.

MATERIALS AND METHODS

Theoretical propositions and terms

The concept of building quality public institutions and its fundamental principles are described in detail in the theory "Good governance" [33]. The quality of the institutional structure of the economy creates an environment in which every member of society feels, in reality and not on paper, that its well-being is a priority of public policy (*Table 1*).

By the quality of the institutional structure of the economy we mean a set of qualitative characteristics of the functioning of socio-economic institutions in the country, on which the potential of its economic growth and technological development depends.

⁴ World Government Indicators.

Improving the inclusiveness and institutional structure of the economy is essential for effective regulation of economic inequality.

By household income inequality we will understand the level of differentiation of households by their current pretax market income and distribution of transfers from the State.

Performance and indicators, from which are measured studied phenomenon

Analysis of interrelationships between the categories "Income inequality of households" and "Institutional structure of economy" is carried out on the basis of indicators of Integral indicator of quality of institutional structure of economy and Gini Index, calculations based on market income of households.

In this study, to assess the quality and inclusiveness of the work of economic institutions, WGI indicators from the World Bank⁵ methodology were used, similar to the studies of F. Emily et al., M. Lockwood et al. [34, 35]. The integral indicator is based on six factors of the quality of the institutional structure of the economy, among which:

- 1. Control of corruption (further CC) provides an indication of what extent State power is exploited for private gain, including small and large forms of corruption, as well as "capture" of the State by elites and private interests.
- 2. Government effectiveness (further GE) shows perceptions of the quality of public services, the quality of the civil service and its independence from political pressure, the quality of policy formulation and implementation and confidence in the Government's commitment to such policies.
- 3. Regulation of quality (further RQ) reflects the Government's ability to design and implement rational policies and regulations that enable and facilitate private sector development.
- 4. Rule of law and protection of property rights (further RL) reflects an understanding of the extent to which agents trust and comply with the rules of society, the quality of contract execution, property rights, how the police and courts function, and probability of crime and violence.

- 5. Political stability and non-violence/terrorism (further PS) measures perceptions of political instability and/or politically motivated violence, including terrorism.
- 6. Right to vote and accountability of the Government (further VA) reflect perceptions of the extent to which citizens can participate in the election of their Government, as well as freedom of expression, freedom of association and free media.

The methodology for calculating the integral assessment of the level of inclusiveness and the quality of the system of institutional arrangement of the economy $\left(I_{EI}\right)$ is presented in the formula (1).

$$I_{EI} = w1*CC + w2*GE + w3*RQ + + w4*RL + w5*PS + w6*VA,$$
 (1)

where I_{EI} — is measured in percentiles from 0 to 100 and reflects the ranking of the country on the aggregate indicators of the inclusive institutional structure of the economy;

CC — effectiveness of corruption control;

GE — effectiveness of government;

RQ — quality of government regulation;

RL—rule of law and protection of property rights; PS—political stability and absence of violence / terrorism;

VA — right to vote and Government accountability w1; w2; ...; w6 — weights of different indicators of economic inclusion, which are taken equally in the basic version of the model, for 1/6.

We measured income inequality in this research using the Gini index from the World Inequality Database. The coefficient is based on pre-tax income and transfer payment.

In the research analyzed data for 159 countries over the period 1996–2020. Two research methods were used to analyze the relationships between the quality of the institutional structure of the economy and income inequality.

Methodical tools and characteristics of the main research methods

The first research method — is a classical quantitative analysis of the pair correlation with the Pearson coefficient significance test by the confidence interval boundary values.

⁵ World Bank database. URL: https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators (accessed on 05.01.2022).

Table 1
Principles of inclusive economic institutions and public authorities in accordance with the Good
Governance concept

Principle	Characteristic
1. Inclusivity	All stakeholders have opportunities to participate in and affect decision-making
2. Fairness	Governing body and decision-making process respects diverse stakeholder views, without bias; considers costs/benefit distribution
3. Performance	Effectiveness and efficiency; processes meet their objectives while making the best use of resources
4. Transparency	Rationale for decision-making is clearly communicated; information is freely available and accessible
5. Legitimacy	Governing body given authority to make decisions by rule of law or by stakeholders; authority used with integrity
6. Accountability	Governing body takes responsibility and is answerable for its decisions; demonstrates fulfillment of responsibilities
7. Direction	Strategic vision; looking constructively towards the future
8. Capability	Resources, skills, leadership, knowledge of governing body

Source: compiled on the basis of F. Emily et al., M. Lockwood et al. [34, 35].

The second research method — qualitative analysis of pairwise changes between studied variables. Its essence is to compare the relative changes between the studied variables by year in order to compare the direction of these changes, i.e. make a qualitative comparison of the evolution of the integral indicator of institutional quality and the Gini index. This is followed by counting observations for the entire study period and collecting annual statistics. Identifies the number of periods in which the variables have changed in one direction and in different directions. This information is grouped and a comparison of the trends of the studied variables is obtained for this statistics, which can also be used to judge their correlation.

The results of the calculations were analyzed in several sections: (1) analysis of relationships in the quartile groups of countries by the Gini index; (2) use of the significance criterion for the Pearson correlation coefficient as a filter and analyzing the part of the sample in which the relationship between the variables studied is statistically significant; (3) use of the inequality transparency index as a filter to select only those countries whose income inequality data are the most reliable.

RESULTS AND DISCUSSION

The *Appendix* presents the results of primary scientific research. Here you can also see supporting indicators such as the average of the Gini index (GIav.) and IEI over the last 10 years (IEIav.). Deviations of 2020 GI and IEI values from the 10-year moving average show a long-term trend of the analyzed indicators.

The relationship between variables in the complete sample of countries is not obvious. In half cases it is direct, in half — inverse. The average correlation coefficient shows the same, as it is near zero (slightly lower). That is, the relationship between the studied

variables is negative on average. This suggests that as the institutional structure of the economy grows and economic institutions become more inclusive, income inequality on average will decrease. However, the average and comparative analysis of the data for individual countries show that the dependency studied is non-linear and difficult understood through the lens of average values of a complete sample of countries.

However, based on the information from the Appendix we may be able to draw some conclusions on the first iteration of calculations. For many countries, income inequality is not directly related to the quality of economic, legal, political and other social institutions. From a theoretical point of view this thesis does not seem logical, but according to the available data we see no correlation between the studied indicators. In this case, our conclusions about the lack of correlation between institutional quality and income inequality coincide with the results obtained in the work [6] and can be explained by the topics that in non-democratic countries, even high-quality economic institutions may not work as effectively as in democratic ones. On the other hand, this conclusion may also suggest that even in countries with bad institutions, there is nonzero probability of reducing extreme income inequality through factors, that not dependent on the country itself, for example, through globalization, digitalization, acceleration of the technological progress of humanity as a whole or other external factors. Of course, it is not necessarily the case that in such countries economic inequality and poverty will themselves be reduced. It is most likely that the problem will not be substantially resolved without the political commitment and efforts of the Government and its citizens [17].

In the second iteration of calculations we grouped countries on the basis of the index of income inequality. The first quartile means that the country has the lowest income inequality and the fourth quartile the highest income inequality (*Table 2*). Analysis of data received showed mixed and inconclusive results. Positive correlation was found in half of the years in the study period and negative relationship in the other half. The correlation between income inequality and the quality of the institutional structure of the economy based on the grouping of countries by quartile groups has not given us more

insight into the problem under research, but has only confirmed the thesis that the relationship between variables are specific country peculiarities.

In the third iteration of the calculations we used the Pearson correlation coefficient and the results of its significance test as a filter for selection of countries. In this iteration we analyzed the relationships between the studied variables in more homogeneous parts of the sample, provided that there is a confirmed non-zero correlation between them. With the pair correlation coefficient, those countries for which the correlation significance coefficient test showed a statistically insignificant result during the study period were eliminated. The selection of the respective countries reduced the final sample from 159 to 82 countries. This means that in almost half of the countries there was no clear correlation between the studied indicators for the period. Such countries include the USA, Russia, India, China, Japan, Canada, New Zealand, Germany, the UK and many others. It should be noted that during the analyzed period, the quality of the institutional structure of the Russian economy gradually increased, while the income inequality on the Gini index during the same period steadily increased until 2008 and steadily decreased after 2008 to our time. This may explain the lack of statistical correlation between the indicators studied at least during the selected time period. Corresponding calculations of average values by quartile groups are presented in *Table 3*.

According to *Table 3* we again see contradictory results. The high negative correlation in the fourth quartile group by the Pearson coefficient is not supported by the results of the decomposition of the trend by the method of pairwise qualitative correlation of changes in the studied indexes. The relationship between the indicators studied seems to be very individual for each particular country and the overall picture remains rather confusing. On average, we cannot say anything definite, because even in a truncated sample, the number of periods in which the relationships between the studied variables were negative is approximately equal to the number of periods with a positive relationship.

The latest iteration of calculations was the grouping and selection of countries according to the Inequality Transparency Index. In this case, we pursued the goal to adjust the data to the quality of the information base

Table 2
Analysis of the relationships between the quality of the institutional structure of the economy and income inequality in quartile groups

Statistics	inequal average 2020) (D1, % incom	ators of m nality: Gini ge. — (aver ; deviation 6) and qua ne inequal ere 1 = lo	Index (G age for 1 n from av artile gro ity level	il); GI 1996- verage oup of (QG1,	Inequality Transparency Index	for 19 from av tile gro	x of econo ; IEI avera 996–202 erage (D2 up of inco (QG2, wh 4 = lo	ge. — (ave 0); deviat 2, %) and ome inequ ere 1 = hi	erage ion quar- uality	Total i of ob tions direct	alitative (tre number serva- s with ct de- ence of ables	Total ber serv with depe	l num- of ob- ations inverse ndence riables	relation ficient and eva of its cance (on cor- on coef- r [-1; 1] aluation signifi- [1 = yes, no)
	GI, 2020	GI average	D1,%	QG1	0 = min, 17 = max	IEI, 2020	IEI average	D2,%	QG2	num.	% of total	num.	% of total	r	signifi- cance
4			4	_					10	44		47		45	of r
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Maximum	0.76	0.74	6.61		10.00	65.95	69.52	17.70		16	76.19	15	71.43	0.95	
Average	0.66	0.66	0.23	4	2.23	30.82	32.27	-6.50	_	11	50.83	10	49.17	-0.17	_
Median	0.64	0.65	0.02	i i	1.00	30.82	35.11	-2.77		11	52.38	10	47.62	-0.23	
Minimum	0.61	0.60	-4.06		0.00	1.40	5.27	-73.45		6	28.57	5	23.81	-0.91	
Maximum	0.61	0.62	5.09		16.00	68.04	73.76	75.93		17	80.95	14	66.67	0.83	
Average	0.59	0.60	-0.93	3	2.20	35.25	35.53	0.15		11	53.33	10	46.67	0.07	
Median	0.59	0.60	-1.36	ر	1.00	36.67	36.18	1.17	_	11	52.38	10	47.62	0.24	_
Minimum	0.56	0.56	-5.45		0.00	1.66	0.94	-49.39		7	33.33	4	19.05	-0.92	
Maximum	0.56	0.57	6.94		15.00	79.98	80.76	24.75		16	76.19	15	71.43	0.90	
Average	0.53	0.53	0.18	2	3.01	37.20	36.02	2.65		10	49.05	11	50.95	0.12	
Median	0.54	0.53	-0.11	2	1.00	33.80	31.12	3.61	_	10	47.62	11	52.38	0.11	_
Minimum	0.49	0.49	-4.26		0.00	3.10	4.96	-37.44		6	28.57	5	23.81	-0.79	
Maximum	0.48	0.52	4.25		17.00	83.86	84.18	11.67		15	71.43	16	76.19	0.82	
Average	0.45	0.45	-0.72		7.97	63.13	63.59	-0.90		10	49.21	11	50.79	-0.07	
Median	0.45	0.45	-0.64	1	9.00	68.37	68.08	-0.56	_	11	52.38	10	47.62	-0.13	-
Minimum	0.38	0.38	-7.09		1.00	20.82	22.46	-19.07		5	23.81	6	28.57	-0.85	

Source: compiled by the author.

on income inequality. We wanted to find out how the results of the study would change if we only analyzed data from those countries that publish an exhaustive amount of information on income inequality above the average. Countries with an inequality transparency index above 10 were selected, taking into account that 17 is the maximum for the full sample. The results of the calculations are presented in *Table 4*.

Data from *Table 4*, in contrast to previous iterations, gave us a very specific result, which is fairly unequivocal for the two research methods. As a result of such sampling filtering, the vast majority of countries (more than 90 per cent) were countries with

high institutional quality in economy and low income inequality. There is a moderately negative correlation between institutional quality and income inequality in these countries.

Our calculations and conclusions confirm the results of previous researches on this topic [31, 32] in which the negative correlation between income inequality and the quality of the institutional structure of the economy is found. If we consider individual countries, we see that this relationship can be both positive and negative and have different correlations across countries. The results of calculations in the second and third iterations of our calculations showed that the relationships between

Table 3
Results of analysis of statistics by quartile groups adjusted by level of correlation coefficient significance

Statistics	come i (GI); G for 19 from a quart ine	nequali I averag 96–202 average tile grou quality l	f market ty: Gini ge. — (avo 20); devi (D 1,%) up of inco evel (QO w, 4 = h	Index erage iation and ome 51,	Inequality Transpar- ency Index	quality; for 19 from quartil equal	IEI avera 96–202 average le group	omic inst age.— (av 0); deviat (D 2,%) a of income (QG2, wh 4 = low)	erage tion ind e in-	Total not of obstions direct pender	(tree (tree number serva- s with ct de- ence of ables	Total ber of servitions with it	l num- of ob- ations inverse ndence riables	Pearson tion coe r [-1; evaluati signifi (1 = yes,	officient 1] and on of its cance
	GI, 2020	GI av- erage	D1,%	QG1	0 = min, 17 = max	IEI, 2020	IEI av- erage	D2,%	QG2	num.	% of total	num.	% of total	r	signifi- cance of r
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Maximum	0.76	0.74	6.61		10.00	59.51	61.70	17.70		16	76.19	15	71.43	0.95	
Average	0.66	0.66	0.40	4	1.87	29.25	31.05	-8.52		10	49.07	11	50.93	-0.22	1
Median	0.65	0.65	0.04	4	1.00	31.14	34.15	-2.50	_	10	47.62	11	52.38	-0.49]
Minimum	0.61	0.60	-4.06		0.00	1.40	5.27	-73.45		6	28.57	5	23.81	-0.91	
Maximum	0.61	0.62	5.09		6.00	68.04	73.76	5.09		17	80.95	14	66.67	0.83	
Average	0.59	0.60	-0.93	3	1.82	34.42	35.12	-0.93		11	52.95	10	47.05	0.10	1
Median	0.60	0.61	-1.36)	1.00	33.57	33.02	-1.36	_	11	52.38	10	47.62	0.53	
Minimum	0.56	0.56	-5.45		0.00	3.57	7.05	-5.45		7	33.33	4	19.05	-0.92	
Maximum	0.56	0.56	6.94		15.00	70.43	67.08	6.94		15	71.43	15	71.43	0.90	
Average	0.53	0.53	0.09	2	2.50	37.32	36.39	0.09		10	48.94	11	51.06	0.32	1
Median	0.54	0.53	-0.15		0.50	37.06	34.03	-0.15	_	11	50.00	11	50.00	0.61	
Minimum	0.49	0.49	-4.26		0.00	3.10	4.96	-4.26		6	28.57	6	28.57	-0.79	
Maximum	0.48	0.52	4.25		15.00	82.80	83.27	4.25		15	71.43	16	76.19	0.82	
Average	0.44	0.45	-0.75	1	7.25	59.10	59.82	-0.75	_	11	51.49	10	48.51	-0.08	1
Median	0.45	0.44	-0.69	1	7.00	62.62	61.89	-0.69	_	12	54.76	10	45.24	-0.13	1
Minimum	0.38	0.39	-7.09		1.00	20.82	22.46	-7.09		5	23.81	6	28.57	-0.85	

Source: compiled by the author.

the studied variables depend on the level of income inequality in the country. An additional contribution to the development of science is that we were able to show the ambiguity of the studied problem in detail on the basis of a detailed quantitative description of the relationships between the studied factors.

One of the conclusions of this study is also that the relatively low level of institutional organization of the Russian economy will not necessarily lead to an increase in income inequality in Russia. This is indicated by the data on the dynamics of the studied indicators for the last 20 years. In this regard, we believe that the regulation of income inequality should focus on the primary factors that contribute to it, namely: increasing the effectiveness of the mechanism of financial redistribution in the economy and developing a flexible system of progressive taxation of incomes.

