



Prospects for Using Blockchain to Create Regional Payment Platforms

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ABSTRACT:

In scientific and expert circles, there is an increasing tendency to justify the feasibility of creating autonomous and independent mechanisms for international payments at the regional level; these payments will rely on local (regional) platforms for their facilitation. This study aimed to address these issues. One crucial component of this is shifting the research focus toward block chain and technologies of externalities. On the one hand, these technologies determine the prospects of sustainable development of the national economic system in terms of creating regional payment platforms, and on the other hand, these technologies support national sovereignty under sanctions imposed on the financial system. These issues are resolved using the proposed methodological approaches, which allow to systematize the generated effects and empirically justify them using econometric and statistical analysis methods. Our results indicate that the potential cumulative increase in Russia's gross domestic product (GDP) will be approximately 4% after the full-scale transition of transnational payments to blockchain, and within the Eurasian Economic Union (EAEU), the potential cumulative increase in Russia's GDP will be approximately 0.25%. Additionally, the application of blockchain technologies in cross-border payments will contribute to the localization of external sanction pressure on the national economic systems of regional supply chain participants. These findings can be used to develop models for economic growth under conditions of systemic transformations and to prepare roadmaps for sustainable development of socio-economic systems under conditions of digital transformation and institutional changes.

1. Introduction

The dominant role of the dollar in the world and the control exercised by the United States and their allies over global clearing services pose a constant threat to national economic systems and make them vulnerable to sanctions and other forms of administrative barriers and restrictions. Therefore, it is not surprising that in recent years, there has been an increased interest in creating

alternative systems for ensuring and facilitating transnational added value chains as well as regionalization of these processes via the establishment of new platforms and channels for international connections, including in the financial sphere.

The question of alternative mechanisms for organizing international supply chains and accompanying cross-border transactions is particularly acute for the Russian



economy (Masalsky M.G., 2022; Dubrovskaya E.S., 2022). The attempt, at least in part, to address this issue relies on the exploration of alternative possibilities for conducting cross-border financial operations under the new reality. The restrictions imposed by Western countries on Russia's access to international clearing systems limit the potential of foreign economic activity (FEA) and significantly complicate international trade processes, especially in terms of transaction costs. Therefore, it is crucial to analyze the current global architecture of the payment system as well as the relevant and prospective trends in the FinTech sphere that enable the creation of new formats for implementing cross-border payments, particularly in light of the rapidly evolving technological revolution and the ongoing digital transformation. Our study addresses this issue in terms of macroeconomic perspectives on the creation of regional blockchain platforms for transnational transactions.

2. Main part

In addition to the issues of sanction pressure on sovereign financial systems, despite the significance of such restrictions on economic growth sustainability, other problems limit the potential development of the established global system for transnational payment facilitation. These problems include:

- Insufficient transparency^{1, 2};
- High costs (according to the Bank for International Settlements (BIS), transaction fees for cross-border transactions can reach 10% of the transaction amount)³;
- Slow transaction speed (according to the same BIS report, cross-border payments may take up to 5 days) (Ganne and Patel, 2019).

These problems have led to increased activity within the expert community in the search for new mechanisms to implement transnational payments to optimize

technological processes. Increasingly, researchers (Saadaoui, 2018; Safiullin, Abdukaeva, and Yelshin, 2019; Nascimento et al., 2019) emphasize the need for the creation of new interoperable payment platforms built on blockchain technology to bring together countries and regions and subsequently integrating them into global cross-border payment networks. Moreover, these theoretical studies are beginning to manifest in practical implementation, with projects, such as Ripple, R3, and the Ubin project (implemented by the Monetary Authority of Singapore), to create new payment infrastructures and protocols based on blockchain distributed ledger technology (DLT)⁴.

According to commonly accepted approaches, the main advantages of cross-border payments implemented on blockchain platforms include:

- Reduction of fees by eliminating several intermediaries in the form of traditional clearing and payment systems within the supply chain (the current banking system involves a complex network of organizations facilitating cross-border payments) (Glaser, Hawlitschek, and Notheisen, 2019);
- Shorter reconciliation time for payment information, which accelerates the process of trade and increases the economic efficiency of FEA participants (Allessie et al., 2019);
- Increased business activity by involving new regions and countries in the economy through expanded access to national payment systems⁵;
- Enhanced security (Safiullin, Savelichev, and Yelshin, 2019; Epps, Carey, and Upperton, 2018). The decentralized nature of blockchain data storage prevents the manipulation of transaction history. Because payments are a critical aspect of society, preventing fraud and unauthorized use of data, such as for illicit and criminal activities, can be addressed using authorized

¹ Cross-border payments under sanctions: crisis or opportunity? URL: <https://plusworld.ru/journal/2022/plus-3-2022/transgranichnye-platezhi-na-treh-kitah/?ysclid=lewmwnupn872660985> (Assessed on: 10.02.2023)

² World Economic Forum, 'Windows of Opportunity: Facilitating Trade with Blockchain Technology', WEF White Papers, 2019.

³ Rise of the central bank digital currencies: drivers, approaches and technologies. URL:

<https://www.bis.org/publ/work880.htm> (Assessed on: 28.03.2023)

⁴ What will ASEAN payment integration achieve? URL: <https://www.theasianbanker.com/updates-and-articles/what-will-asean-payment-integration-achieve> (Assessed on: 10.05.2023)

⁵ European Parliament, Report on Blockchain: a forward-looking trade policy, (2018/2085(INI)), 2018. URL: https://www.europarl.europa.eu/doceo/document/A-8-2018-0407_EN.html (Assessed on: 20.05.2023)



blockchains combined with proper user identification and management;

- Creation of new opportunities for organizing business processes (Lyons, Courcelas, and Timsit, 2019). The application of blockchain-based smart contracts allows automation of international transactions according to predefined algorithms that consider the interests of all participants in the supply chain;

- Increased autonomy in international relations through the establishment of intergovernmental digital blockchain platforms, enabling transactions to bypass global intermediary organizations (such as SWIFT).

These and other opportunities that arise from the application of blockchain in the international payment system provide significant impetus for integrating these technologies into the financial sectors of national economic systems. The increasing pace of regionalization processes worldwide further strengthens the interest in transitioning to blockchain-interoperable digital payment platforms across different countries.

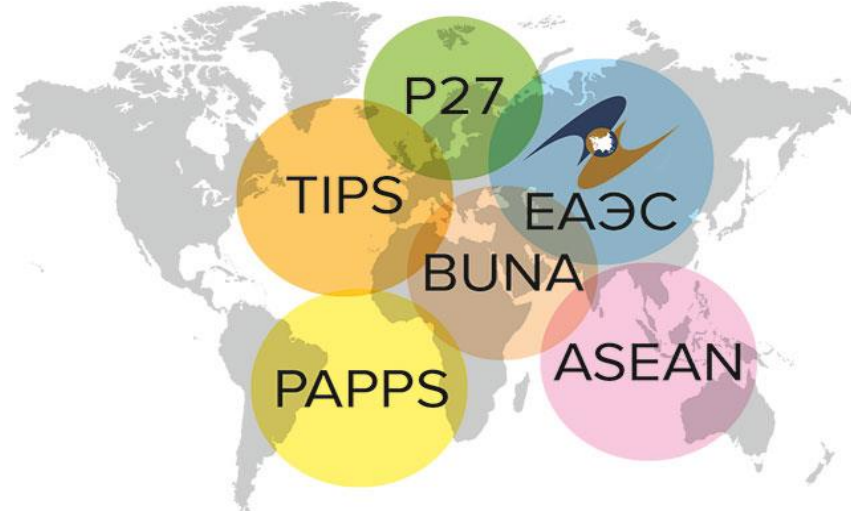
Of note, as part of the United States' efforts to strengthen the role of the American dollar globally, representatives of the country's financial community systematically lobby for the localization of projects aimed at creating regional payment systems. This is related not only to the United States' desire to maintain the role of the US dollar as a global reserve currency but also to the need, from their perspective, to address geopolitical challenges associated, for example, with the possibilities of imposing sanctions on individual

national economic systems if the US dollar dominates the world. Therefore, the United States actively promotes the idea that the use of digital currencies in supporting national and supranational business processes is unacceptable. According to the US Treasury Department, this tool contradicts their national interests because it opens the gateway to bypassing economic barriers⁶.

However, the need to overcome the limitations of sanctions and the search for new mechanisms to optimize the processes of cross-border transactions have compelled an increasing number of countries to develop solutions that provide the possibility of localizing such risks. This trend leads to an acceleration of the abandonment of the American dollar and the creation of uncontrolled regional platforms for financial messaging exchange.

These trends have been confirmed by the worldwide development of alternative platforms for economic cooperation, deglobalization processes, and the transition to regional interaction platforms. Projects aimed at creating regional intergovernmental economic blocs and regional payment platforms based on them have been flourishing.

These processes of regionalization can be observed on a global scale in Europe, Asia, Africa, and the Middle East. As a result, regional associations and ecosystems emerge within these regions, including systems for organizing cross-border payments (Figure 1).