Table 4
Results of analysis of statistics by quartile groups adjusted for correlation coefficient significance level and inequality transparency index

No.	Country	inequal average 2020); (D 1,% incom	ators of ma ality: Gini ge. — (avera deviation 6) and qua ge inequali ere 1 = lov	Index (G age for 1 from av rtile gro ty level	GI); GI 1996- verage oup of (QG1,	Inequality Transparency Index	tute's (average viation and que ineque	dex of ecc quality; II ge for 199 n from ave uartile gro ality level 1 = high, 4	El average (Derage (Doup of in (QG2, w	ge. – 0); de- 2,%) come	Total r of ob tions direc	umber serva- with ct de- ence of	rnd) Total r of ob tions inver pende	number serva- s with se de- ence of ables	relation cient and ev of its cance	son cor- on coeffi- r [-1; 1] valuation signifi- (1 = yes, = no)
		GI, 2020	Gl aver- age	D1,%	QG1	0 = min, 17 = max	1EI, 2020	IEI aver- age	D2,%	QG2	num.	% of total	num.	% of total	r	signifi- cance of r
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
31	Colombia	0.640	0.639	0.08	4	10.0	39.4	38.5	2.16	2	11	52.38	10	47.62	-0.53	1
149	USA	0.583	0.583	-0.12	3	16.0	66.5	71.9	-7.56	1	13	61.90	8	38.10	-0.41	_
72	Korea	0.553	0.554	-0.22	2	11.0	66.7	64.1	4.14	1	8	38.10	13	61.90	0.69	1
154	Uruguay	0.505	0.506	-0.25	2	15.0	70.4	67.1	5.00	1	7	33.33	14	66.67	-0.70	1
6	Austria	0.439	0.438	0.24	1	10.0	77.7	79.1	-1.71	1	10	47.62	11	52.38	0.37	_
11	Belgium	0.450	0.440	2.14	1	10.0	72.5	74.0	-2.10	1	9	42.86	12	57.14	-0.15	_
38	Denmark	0.445	0.433	2.71	1	13.0	81.9	81.4	0.60	1	12	57.14	9	42.86	-0.85	1
47	Finland	0.446	0.440	1.38	1	11.0	82.8	83.3	-0.56	1	11	52.38	10	47.62	-0.68	1
48	France	0.426	0.429	-0.76	1	15.0	69.2	71.0	-2.61	1	11	52.38	10	47.62	0.62	1
51	Germany	0.485	0.489	-0.95	1	10.0	76.0	77.0	-1.22	1	13	61.90	8	38.10	-0.16	_
64	Ireland	0.461	0.458	0.78	1	10.0	77.6	77.3	0.35	1	9	42.86	12	57.14	0.13	_
66	Italy	0.444	0.439	1.22	1	13.0	58.3	58.2	0.17	2	6	28.57	15	71.43	-0.52	1
101	Netherlands	0.413	0.411	0.55	1	10.0	79.7	81.0	-1.66	1	11	52.38	10	47.62	-0.75	1
102	New Zea- land	0.459	0.454	1.05	1	11.0	83.9	84.2	-0.38	1	14	66.67	7	33.33	0.26	-
108	Norway	0.390	0.406	-3.92	1	17.0	83.7	83.4	0.43	1	11	52.38	10	47.62	-0.14	_
117	Portugal	0.467	0.487	-4.05	1	10.0	70.7	69.8	1.23	1	7	33.33	14	66.67	0.04	_
130	Slovenia	0.408	0.411	-0.91	1	10.0	67.8	67.7	0.15	1	9	42.86	12	57.14	-0.19	_
133	Spain	0.451	0.456	-1.14	1	10.0	63.6	64.5	-1.43	1	8	38.10	13	61.90	-0.03	-
136	Sweden	0.406	0.402	1.19	1	15.0	81.2	82.5	-1.53	1	9	42.86	12	57.14	-0.07	-
137	Switzerland	0.427	0.431	-0.74	1	12.0	82.9	83.2	-0.40	1	8	38.10	13	61.90	-0.38	_
153	Great Brit- ain	0.465	0.473	-1.66	1	16.0	73.9	75.0	-1.53	1	8	38.10	13	61.90	0.12	-
160	Maximum	0.64	0.64	2.71	4	17.0	83.86	84.18	5.00	2	14	66.67	15	71.43	0.69	
161	Average	0.46	0.47	-0.16	1	12.1	72.68	73.06	-0.40	1	10	46.49	11	53.51	-0.16	_
162	Median	0.45	0.44	-0.12	1	11.0	73.86	75.01	-0.40	1	9	42.86	12	57.14	-0.15	
163	Minimum	0.39	0.40	-4.05	1	10.0	39.35	38.52	-7.56	1	6	28.57	7	33.33	-0.85	

Source: compiled by the author.

Note: country numbering is kept the same as shown in *Appendix*.

Income inequality alone does not guarantee a high standard of living [2, 36]. Based on the data obtained, we assume that the quality of the institutional structure of the economy has a greater impact on the rate of economic growth and on the average standard of living in the country, rather than on the problem of the distribution of national income among households, i.e. income inequality. The experience of the USSR has clearly shown that it is possible that income inequality is formally low, and the standard of living in the country may be quite low compared to the world average. This hypothesis deserves further empirical research.

The results of this research have a number of limitations related to the selected research methodology in terms of indicators for assessing the quality of the institutional structure of the economy and assessing the level of income inequality. These limitations are due both to the quality of the data and to the characteristics of the indicators selected for the research.

Further studies of this problem can be developed in several directions: (1) experiment with the weights of factors in the integral indicator of the quality of the institutional structure of the economy and (2) use other measures of income inequality, including disposable and factor income.

Within the framework of the factor analysis of the integral indicator IEI it is possible to analyze the influence of each component on income inequality by changing the weights of each factor in the formula (1). In this direction, the most interesting is the additional research of the factor "VA" (voting rights and accountability of the government), because for such large countries, as China, this factor significantly reduces the IEI resulting index due to the features of the political system. However, China's macroeconomic data show that low VA does not prevent the country from succeeding in creating a rich and voluminous middle class, and to take significant and sustained efforts to reduce poverty in the country, both through high economic growth and through a policy of active redistribution through the budget system. The same can be said of the Russian Federation, which has been striving for the last 20 years to build no less quality social State than exists at present in the European Union.

The conducted research, as well as some earlier empirical work, have significant limitations due to the imperfect institutional qualitative model proposed by the World Bank. In further studies of this problem it is necessary to eliminate influence of the factor of the type of political system of the assessed country on the results of the study, to conduct a re-evaluation of the hypothesis that democratic institutions are more effective than non-democratic, because China has been a greatest contradiction to this claim for the last few decades.

On the first point one can try to completely exclude some of the factors of the integral indicator of assessment of the quality of the institutional structure in economy (IEI), that proposed by the World Bank. In our view, it would be possible to leave only "the effectiveness of control of corruption", "the effectiveness of government" and "the quality of state regulation". In modern conditions, we see how the rule of law, in the context of geopolitical developments in the world economy in 2022, has created a crack unprecedented in recent decades. Indeed, it has been neglected for political purposes, even by countries that have been representative examples until recently in protecting the integrity of private property. Is this a systemic failure of the "highly effective institutions of Western countries"? How will geopolitical developments and related decisions by Western countries in 2022 affect the level of income inequality in the group of unfriendly countries in the next 5–10 years? Finding answers to these questions is a priority for further scientific research.

On the second point, an additional round of researches based on the Gini index on disposable and factor incomes could be conducted to assess the effects of income redistribution and the effectiveness of public financial policies in this area.

CONCLUSION

This research examines the problem of assessing the relationship between changes in the institutional structure of the economy and the dynamics of income inequality. The goal of the research was to test the hypothesis that the improvement of the quality of political and economic institutions in the country has a positive impact on the problem of income inequality.

It was found that in individual countries there is a fairly high dependence between analyzed variables. This dependence can take both negative and positive values. By analyzing the complete sample of countries, as well as by grouping it by income inequality, we have not identified any pattern or particular feature in which the relationship between the studied variables becomes more pronounced and more distant from zero. On average, for a complete sample of countries, we find that the correlation between the variables is just below zero by the Pearson correlation coefficient. The method of qualitative pairwise correlation shows the same if the results of the transparency index of inequality for a complete sample of countries are weighted. Thus, in the first part of our research we found that the relationships analyzed are non-linear character and country specificity.

We were able to obtain more conclusive results when we used a filter to select countries from the index of transparency of inequality. By eliminating all countries with an inequality transparency index below 10, we obtained relatively reliable data for 21 countries. This list included countries from different quartile groups of income inequality, mainly from the first, with the vast majority of countries also in the first group on the quality of the institutional structure of the economy. In general, it can be said that the sample obtained is more homogeneous in its properties than the full list of countries presented in the *Appendix*. Analyzing this part of the sample, we obtained results with a moderately negative relationship between the variables studied and the conclusions, that, for developed countries with good government and relatively low income inequality, the decline in the

quality of the institutional structure of the economy, on average, will be accompanied by rising income inequality and on the contrary.

Our calculations and conclusions confirm the results of previous studies on this topic, in which the negative relationship between income inequality and the quality of the institutional structure of the economy was found. At the same time, we were able to show the ambiguity of the studied problem in detail on the basis of a detailed quantitative description of the relationships between the studied factors.

For many countries, income inequality is not directly related to the quality of economic, legal, political and other social institutions. The conclusion that there is no correlation between institutional quality and income inequality can be explained by the fact that in non-democratic countries even high-quality economic institutions may not work effective as in democratic. On the other hand, this conclusion may also suggest that even in countries with poor institutions, there is no zero probability of reducing extreme income inequality through factors beyond the control of the country itself, for example, through globalization, digitalization, and acceleration of technological progress of humanity as a whole or other external factors. Of course, it is not necessarily the case that in such countries economic inequality and poverty will themselves be reduced. It is most likely that the problem will not be substantially resolved without the political will and efforts of the Government and its citizens.

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Appendix Results of the study of the impact of the quality of the institutional structure of the economy on the dynamics of household income inequality in different countries in 1996-2020

Pearson correlation	coefficient r [-1; 1] and evaluation of its significance (1 = yes, 0 = no)	signifi- cance of <i>r</i>	16	-	-	-	,	-	-	1	1	'	П	,	1	1	1	1	₽	П	1	1		П	1	1
Pe	coeff [-1; evalua; signi (1 = ye	L	15	-0.15	0.10	0.05	-0.31	0.04	0.37	99.0-	-0.86	-0.37	-0.47	-0.15	0.83	-0.78	-0.68	0.62	0.71	0.52	-0.41	-0.55	0.15	0.46	-0.47	-010
rend)	Total number of observations with inverse dependence of variables	% of total	14	52.4	61.9	71.4	52.4	57.1	52.4	76.2	61.9	66.7	52.4	57.1	57.1	61.9	52.4	61.9	42.9	52.4	52.4	38.1	42.9	28.6	42.9	476
Qualitative correlation (trend)	Total nu observat inverse de of var	num.	13	11	13	15	11	12	11	16	13	14	11	12	12	13	11	13	6	11	11	8	6	9	6	10
litative co	Total number of observations with direct dependence of variables	% of total	12	47.6	38.1	28.6	47.6	42.9	47.6	23.8	38.1	33.3	47.6	42.9	42.9	38.1	47.6	38.1	57.1	47.6	47.6	61.9	57.1	71.4	57.1	57.4
Qua	Total number of observation with direct dependence o variables	num.	11	10	8	9	10	6	10	5	8	7	10	6	6	8	10	8	12	10	10	13	12	15	12	11
quality; -2020);	s) and lity level ww)	0G2	10	4	4	2	2	1	1	3	7	4	4	1	3	3	2	4	3	2	3	1	2	3	4	2
IEI Index of economic institute's quality; IEI average. — (average for 1996–2020);	deviation from average (D2, %) and quartile group of income inequality level (QG2, where 1 = high, 4 = low)	D2, %	6	-4.8	14.6	3.1	11.2	-2.1	-1.7	-1.5	0.5	-2.8	-12.5	-2.1	-2.5	-2.8	10.1	-13.4	-19.1	-3.5	-10.2	5.3	-4.8	-8.8	-25.1	2.5
of economi e. – (averaç	on from ave oup of inco , where 1 =	IEIcp.	∞	19.4	14.4	38.0	37.9	79.5	79.1	22.5	42.3	18.7	23.8	74.0	37.6	34.1	53.1	25.1	34.4	61.7	42.0	60.7	50.3	31.4	9.8	57.7
IEI Index o	deviatic quartile gr (QG2	IEI, 2020	7	18.4	16.5	39.2	42.1	77.8	77.7	22.1	42.5	18.2	20.8	72.5	36.7	33.1	58.5	21.7	27.8	59.5	37.7	64.0	47.9	28.7	7.3	59.1
Inequality Transpar-	ency In- dex	0 = min, 17 = max	9	1.0	1.0	7.0	1.0	9.0	10.0	1.0	1.0	3.0	1.0	10.0	0.0	1.0	1.0	3.0	1.0	0.5	0.9	1.0	0.9	0.5	1.0	0.5
nequality: (average	group of , where 1	061	2	2	4	2	2	2	1	1	4	2		1	3	4	2	3	1	4	4	1	2	3	3	2
Indicators of market income inequality Gini Index (GI); GI average. — (average	for 1996–2020); deviation from average (D1, %) and quartile group of income inequality level (QG1, where 1 = low, 4 = high)	D1, %	4	-0.1	3.8	4.2	-0.6	1.6	0.2	-0.2	0.4	-1.0	-2.4	2.1	-1.4	8.0	-2.4	-1.4	-0.1	-1.8	0.2	8.0	6.9	-1.0	0.4	-1.4
s of marke ex (GI); GI	996–2020 (D1, %) ar inequality = low, ⁴	Glcp.	3	0.488	0.661	0.518	0.509	0.489	0.438	0.483	0.671	0.537	0.442	0.440	0.613	0.635	0.564	0.613	0.480	0.714	0.677	0.477	0.507	0.577	0.585	0.615
Indicator Gini Ind	for 19 average income	GI, 2020	2	0.488	0.686	0.539	0.507	0.497	0.439	0.482	0.673	0.532	0.431	0.450	0.604	0.640	0.551	0.604	0.480	0.700	0.679	0.481	0.541	0.571	0.587	0.607
Country			П	Algeria	Angola	Argentina	Armenia	Australia	Austria	Azerbaijan	Bahrain	Bangladesh	Belarus	Belgium	Belize	Benin	Butane	Bolivia	Bosnia and Herzegovina	Botswana	Brazil	Brunei Darussalam	Bulgaria	Burkina Faso	Burundi	Cape Verde
o Z				1	2	3	4	5	9	7	8	6	10	11	12	13	14	15	16	17	18	19	70	21	22	23

Appendix (continued)

Pearson correlation	coefficient r [-1; 1] and evaluation of its significance (1 = yes, 0 = no)	signifi- cance of <i>r</i>	16	1	1	-		1	-	-	1	1	-	-	1	-	-	1	1	-	-	1	1	1	1	1	1	—
Pea	coeff [-1; evaluat signi (1 = ye	`	15	-0.83	-0.81	-0.10	-0.36	-0.47	0.34	0.11	-0.53	-0.20	-0.36	0.33	-0.79	-0.22	-0.08	-0.85	-0.70	-0.42	-0.20	0.52	-0.05	-0.58	-0.66	0.70	-0.68	0.62
rend)	Total number of observations with inverse dependence of variables	% of total	14	28.6	66.7	66.7	33.3	52.4	38.1	47.6	47.6	61.9	42.9	47.6	38.1	71.4	38.1	42.9	42.9	42.9	52.4	61.9	57.1	71.4	42.9	42.9	47.6	47.6
Qualitative correlation (trend)	Total nu observat inverse de of var	num.	13	9	14	14	7	11	8	10	10	13	6	10	8	15	8	6	6	6	11	13	12	15	6	6	10	10
itative co	umber vations direct ence of bles	% of total	12	71.4	33.3	33.3	2.99	47.6	61.9	52.4	52.4	38.1	57.1	52.4	61.9	28.6	61.9	57.1	57.1	57.1	47.6	38.1	42.9	28.6	57.1	57.1	52.4	52.4
Qual	Total number of observations with direct dependence of variables	num.	11	15	7	7	14	10	13	11	11	8	12	11	13	9	13	12	12	12	10	8	6	9	12	12	11	11
quality; -2020);	and ty level w)	0G2	10	4	4	1	4	4	1	3	2	4	1	2	3	1	1	1	3	3	4	3	4	4	1	4	1	1
IEI Index of economic institute's quality; IEI average.— (average for 1996–2020);	deviation from average (D2, %) and quartile group of income inequality level (QG2, where 1 = high, 4 = low)	D2, %	6	2.4	-14.0	-1.0	-9.9	2.2	-5.1	16.0	2.2	-18.1	2.6	-1.7	1.9	-8.8	0.4	9.0	7.5	10.5	-5.7	-11.5	-1.2	-31.6	3.6	9.1	9.0-	-2.6
of economic e. – (averag	on from ave oup of inco , where 1 =	IEIcp.	∞	21.0	14.6	80.8	6.7	7.5	69.5	53.4	38.5	17.8	61.1	56.5	31.1	8.99	68.1	81.4	36.1	25.9	21.2	37.9	9.4	6.9	72.0	19.9	83.3	71.0
IEI Index o	deviation quartile gr (062	IEI, 2020	7	21.5	12.6	80.0	0.9	7.6	0.99	38.8	39.4	14.6	62.7	55.5	31.6	61.0	68.4	81.9	38.9	28.6	20.0	33.6	9.3	4.7	74.6	21.7	87.8	69.2
Inequality Transpar-	ency Index	0 = min, 17 = max	9	1.0	0.5	9.0	1.0	0.5	8.0	7.0	10.0	0.5	5.0	8.0	0.0	7.0	5.0	13.0	3.0	5.0	3.0	5.0	0.0	0.0	9.0	0.5	11.0	15.0
nequality: (average	from group of where 1	061	5	3	4	2	4	4	4	2	4	4	4	1	2	1	1	1	3	2	3	3	4	2	1	2	1	1
Indicators of market income inequality: Gini Index (GI); GI average. – (average	for 1996–2020); deviation from average (D1, %) and quartile group of income inequality level (QG1, where 1 = low, 4 = high)	D1, %	4	-1.8	0.4	1.2	0.0	0.0	-1.6	-0.4	0.1	-1.7	0.2	0.4	0.2	-1.5	-1.4	2.7	-1.4	-3.3	0.2	-5.5	9.0	0.5	-3.5	0.5	1.4	-0.8
s of marke ex (GI); GI	996 – 2020 (D1, %) ar nequality = low, ⁴	Glcp.	3	0.595	0.635	0.529	0.733	0.609	0.690	0.558	0.639	0.632	0.630	0.479	0.518	0.487	0.383	0.433	0.613	0.531	0.589	0.611	0.626	0.552	0.496	0.552	0.440	0.429
Indicator Gini Ind	for 19 average income i	GI, 2020	2	0.584	0.638	0.535	0.733	609.0	0.678	0.555	0.640	0.621	0.631	0.480	0.519	0.480	0.378	0.445	0.604	0.514		0.577	0.629	0.554	0.479	0.554	0.446	0.426
Country			₽	Cambodia	Cameroon	Canada	Central African Republic	Fumes	Chile	China	Colombia	Comoros	Costa Rica	Croatia	Cuba	Cyprus	Czech Republic	Denmark	Dominican Republic	Ecuador	Egypt	Salvador	Equatorial Guinea	Eritrea	Estonia	Ethiopia	Finland	France
oi Z				24	25	76	27	28	29	30	31	32	33	34	3.5	36	37	38	39	40	41	42	43	44	45	46	47	48

Appendix (continued)