⁶ U.S. Department of the Treasury Releases Sanctions Review URL: <https://home.treasury.gov/news/press-releases/jy0413> (Assessed on: 28.03.2023)



Regional payment platform Buna – A cross-border centralized payment system established in 2018 by the Arab Monetary Fund (AMF)
Pan-African Payment and Settlement System (PAPSS) – A pan-African payment system
ASEAN Payment Connectivity Initiative – A unified payment platform for the Association of Southeast Asian Nations (ASEAN)
Target Instant Payment Settlement (TIPS) – European payment platform
P27 – Payment platform
Unified payment environment of the Eurasian Economic Union (EAEU) – A unified payment ecosystem for the member states of the Eurasian Economic Union

Figure 1 – Regional payment systems worldwide (developed based on published data⁷)

The processes of regionalization in international financial relations create new opportunities in terms of the intensification of the construction of new channels and gateways for conducting cross-border transactions and the development of interregional relations based on new infrastructure mechanisms and solutions. Among them, undoubtedly, blockchain and innovative mechanisms based on it for organizing international supply chains, including the crucial component of cross-border payments, should be mentioned.

Not surprisingly, despite the debate regarding the prospects of applying DLT in the development of international payment systems and the creation of fundamentally new ecosystems based on DLT, the interest in DLT is currently very high. This interest is expressed not only in scientific articles and analytical reports dedicated to this topic but also in specific results, including prototyped systems and successfully functioning blockchain platforms that facilitate international, regional, and corporate supply chains⁸ (Kohergin, 2021; Engert and Fung, 2017).

Therefore, owing to the growing interest in exploring the prospects of creating Central Bank Digital Currencies (CBDCs) in many countries around the world, the

question of methodological support for assessing the generated externalities of the macroeconomic order is extremely relevant. This question is particularly relevant at the regional level and on the global scale for platforms that are autonomous from global regulators.

2.1 Hypothesis, research methodology, and databases used (Methods)

It is a complex task to study the methodological framework for assessing the generated externalities of macroeconomic order in the context of creating regional blockchain-based payment systems. The solution should be universal for all international blocs and based on the evaluation of homogeneous effects generated using blockchain in the system of organizing transnational payments within regional alliances. The condensed algorithm for formalized research on the cumulative impact of blockchain payment systems on economic growth prospects is presented in Figure 2. Its implementation, along with the elucidation of effects at the level of individual regional payment systems worldwide (such as Buna, PAPSS, ASEAN, TIPS, P27, and EAEU), forms the basis for empirically assessing the generated macroeconomic externalities at the regional level.

⁷ Cross-border Payments Under Sanctions: Crisis or Opportunity? URL: <https://plusworld.ru/journal/2022/plus-3-2022/transgranichnye-platezhi-na-treh-kitah/?ysclid=lewwmwnupn872660985> (Assessed on: 10.02.2023)

⁸ Blockchain for supply chains and international trade. Report on key features, impacts and policy options. European Parliamentary Research Service. Scientific Foresight Unit (STOA). PE 641.544 – May 2020



Step 1: Identification and systematization of effects resulting from the implementation of blockchain in the international payment system



Reduction of transaction costs by eliminating intermediaries in the supply chain organizational system and conducting transnational transactions through blockchain

Increase in the speed of transnational transactions and trade

Improvement of the transnational payment process using blockchain, eliminating the need for the letters of credit financial mechanism and increasing trust between trading partners

Enhanced transaction transparency and localization of fraud/opportunistic business models

Automation of transactions and execution of business operations using automated algorithms (smart contracts)

Blockchain reduces entry barriers to the global market for goods and services and promotes business activity in national economies

Increase in the autonomy of intergovernmental relations through the creation of international digital blockchain platforms that enable transactions without relying on global intermediaries (such as SWIFT)

Step 2: Empirical assessment of the impact of blockchain effects on the GDP of national economies

Step 3: Cumulative assessment of the impact of implementing blockchain in transnational transactions on GDP growth

Step 4: Cumulative assessment of the impact of implementing blockchain in transnational transactions within the scope of individual regional payment systems

Figure 2 – Algorithm for studying the cumulative impact of blockchain payment systems on GDP growth prospects.

Source: developed by the authors based on data from (Alonso et al., 2021; Zhang and Huang, 2021; OECD, 2019)

The described approach for studying the impact of blockchain on the formation of cumulative socio-economic effects through the establishment of new-format digital cross-border payment systems is a complex method for conducting empirical assessments. In agreement with the positions of both Russian and foreign researchers (Masalsky, 2022; Dubrovskaya, 2022; Allesie et al., 2019; Lyons, Courcelas, and Timsit, 2019), the most challenging aspect from a methodological standpoint is the process of evaluating and analyzing macroeconomic externalities.

Nevertheless, it is relevant and important to address this issue.

Therefore, by relying on the abovementioned effects that justify possible externalities resulting from the integration of blockchain into the transnational payment environment (Figure 1), we performed the empirical assessment using the Russian economy as an example.

2.2 Results

1. Evaluation of the impact of eliminating intermediaries in the supply chain and cross-border transactions through blockchain



The calculations are based on data on the movement of export–import flows from 2013 to 2021. The hypothesis assumes an abstract model that allows for the complete transition of cross-border transactions in the Russian economy to blockchain. The main effect of localizing intermediary institutions in the international payment system will be observed in import flows. This occurs because export shipments are paid by buyers from third countries, and all commission burden falls on them; however, this was not the focus of this study.

According to the arguments presented earlier, the application of blockchain in cross-border payments will form the basis for localizing transaction fees for transaction support. This, in turn, will contribute to the release of capital for economic entities and provide potential growth in working capital (WC) and financial results (FR).

In agreement with (OECD, 2019), the potential increase in the WC of Russian residents–FEA participants is based on the hypothesis that the average commission rate for retail cross-border payments will decrease within blockchain ecosystems from 7.45% to 1%⁹. By analyzing the potential increase in WC at the national level of the Russian economy, we can proceed to a new stage of solving this problem. The aim of this stage is to determine the relationship between the growth of FR for economic entities in the Russian economy and changes in the WC of FEA participants according to the projected parameters of transaction cost reduction. This model is based on statistical data from Rosstat and the Unified Interagency Information and Statistical System (EMISS) for the period from 2009 to 2021. The results of building

a model that characterizes the degree of interconnection between the considered factors are obtained using Equation 1.

$$FR = (-1,4E + 10) + 0,146TO \quad (1)$$

where

FR – Financial result (FR, in thousands of rubles)

TO – Turnover of organizations (turnover of organizations at current prices, in thousands of rubles)

The statistical estimates obtained using Equation 1 are characterized by a high level of statistical significance ($R^2 = 0.93$; t-statistic = 2.25342; P-value for the exogenous factor is 0.037). These estimates allow modeling of the increase in cumulative FR of economic entities under the expected turnover growth when implementing the concept of cross-border blockchain transactions.

The final step in calculating the macroeconomic effect, expressed by the increase in GDP resulting from the increase in the FR of the economic entities, is the construction of an econometric model that assesses the relationship between the considered parameters (Equation 2). The calculations were performed using data from 2010 to 2021.

$$GDP = 70231395 + 0,00258FR \quad (2)$$

where

GDP – Gross domestic product, in millions of rubles

FR – Net financial result, in thousands of rubles

The constructed model (possessing all signs of statistical significance, $R^2 = 0.92$; t-statistic = 4.576; P-value for the exogenous factor is 0.01) allows us to obtain forecast estimates of Russia's GDP considering the current and new values of the FR (Table 1, Figure 3).

Table 1 – Forecast of GDP growth based on modeling of the transition of cross-border payments of Russia's gross imports to blockchain

Year	GDP forecast based on the model	GDP forecast considering the growth of the FR	Deviation	Contribution to GDP, %
2017	96860523,28	97173068,43	312545,153	0,340303157
2018	105830974,7	106192126,1	361151,4465	0,347723575
2019	110891446,1	111205883,8	314437,7862	0,28687405
2020	102280368,2	102685519,6	405151,4356	0,376331344
2021	146733966,3	147260087,6	526121,3671	0,388869852

⁹ Enhancing Cross-border Payments Stage 3 roadmap.
URL: <https://www.fsb.org/wp->



Source: Developed by the authors based on EMISS data¹⁰

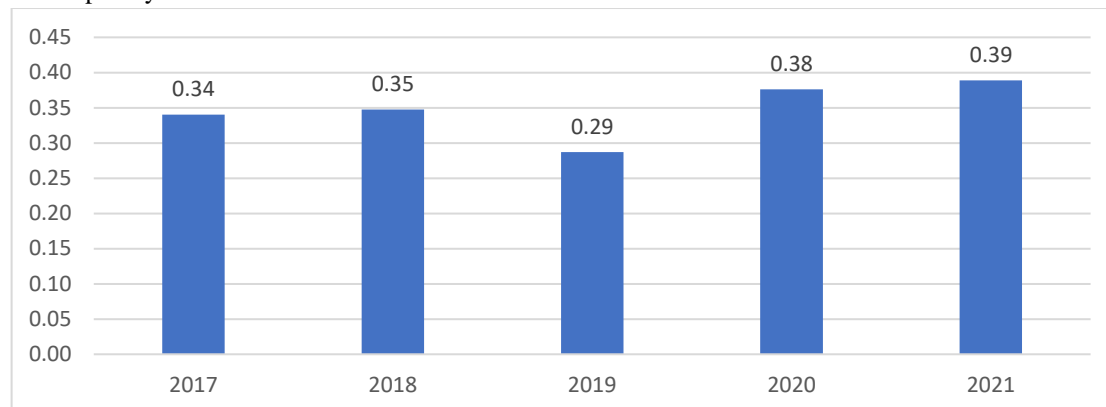


Figure 3 – Forecast of GDP growth based on modeling of the transition of cross-border payments of Russia's gross imports to blockchain