Pearson correlation	coefficient r [-1;1] and evaluation of its significance (1 = yes, 0 = no)	signifi- cance of <i>r</i>	16	1	-	-	1	1	1		1	1	1	П	- ~	1	1	1	,	1	1	1	-	-	-	5 1	1	'	1
<u>~</u> <u>5</u>	coe [] evalu sign (1 =)	`	15	0.79	0.27	-0.16	0.43	0.75	0.76	-0.02	-0.49	0.70	-0.61	0.82	-0.08	0.70	0.49	-0.91	0.13	-0.80	-0.52	-0.70	0.13	0.02	-0.32	-0.66	0.69	-0.11	0.95
rend)	Total number of observations with inverse dependence of variables	% of total	14	47.6	52.4	38.1	57.1	33.3	47.6	42.9	52.4	33.3	42.9	28.6	42.9	52.4	42.9	2.99	57.1	52.4	71.4	61.9	47.6	57.1	52.4	38.1	61.9	38.1	42.9
Qualitative correlation (trend)	Total nu observat inverse de of var	num.	13	10	11	8	12	7	10	6	11	7	6	9	6	11	6	14	12	11	15	13	10	12	11	8	13	8	6
alitative cc	Total number of observations with direct dependence of variables	% of total	12	52.4	47.6	61.9	42.9	2.99	52.4	57.1	47.6	2.99	57.1	71.4	57.1	47.6	57.1	33.3	42.9	47.6	28.6	38.1	52.4	42.9	47.6	61.9	38.1	61.9	57.1
Ons	Total numbe of observatio with direct dependence variables	num.	11	11	10	13	6	14	11	12	10	14	12	15	12	10	12	7	6	10	9	8	11	6	10	13	8	13	12
quality; -2020);	6) and lity level ow)	0G2	10	4	2	1	2	2	3	4	4	1	2	1	2	2	4	4	1	2	2	2	1	2	3	3	1	3	2
IEI Index of economic institute's quality; IEI average. — (average for 1996–2020);	deviation from average (D2, %) and quartile group of income inequality level (QG2, where 1 = high, 4 = low)	D2, %	6	-14.4	2.8	-1.2	-1.0	6.5	-6.1	15.3	17.7	-7.8	-2.7	2.0	9.9	11.4	-31.8	-2.5	0.3	-1.9	0.2	3.1	1.3	1.5	15.4	-2.5	4.1	3.2	3.7
f economic e. — (averaç	n from ave oup of inco where 1 =	IEIcp.	∞	24.7	51.8	77.0	46.3	52.8	25.1	13.6	11.2	73.8	59.1	79.2	38.3	36.2	15.2	7.9	77.3	59.8	58.2	48.4	74.9	42.2	31.2	26.1	64.1	32.5	42.8
IEI Index o IEI averag	deviatio quartile gr (QG2,	IEI, 2020	7	21.1	53.3	76.0	45.8	56.2	23.6	15.7	13.2	0.89	57.5	80.8	40.9	40.4	10.4	7.7	77.6	58.7	58.3	49.9	75.9	42.9	36.0	25.4	66.7	33.5	44.4
Inequality Transpar-	ency In- dex	0 = min, 17 = max	9	0.5	5.0	10.0	1.0	0.6	0.0	0.5	0.5	4.0	0.9	7.0	4.0	0.9	3.0	0.5	10.0	3.0	13.0	0.0	0.9	3.0	3.0	0.5	11.0	1.0	0.5
nequality: (average	group of where 1	061	2	3	3	1	4	1	3	2	4	3	1	1	4	3	4	4	1	3	1	3	2	3	2	3	2	1	4
Indicators of market income inequality: Gini Index (GI); GI average. — (average	for 1996–2020); deviation from average (D1, %) and quartile group of income inequality level (QG1, where 1 = low, 4 = high)	01,%	4	-2.0	0.5	-0.9	0.3	-3.5	-1.4	-0.4	0.0	-1.0	2.5	9.0-	8.0	5.1	2.1	-0.2	8.0	-1.7	1.2	-1.4	0.0	-0.9	2.4	-1.2	-0.2	0.1	-0.1
rs of marke ex (GI); GI	996 – 2020 : (D1, %) ar inequality = low, 4	Glcp.	2	0.571	0.590	0.489	0.606	0.461	0.613	0.540	0.685	0.599	0.427	0.389	0.629	0.574	0.602	0.622	0.458	0.611	0.439	0.613	0.539	0.597	0.525	909.0	0.554	0.471	0.648
Indicator Gini Ind	for 1 average income	GI, 2020	7	0.559	0.593	0.485	0.608	0.446	0.604	0.538	0.685	0.593	0.438	0.387	0.634	0.603	0.615	0.621	0.461	0.601	0.444	0.604	0.539	0.592	0.537	0.599	0.553	0.471	0.647
Country			1	Gabon	Georgia	Germany	Ghana	Greece	Guatemala	Guinea	Guinea-Bissau	Hong Kong	Hungary	Iceland	India	Indonesia	Iran	Iraq	Ireland	Israel	Italy	Jamaica	Japan	Jordan	Kazakhstan	Kenya	Korea	Kosovo	Kuwait
ol Z				46	20	51	52	53	54	55	99	57	58	59	09	61	62	63	64	65	99	. 67	. 89	69	70	71	72	73	74

Appendix (continued)

								_	_			_	_	_		_					_	_		_				
Pearson correlation	coefficient r [-1;1] and evaluation of its significance (1 = yes, 0 = no)	signifi- cance of <i>r</i>	16	,	1	,	1	П	1	1	┰	ı	1	1	⊣	-	1	1	1	1	1	1	-	-	1	-	1	1
Pe	coeff [-1; evalua† signi (1 = ye	_	15	-0.18	09:0	-0.27	-0.79	69.0	99.0-	0.47	0.63	0.05	0.43	90.0	0.44	-0.38	0.84	0.74	-0.57	0.88	0.59	-0.42	-0.22	-0.25	06.0	-0.02	-0.84	-0.19
rend)	Total number of observations with inverse dependence of variables	% of total	14	52.4	47.6	52.4	52.4	47.6	47.6	52.4	57.1	57.1	42.9	47.6	38.1	52.4	33.3	42.9	38.1	57.1	42.9	47.6	42.9	47.6	38.1	52.4	57.1	42.9
Qualitative correlation (trend)	Total nu observat inverse de of var	num.	13	11	10	11	11	10	10	11	12	12	6	10	8	11	7	6	8	12	6	10	6	10	8	11	12	6
litative co	Total number of observations with direct dependence of variables	% of total	12	47.6	52.4	47.6	47.6	52.4	52.4	47.6	42.9	42.9	57.1	52.4	61.9	47.6	66.7	57.1	61.9	42.9	57.1	52.4	57.1	52.4	61.9	47.6	42.9	57.1
Qua	Total number of observation with direct dependence o	num.	11	10	11	10	10	11	11	10	6	6	12	11	13	10	14	12	13	6	12	11	12	11	13	10	6	12
quality; -2020);) and ity level w)	0G2	10	3	4	1	4	3	4	4	1	1	1	4	3	2	3	4	1	4	1	3	3	2	2	3	4	2
IEI Index of economic institute's quality; IEI average. – (average for 1996–2020);	deviation from average (D2, %) and quartile group of income inequality level (QG2, where 1 = high, 4 = low)	D2, %	6	13.2	3.8	3.1	-28.7	-16.9	-5.0	-37.4	4.6	0.2	1.6	-2.7	-1.5	3.0	13.7	-23.2	-4.6	5.0	6.0	-15.6	-0.7	3.3	-3.1	1.6	-23.5	-2.7
of economi e. – (avera	on from ave oup of incc , where 1 =	IEIcp.	∞	20.9	21.0	62.8	22.7	37.5	20.2	5.0	0.99	82.5	65.5	20.7	31.0	53.2	33.5	22.0	71.7	19.1	64.8	36.1	33.8	41.7	48.1	36.8	25.2	53.3
IEI Index o	deviatic quartile gr (QG2	IEI, 2020	7	23.7	21.8	64.7	16.2	31.1	19.2	5.1	69.1	82.7	66.5	20.2	30.5	54.8	38.1	16.9	68.4	20.0	65.4	30.4	33.6	43.1	46.6	37.4	19.3	51.9
Inequality Transpar-	ency Index	0 = min, 17 = max	9	3.0	1.0	0.9	5.0	1.0	1.0	0.0	3.0	8.0	0.0	1.0	1.0	4.0	0.5	0.5	7.0	0.5	1.0	9.0	2.0	1.0	1.0	2.0	0.5	0.5
nequality: (average	from group of where 1	061	2	2	3	1	4	4	2	2	2	1	2	4	4	2	2	2	1	2	3	4	1	3	2	3	4	4
Indicators of market income inequality: Gini Index (GI); GI average. — (average	for 1996–2020); deviation from average (D1, %) and quartile group of income inequality level (QG1, where 1 = low, 4 = high)	D1, %	4	6.9	1.7	-1.8	-0.1	-4.1	1.0	0.3	-0.7	0.4	-0.4	-0.2	0.0	-2.0	-4.0	0.0	-0.4	9.0-	-1.2	-1.4	-1.3	-1.6	0.2	-0.2	1.6	-0.9
s of marke ex (GI); GI	996 – 2020 (D1, %) ar inequality = low, ⁴	Glcp.	3	0.506	0.596	0.490	0.660	0.645	0.544	0.542	0.495	0.455	0.558	0.615	0.652	0.529	0.529	0.529	0.449	0.524	0.582	0.693	0.486	0.569	0.504	0.597	0.714	0.743
Indicator Gini Ind	for 19 average income	GI, 2020	7	0.541	909:0	0.482	0.659	0.619	0.549	0.544	0.491	0.457	0.555	0.614	0.652	0.518	0.507	0.529	0.447	0.521	0.575	0.683	0.480	0.560	0.505	0.596	0.725	0.737
Country			1	Kyrgyzstan	Lao People's Democratic Republic	Latvia	Lebanon	Lesotho	Liberia	Libya	Lithuania	Luxembourg	Macau	Madagascar	Malawi	Malaysia	Maldives	Mali	Malta	Mauritania	Mauritius	Mexico	Moldova	Mongolia	Montenegro	Morocco	Mozambique	Namibia
ol Z				75	76 II	77	78	1 6/	80	81 1	82	83	84	85 N	√ 98	87	88	89	ا 06	91	92	93	94	95	96	97	N 86	66

Appendix (continued)

TOT 1996-		Gini Index (GI); GI average. — (average	Transpar-	IEI average	e. — (avera <u>c</u>	IEI average. — (average for 1996–2020);	IEI average. — (average for 1996–2020);					correlatio	correlation
, <u>p</u>	for 1996–2020); deviation from average (D1, %) and quartile group of income inequality level (QG1, where 1 = Low, 4 = high)	ion from lle group of G1, where 1	ency In- dex	deviatio quartile gra (QG2,	n from ave oup of incc where 1 =	deviation from average (D2, %) and quartile group of income inequality level (QG2, where 1 = high, 4 = low)	ity level wv)	Total number of observations with direct dependence of variables	umber vations direct ence of ibles	Total nu observat inverse de of var	Total number of observations with inverse dependence of variables	coeffi [-1; : evaluati signif (1 = yes	coefficient r [-1; 1] and evaluation of its significance (1 = yes, 0 = no)
Glcp.	p. D1,%	0G1	0 = min, 17 = max	IEI, 2020	IEIcp.	D2, %	<u>0</u> 62	num.	% of total	num.	% of total	_	signifi- cance of <i>r</i>
3	4	5	9	7	∞	6	10	11	12	13	14	15	16
0.535	55 -0.8	2	1.0	26.9	21.6	24.7	3	16	76.2	5	23.8	0.16	
0.411	11 0.5	1	10.0	79.7	81.0	-1.7	1	11	52.4	10	47.6	-0.75	1
0.454	54 1.0	1	11.0	83.9	84.2	-0.4	1	14	66.7	7	33.3	0.26	-
0.613	13 -1.4	3	0.0	16.2	23.0	-29.5	4	14	66.7	7	33.3	0.73	1
0.543	13 0.4	2	1.0	21.8	23.6	-7.8	4	11	52.4	10	47.6	0.40	-
0.569	59 –4.3	2	0.5	14.2	14.3	9.0-	4	7	33.3	14	66.7	-0.32	-
0.555	55 –0.6	2	0.0	6.7	6.1	9.5	4	13	61.9	8	38.1	0.10	1
0.448	18 -5.0	1	2.0	45.4	43.3	4.9	2	10	47.6	11	52.4	-0.13	-
0.406)6 –3.9	1	17.0	83.7	83.4	0.4	1	11	52.4	10	47.6	-0.14	-
0.678	0.0	4	0.5	47.7	49.4	-3.4	2	11	52.4	10	47.6	0.33	-
0.535	55 –0.6	2	1.0	18.9	18.0	5.2	4	13	61.9	8	38.1	0.39	ı
0.613	-1.4	3	3.0	45.6	47.6	-4.3	2	6	42.9	12	57.1	0.22	ı
0.593	93 0.0	3	1.0	24.1	24.4	-1.4	3	15	71.4	9	28.6	0.39	1
0.613	1.4	3	3.0	33.5	28.7	16.9	3	13	61.9	8	38.1	-0.92	1
0.651	51 -4.0	4	5.0	40.2	39.4	2.2	2	6	42.9	12	57.1	-0.27	1
0.592	92 -2.9	3	3.0	33.7	34.9	-3.4	3	6	42.9	12	57.1	0.26	-
0.478	78 1.3	1	9.0	59.4	63.9	-7.1	2	8	38.1	13	61.9	-0.25	1
0.487	37 -4.1	1	10.0	70.7	8.69	1.2	1	7	33.3	14	66.7	0.04	1
0.679	0.0	4	1.0	56.9	57.7	-1.5	2	16	76.2	5	23.8	0.50	1
0.532	32 2.4	2	7.0	50.8	49.7	2.3	2	9	28.6	15	71.4	0.59	1
0.551	-0.3	2	1.0	24.8	23.8	4.4	м	10	47.6	11	52.4	90.0-	
0.648	18 -1.9	4	1.0	45.1	42.8	5.4	2	7	33.3	14	2.99	-0.77	1
0.509	0:0 60	2	н/д	36.1	34.6	4.3	3	15	71.4	9	28.6	0.84	
	55 -0.7	4	0.0	38.8	38.4	1.1	3	11	52.4	10	47.6	-0.63	1
0.5	0.0	3	0.5	43.0	40.5	6.2	2	10	47.6	11	52.4	0.25	ı

Appendix (continued)

						_			_		_					_						_	_					
Pearson correlation	coefficient r [-1;1] and evaluation of its significance (1 = yes, 0 = no)	signifi- cance of <i>r</i>	16	1		1	ı	1	-	-	1	1	-	1	1	1	1	-	1	1	1	-	1	-	4	₽	ı	1
Pea	coeff [-1; evaluat signi: (1 = ye	_	15	0.52	0.00	-0.84	0.42	0.54	-0.19	0.03	-0.88	-0.03	0.36	0.82	-0.07	-0.38	-0.47	0.38	0.57	-0.27	0.53	-0.23	-0.33	0.63	0.89	-0.76	0.02	-0.41
rend)	Total number of observations with inverse dependence of variables	% of total	14	61.9	33.3	66.7	61.9	61.9	57.1	38.1	42.9	61.9	28.6	19.0	57.1	61.9	42.9	47.6	66.7	33.3	57.1	42.9	42.9	61.9	47.6	71.4	38.1	38.1
Qualitative correlation (trend)	Total nu observat inverse de of var	num.	13	13	7	14	13	13	12	8	6	13	9	4	12	13	6	10	14	7	12	6	6	13	10	15	∞	∞
litative co	Total number of observations with direct dependence of variables	% of total	12	38.1	66.7	33.3	38.1	38.1	42.9	61.9	57.1	38.1	71.4	81.0	42.9	38.1	57.1	52.4	33.3	66.7	42.9	57.1	57.1	38.1	52.4	28.6	61.9	61.9
Qual	Total number of observations with direct dependence of variables	num.	11	8	14	7	8	8	6	13	12	8	15	17	6	8	12	11	7	14	6	12	12	∞	11	9	13	13
quality; -2020);) and ity level iw)	0G2	10	2	2	3	1	1	1	4	2	1	2	3	1	1	4	1	4	3	3	3	3	2	2	3	4	1
IEI Index of economic institute's quality; IEI average. – (average for 1996–2020);	deviation from average (D2, %) and quartile group of income inequality level (QG2, where 1 = high, 4 = low)	D2, %	6	-6.4	7.4	11.0	0.3	-2.8	0.1	75.9	-3.0	-1.4	5.2	-7.2	-1.5	-0.4	-73.5	4.4	13.1	-12.1	2.7	19.9	12.1	-2.3	2.3	-16.6	-9.8	-7.6
of economic e. — (averag	n from ave oup of inco where 1 =	IEIcp.	∞	43.0	52.6	23.0	0.97	63.0	67.7	6.0	50.5	64.5	38.6	40.2	82.5	83.2	5.3	6.69	10.9	29.4	37.5	24.8	19.6	48.3	38.5	38.5	10.3	71.9
IEI Index o	deviatio quartile gr (QG2,	IEI, 2020	7	40.2	5.95	25.5	76.2	61.3	8.79	1.7	48.9	9.29	40.6	37.3	81.2	82.9	1.4	73.0	12.4	25.8	38.5	29.8	22.0	47.2	39.3	32.1	9.3	66.5
Inequality Transpar-	ency In- dex	0 = min, 17 = max	9	0.9	н/д	1.0	4.0	6.0	10.0	0.5	9.0	10.0	3.0	0.0	15.0	12.0	0.5	5.0	0.5	1.0	4.0	2.0	0.5	0.0	1.0	3.0	0.5	16.0
nequality: (average	group of , where 1	061	2	1	4	3	2	1	1	3	4	1	3	3	1	1	4	1	2	4	3	2	3	3	2	4	4	3
ndicators of market income inequality: Gini Index (GI); GI average. — (average	for 1996–2020); deviation from average (D1, %) and quartile group of income inequality level (QG1, where 1 = low, 4 = high)	D1,%	4	-7.1	0.0	2.3	6.0	-4.8	-0.9	0.0	2.1	-1.1	0.1	-1.4	1.2	-0.7	0.0	-1.6	1.7	2.9	-3.9	-0.2	-1.5	-1.4	-0.9	3.9	0.7	-0.1
s of marke ex (GI); GI	996 – 2020) (D1, %) an inequality = Low, ⁴	Glcp.	3	0.521	0.625	0.558	0.541	0.395	0.411	0.558	0.743	0.456	0.593	0.613	0.402	0.431	099.0	0.461	0.540	0.595	0.616	0.534	0.613	0.613	0.533	0.613	0.613	0.583
Indicator Gini Ind	for 19 average income	GI, 2020	2	0.484	0.625	0.571	0.545	0.376	0.408	0.558	0.758	0.451	0.593	0.604	0.406	0.427	099.0	0.453	0.550	0.613	0.592	0.533	0.604	0.604	0.528	0.637	0.617	0.583
Country			₽	Serbia	Seychelles	Sierra Leone	Singapore	Slovakia	Slovenia	Somalia	South Africa	Spain	Sri Lanka	Surinam	Sweden	Switzerland	Syrian Arab Republic	Taiwan	Tajikistan	Tanzania	Thailand	Timor-Leste	Togo	Trinidad and	Tunisia	Turkey	Turkmenistan	USA
oi Z				125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146		148	149