Source: Developed by the authors

The results of the analysis show that reduction of the cost of transnational payments in the Russian economy can lead to an average GDP growth of 0.4% within the overall volume of import flows.

2. *Assessment of economic externalities within the study of the impact of transnational transaction speed increase*

Regarding the assessment of macroeconomic externalities resulting from the construction of international blockchain platforms that enable nearly instantaneous data exchange and, consequently, international payments, the following assessment algorithm is proposed (Figure 4):

Step 1. Assessment of economic externalities within the study of the impact of increased transnational transaction speeds

Evaluation of potential losses by FEA participants owing to currency exchange rate volatility. At this stage, it is appropriate to assess economic externalities in the context of export flows. We focus on this aspect because transaction speed matters only when waiting for payment from the buyer, i.e., it matters for the product/service provider. Prolonged payment receipt periods under the conditions of national currency appreciation may lead to losses. For importers, transaction speed is not critical because the timing of funds receipt is less important for them to achieve economic results.

Evaluation of the cumulative value of exports in Russia

Assessment of the average volatility of the ruble exchange rate against the US dollar over a 72-hour period. This period corresponds to the current average transaction speed for transnational payments.

Modeling of the number of import-related transactions for Russia

¹⁰ EMISS URL: <https://www.fedstat.ru/indicator/38574> (Assessed on: 12.04.2023)

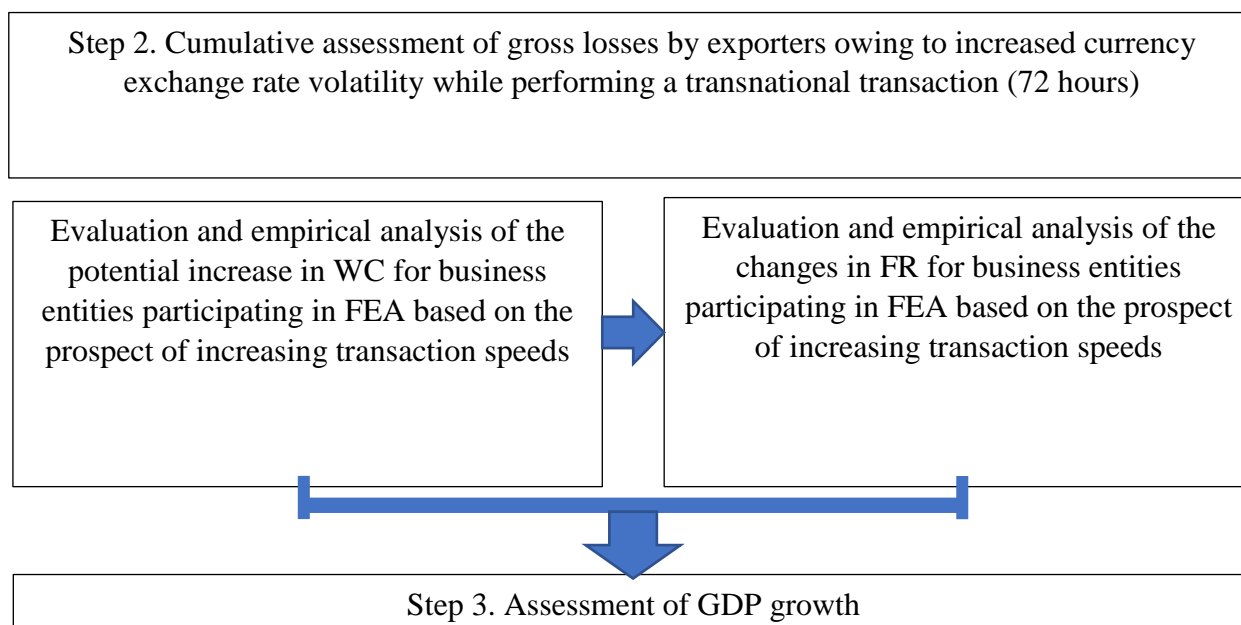


Figure 4 – Algorithm for assessing the macroeconomic externalities resulting from the construction of cross-border blockchain platforms that enable the growth of transnational transaction speeds