oi Z	Country	Indicato Gini Ind	rs of marke tex (GI); GI	Indicators of market income inequality: Gini Index (Gl); Gl average. — (average	nequality: (average	Inequality Transpar-	IEI Index o	of economic e.— (averag	IEI Index of economic institute's quality; IEI average. – (average for 1996–2020);	quality; -2020);	Qua	litative co	Qualitative correlation (trend)	rend)	Pea	Pearson correlation
		for 1 average income	.996–202C e (D1, %) ar inequality = low, '	for 1996–2020); deviation from average (D1, %) and quartile group of income inequality level (QG1, where 1 = low, 4 = high)	n from group of , where 1	ency Index	deviation quartile gr (QG2,	on from ave oup of incc , where 1 =	deviation from average (D2, %) and quartile group of income inequality level (QG2, where 1 = high, 4 = low)	s) and lity level wv)	Total number of observations with direct dependence of variables	Total number of observations with direct dependence of variables	Total number of observations with inverse dependence of variables	Total number of bservations with verse dependence of variables	coefficient [-1; 1] and evaluation of significance (1 = yes, 0 = r	coefficient r [-1; 1] and evaluation of its significance (1 = yes, 0 = no)
		GI, 2020	Glcp.	D1, %	061	0 = min, 17 = max	IEI, 2020	IEIcp.	D2, %	0 6 2	num.	% of total	num.	% of total		signifi- cance of r
	1	2	3	4	2	9	7	∞	6	10	11	12	13	14	15	16
150	Uganda	0.624	0.620	0.7	4	1.0	24.8	26.6	-6.7	3	6	42.9	12	57.1	0.05	,
151	Ukraine	0.431	0.413	4.3	1	1.0	27.9	25.0	11.7	3	12	57.1	6	42.9	0.34	
152	United Arab Emirates	0.602	0.624	-3.5	3	3.0	59.5	58.6	1.5	2	12	57.1	6	42.9	-0.74	-
152	Croat Britain	0.465	2710	17	_	16.0	72.0	75.0	7 7	_	٥	701	17	610	0.10	4
154	Urionav	0.705	0.506	-0.7	7	15.0	70.4	671	7.D		2 /	7 2 2	C1 41	66.7	-0.70	-
155	Uzbekistan	0.573	0.572	0.2	3	0.5	16.6	13.1	27.0	4	13	61.9	- ∞	38.1	-0.11	1 '
156	Venezuela	0.604	0.613	-1.4	3	0.0	3.6	7.1	-49.4	4	11	52.4	10	47.6	0.72	1
157	Vietnam	0.566	0.573	-1.2	3	5.0	36.6	33.0	11.0	3	8	38.1	13	61.9	-0.79	₽
158	Zambia	0.722	0.723	-0.1	4	1.0	26.5	34.1	-22.5	3	11	52.4	10	47.6	0.43	П
159	Zimbabwe	0.685	0.643	9.9	4	1.0	9.6	8.4	14.6	4	15	71.4	9	28.6%	0.49	П
160	Maximum	92.0	0.74			17.00	83.86	84.18			17	81.0	16	76.2%	0.95	
161	Average	0.56	0.56			3.86	41.61	41.86			11	50.6	10	49.4%	-0.01	
162	Median	0.56	0.57	I	I	2.00	39.03	38.38	I	I	11	52.4	10	47.6%	-0.02	
163	Minimum	0.38	0.38			0.00	1.40	0.94			5	23.8	4	19.0%	-0.92	
164	Mean dependency across a sample of countries	across a sa	ample of co	ountries								9'05		46,4		
165	Weighted average (by inequality transparency index) dependence across a sample of countries	by inequa	lity transp	arency inde	x) depende	ence across	a sample of	countries				48,2		51,8		

Source: compiled by the author on the basis of the study materials.

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The Problem of Double Economic Taxation of Distributed Profits and Reform Scenarios in Russia

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ABSTRACT

The article is devoted to the research of economic and tax distortions arising from double economic taxation of distributed profits in the form of dividends to participants-individuals. The **goal** of the article is to develop approaches to the development of the Russian tax system. In order to achieve it, we summarize theoretical ideas of solving the problem and approaches of foreign countries. We also review the Russian context of taxation of dividends. The following features of Russian tax system are analyzed. First, distortion of tax regime in favor of debt financing of companies, and second, sufficiently competitive level of aggregate tax rate on distributed profits compared to developed countries. The presence of "debt bias" in the financing of Russian companies was revealed. The different scenarios of reform of the Russian tax system are analyzed. The authors **concluded** that feasibility of transition to capital taxation with two elements: (1) partial exemption of dividends from taxation at the level of individual (recipient of profits) and (2) harmonization of the dividend tax regime with income tax regime from capital appreciation.

Keywords: tax policy; profit distribution; dividends; double taxation; notional interest deduction; tax system

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Due to the fact that existence of double economic taxation when distributing dividends to retail investors can lead to significant economic distortions, topical issue, raised in the scientific literature and in the practice of tax reforms in Russia and in foreign countries, is integration of corporate and personal taxation mechanisms and other means of eliminating such double economic taxation [1]. This article is devoted to the study of questions on whether this problem is relevant for the Russian tax system, how foreign countries eliminate (reduce) double economic taxation when distributing dividends, and to what extent the approaches of foreign countries are applicable in Russian conditions.

The goal of the research is to develop scientifically based recommendations and practical approaches to the development of the Russian tax system with international experience and the characteristics of the Russian tax system and economy. The article is structured as follows. Firstly, the theoretical arguments that define the contours of the discussion of the problem of double economic taxation of profits are outlined; secondly, the analysis of indicators of the presence of "debt bias" (insufficient capitalization) in the financing of enterprises in Russia is given; thirdly, the results of the analysis of the presence in the Russian system of tax prerequisites for the presence of economic distortions are presented; fourthly, approaches in foreign practice to eliminate (reduce) double economic taxation of profits have been generalized; fifthly, various scenarios of development of the Russian tax system were considered and proposals for tax reform were formulated.

DISTORTIONS AND EFFECTS ARISING FROM DOUBLE ECONOMIC TAXATION OF PROFITS

To date, one of the strategies for obtaining economic benefits from a retail investor's

participation in the capital of a legal entity is the acquisition of securities with the aim of regular receive dividends. This approach may lead to double economic taxation as the company's distributed profits will be taxed at two levels — corporate (as its profit) and individual (as taxable shareholder income), which distorts investors' investment decisions and companies' decisions on distribution of profits. At the same time, according to economists, tax conditions should not influence the decisions of economic agents, i.e. the tax system should be neutral [2].

In practice, however, tax conditions can lead to several types of economic distortions that together form the basis of the double economic taxation of distributed profits:

- 1) distortion selection of companies for debt relatively capital as ways of financing;
- 2) distortion selection of retail investors to implement strategies aimed at obtaining returns from capital appreciation relative to "dividend" investment strategies;
- 3) distortion selection of companies to reinvest profits rather than distribute them.

The first type of distortion relates to the fact that it is more profitable for companies to attract debt financing than to increase net worth, knowing, that the interest paid will be deducted from the taxable profit and imposed once at a lower aggregate rate than the dividend distributed [3]. This may increase risks in the economy due to excessive debt financing of enterprises or for lower tax revenues. Fiscal risks for the budget are particularly high in cross-border loan, as it is possible to optimize taxes through a combination of instruments embedded in national legislation and tax agreements [4].

The second and third types of distortions relate to the fact that the level of the aggregate tax rate in the distribution of dividends may be so high that individuals lack incentives to invest in capital [5]. In this regard, the international downward trend in income tax rates on capital income in developed countries in recent decades can

Table 1

Tax and economic distortions as a result of double taxation of distributed profits

Distortion of incentives due to different tax conditions	Possible negative effects
Debt financing is preferable for companies to contribute to	Systemic risk due to excessive debt in the economy
capital ("debt bias")	Erosion of the national tax base
	Underinvestment of financial market
"Dividend strategies" are less preferable for investors than	Low level of investment activity
receive income as capital appreciation	Loss of tax revenue due to difficulty in effectively taxing income from capital appreciation
Reinvestment of profits is preferable for companies than its distribution to participants	Non-optimal distribution of capital in the economy

Source: compiled by the authors.

be attributed to attempts by legislators to maintain incentives for investment.¹

One way in which companies can reduce the negative impact of taxation on the attractiveness of shares to investors is to reinvest profits to increase the value of the company's shares and then resell them to a retail investor [6]. In this case, instead of dividends, the investor will receive income from capital appreciation. Unlike dividends, income as capital appreciation earned from securities are usually subject to gentler taxation, which can also often be deferred to the future, which also distorts the distribution of capital in the economy [7].

These are thus the three types of tax assumptions for economic distortions summarized in *Table 1* and various options for possible negative consequences of the violation of tax neutrality.

Analysis of the negative economic effects in the Russian context in *Table 1* is presented below. For this purpose, the indicators of presence of "debt bias" in Russia have been

evaluated, and then the analysis of tax prerequisites of presence of distortions in Russia has been conducted.

IS THERE A PROBLEM OF "DEBT BIAS" IN RUSSIA?

One of the most significant effects, which, all other things being equal, can occur due to the more profitable tax consequences of attracting debt relative to capital contribution, is the so-called "debt bias", or insufficient capitalization of enterprises [3].

Below is an analysis of indicators of the presence of "debt bias" in Russia, the results of which will determine the significance of this economic impact on the Russian economy, is conducted. To do this, one main ("system") and three additional ("tax") indicators, which may indicate the presence of "debt bias" in Russia, have been evaluated, for a selection of the largest Russian private companies based on revenue and availability of statistical information for all indicators.²

¹ Tax Reform Trends in OECD Countries. OECD. URL: https://www.oecd.org/ctp/48193734.pdf (accessed on 08.09.2021).

² The sample includes 6248 Russian private companies. Excluded from the analysis are legal entities engaged in financial and insurance activities, as different criteria may be used to assess the relationship between debt obligations and

Indicators of "debt bias" for Russian companies

Indicator	Debt / Capital		Interest / EBIT	Interest / assets
Standard	1:1	3:1	30%	3%
25% quartile	0.22		0.03	0.01
Median	0.84		0.14	0.06
75% quartile	2.55		0.45	0.18
Share of companies with an indicator of "debt bias"	45.79%	21.78%	34.11%	62.48%

Source: compiled by the authors on the basis of SPARK materials. URL: https://www.spark-interfax.ru/ (accessed on 17.08.2022).

The main indicator is ratio of aggregate company debt to own net worth. The threshold value is the ratio 1:1. This indicator will show what percentage of the Russian companies in question have debt levels above their own funds.

Additional indicators identify the proportion of companies in a sample with an increased risk of tax erosion due to thin capitalization and over-deduction of interest payments. We use three indicators for this purpose:

- ratio of company debt to its capital (threshold value is the ratio 3:1) this criterion is established by the tax legislation of the Russian Federation (art. 269 of the Russian Tax Code) for the purpose of limiting the deduction of interest on controlled debt (loans provided by foreign associates, directly or indirectly, or with a significant impact on loan conditions);
- interest ratio on debt to EBIT (threshold is 30%) this criterion is planned to be used in the USA starting from 2022 [8];
- ratio of interest on debt to assets (threshold is 3%) this criterion is used in particular in Danish tax legislation.³

net worth (for financial sector as a whole is characterized by significantly higher levels of debt financing).

As the results of the evaluation of indicators presented in *Table 2* show, about half (45.79%) of Russian companies from the sample have a debt level above their capital size. By itself, this result already shows that the level of debt is significant, especially given that 21.78% of companies have a debt to capital level above the 3:1 standard used in the Russian rules of "thin capitalization". The fact that this level of debt may be indirectly related to the tax motives of companies is evidenced by the results of the assessment and the last two "tax" indicators, which indicate that more than one third and one half of companies, 34.11 and 62.48%, respectively, have exceeded their fiscal risk.4

Thus, it can be concluded that in Russia there are reasons to use the mechanism of profit taxation as an instrument of economic policy to reduce the degree of "debt bias" and counteract the erosion of the tax base. Tax assumptions that form the necessary conditions for "debt bias" and other types of distortions are discussed below.

³ Denmark — Corporate Group Taxation. URL: https://taxsummaries.pwc.com/denmark/corporate/group-taxation

⁴ In our view, a promising direction in this part is the definition of "debt bias" of Russian private companies using the EBITDA indicator, as it is proposed in particular by Action 4 of the BEPS Plan in the improvement of rules of "thin capitalization". Find out more: Limiting Base Erosion Involving Interest Deductions and Other Financial Payments, Action 4–2016 Update. OECD. URL: https://www.oecd.org/tax/beps/beps-actions/action4/

Table 3 Conditions for exemption from personal income tax of income received from the sale of securities

Holding period	Form of tax benefit	Features	
1 year	Exemption from personal income tax	Ownership of securities from the list of companies that components of high-tech sector of the economy	
3 years	Exemption from personal income tax within maximum amount of the tax benefit *	Ownership of securities, which are traded on the organized securities market (distributed after 1 January 2014)	
5 years Exemption from personal income tax		Ownership of shares that are not traded in the organized securities market (applies to shares purchased since 1 January 2011)	

Source: compiled by the authors.

Note: * maximum amount of the benefit – 3 million rubles for each year of ownership of securities.

ANALYSIS OF THE PRESENCE OF TAX PREREQUISITES FOR ECONOMIC DISTORTIONS IN THE RUSSIAN TAX SYSTEM

Finding an answer to the question whether these distorting conditions are characteristic of the Russian tax system is difficult. In fact, dividends received by the investor (individuals) are taxed twice: firstly, at the corporate level (20%), secondly, at the level of the natural person itself — at 13% (if individual is a Russian tax resident) or 15% (if not). As a general rule, when paying dividends to individuals, the organization acts as a tax agent, which ensures the effectiveness of tax control. Thus, when distributing profits to a resident investor, the cumulative tax rate would be 30.4%, which is lower, for example, than the average aggregate rate among OECD countries [5].

When calculating corporate income tax, Russian companies are entitled to deduct interest paid (as opposed to dividends). At the level of individuals, interest, like dividends, is mainly taxed at 13%. The amount of interest may be affected by the presence in the legislation of rules "thin capitalization", providing for the reclassification of part of interest into taxable dividends and the refusal to record them as expenses of income tax. However, due to the limited application

of these rules,⁵ it cannot be said that they provide complete neutrality between debt or capital financing.

Thus, based on the results of the analysis of the rules of taxation of dividends and interest, it follows that in Russia there are, firstly, prerequisites for the presence of "debt bias" and, secondly, negative incentives for the "dividend strategies" of investors — individuals. With regard to the third type of distorting tax conditions (related to differences in the terms of taxation of dividends and income from capital appreciation), it should be noted that the Russian tax regime of personal income tax on capital appreciation is methodologically more complex than the tax regime on dividends.

Individual (Russian resident) must pay tax on the proceeds from the sale of shares

⁵ These rules apply to a Russian organization in respect of its controlled debt to a foreign organization exceeding the net worth of the Russian borrower organization by more than three times (for banks and leasing companies — in 12.5 times). ⁶ It should be emphasized that negative incentives may be specific for organizations — receiving dividends. However, in our opinion, they are less significant given that legal entities are entitled to claim exemption of the received dividends from taxation if they "substantially" (participation exemption) participate in the capital of the organization paying dividends (sub-para. 1, para. 3, art. 284 of the Russian Tax Code).

⁷ More detailed this distortion is discussed in the US Treasury report "Integration of The Individual and Corporate Tax Systems" (1992). URL: https://www.treasury.gov/resource-center/tax-policy/documents/report-integration-1992.pdf. (accessed on 18.08.2022).

at the rate of 13% when selling securities. At the same time, Russian tax legislation provides benefits that exempt income from capital appreciation on sale of securities from taxation, when performing various criteria (*Table 3*). Thus, it can be concluded that in the Russian tax system there are prerequisites for distortions to the choice in favor of reinvestment profits.

The rate for income from capital appreciation can be described as competitive in international comparison. For example, average rates in OECD countries in ratio income from capital appreciation for individuals is 28% [5], and some researches indicate that the optimal income from capital appreciation tax rate varies between 10 and 20% [9].

As of 2020, dividends do not play a significant role in Russian income. Thus, according to Rosstat, "income from property" accounts for only 4.3% of total monetary income of Russians, while "income from wages of employees" and "social payments" are 58.4 and 20.8% respectively. It should also be pointed out that the return of securities through the receive dividends by individuals in today's conditions is long, that can stimulate of implementation "speculative" and risky investments by individuals.

The experience of the pandemic has shown how vulnerable labour markets are in traditional sectors of the economy today. There is therefore a need to reassessment tax policies to ensure that they are in line with changes in the labour market, 10 and led to

stimulation of investment activity of citizens through their long-term investments in securities¹¹ and creating positive structural changes in the national economy.¹² What tools have been developed by foreign countries to reduce double economic taxation and eliminate "debt bias", is discussed in the following section.

ELIMINATION (REDUCTION) OF DOUBLE TAXATION IN THE DISTRIBUTION OF PROFITS: ANALYSIS OF AVAILABLE APPROACHES IN FOREIGN PRACTICE

Should double economic taxation be reduced or eliminated? Consider the answer to this question, based on the foreign experience of developed countries. Under the "classical" system of taxation, company income tax and personal income tax are strictly separated, so dividends are subject to full taxation of shareholders [10]. It is clear that this approach does not eliminate the problems of double economic taxation and economic distortions described above, which may worsen the country's international investment attractiveness.¹³

The alternative may be a full integration of corporate and personal taxation, whereby the company's profits are not taxed at the corporate level while being taxed at the shareholder level. Despite the increased tax neutrality (profit is taxed regardless of whether it is distributed or kept within the company), there are many "political and

⁸ Amount and structure of monetary income of the population of the Russian Federation by source (new methodology) (2021). Federal State Statistics Service. URL: https://rosstat.gov.ru/storage/mediabank/urov_13kv-nm(2).xls (accessed on 01.12.2021).

⁹ In particular, according to the authors' calculations, the shares bought in 2010 of such companies as Gazprom, Sberbank, Aeroflot, MTS, VTB (the most popular shares according to the Moscow Stock Exchange in 2020) did not pay off through the dividends received by individuals (as of December 2021), including due to the levying of a tax on the dividends received. ¹⁰ See. for example, OECD report Taxing Wages (2020). URL: https://www.oecd-ilibrary.org/taxation/taxing-wages/volume-/issue- 047072cd-en (accessed on 01.12.2021).

¹¹ From the speech of Russian President Vladimir Putin at the forum "VTB Capital" "Russia calls!" (2021). URL: https://tass.ru/ekonomika/13067179 (accessed on 01.12.2021).

¹² This goal is laid down in the main directions of budget, tax and customs tariff policy for 2021 and for the planned period 2022 and 2023. In particular, the transition to an additional levy on the income of individuals at a progressive rate and the introduction of personal income tax on interest on bank deposits, as well as changes in the terms of taxation of dividends and interest on profit due to changes in bilateral tax agreements. URL: https://minfin.gov.ru/common/upload/library/2020/10/main/ONBNiTTP_2021_2023.pdf (accessed on 01.12.2021).

¹³ See U.S. Treasury report "Integration of The Individual and Corporate Tax Systems" (1992). URL: https://www.treasury.gov/resource-center/tax-policy/documents/report-integration-1992.pdf (accessed on 08.09.2021).

practical barriers" [11] preventing the overall implementation of this initiative. At present, a somewhat similar system is used only in Estonia, where company profits are not taxed at the corporate level before they are distributed as dividends, and at the level of shareholders the entire amount allocated is recorded as taxable income [6].

Generalization of foreign practice shows that countries paying attention to the problem of eliminating double economic taxation of profits, use various options for integration of corporate and personal taxation, leading to various consequences.

The most systemic solution is to move to the so-called imputation system (charge system), where the tax payable at the level of an individual is reduced by the amount of taxes paid at the corporate level [5]. Its key advantage is that, in addition to harmonizing the reduction of the aggregate effective tax rate, it also reduces the impact of various economic distortions on investment decisions.14 However, although the systems of imputation were widespread in Europe until recently [12], most European countries have abandoned their use, and among OECD countries, only five use full imputation (Australia, Canada, Chile, Mexico and New Zealand) when taxing dividends [13]. This is largely due to the fact that the mechanism is administratively more complex and costly than, for example, the classical system of profit taxation.¹⁵

However, European countries were also significantly influenced by the position of the European Commission, which considered the system of imputation to discriminatory foreign parties [14]. In the absence of international cooperation, its use leads to

different taxation incoming and outgoing flows of dividends between countries (compared to domestic dividend flows), which contradicts the principle of free intra-EU capital flows.¹⁶

It is noteworthy that the abandonment of the imputation system in European countries did not imply the harmonization of dividend taxation systems, as "Member States can and should remain free to determine...the type of dividend taxation system". 17 However, in our view, it can be said that it exists spontaneously. To date, most OECD countries use the scheme, where company profits are taxed according to standard tax treatment, and double taxation of dividends is eliminated (reduced) or at the level of individuals using mechanisms of partial release of dividends,18 or by reducing the overall corporate rate [5]. Beyond the OECD, Singapore's experience is notable in transition towards full individual income tax exemption [15] in response to high unemployment and the impact of the recession on the national economy.¹⁹

In our view, the choice of such simpler unilateral measures by developed countries

¹⁴ Tax Working Group Information Release (2018). URL: https://taxworkinggroup.govt.nz/sites/default/files/2018–09/twg-bg-appendix-3—new-zealand's-imputation-system.pdf (accessed on 08.09.2021).

¹⁵ See U.S. Treasury report "Integration of The Individual and Corporate Tax Systems" (1992). URL: https://www.treasury.gov/resource-center/tax-policy/documents/report-integration-1992.pdf (accessed on 08.09.2021).

¹⁶ Is such cooperation possible? In particular, the Dutch tax authorities have historically opposed the introduction of a charge system because of the presence of large transnational corporations in the country, while providing tax credit only to Dutch shareholders would be a clear discrimination. Theoretically, international cooperation can be built on the basis of special tax agreements providing for mutual imputation credits. However, experts note that such a development is unlikely even within the EU. For detail see: URL: https://nalogoved.ru/art/1134.html (accessed on 08.09.2021).

¹⁷ Commission to tackle tax discrimination against foreign dividends. European Commission. URL: https://ec.europa.eu/commission/presscorner/detail/en/IP_04_25 (accessed on 08.09.2021).

¹⁸ The specific scenario of tax dividend exemption may vary from country to country. For example, in Turkey, 50% of the gross dividend received by an individual without any essential conditions is exempt. In Finland, for its part, the exemption depends primarily on whether the shares are publicly traded or not. For detail see: URL: https://taxsummaries.pwc.com (accessed on 08.09.2021).

¹⁹ Opening Remarks by Mr. Tharman Shanmugaratnam Chairman, ERC Sub-Committee on Policies Related to Taxation. Ministry of Finance. URL: https://www.mof.gov.sg/news-publications/speeches/Opening-Remarks-by-Mr-Tharman-Shanmugaratnam-Chairman-ERC-Sub-Committee-on-Policies-Related-to-Taxation-the-CPF-System-Wages-Land-and-Senior-Minister- (accessed on 08.09.2021).

to address the issue of double taxation is due to the relatively high efficiency of eliminating (reducing) double taxation collectively with simple administration, which other tax instruments cannot provide, and the complexities of international cooperation and harmonization of corporate profit taxation systems.

The tools for eliminating (reducing) double taxation of dividends sometimes also include the possibility of deduction by companies from the taxable base on income tax "conditional" the amount of income on equity (further — allowance for corporate equity, ACE). In addition to the fact that the implementation of the measure promotes capital investment as a means of financing the activities of companies [16] and may theoretically lead to the elimination of double taxation [1] when ACE is introduced, the level of economic activity and investment plans of companies are not distorted by taxation [17].

Research results show that ACE is characterized by simple implementation in legislation and high efficiency as a tool to reduce "debt bias". 20 Lack of mechanisms can be the difficulty of correctly determining the value of capital (net assets), and that the introduction of the mechanism can lead to a decrease in revenue on income tax. However, such losses can be minimized by providing ACE only for new capital. This is the path that most of the countries that have introduced ACE into their legislation [18].

In *Table 4* are presents approaches of foreign countries to eliminate (reduce) double taxation of dividends.

Experience has shown that this problem can be addressed in various ways. It should be emphasized, however, that the introduction of each instrument is characterized by the need to take into account its specific features. What development scenarios might be relevant to

the Russian tax system, based on this thesis and the above goal, is the following section.

DISCUSSION OF REFORM SCENARIOS IN RUSSIA

Double economic taxation in the distribution of profits, as well as "debt bias" can be eliminated or eased through reform of the mechanism of income tax. It can be realized, firstly, through the transition to income taxation, only at its distribution ("Estonian" model) and, secondly, through deduction of "notional interest" (notional return on share capital) from the taxable base on income tax.

Transition to tax on profits only when distributed. In our view, the implementation of such a reform is not a suitable scenario for the Russian tax system because the transition to taxation of profits only when it is distributed will lead to a substantial loss of tax revenues.²¹ It should also be noted that almost 20% of all dividends payable to shareholders were sent to foreign corporate recipients and were taxed on profits using preferential rates from 0 to 10% according to tax agreements.²² Thus, the proposed reform may increase the risk of disruption the tax base and withdrawal of profits to low-tax jurisdictions through associated companies, registered in countries with favorable conditions of tax agreements with Russia [4].

Introduction of the deduction mechanism "notional interest". Implementation of this mechanism in the Russian tax legislation is connected with the task of economic policy to reduce "debt bias" through the equalization of

²⁰ See International Monetary Fund document "Tax Policy, Leverage and Macroeconomic Stability" (2016). URL: https://www.imf.org/external/np/pp/eng/2016/100716.pdf (accessed on 08.09.2021).

²¹ As of 01.01.2021, the volume of calculated income tax (total) amounted to about 3.4 trillion rubles. During the same period, the total amount of dividends payable to shareholders (total) amounted to about 7.7 trillion rubles. See Updated report on form No. 5-P as of 01.01.2021, consolidated for the Russian Federation as a whole. URL: https://www.nalog.gov.ru/html/sites/www.new.nalog.ru/docs/otchet/5p/5p010121ut.xlsx. (accessed on 08.09.2021).

²² Section I. Updated report on form No. 5-P as of 01.01.2021, consolidated for the Russian Federation as a whole. URL: https://www.nalog.gov.ru/html/sites/www.new.nalog.ru/docs/otchet/5p/5p010121ut.xlsx. However, it should be pointed out that the Russian policy to revise tax agreements with key partners to raise the rates of the source tax on dividends and interest up to 15%.

Table 4

Mechanisms of elimination (reduction) of double taxation

	Corporate level						
No.	Mechanism	Advantages	Disadvantages				
1	Taxation of full dividends	Simplicity	Double economic taxation				
2	No profit proposition before distribution as dividends	Reinforce the reinvestment of profits	Decrease in tax revenues				
3	Deduction of "conditional" rate of return on capital from the taxable base of the company	Reduction of "debt bias" due to neutral conditions of debt and capital taxation	Methodological complexity of correct estimation of the cost of capital and the rate of conditional return				
			Decrease in tax revenues				
	Recipient —individual						
1	1 Taxation of full dividends	No loss in tax revenues Double economic taxation					
		Simplicity					
2	Tax exemption for part of	Ensuring partial neutrality of the tax system (in certain legislative	Double economic taxation in the remaining cases				
dividends	cases)	Risk of abuse and formal criteria compliance					
3	Full exemption of dividends from taxation	Ensuring tax neutrality	Considerable decrease in tax revenues				
4 Imputation sy			Complexity in methodology and administration				
	Imputation system	Ensuring tax neutrality	The complexity of harmonizing mechanisms among countries in the context of free international capital flows				

Source: compiled by the authors.

conditions of taxation of debt and capital. The following is an assessment of the economic significance of such a reform for Russian companies. To do this, the authors make several assumptions, listed below, and assess how the level of the aggregate rate when taxing distributed profits as a result of such a reform will change.

The authors assume that, as a result of the reform, Russian companies will be allowed to deduct "notional interest" from the base of profit tax — calculated nominal income

on new capital for rate of the CBR. For valuation purposes, the authors calculated the difference in net assets for the period 2019–2020 of the largest private companies in Russia in terms of their profits. If the obtained value is positive, the company is entitled to use the deduction of "notional interest" from the base on the profit tax of organizations at the rate of 7%. ²³ The company is supposed to

²³ The weighted average interest rate of the Central Bank of Russia on loans provided by credit organizations to nonfinancial organizations in rubles (in general for the Russian

distribute all profits to individuals — residents of Russia in the form of dividends, c for which personal income tax is charged at 13%. The obtained values are compared with the current effective rate (30.4%) (*Table 5*).

According to the authors, the introduction of the mechanism of deduction of "notional interest" will not lead to a significant reduction of the aggregate tax rate when distributing profits to individuals. This estimate is linear and does not take into account that the introduction of the "conditional interest" mechanism will change economic incentives by equalizing the conditions of taxation of debt and capital, this should lead to faster growth of equity investment (net assets). In this case, a more substantial reduction of the tax burden and the aggregate effective rate can be observed.

Nevertheless, a (very modest) assessment of the impact of the reform at the corporate level suggests that tax reform will have the greatest economic impact at the individual rather than at the corporate level.

The introduction of the system of imputation in Russia is not realistic due to its methodological and administrative complexity and the negative historical experience with the application of this system in most developed countries. In this regard, the authors below consider such options to eliminate double taxation at the individual level as full and partial release of dividends received by individuals.

Full exemption of dividends from taxation at the level of individuals. The domestic literature has already suggested the idea of transition to full exemption of dividends from taxation at the individual level, since the "payment of dividends in full will contribute to the inflow of domestic and foreign capital due to the increased interest in the establishment of organizations" [19]. At first sight, implementation of the scenario will not become

Federation) for a period of more than 3 years was used. As of September 2020. URL: http://www.cbr.ru/statistics/bank_sector/int_rat/ (accessed on 08.09.2021).

Table 5

Change in the aggregate effective rate as a result of the introduction of the "notional interest deduction" mechanism

Part of the sample	Changes
First quartile	-0.54%
Median	-0.92%
Third quartile	-1.01%
95th percentile	-1.29%
Number of companies in the sample	7893

Source: compiled by the author on the basis of SPARK data.

a "shock" for the Russian tax system. Based on the data of the Federal Tax Service of Russia on distributed dividends for 2020, it is possible to talk about an estimated amount of 82 billion rubles of shortfall in income, which, however, can be replenished by an increase in investment in companies by individuals and, consequently, an increase in income tax revenues due to an increase in the tax base. The given estimate of losses of tax revenues is only 2.2% of the tax on profit of organizations. However, the full exempt of dividends without harmonization with the capital gains tax mechanism will lead to new types of distortions, because it is more profitable for companies to distribute all profits to shareholders, which may lead to a decrease in reinvested profits.

Partial exemption of dividends from taxation. Transition to partial exemption of dividends from taxation will require introduction of criteria for taxable and non-taxable dividends. For example, in Finland dividends are paid differently depending on whether the shares of the company paying them are quoted on the stock exchange and other terms.²⁴ The approach is not without disadvantages: the introduction of any additional criteria for the application of incentives could lead

²⁴ Finland. Individual. Income determination. Pw C. URL: https://taxsummaries.pwc.com/finland/individual/incomedetermination (accessed on 08.09.2021).

to increased tax disputes. Criteria should therefore be as transparent, verifiable and methodologically justified. Based on the problems arising from double taxation of dividends, the criteria for their release can be based on two objectives of economic policy:

- 1) stimulation of public investment in the financial market and priority sectors the most appropriate criterion in this case will be "placement of securities in the organized securities market" and "inclusion of the company in the list of organizations that components of high-tech sector of the economy";
- 2) neutrality of conditions of taxation of dividends and capital the above criteria will be suitable for this task, as the benefits for income from capital appreciation already exist in the Russian tax legislation (*Table 3*).

An actual issue in this case is the prolongation of the "high-tech" tax credit, as deadline at the end of 2022. Indeed, as former Russian Prime Minister Dmitry Medvedev rightly pointed out, a five-year holding period significantly reduces capital inflows into high-tech projects, which usually last 1-2 years.²⁵ However, despite the lack of data on the effectiveness of the tax credit, the current version, in our view, requires an adjustment given that it currently covers only 16 high-tech companies.²⁶ Such a policy of stimulation seems unreasonably limited in the new "epidemiological" conditions, when it is the digital (high-tech) sector that should become the "catalyst" of economic growth and, accordingly, the tool to replenish the shortfall tax revenues. In this regard, in our view, it is appropriate to extend the tax credit to include more digital (high-tech) companies whose securities it could cover, as

well as its synchronization with preferential taxation dividends at the level of individuals.

The second option of partial taxation of dividends involves the introduction of a regressive tax scale on dividends for individuals investing in shares for a long term. In particular, experts of the Ministry of Economic Development of Russia proposed to introduce the taxation of personal income tax dividends at a rate of 8% in the case of ownership of shares more than 3 years, 3% — more than 5 years and 0% — more than 7 years. 27 Despite the technical complexity of implementation this scenario, the transition to a regressive dividend tax rate is balanced, as it encourages citizens to implement long-term rather than speculative investments without reference to other characteristics of securities. Also in this case, it should be determined in advance whether the regressive tax rate applies to foreign shares in the hands of Russian residents. The approach in this part should be based on the norms of the EAEU Treaty on free movement of capital within the EAEU single market (which, as EU experience has shown, is essential for the development of a single financial market).

CONCLUSION

In conclusion, the following four points are worth noting:

1. The existence of double economic taxation when distributing dividends to retail investors led to calls for the integration of corporate and personal taxation mechanisms. Indeed, this feature of dividend taxation can lead to several types of distorting effects. First, it becomes more profitable for companies to attract debt capital; second, individuals have reduced incentives to invest; third, unlike dividends, income from capital appreciation usually exposed to gentler taxation, which can lead to lower tax revenues and distorted decisions to reinvest or distribute profits.

²⁵ The Council extended tax benefits for transactions with high-tech companies. Interfax. URL: https://www.interfax.ru/business/485876 (accessed on 08.09.2021).

²⁶ List of securities of high-tech (innovative) sector of economy (in accordance with the resolution of the Government of the Russian Federation No. 156 from 22.02.2012). Moscow Exchange. URL: https://www.moex.com/ru/markets/rii/rii.aspx (accessed on 08.09.2021).

²⁷ Mingazov S. Ministry of Economic Development offers a package of newbenefits for retail investors. Forbes. URL: https://www.forbes.ru/newsroom/finansy-i-investicii/415821-minekonomrazvitiya-predlozhilo-paket-novyh-lgot-dlyaroznichnyh (accessed on 08.09.2021).

- 2. Analysis has shown that the problem of double taxation of profits can lead to negative effects in Russian conditions. First, in the Russian tax system there are preconditions for the existence of all types of economic distortions; second, there is evidence of "debt bias" in Russia and erosion of the tax base due to excess debt; third, the level of public investment in the capital of enterprises in Russia is still negligible, which may be due, in particular, to the absence of a well-developed mechanism of tax incentives.
- 3. Introduction of the "conditional interest" mechanism into the Russian legislation, according to the authors, will not lead to a significant reduction of the aggregate tax rate, therefore, such an instrument can only be considered as a way to smooth out the

- "debt bias", but not as a way to increase the investment of individuals in capital.
- 4. According to the authors, the problem of double economic taxation in Russia is best solved by improving the mechanism of taxation of dividends at the level of individuals, which can be implemented in two alternative ways. First, through the transition to partial exemption of dividends from taxation, including depending on the term of ownership of shares, the fact of placement of shares in the organized financial market and the sector of the economy to which the issuing companies belong. This mechanism should be harmonized with the mechanism of taxation of income from capital appreciation. Second, through the introduction of a regressive dividend tax scale depending on the investment period.