Source: Developed by the authors

One significant methodological aspect of evaluating the impact of a reduced transnational payment speed on GDP growth prospects is the search for a value that characterizes the average volatility of the ruble exchange rate against the US dollar over a 72-hour period, corresponding to the current average transaction speed for cross-border payments. The assessment of the annual average value of this parameter is calculated using the equation:

$$K_{\text{avg.year}} = \text{average} (K1) \quad (3)$$

Where

K1 – Average chain growth rate of the ruble exchange rate against the US dollar over three days;

$K_{\text{avg.year}}$ – Average annual value of the ruble growth index against the US dollar over three days.

The calculations are based on the average daily exchange rate dynamics of the US dollar from 2021 to 2022¹¹.

The following results were obtained, characterizing the annual average growth index of the ruble exchange rate against the US dollar over three days (Table 2).

Table 2 – Annual average growth index of the ruble exchange rate against the US dollar over three days

Indicator	2021	2022	Average value for 2021–2022
$K_{\text{avg.year}}$	0,999941	1,000002	0,999972

Source: Developed by the authors based on published data⁹

The next step was to determine the potential losses by exporters owing to the volatility of the national currency

within the transaction duration (72 hours). The calculation was performed using the following equation:

$$Y = E - E \times K_{\text{avg.year}} \quad (4)$$

¹¹CBR

URL:
https://cbr.ru/currency_base/dynamics/?UniDbQuery.Posted=True&UniDbQuery.so=1&UniDbQuery.mode=1&UniDbQuery.date_req1=&UniDbQuery.date_req2=&UniDbQuery.VAL_NM_RQ=R01235&UniDbQuery.From=01.01.2021&UniDbQuery.To=13.04.2023 (Assessed on: 13.04.2023)

ate_req2=&UniDbQuery.VAL_NM_RQ=R01235&UniDbQuery.From=01.01.2021&UniDbQuery.To=13.04.2023 (Assessed on: 13.04.2023)



where:

Y – gross exchange rate losses from exports owing to low cross-border payment speed;

E – gross exports.

Based on the data presented in Table 2, the key assessments are provided in Table 3.

Table 3 – Assessment of gross losses by exporters under conditions of increased currency exchange rate volatility during a transnational transaction (72 hours)

Indicator	2017	2018	2019	2020	2021
Exports, in millions of US dollars	525 976,3	526 608,4	520 058,25	522 261,95	525 396,58
Exchange rate losses by exporters, in millions of US dollars	14,90	14,99	14,95	15,02	14,99
Exchange rate losses, in millions of rubles	-869,49	-939,87	-967,83	-1083,68	-1104,37
Potential increase in FR	+869,49	+939,87	+967,83	+1083,68	+1104,37
FR (actual value), in thousands of rubles	10 320 526 738	13 797 162 645	15 758 425 864	12 421 070 680	29 649 743 813
Forecasted value of FR considering the growth in transaction speed, in thousands of rubles	10321396230	13798102517	15759393696	12422154364	29650848178

Source: Developed by the authors based on data from EMISS¹² and CBR¹³

The previously developed model (Equation 2) allowed us to forecast GDP considering current and new values of the FR and to evaluate the potential changes in GDP (Table 4).

¹² EMISS URL: <https://www.fedstat.ru/indicator/38574> (Assessed on: 12.04.2023)

¹³

CBR

URL:

https://cbr.ru/currency_base/dynamics/?UniDbQuery.Posted=True&UniDbQuery.so=1&UniDbQuery.mode=1&UniDbQuery.date_req1=&UniDbQuery.date_req2=&UniDbQuery.VAL_NM_RQ=R01235&UniDbQuery.From=01.01.2021&UniDbQuery.To=13.04.2023 (Assessed on: 13.04.2023)



Table 4 – Forecast of GDP growth based on the modeling of incoming transnational payments using blockchain

Year	GDP forecast according to the model	GDP forecast considering the growth in the FR of economic entities	Deviation	Contribution to GDP, %
2017	96860523,28	96862766,75	2243,47	0,0023
2018	105830974,69	105833399,76	2425,07	0,0023
2019	110891446,05	110893943,26	2497,21	0,0023
2020	102280368,17	102283164,31	2796,13	0,0027
2021	146733966,28	146736815,77	2849,49	0,0019

Source: Developed by the authors based on published data^{10, 11}

The obtained assessments indicate a negligible direct impact of the reduction in transnational payment speed on the dynamics of GDP in terms of it being tied to the volatility of the national currency exchange rate. However, if the ruble demonstrates more significant strengthening trends, the potential effects on GDP growth in terms of the total transition of international transactions to blockchain become significantly amplified. These results agree well with the macroeconomic logic of the benefits of a weakened ruble for exporting companies.