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Cryptocurrencies vs Central Banks' Digital Currencies: The Role of Financial Literacy

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ABSTRACT

A bifurcation point has arisen in the transformation of the global monetary and financial system, associated with its further digital transformation: will it be based on private digital currencies like Bitcoin, or on the basis of central bank digital currencies (CBDC)? To a large extent, this depends on the willingness of economic agents to use virtual currencies. The purpose of the study is to explore the factors determining the attitude of economic agents to digital currencies and the impact of financial literacy on using these instruments as an investment object and means of payment. The authors use the following research methods: content analysis, retrospective analysis, methods of comparative cross-country analysis, and empirical research in the form of an online survey of graduate financial students. This study is one of the first to reveal differences in the assessment of their knowledge and readiness to use digital currencies of financial and non-financial students, as well as to confirm an adequate assessment of the risks and opportunities of different types of virtual currencies if students have financial knowledge. The research shows that the situation with the decisionmaking of economic agents on the use of cryptocurrencies and the CBDC differs: in the first case, the initiative comes from the economic agents themselves, who make decisions at their own peril and risk; in the second case, economic agents are confronted with the fact of the existence of the CBDC and the need to use them. The authors conclude that the population's low financial and digital literacy can create a mental barrier to the use of CBDC, complicating their implementation in national monetary systems. The lack of financial literacy leads to an exaggeration of their knowledge by participants in the cryptocurrency market.

Keywords: cryptocurrencies; digital currencies; financial literacy; financial inclusion; CBDC; Bitcoin

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INTRODUCTION

The era of great transformations is the twenties of the 21st century. In addition to reforming the global monetary and financial system (IMFS) and the international financial architecture, humanity has decided on a double transition: to a green and digital economy. As part of digitalization, which is changing all spheres of human life, it is planned to carry out a global monetary reform — the introduction of virtual currencies into national and international payment transactions. Changing the main element of monetary systems — the form of money — is a serious transformation of the entire monetary sphere.

The advent of Bitcoin marked the beginning of an era of virtual currencies, interpreted as "digital representations of value not issued by a central bank, credit institution or electronic money institution, which in some cases can be used as an alternative to money". 1 Their economic nature and capabilities have become the subject of close study [1, 2], but so far, researchers have not come to a consensus on whether bitcoin can be considered money. Most experts state that, being a financial asset, cryptocurrencies can serve as a means of payment, but they are not money in the full sense of the word, since they are not an obligation to anyone and have no intrinsic value and collateral, and do not implement most of the monetary functions [3, 4]. However, there is another point of view based on the fact that the technologies for the production and circulation of cryptocurrencies fully meet the requirements for "monetary material" and

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¹ ECB. Virtual Currency Schemes — a further analysis. February 2015. URL: https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf (accessed on 11.03.2022).

reflect the development trends of monetary systems on a new technological basis [5], and cryptocurrencies themselves represent a modern stage in the development of electronic money, which is characterized by an exit from the jurisdiction of national states [6, p. 99]. In the context of monetary functions, the issue of the effectiveness of private currencies [7] was studied, including cryptocurrencies that function and compete with the money of central banks [8].

There is no consensus on whether cryptocurrencies are money, and among international organizations. Thus, FATF experts² consider cryptocurrencies as a kind of virtual currencies, which, in their opinion, cannot be considered a means of payment until they can be legally borrowed in any jurisdiction.³ The Bank for International Settlements (BIS) stated in its annual report: "By now, it has become clear that cryptocurrencies are speculative assets, not money".⁴

We agree with the thesis that good money requires confidence in the stability of its value and that the institutional mechanisms of money emission are of great importance.⁵ At the same time, we note the complexity of the theoretical analysis of cryptocurrencies in this context, due to the fact that this ambiguous innovative tool is difficult to include in traditional monetary theories.

However, in practice, many economic agents make their choice in favor of cryptocurrencies, using them as an investment asset and means of payment, which necessitates further scientific study of their economic nature, functions, and the reasons for such interest in very complex and risky financial instruments.

MATERIALS AND METHODS: PROBLEM STATEMENT

This paper aims to study the factors that determine the attitude of economic agents to digital currencies and the impact of financial literacy on the use of these instruments as an investment object and means of payment. The study used content analysis, retrospective analysis, methods of crosscountry comparative analysis and empirical research in the form of an online survey of undergraduate students in finance and graduate students of the Financial University.

The emergence (2009), the spread and rapid growth in the turnover of cryptocurrencies, as well as their use as means of payment, caused concern among national and supranational currency regulators, who saw this new tool as a threat to the existing principles of the functioning of monetary systems. The transformation of the IMFS based on cryptocurrencies would narrow the ability to fulfill the targeted mandates of central banks, and ultimately undermine national sovereignty in the monetary sphere, since it involves the transfer of money from the control of central banks to technological and financial control of digital monopolists. An example is Facebook's Libra⁶ cryptocurrency, whose high security and potential scale of use (3 billion Facebook users) could make it a viable supranational reserve cryptocurrency alternative to the dollar [9].

At present, a bifurcation point has emerged in the transformation of the IMFS, related to determining the ways of its further digital transformation: whether it will be based on *private* digital currencies like Bitcoin or Diem, or on the basis of *central bank digital currencies* (CBDC). The probability of the first option will depend, in our opinion, on the timing and success of the implementation of digital currency projects of central banks in various countries. In the case of a

² FATF — Financial Action Task Force.

³ FATF. Virtual Currencies — Key Definitions and Potential AML/CFT Risks. June 2014. URL: https://www.fatf-gafi.org/documents/documents/virtual-currency-definitions-aml-cft-risk.html (accessed on 11.03.2022).

⁴ BIS Annual Economic Report. June 2021. URL: https://www.bis.org/publ/arpdf/ar2021e.pdf (accessed on 11.03.2022).

⁵ BIS Annual Economic Report. June 2018. P. 91. URL: https://www.bis.org/publ/arpdf/ar2018e.pdf (accessed on 11.03.2022).

⁶ Blockchain payment system Libra Association, from 01.12.2021 renamed to Diem.

seamless introduction of the CBDC into the monetary systems of national states, the digitalization of the IMFS will follow this path, as it is safer and meets the interests of most countries. If problems and risks are identified that are critical for the use of the CBDC, the spontaneous expansion of the use of Bitcoin, other private digital currencies of the distributed ledger and their legalization in national jurisdictions will continue [10, p. 47].

The study of the available literature on the issue under study indicates a significant variety of forms and types of virtual currencies. Currently, they are usually divided into two large classes: convertible and non-convertible virtual currencies, depending on the possibility of their exchange for regular flat money.7 The former, in turn, are divided into centralized and decentralized (functioning on the basis of distributed ledger technology, DLT). Representatives of non-convertible virtual currencies are game currencies that cannot be converted into fiat money. We will not consider this class. Bitcoin is a decentralized convertible virtual currency. Central bank digital currencies, another representative of convertible virtual currencies, refer to centralized virtual currencies, which are central bank liabilities denominated in national currency, having a digital representation and capable of acting as legal tender, measure and means of payment. store of value [11, p. 5].

The strategic choice of digitalization models for the monetary and foreign exchange sector will largely determine the competitive positions of certain countries in the future IMFS and the key contours of this system itself. Realizing the threat, central banks around the world began to actively explore the possibilities of digital money and related distributed ledger technologies (DLT). In 2014, the central bank of Ecuador launched a project to explore electronic money and the possibility of making

payments on the platform of the central bank. In 2015, the Central Bank of the Netherlands (De Nederlandsche Bank) began experimenting with the formation of money based on DLT. Meanwhile, the central banks of Great Britain, Canada, and Singapore were doing the same. Their general conclusion was the assertion that the degree of development of the distributed ledger technology does not yet allow its use within the payment systems of central banks [12, p. 5]. In this regard, other technologies and designs of central bank digital currencies (CBDC) began to be developed — a new form of money in the digital age as an alternative to private cryptocurrencies.

In 2018, a survey by the Bank for International Settlements (BIS) and the Committee on Payments and Market Infrastructures (CPMI) showed that most central banks consider the introduction of the CBDC only in conceptual terms, and few believe in their appearance in the short or medium term [13]. A year later, in 2019, of the 66 central banks surveyed (21 advanced economies, 45 emerging market jurisdictions, accounting for 75% of the world's population and 90% of global GDP), 80% reported that they already developing CBDC at one stage or another [1]. By mid-2020, pilot projects of three retail CBDCs had already been completed in the world, projects were under way in 28 countries, and the development of the CBDC concept was carried out in another 68 jurisdictions [12].

The People's Bank of China has advanced the furthest in the implementation of the CBDC project, which in 2020 tested the use of retail CBDC in several cities of the country, and from April 2021 launched the DCEP (Digital Currency Electronic Payment) application. In total, since 2014, more than 140 million personal digital wallets have been created in China, and the transaction volume has exceeded 62 billion yuan. During the

⁷ Overview of cryptocurrencies, ICO (initial coin offering), and approaches to their regulation. Bank of Russia, December 2017, Moscow. URL: http://www.cbr.ru/content/document/file/36009/rev_ico.pdf (accessed on 11.03.2022).

⁸ URL: https://ria.ru/20220209/yuan-1771832356.html (accessed on 11.03.2022).

2022 Winter Olympics, more than 2 million yuan of payments were made daily using e-CNY,9 both by residents of the country and foreign citizens. Representatives of the People's Bank of China noted that the growth of the market and the importance of cryptocurrencies was one of the factors in the decision to switch to digital currencies. It can be stated that the CBDC is already a reality of the monetary sphere.

The concept of CBDC has been around for a long time. Back in 1987, the expediency of providing electronic money by central banks directly to economic agents was studied [14]. To date, a significant array of scientific publications has appeared, the authors of which have studied the role and place of the CBDC in the existing variety of forms and types of money, the feasibility of creating CBDCs, possible models and types of architecture of the payment system [15–18]. Russian specialists, developing the problems of CBDC, studied their economic nature, advantages and disadvantages [19–22], the impact on the financial system [23].

The introduction of digital currencies was agreed upon at the G20 Rome Summit, and the Bank of Russia announced its concept of the digital ruble and the specific stages of the implementation of this project: December 2021 — creation of a prototype digital ruble platform of the Bank of Russia; January 2022 — development of necessary changes in legislation; Q1 2022 — testing a prototype of a digital ruble platform together with financial market participants. In case of successful testing, further development of the CBR platform will take place¹¹:

- connecting credit institutions and the Federal Treasury to the digital ruble platform of the Bank of Russia, carrying out C2C, C2B, B2C, B2B, G2B, B2G, C2G, G2C;
- connecting financial intermediaries, introducing an offline mode, ensuring the exchange of the digital ruble for foreign currency and the possibility of opening wallets for non-resident clients.

In this regard, the question arises about the readiness of economic agents for the practical use of virtual currencies. Last but not least, the success of introducing the CBDC into the national monetary systems, and, consequently, the possible directions for their further digital transformation, depends on this. The emphasis on financial literacy in our study is not accidental. The situation with the decision-making by business entities on the use of cryptocurrencies and CBDCs differs significantly.

In the first case, the initiative comes from the economic agents themselves, who make decisions about investing in cryptocurrencies or making (accepting) payments using them at their own peril and risk. How adequately do they assess this risk?

In the second case, the decision on the introduction and areas of use of the CBDC is made by the state represented by the central bank, and economic agents are faced with the fact of their existence in the country's monetary system. Will the population's financial literacy make it possible to quickly and painlessly introduce this new form of money into monetary and payment circulation? Won't this create a situation similar to trying to use QR codes during a pandemic?

The priority motives of regulators in developing CBDC models vary from country to country. The main tasks for the central banks of most countries are similar: ensuring the safety and efficiency of domestic payments, financial stability, the effectiveness of the implementation of monetary policy and cross-border payments, as well as *the financial*

⁹ e-CNY is the China's Central Bank digital currency.

URL: http://cryptohamster.org/%D0%B2%D0%BE%D1%82
 %D1%81%D0%BA%D0%BE%D0%BB%D1%8C%D0%BA%D0%BE-%D1%86%D0%B8%D1%84%D1%80%D0%BE%D0%B2%D0
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 %D0%BE%D0%B2 (accessed on 11.03.2022).

¹¹ The concept of the digital ruble. Bank of Russia. April 2021. P. 29. URL: http://www.cbr.ru/content/document/file/120075/concept_08042021.pdf (accessed on 11.03.2022).

inclusion of these instruments. However, K. Boar [1] notes that in developed countries, central banks are exploring the possibilities of CBDC mainly in order to ensure the safety and efficiency of domestic and external payments, they are also concerned about the impact of CBCB on financial stability. Whereas in *developing* countries, the most important task in the implementation of the CBDC, along with ensuring the security and efficiency of domestic payments, is to *ensure financial inclusion*, which is not among the priorities of developed countries. In general, for developing countries, CBDCs turned out to be more significant than for developed ones. ¹²

Financial Inclusion is the state of the financial market, in which the entire capable population of the country, as well as small and medium-sized businesses, have a full opportunity to receive a basic set of financial services as defined by the G20 Global Partnership for Financial Inclusion (including payments, deposits, loans, and insurance). 13 It implies the presence of physical, price, mental, and assortment inclusion. In our study, we will focus only on mental inclusion, given the specific nature of new virtual financial instruments. Although for the population of developing countries, the issue of physical inclusion is also very relevant, given the prevalence and cost of technical devices and software needed to access digital currencies. In many countries, a significant portion of the adult population still lacks access to digital payment options. 14

Mental inclusion to financial products, services, and instruments implies an understanding of their properties, opportunities, and inherent risks. Therefore, it requires a certain level of *financial* literacy of economic agents. In addition, the use of

https://www.bis.org/publ/arpdf/ar2021e.htm (accessed on 11.03.2022).

virtual currencies also implies a certain level of *digital* literacy. The lack of financial and digital literacy can become a mental barrier to the use of virtual currencies, leading to the formation of inadequate behavior patterns, and forming a negative investment or payment experience [24].

FINANCIAL LITERACY WITH RESPECT TO VIRTUAL CURRENCIES AS A FACTOR OF THEIR USE

The cryptocurrency market attracts investors with the dynamics of its development and the possibility of obtaining high income. *Fig. 1* shows the growth of the aggregate index of cryptocurrencies, which includes the largest cryptocurrencies and is calculated by the Bloomberg together with the cryptocurrency bank Galaxy Digital Capital Management. Its composition as of March 2022 is shown in *Table 1*. At the bottom of *Fig. 1*, the evolution of Bitcoin's market capitalization from March 2020 to March 2022 is presented. The top graph shows that the dynamics of the aggregate index are largely determined by this cryptocurrency, which dominates the market.

The graph data shows that lockdowns during the COVID-19 pandemic gave a powerful impetus to the development of the cryptocurrency market: in just a year, from November 2020 to November 2021, the total capitalization of the global digital currency market, including stablecoins, grew 6.6 times — up to \$ 2.9 trillion dollars. Bitcoin has the largest market share at 43%, or \$ 1.2 trillion. 15

Russian participants are very active in this market, being the leaders in the number of visits to the Binance digital currency exchange, and the annual volume of transactions with digital currencies of Russian citizens is about \$ 5 billion dollars. 16

The activity of Russian citizens in the cryptocurrency markets reflects, in our

 ¹² BIS Annual Economic Report. June 2018. P. 8. URL: https://www.bis.org/publ/arpdf/ar2018e.pdf (accessed on 11.03.2022).
 ¹³ Bank of Russia. URL: http://www.cbr.ru/develop/development_affor/dic/#highlight (accessed on 11.03.2022).
 ¹⁴ BIS Annual Economic Report. June 2021. P. 69. URL:

¹⁵ Bank of Russia. Financial Stability Review Q2–Q3 2021, P. 40. URL: https://www.cbr.ru/Collection/Collection/File/39346/2_3_q_2021. pdf (accessed on 11.03.2022).

¹6 Там же, с. 41.

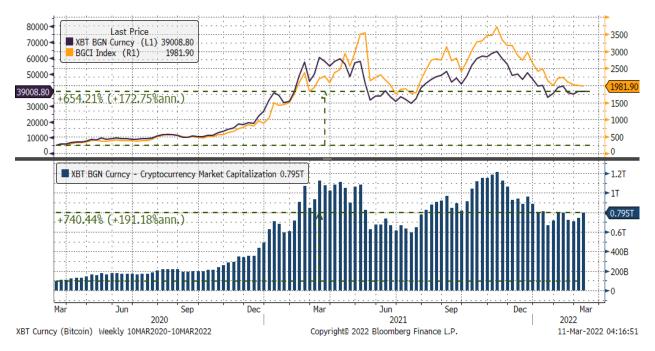


Fig. Comparative dynamics of the aggregated crypto-index (BGCI Index) and its main component — Bitcoin (XBT Currency) in the cryptocurrency market (Market capitalization in trillion dollars)

Source: compiled by the authors based on Bloomberg statistics (accessed on 11.03.2022).

opinion, the general trend of increased activity of individuals in the financial markets during the period of low-interest rates and coronavirus restrictions, with a low overall level of financial literacy, as well as an increased appetite for risk.

OECD research indicates a relatively low level of financial literacy in the world population as a whole. The OECD financial literacy assessment methodology includes three components: financial knowledge, financial behavior, and financial attitudes that shape attitudes toward long-term financial planning. According to an OECD study, the index of basic financial knowledge of Russians is higher than the world average, while financial behavior and financial planning are lower.¹⁷ In our opinion, such results are due to the low incomes of many Russian citizens, which determine the presence (or absence) of demand for investment financial products and the experience of using them. According to a

The problem of financial literacy of cryptocurrency market participants is of interest to researchers; many publications were devoted to it in 2020–2021. G. Panos, T. Karkkainen, A. Atkinson [25], studying the impact of financial literacy on the ownership of cryptocurrencies based on data from 15 countries, revealed a negative relationship. The authors concluded that the demand for cryptocurrencies among the population is largely due to the inexperience of users.

A study of factors influencing the use of cryptocurrencies by households [26] did not show a significant impact of financial literacy on the desire to operate cryptocurrencies; the expectation of profitability of operations was more important.

H. Zhao and L. Zhang [27] found that investment experience has a greater influence on investment in cryptocurrency than

survey by the Bank of Russia, 17% of citizens do not have savings. 18

¹⁷ OECD/INFE 2020 International Survey of Adult Financial Literacy. URL: https://www.oecd.org/financial/education/oecd-infe-2020-international-survey-of-adult-financial-literacy.pdf (accessed on 11.03.2022).

¹⁸ The attitude of the Russian population to various means of payment. Results of sociological research for 2020. URL: https://www.cbr.ru/Collection/Collection/File/35422/results 2020.pdf (accessed on 11.03.2022).

financial literacy, although the experience of owning risky assets indirectly influenced the formation of a connection between subjective financial knowledge and behavior when investing in cryptocurrency.

Q.T. Pham et al. [28] also concluded that socio-demographic factors and financial literacy do not affect the intention to invest in cryptocurrencies.

Of particular interest is the study of millennials' awareness ¹⁹ of various investment asset classes, with a special focus on cryptocurrencies, given this generation's propensity for digital technologies [29]. This study showed that market participants were generally aware of the level of risk of the chosen financial products, but their main motivation was to achieve the target return. By early 2022, 48% of U.S. millennial households owned crypto, compared to 20% of the country's adult population as a whole.²⁰

Thus, it seems that a significant part of cryptocurrency users do not have the financial literacy necessary for these operations, and their main motive is the desire to obtain high returns. More active in relation to cryptocurrencies are representatives of the younger generation, in particular millennials, who are ready to take on increased risks and are well-versed in the world of digital technologies.

In this regard, the authors conducted a study, the purpose of which was to identify the degree of awareness of students with financial knowledge regarding virtual money, their understanding of the differences between cryptocurrencies and the CBDC, and their willingness to use these tools.

Table 1
Composition of the Global BGCI Index
as of March 2022

Cryptocurrency	Ticker	Index constituent weights, %		
Bitcoin	BTC	35		
Ethereum	ETH	35		
Cardano	ADA	6.66		
Solana	SOL	6.11		
Avalanche	AVAX	4.14		
Polkadot	DOT	3.51		
Polygon	MATIC	2.48		
Cosmos	ATOM	1.64		
Litecoin	LTC	1.64		
Chainlink	LINK	1.40		
Uniswap	UNI	1.25		
Algorand	ALGO	1.16		

Source: Bloomberg statistics (accessed on 11.03.2022).

RESEARCH RESULTS: UNDERSTANDING DIFFERENCES REGARDING TYPES OF VIRTUAL CURRENCIES

The online survey was completed by 222 undergraduate students and graduate students in finance. The survey results showed the following. Answers are given as a percentage of the total number of respondents.

First of all, we found that the level of trust in the traditional financial system and fiat money remains high at 56% and 57% respectively. However, 38% of respondents believe that the latter have outlived themselves.

The preferred payment methods are mobile and card payments relatively equally (45% and 49%). Cash payments seem obsolete (3%), while payments using cryptocurrencies seem exotic (3.6%).

The study showed that students are equally familiar with both cryptocurrencies and CBDC (36% and 37%).

Interestingly, 29% of the students surveyed *have experience with cryptocurrencies*, mainly as an investment object (24%).

About 30% of respondents are ready to receive a salary in the CBDC and 20% agree to a salary in cryptocurrency. This share generally correlates with the share of those who believe that cryptocurrencies can already replace fiat money: 27%. However, only 4.5% of respondents consider cryptocurrencies to be a means of payment. The majority — 65% — consider them both a financial asset and a means of payment.

The position of respondents regarding the need to regulate the cryptocurrency market is interesting: 81% believe that this should be done. At the same time, 47% believe that this should be done by central banks and 37% — by other organizations.

The survey results also showed that, according to students, the introduction of the CBDC is important both for success in the most important industries and key markets (53%) and for geopolitical reasons (75%).

However, despite the fact that 61% of respondents know little about the CBDC, they believe that they can be introduced to the national (65%) and international (55%) payment turnover. Preference for cryptocurrency in this context is given by 18 and 31%, respectively. It can be stated that those of the students who had experience with cryptocurrencies (29%) prefer it, rather than the CBDC, as a new form of money.

Similar studies were carried out in other countries, which indicates the presence of a problem that causes concern among specialists. We have access to data from a survey conducted at 6 universities in Germany, China, Poland, and Russia among *non-finance* students with *no banking (financial) training* or special knowledge about virtual currencies.²¹

A comparison of the results of this study with ours showed a significantly greater propensity for cash settlements in Germany and Poland than in Russia and even more so in China. There is evidence that Germans often resort to cash payments to reduce their digital footprint.

Interestingly, about a quarter of respondents see the potential of cryptocurrencies as a replacement for traditional central bank money, similar to our study.

However, it should be noted that if in our study only 37% of respondents said that they know a lot about virtual currencies, then in the study of our Western colleagues there are much more of them: in Germany -65%, in Poland -78%, in China -60%. It seems that the majority of non-major students overestimate their knowledge of these issues.

CONCLUSIONS

The paper considers the phenomenon of convertible virtual currencies, the use of which will determine the direction of the digital transformation of the IMFS.

The study was aimed at determining the degree of influence of financial literacy on the use of digital currencies as an investment object and means of payment in the context of the successful introduction of the CBDC into national monetary systems. Based on the study of publications on the research topic, the results of an online survey of undergraduate students in finance, and crosscountry comparisons, the authors came to the following conclusions.

The link between financial literacy and investment in cryptocurrencies is almost non-existent, or vice versa. A significant part of cryptocurrency users do not have the financial literacy necessary for these operations, and their main motive is the desire for high profits. The younger generation is more active in cryptocurrencies.

The younger generation is more active in cryptocurrencies.

²¹ Report by D. Hummel "Digitalization — challenges for regulators and financial literacy" at the II International Scientific and Practical Conference (ISPC) "Transformation of Financial Markets and Financial Systems in the Digital Economy". Moscow, Financial University, 14–15.10.2020.

The lack of financial training and low financial literacy, as well as the lack of experience in financial investment, lead to a reassessment of their knowledge by participants in the cryptocurrency market, confirming the Dunning-Kruger effect.²² The presence of financial knowledge contributes to a more adequate assessment of the opportunities and risks of virtual currencies and an understanding of the features of their different types.

A large number of unqualified investors with low financial literacy and high-risk appetite in the cryptocurrency market can lead to increased volatility, increased financial instability with the growth of market volumes, and negative social consequences.

The presented study is one of the first to reveal differences in the assessment of their knowledge and readiness to use digital currencies by students of financial and nonfinancial specialties, and also confirms a more balanced assessment of the risks and opportunities of different types of virtual currencies if they have financial knowledge.

Also, the contribution of the authors is to identify social and financial risks due to insufficient financial literacy of the population when using cryptocurrencies and CBDCs: in the first case — when making investment decisions, in the second — in a situation where they should be applied when issued by the Central Bank. Low financial and digital literacy of the population can create a mental barrier to the use of CBDCs, complicating their implementation in national monetary systems.

The results of this study may be useful in developing a strategy for the introduction of the CCDC into the national monetary systems and the development of the financial market of the Russian Federation in order to reduce the social and financial risks of the population when using virtual currencies, reputational risks of the Central Bank, as well as in training programs for financial specialists and programs to improve the financial literacy of the population.

Further research into the phenomenon of virtual currencies can be aimed at studying their economic essence and functions, the issues of regulating their circulation and taxation, as well as the experience of practical use of the CBDC of China.

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Appendix

Survey results

		Respondents' answers					
No.	Question		%	Number of students			
	What is your level of confidence in the	High	56	125			
1	traditional financial system based on	Low	24	54			
	money issued by the Central Bank?	Don't know	20	43			
	Do you think that traditional money is obsolete?	Yes	38	84			
2		No	57	126			
	obsolete.	Don't know	5	12			
	Which currencies issued by central banks do you trust the most?	Dollar	55	122			
3		Euro	30	67			
3		Yuan	8	18			
		Russian ruble	7	15			
	Which payment method do you prefer?	Cash	3	6			
4		Credit card	49	109			
4		Mobile payment	44	99			
		Cryptocurrency	4	8			
	What do you know about digital currencies?	A lot	37	83			
5		Few	61	135			
	ediverseles.	Nothing	2	4			
	What do you know about cryptocurrencies?	A lot	35	79			
6		Few	63	139			
	S. JP CO CONTINUES.	Nothing	2	4			
		Yes	43	96			
7	Are you interested in making transactions using cryptocurrency?	No	42	93			
	and a string cryptocarrelley.	Don't know	15	33			

Appendix (continued)

		Respondents' answers				
No.	Question		%	Number of students		
8	Have you had any experience using	as a means of payment?	5	12		
		as a financial asset?	24	53		
	cryptocurrencies	no user experience	71	157		
	Would you agree to receive a salary in cryptocurrency?	Yes	20	44		
9		No	59	131		
	eryptocurrency.	Don't know	21	46		
	Would you agree to receive a salary in digital rubles issued by the Central	Yes	30	67		
10		No	49	108		
	Bank?	Don't know	21	46		
	Do you think that cryptocurrencies	Yes	27	60		
11	can replace money issued by central banks?	No	61	135		
		Don't know	12	27		
	Is there any need for any regulation of the cryptocurrency market?	Yes	65	79		
12		No	25	31		
	and dryptocontency manner	Don't know	10	12		
	Do you agree with the thesis that	Yes	53	118		
4.7	digital money, i.e. e-euro, e-yuan,	No	22	49		
13	etc., is essential for success in key industries (engineering, finance, medicine, IT technology)?	Don't know	25	54		
	Do you think there are goonelitical	Yes	75	167		
14	Do you think there are geopolitical reasons for the development and adoption of the Central bank digital currency?	No	9	19		
14		Don't know	16	35		
	Are cryptocurrencies	means of payment?	5	10		
		a financial asset?	25	56		
15		both a means of payment and a financial asset?	65	144		
		other	5	11		
		by central banks?	47	104		
	6	by other organizations?	37	82		
16	Should the cryptocurrency market be regulated	shouldn't be regulated	16	34		

Appendix (continued)

		Respondents' answers				
No.	Question		%	Number of students		
17	In your opinion, in the national payment turnover	it is preferable to introduce the Central Bank digital currency	66	145		
		it is preferable to introduce cryptocurrency	18	40		
		other	16	35		
	In your opinion, in the international payment turnover	it is preferable to introduce the Central Bank digital currency	56	122		
18		it is preferable to introduce cryptocurrency	31	69		
		other	13	28		

Источник / Source: составлено авторами / compiled by the authors.

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The State of the Russian Bancassurance Market

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ABSTRACT

Bancassurance has recently appeared on the market but is developing rapidly. The subject of the study is the process of combining banks and insurance companies, which contributes to the emergence of new products, increased risk protection, improved customer service quality, and increased profitability of their business. The purpose of the research is to study the state of bancassurance at the present stage in Russia and to set goals to overcome the difficulties of developing a joint business of banks and insurance companies. The author uses the following methods: comparative, statistical, and factor analysis, identification of trends, graphical comparisons, etc. Theoretical analysis of research on this issue allowed the author to clarify the concept of "bancassurance" and group the motives of interaction and the advantages of cooperation between banks and insurance companies. The result of the practical analysis was the identification of current trends in bancassurance in the country: a decrease in the number of participants; the predominance of large institutions in the bancassurance market, concentrating a large share of assets; imposing additional services on customers, which as a result increases their debt burden. The systematic and integrated approaches of the research allowed the author to identify important problems that require a primary solution (the imposition of bancassurance products and their inflated price, high costs for the sale of products, and the presence of contradictions between the bank and the insurance company). The author concludes that systematic and complete informing to the population about the importance of bancassurance products, providing customers with their independent choice, as well as the introduction of joint business standards of banks and insurance companies using modern digital technologies will bring the Russian bancassurance market to a higher level of development. The prospect of further study of the subject is presented by the author in a more detailed study of minimizing factors that negatively affect the merger of banking and insurance businesses.

Keywords: banks; insurance companies; bancassurance; interaction; pandemic; bancassurance products

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INTRODUCTION

At present, the importance of bancassurance has increased significantly. Mutual banking and insurance business optimize the balance of supply and demand for services, minimizes risks and transaction costs, and increases the level of customer protection and their degree of financial literacy.

In the post-crisis period, the interaction between banks and insurance companies has intensified. At a time when the merger of their businesses is actively manifested abroad, in Russia this process is limited due to the specifics of their activities, differences in the "rules of the game in the market", imperfection of the legislative framework, etc.

The research methodology is based on the work of foreign and domestic economists. The scientific works of A. Smith, D. Ricardo, J. M. Keynes, J. Schumpeter describe the main functions of financial intermediaries as commodity-money relations develop. The value chain of financial intermediary products has been studied by J. Sink (Jr.), R. Miller, F. S. Mishkin, D. VanHoose, and others. Transactional and informational approaches to the study of financial intermediaries are distinguished by V. Smith, J.E. Stiglitz, D.V. Diamond, et al. [1]. They argue that the presence of "transaction costs and asymmetric information determines the activity of financial intermediaries" [2]. Thus, the transformation of capital, terms, and risks is carried out only by banks. The research on the financial market by W. Buffett and G. Soros 1 revealed the turbulence of its processes, the presence of speculative motives, and high risks. Banks get the opportunity to minimize the costs of financial market participants, thereby attracting more investors and managing partners' risks more effectively.

J. Sink designated the interaction of institutions in the form of a "financial services industry", which made it possible to expand their functions. J. Sink gives a special place to banks that provide optimal liquidity, increase capital, provide loans, accumulate resources and act as information providers [3].

Financial supermarkets first appeared in Europe in 1970–1980 from the merger of banks and insurance companies. In the USA and Japan, they formed in the second half of the 1990s. [2] However, the rapid development of their mutual business revealed many forms of interaction:

- a) an agent bank for the sale of standard insurance products;
- b) an insurance company affiliated with a bank with ordinary shareholders;
- c) bank-shareholder of the insurance company;
- d) establishment of a financial intermediary by the bank;
- e) creation of a "supermarket" providing services to financial institutions under a single brand.²

The advantages of the joint business of banks and insurance companies are obvious: increase in customers; reducing the cost of office work, advertising, and marketing; no duplication of functions; improving the quality of services; expanding the range of customer-oriented products; income increase [3].

E. M. Sandoyan describes in detail and authentically the functions of these financial institutions: informing; facilitating the circulation of goods and services; investments; liquidity regulation [4].

The authors of the market approach study the unity of banks and insurance companies in the local [5–9], federal and international markets [10, 11] in the form of bancassurance

¹ Maslov O. Yu. Speculative capital, derivatives, hedge funds, and the First Global Great Depression of the 21st century. Weekly independent analytical review. 26.11.2007. URL: https://elitetrader.ru/index.php?newsid=5931 (accessed on 01.08.2021).

² Vlasenkova Yu. Financial supermarkets as a strategy for the development of international financial intermediaries in a competitive environment. CBR, May. 2008. URL: https://studylib.ru/doc/2508281/finansovyj-supermarket-kak-strategiya-razvitiya (accessed on 06.08.2021).

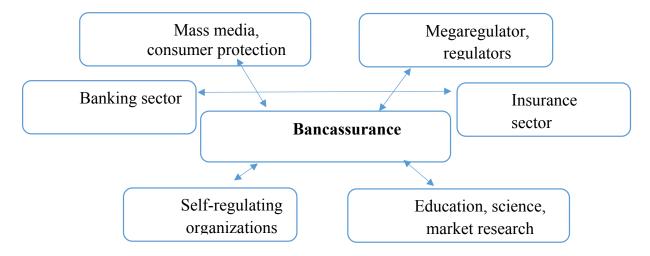


Fig. 1. Institutional structure of the bancassurance market in Russia

Source: compiled by the author.

and "assurfinance". The concept of bancassurance is based on the proposal of new related products based on the development of a common infrastructure for banks and insurance companies, which increases their competitiveness.

E. A. Pomogaeva studies bancassurance from the standpoint of an institutional approach — as a joint activity of banks and insurance organizations, and from a functional approach — as "creating a system of cross-selling banking and insurance product" in one place [12].

An integrated approach to the study of bancassurance by economists M.K. Yurik and K.S. Petrov made it possible to identify the unification of information systems, the integration of the client base, and the formation of unified business processes of banks and insurance companies [13].

In foreign literature, bancassurance is understood as the process of selling insurance products by banks, savings banks, etc. This direction is considered promising; therefore, economists are actively developing strategies for its effective development [14–19]. Bank insurance minimizes the risks for all market participants.

The above definitions of bancassurance can be divided into two groups: some economists point to the unification of the business of banks and insurance companies, others point to the integration of their systems [20–22].

Taking into account all the points of view of economists, the author's understanding of "bancassurance" is the totality of banking and insurance, aimed at:

- expanding the range of the joint product line:
- taking over new sectors of the financial market;
- increasing the portfolios of banks and insurance companies;
 - increasing profits.

Bancassurance includes not only the implementation by the bank of the entire range of insurance products but also insurance of all its risks.

In the bancassurance market (*Fig. 1*), as a result of economic relations, market participants can simultaneously act as sellers and buyers of insurance coverage. The necessary conditions for the functioning of the banking insurance market are:

- emerging demand for bancassurance products;
- availability of institutions capable of satisfying consumer demand (supply of bancassurance products) [23].

 $^{^{\}rm 3}$ The method associated with the provision of banking services by the insurer.

Advantages for bancassurance participants

For a bank	For a customer	For an insurance company
 Development of a new market niche; expansion of the product line with insurance products; additional commission income from the sale of bancassurance products; maintenance of the insurance company and its employees; banking services for new customers and attraction of their resources; expansion of the client base, who have insurance coverage; ensuring protection against risks, transferring banking risks to insurance companies; improving the quality of the loan portfolio through insured loans; accumulation of resources of the insurance company and their placement in profitable assets; increased competition in the market 	 Protecting the financial liability of a borrower and guarantors; a guarantee of repayment of credit obligations in the event of an insured event; receiving services in one place; obtaining a tax deduction from the payment of insurance premiums; receipt of insurance payment and repayment by the insurance company of loans in case of temporary disability; insurance contracts are not subject to seizure, unlike bank accounts, etc. 	 Increase in insurance premiums for insurance of bank risks; sales growth through the use of the banking channel and the bank's client base; reducing the cost of sales through the use of equipment and bank employees; banking services at reduced rates/tariffs; implementation of bank investments; expansion of the market share due to the growth of sales volume; increasing competitive advantages in the market; increasing the profits of the insurance company

Source: compiled by the author.

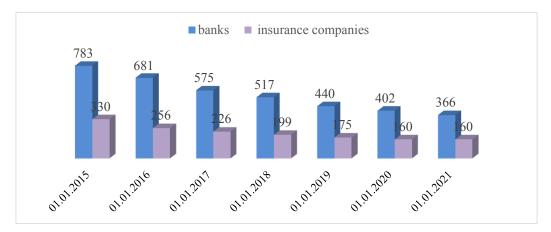


Fig. 2. Dynamics of the number of banks and insurance companies in Russia

Source: compiled by the author.

Mutually beneficial cooperation between institutions of the banking and insurance market comes down to obtaining benefits for each participant (*Table 1*).

The trend of recent years is a decline in the number of financial institutions (*Fig. 2*).