3 Assessment of the impact of transitioning transnational payments to blockchain, eliminating the need for the letters of credit financial mechanism

According to the data provided in the GLOBE NEWSWIRE analytical report, the global letters of credit market reached \$3.9 trillion in 2022¹⁴. Additionally, according to the published information at the United Nations Conference on Trade and Development (UNCTAD), global trade volume for the

same year reached \$32 trillion¹⁵. Thus, clearly, the letters of credit market plays a significant role in facilitating global trade.

Furthermore, it is reasonable to project this ratio onto the Russian national economy. In the absence of freely available statistical data on documentary operations in foreign trade activities related to the FEA, it is advisable to use this ratio in calculations. Importantly, in these calculations, all attention is focused exclusively on export operations. Import transactions accompanied by letters of credit were not the focus of this study because the financial burden for them falls on the importers. Moreover, because the research objective is to empirically assess economic externalities in the context of the Russian national economy, we focused on export letters of credit that affect Russian economic entities.

Based on this approach, Table 5 presents the calculated data on the gross level of export letters of credit for Russia.

Table 5 – Assessment of the gross level of export letters of credit for Russia

Indicator	2017	2018	2019	2020	2021
Export, in millions of US dollars	525 396,58	528 438,54	527 177,33	529 576,6	528 691,72
Volume of export letters of credit in Russia, in millions of US dollars	22592,05	22722,86	22668,63	22771,79	22733,74

¹⁴ Insights on the Letter of Credit Confirmation Global Market to 2027 - Demand for Customized Trade Services Presents Opportunities /www.yahoo.com/lifestyle/insights-letter-credit-confirmation-global-095800655.html (Accessed on: 04/14/2023)

¹⁵ Global trade broke records in 2022 URL: [https://kz.kursiv.media/2023-03-24/lgtm-worldtrade/#:~:text=Объем%20мировой%20торговли%20в%202022-м,продаж%20«зеленых»%20\(экологически%20чистых\)%20товаров](https://kz.kursiv.media/2023-03-24/lgtm-worldtrade/#:~:text=Объем%20мировой%20торговли%20в%202022-м,продаж%20«зеленых»%20(экологически%20чистых)%20товаров) (Assessed on: 14.04.2023)



Source: EMISS¹⁶

The use of blockchain technology in transnational payments will increase trust among participants in the entire digital ecosystem and automate all planned transaction iterations. Consequently, the practical use of documentary operations (including letters of credit) in servicing the supply chain process in the foreign trade system becomes localized. Thus, based on this hypothesis and data on the volume of the export letters of credit market (Table 5), it is possible to estimate the

potential for growth of the cumulative FR of Russian economic entities in accordance with the level of cost savings from letters of credit.

To conduct calculations aimed at assessing the macroeconomic effect expressed in the GDP growth resulting from an increase in the cumulative FR of economic entities, we constructed corresponding econometric models that evaluate the relationship between the studied parameters (Equation 2). Table 6 presents the results of these calculations.

Table 6 – Forecast of GDP growth based on the modeling of the transition of transnational payments to a global blockchain ecosystem, which promotes trust among transaction participants, in millions of rubles

Year	GDP forecast based on the model	GDP forecast accounting for growth in cumulative FR	Deviation	Contribution to GDP, %
2017	97515604,91	100152081,77	2636476,86	2,70
2018	104468835,27	107318719,03	2849883,76	2,73
2019	108391338,32	111326001,04	2934662,72	2,71
2020	101716667,74	105002618,00	3285950,25	3,23
2021	136173808,57	139522469,08	3348660,52	3,46

Source: Developed by the authors based on EMISS data¹⁷

The obtained estimates indicate a significant potential for blockchain application in facilitating transnational transactions in accordance with the concept of enhancing trust among participants in foreign trade,

which implies localization of the tools for documentary operations.

A graphical visualization of the consolidated assessment of the calculated effects is presented in Figure 5.