The factors behind a significant number of institutions are the policy pursued by the Bank

of Russia to protect the financial market, the requirements for the size of institutions, and the tightening of their activities.

The trend of recent years in the banking sector is the increase in the state's share in the capital of banks, the monopolization of large banks, and the reduction of competition between medium and small banks. Despite

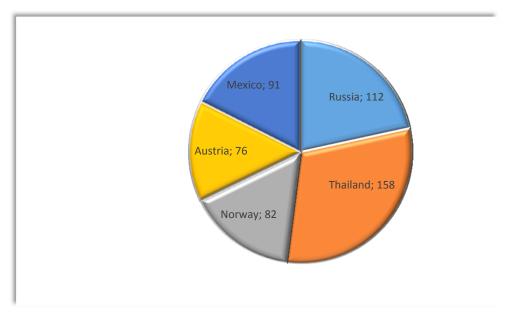


Fig. 3. Insurance companies in foreign countries, units

Source: compiled by the author based on the Banki.ru data. URL: https://www.banki.ru/news/daytheme/?id=10946482 (accessed on 06.08.2021).

the decline in the number of institutions, the market is seeing an improvement in the quality of assets on the balance sheets of banks and insurance companies, an increase in investment portfolios, and an increase in the supply of products, including bancassurance products. Therefore, it can be argued that the level of service provision is not low. On the contrary, in Russia, the number of companies exceeds foreign statistics [24]. Thus, in foreign countries, there are significantly fewer insurance companies on the financial market than in Russia: in Thailand — by 51%, in Norway — by 47.5, in Austria — by 56.8; in Mexico — by 70%. At the same time, more than 40% of them are branches of foreign insurers (Fig. 3).

A decline in the number of companies in the insurance market was observed in the periods of 1994–1996, after August 1998, and also during the crisis of 2008–2009 in connection with the bankruptcy of companies, their failure to fulfill their obligations to customers, as well as the low standard of living of the population [25]. In Russia, large companies dominate, on which a significant part of the fees is concentrated. If we assume that the insurance market will lose a few more

companies that occupy the last places in the rating, then there will be no crisis in the market, since the volume of their penalties is negligible.

The processes of world globalization and business integration, the increase in the capitalization of financial institutions through mergers and acquisitions — all contribute to a reduction in the presence of banks and insurance companies in the market. Bancassurance strengthens the competitiveness of its members, expands its product line, and increases its customer base. Not opposing, but complementing each other, the synergy of the business of banks and insurance companies contributes to the mutual use of the material base, increasing staff productivity, increasing sales, and increasing commission income [26].

Bancassurance has taken root in the Russian financial market in a short time. According to analysts, the share of bancassurance in the total insurance market tends to grow rapidly: from 16.9% in 2010 to 47.2% in 2018. However, banks need to predict not only the growth in demand for bancassurance products but also customer

 ${\it Table~2} \\ {\it Dynamics~of~the~current~year~profit~before~taxation~of~banks~and~insurance~companies~in~2017-2021}$

	Data as of January 01				Profit growth, %				
Indicators	2017	2018	2019	2020	2021	2018/ 2017	2019/ 2018	2020/ 2019	2021/ 2020
Banks, billion rubles	930	790	1,345	2,037	1,974	84.95	170.25	151.45	96.91
Insurance companies, billion rubles	137.7	236.5	338.2	287.9	363.1	171.75	143.00	85.13	126.12

Source: compiled by the author based on the Central Bank data. URL: https://cbr.ru/banking_sector/statistics/; http://www.cbr.ru/insurance/reporting stat/ (accessed on 16.08.2021).

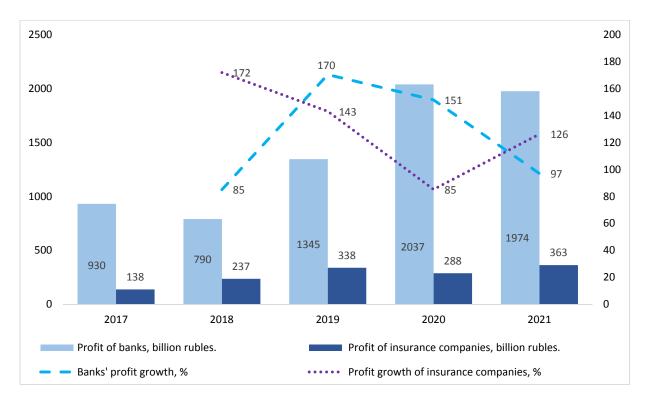


Fig. 4. The ratio of profits of bancassurance participants

Source: compiled by the author.

abandonment. Constantly forcing them on customers can exacerbate competitive conflict and, as a result, reduce sales efficiency.⁴ In 2019, there was a decrease in bancassurance

to 43.1% due to the negative impact of the pandemic.⁵

Banks and insurance companies seek to minimize the gap in the interests of their joint business. "Interest" should be understood as a financial gain. Thus, the dynamics of the

⁴ Review of practices for the implementation of insurance services when concluding a loan agreement. Central Bank of the Russian Federation. Information and analytical material, M.; 2021. 9 p. URL: https://cbr.ru/Content/Document/File/123515/review_20210618.pdf (accessed on 06.08.2021).

⁵ The bancassurance market in 2019 and the forecast for 2020: Crisis premonition. URL: https://raexpert.ru/researches/insurance/bancassurance_2020/ (accessed on 06.08.2021).

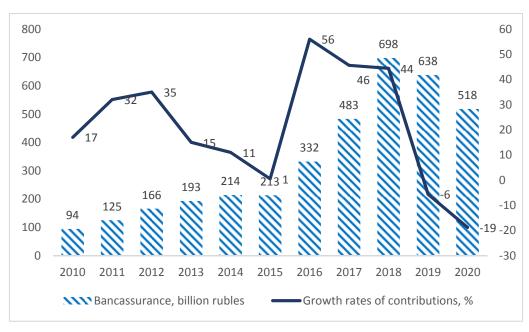


Fig. 5. Dynamics of bancassurance in Russia, 2010–2020

Source: The bancassurance market in 2019 and the forecast for 2020: A premonition of a crisis. URL: https://raexpert.ru/researches/insurance/bancassurance 2020/ (accessed on 21.08.2021).

financial result of the activities of banks and insurance companies are presented in *Table 2*.

According to Table 2, there is an uneven jump in the profits of banks and insurance companies. Until 2019, there was a clear increase in profits due to the volume of sales of insurance products through banks, as well as due to insurance of the risks of the banks themselves. The force majeure factor of the pandemic had an ambiguous impact on their activities in 2020. Strict restrictive measures fettered the insurance sector [27]. The anticrisis measures of the Bank of Russia made it possible to expand mortgage lending and endowment life insurance, which ensured business growth in 2021. However, the profit of banks significantly exceeds the profit of insurance companies (Fig. 4).

It should be noted that the effectiveness of bancassurance depends on the intensity of effective demand for specific products and the degree of competition in this market. At the same time, competition is presented in a non-price form due to the specifics of the activities of institutions: for banking products, an interest rate is used; and in insurance — the insurance rate. Prerequisites

for the development of bancassurance are the need for the financial protection of the life and health of citizens, and compensation for losses under the influence of adverse factors. Insurance companies, competing with banks, perform information, savings, and investment functions. The concentration of capital and the growth of assets of insurance companies allow them to actively work in the securities market and invest [28].

Multilateral factors influence the dynamics of the development of bancassurance (*Fig. 5*). A set of constraining factors: a drop in the population's demand for consumer loans; decrease in income of citizens; debt of bank customers; lending standards — reduce the volume of life and health insurance for borrowers [29].

The specifics of the structure of bancassurance in Russia lie in the development of the following product lines: non-credit bancassurance; credit bancassurance; bank risk insurance (Fig. 6).

Since 2016, credit insurance, which previously dominated bancassurance, is gradually giving way to non-credit insurance. This is due to the fact that investment-

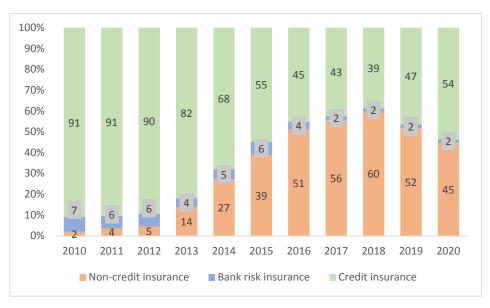


Fig. 6. Structure of the bancassurance in Russia, 2010–2020

Source: The bancassurance market in 2019 and the forecast for 2020: A premonition of a crisis. URL: https://raexpert.ru/researches/insurance/bancassurance 2020/ (accessed on 21.08.2021).

cumulative life insurance, which implements a funded function, has competed with bank deposits. Investment life insurance is a significant area of this niche and accounted for 52.5% in 2020. Endowment life insurance is an alternative savings product and accounts for 34% of non-credit insurance [30]. In addition, "accident insurance services for clients (more than 3%), insurance for persons traveling abroad (0.6%), risk insurance for cardholders (2.5%), property insurance for individuals (4%), voluntary health insurance of clients (about 2%)6 are in demand.

Banking is closely related to various kinds of risks: external (natural, economic, legal, personnel liability, etc.) and internal (currency, credit, deposit, interest, etc.). Despite their significant influence, the share of bank risk insurance in the overall structure of bancassurance remains insignificant and has not exceeded 2% in recent years.

Strengthening the lending activity of banks ensures the growth of their risks and increases the need for insurance. To minimize the level of overdue debts and increase the reliability of collateral, banks have stepped up interaction with insurers. The borrower-pledger must draw up an insurance contract for the pledged property, as well as ensure guarantees of his solvency by insuring his life and health, including insurance against loss of work. The predominant areas are life and health insurance of individual borrowers (more than 66% of fees) and mortgage insurance (17.5%). The coronavirus pandemic contributed to an increase in the execution of contracts against job loss, but the share of this type of insurance is still small (4.4%). Motor vehicle insurance for auto loans is also at a low level (2.8%).

In the context of legal entities' fees in 2020, the predominant service is the insurance of the borrower's property (75.6%). The level of insurance of borrowers in the field of agriculture is 7.1%, while the life and health insurance of borrowers of individual entrepreneurs and SMEs is only 2.4%.

It should be noted that the current period was not easy for the bancassurance development. According to the first, a sharp negative factor for all institutions was the introduction of restrictive measures during the pandemic. However, after some indicators fell, starting from the second half of 2020,

⁶ Bancassurance market in 2020 and forecast for 2021: Smooth recovery. URL: https://raexpert.ru/researches/insurance/bancassurance_2021/ (accessed on 21.08.2021).

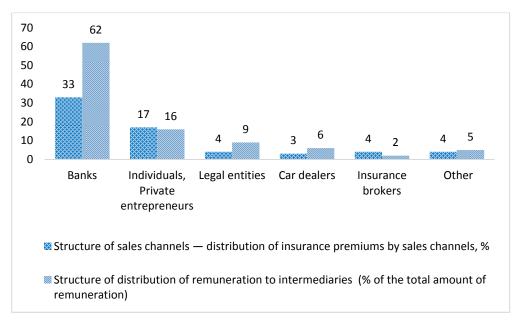


Fig. 7. Structure of sales channels for bancassurance products and the amount of remuneration to intermediaries in 2020, %

Source: compiled by the author based on the Central Bank data. URL: https://cbr.ru/banking_sector/statistics/; http://www.cbr.ru/insurance/reporting stat/ (accessed on 16.08.2021).

the bancassurance market showed growth. Adapting to the new challenges of the time, banks and insurance companies offer new products. In 2020, the following products appeared: a coronavirus insurance service; within the framework of voluntary health insurance, the rehabilitation of the insured after COVID-19 is included; insurance against negative health consequences after vaccination. In addition, the risk of contracting COVID-19 is included in the standard set of travel medical risks.7 Insurance company payouts have risen significantly since the beginning of 2021 due to the new wave of coronavirus. These types of insurance are sold through sales channels and partners. Let us consider the structure of sales channels for bancassurance products, namely, the distribution of insurance premiums by sales channels and the remuneration received (Fig. 7).

Insurance companies independently sell their products by 30% without intermediaries,

and 4% of insurance is purchased by customers through online sales [31]. Banks pay more attention to insurance every year. The advantages of cooperation with an insurance company are obvious: the share of sales through bancassurance is 33%, and the share of remuneration received by banks is 62%.8

However, in Russia there are difficulties hindering the development of bancassurance:

- lack of access to the bancassurance market for insurance companies with low-performance indicators (the size of equity, the volume of contributions, etc.). Unfortunately, banks do not cooperate with all insurance companies due to the financial instability of companies with a small scale of business. To increase confidence in insurance companies, banks establish an accreditation, which is held mainly by financially stable insurance giants;
- the client's lack of independent choice of an insurance company. As a rule, a bank client draws up insurance contracts with a company

⁷ Insurance companies in Russia have offered insurance against coronavirus. RBC. URL: https://www.rbc.ru/rbcfreene ws/5e6f5eef9a79477789cc7ba3 (accessed on 21.08.2021).

⁸ Statistical data for an overview of key performance indicators of insurers. URL: http://www.cbr.ru/insurance/reporting_stat/ (accessed on 21.08.2021).

recommended by the bank. To ensure a healthy competitive environment in the field of bancassurance, the Federal Antimonopoly Service recommended amending Government Decree No. 3869 regarding the quality of supervision, changing the regulator itself, reforming the rating industry, and creating a legal framework for marketplaces;

- the banking market is in many ways more developed than the insurance market;
- lack of information technology for insurers;
- the small size of assets of insurance companies limits their compensation of risks to banks in case of complex insurance;
- bank risk insurance is not standardized, there is no individual approach to protecting the banking business from risks;
- unreasonably high cost of bancassurance products, as their sale increases the functionality of the bank employees;
- in order to retain customers, insurance companies may reduce tariffs for certain insurance products, but this increases the risk of non-fulfillment of obligations in the event of an insured event due to insufficient resources:
- high costs for the sale of banking insurance products. Selling insurance products through banking channels requires more labor and time than selling banking products [32];
- imposing banking insurance products on customers. Often, customers are offered to purchase an insurance product along with the necessary banking product. This, as a result, increases the costs of the client, and also gives rise to criminal liability for bank employees;
- possible contradictions between the bank and the insurance company when drawing up agency contracts for the provision of services;
- bank employees often do not have full information about insurance products. Consultations of low-skilled bank employees

products;

• low level of financial literacy of the population, high debt burden of citizens, falling incomes of the population.

reduce the low demand of clients for insurance

All of the above indicates the imperfection of the development of bancassurance in Russia at the present stage and requires the priority solution of the following tasks:

- determination of the optimal ratio of commission fees of banks and premiums of insurance companies;
- improving the security of sales of bancassurance products across all sales channels, including strengthening cybersecurity;
- development of professional development programs for employees of banks and insurance companies, if necessary with the participation of higher educational institutions;
- informing the population about the importance of bancassurance and expanding the product line;
- providing customers with an independent and voluntary set of bancassurance products;
- introduction of unitary standards for interaction between banks and insurance companies, digital technologies. The Federal Antimonopoly Service recommends that banks focus on the availability of a license and solvency rating when evaluating insurance companies [33];
- introduction of minimum standards for bancassurance products. This will increase their sales remotely (including on marketplaces), and ensure competition due to the optimal ratio of price and quality. In turn, remote sales reduce the need for an expensive banking channel. According to the FAS, it is also necessary to introduce minimum standard requirements for insurance services, which will subsequently make the policy of any insurance organization mandatory for acceptance by all banks;
- systematization of independent audits of banking and insurance activities, etc.

⁹ Decree of the Government of the Russian Federation of April 30, 2009 No. 386 (as amended on April 24, 2017) "On cases of admissibility of contracts between credit and insurance organizations". URL: http://www.consultant.ru/document/ cons_doc_LAW_87494 (дата accessed on 21.08.2021).

CONCLUSIONS

The effectiveness of financial intermediation depends on the degree and closeness of interaction between banks and insurance intermediaries. As a result of studying the economic literature, the author gives a general concept of bancassurance — this is a set of banking and insurance measures aimed at expanding the range of joint products, developing a new niche in the market, and improving the quality of portfolios of banks and insurance companies and increase profits. The author grouped the motives for the interaction of each participant in bancassurance and the benefits of cooperation, namely: minimizing risks, expanding the customer base, offering customer-oriented products, increasing competitiveness, increasing income, etc. identifying modern trends in bancassurance in the country, namely:

- there is a steady downward trend in the number of banks and insurance companies in the market;
- expanding the range of bancassurance products;
- the assets of banks and insurance companies tend to grow, but the market is clearly dominated by banks;
- banking sales channel for insurance products is the most active among other intermediaries;
- contradictions arise between banks and insurance companies, as a result of which banks overestimate the cost of agency services, and insurance companies are forced to underestimate the insurance rate;
- low demand for bancassurance products on the part of clients, sales growth is ensured by compulsory registration of insurance products;
- credit insurance is the predominant area of bancassurance, but there is an upward trend in non-credit insurance.

The turning point in the development of bancassurance, as well as other areas of the market, was in 2020 due to the coronavirus

pandemic. The introduction of quarantine measures contributed to a sharp stop in the banking insurance market. To maintain the level of market development, the megaregulator introduced support measures. Thus, preferential interest rates on mortgage loans in 2020 increased the demand for mortgages and, accordingly, the growth of mortgage insurance. Auto loans and, accordingly, motor vehicle insurance, decreased due to a decrease in effective demand and the quarantine measures introduced. The application during this period of restrictive standards for borrowers with a high share of loan debt affected the decline in retail loans. The coronavirus pandemic triggered an economic crisis that brought much of production to a halt and the population lost their jobs. This fact contributed to an increase in demand for the service of insuring borrowers against job loss in order to issue a loan. Due to the loss of ability to work, mixed life insurance was sharply reduced, and contributions to investment life insurance were partially compensated at the expense of accumulative life insurance. Due to the imposition of a travel ban during the pandemic, insurance for those traveling abroad has fallen to zero. The decline in citizens' incomes has affected the decline in demand for many financial products, including bancassurance products.

Based on the results of the study, the author formed measures that ensure the improvement of bancassurance: the development of a legislative framework, the establishment of unitary standards for the entry of participants into the bancassurance market, monitoring the antimonopoly formation of prices for services, ongoing staff development.

Thus, the state, banks, and insurance companies need to organize such relations that will not only benefit each participant individually but also create favorable conditions for the development of the country's financial market, the transition of financial intermediation to a higher level and will promote economic growth in general.

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