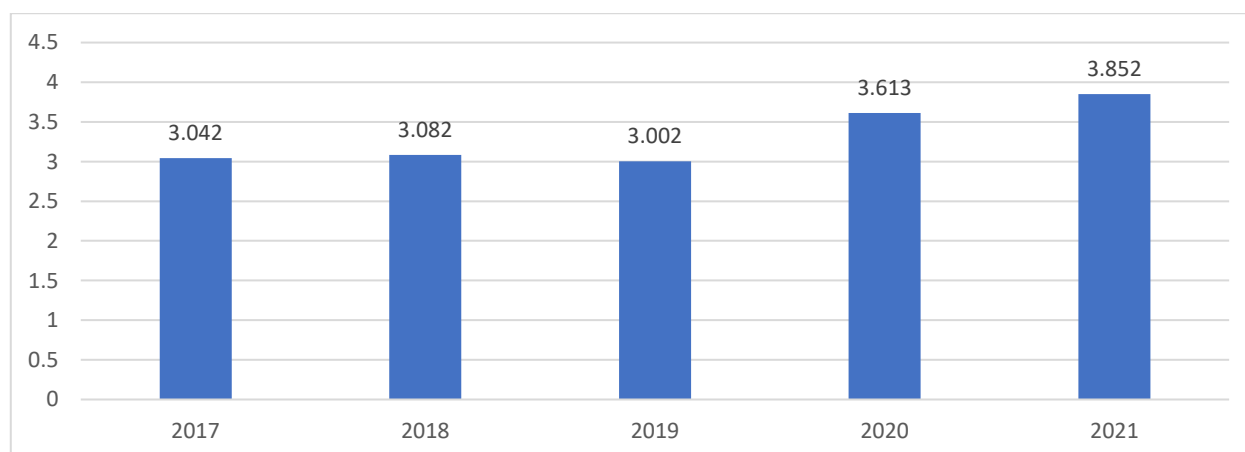


Figure 5 – Potential cumulative GDP growth in Russia through the transition of transnational payments to blockchain

Source: Developed by the authors

¹⁶ EMISS URL: <https://www.fedstat.ru/indicator/38574>
(Assessed on: 12.04.2023)

¹⁷ EMISS URL: <https://www.fedstat.ru/indicator/38574>
(Assessed on: 12.04.2023)



2.2.1 Expected effects for Russia within the Eurasian Economic Union (EAEU)

The obtained estimates allow a new level of research to assess the cumulative effects on the national economy of creating blockchain-based interregional payment systems. Table 7 presents possible macroeconomic

effects for the Russian economy within the EAEU. The calculation is based on the ratio of Russia's trade volume with EAEU countries to Russia's trade volume with the rest of the world (based on the report "On the State of Mutual Trade between the Member States of the Eurasian Economic Union in 2020"¹⁸).

Table 7 – Potential GDP growth in Russia driven by the transition of EAEU countries to blockchain-based transnational payment platforms (modeling based on 2021 data)

Macroeconomic effect	Transnational transactions of Russia with all international trade partner countries	Transnational transactions of Russia within the EAEU
Potential growth in terms of the studied effects, gross regional product (GRP)	3,9%	0,23%

Of note, the obtained estimates are not comprehensive because they reveal the potential economic growth of the Russian national economy only within the framework of studying externalities generated by three effects:

- Localization of intermediation institutions in the system of organizing supply chains and conducting transnational transactions through blockchain;
- Increased speed of transnational transactions;
- Minimization of using the letter of credit financial mechanism.

However, as shown in Figure 1, the externalities formed during the transition of transnational payments to the blockchain ecosystem are much broader. Nevertheless, considering the methodological limitations of their empirical assessment on a national economy scale, this study focused on three key factors responsible for the resulting consequences of the transition of transnational payment systems to blockchain platforms. This approach aligns with the opinions of several researchers (Dubrovskaya, 2022; Lyons, Courcelas and Timsit, 2019; Zhang and Huang, 2021).

In addition to the identified economic effects, the feasibility of building regional blockchain platforms that enable international transactions is justified by the prospects of creating autonomous regional services that are independent of global regulators. This creates new opportunities for localizing processes under external sanction pressure on national economic systems.

3. Conclusion

It is clear that blockchain is currently attracting increased interest in both scientific and expert communities in terms of socio-economic effects. However, the question of justifying the prospects of transitioning international transactions to the blockchain ecosystem is still not fully resolved. This is attributed to both regulatory and methodological limitations in this field. This conclusion is supported by the fact that scientific and journalistic research rarely includes studies that address this question in terms of substantive and empirical analysis of externalities concerning transnational transactions. Therefore, this study aims to fill the conceptual gap (primarily from a substantive and methodological perspective) and stimulate a discussion within the scientific community on the development of theoretical and methodological approaches for studying the effects on national economic systems in the context of the possible transition of transnational payments to the blockchain environment.

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Declaration of conflicting interests

The author(s) declare(s) that there are no conflicts of interest.

¹⁸ Report "On the State of Mutual Trade between the Member States of the Eurasian Economic Union in 2020". URL:

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