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# ДАЙДЖЕСТ ФИНАНСЫ

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# FINANCIAL CAPITAL: ACCOUNTING PROCEDURES AND RESPECTIVE COMMENTS

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**Abstract**
**Importance** In this research, we formulate a body of theoretical and conceptual principles for the business accounting model, which would make the general set of benchmarks to recognize and carry items of financial capital stocks in integrated reporting.

**Objectives** It is reasonable to use the concept for maintaining the financial capital during its conversion into other types of capital. This provision of the business accounting model is based on specific accounting procedures for recognizing the creation of the financial capital value and its conversion and accompanied with respective comments.

**Methods** The methodology rests on general theories of positive and normative economics and general methods of observation, abstraction, deduction and induction, statistical and fact analysis of economic phenomena.

**Results** As a result of the research, we qualify financial assets, cash, equity instruments of the other entity and contractual rights as items of financial capital. They mainly determine its value. Goodwill is a part of the value of long-term financial instruments, rather than an intangible asset. Changes in its value signify the impairment of other assets, investee's assets. Accounts receivables shows the monetized portion of the financial capital value.

**Conclusions and Relevance** To illustrate the result of the research, we perform accounting procedures by consecutively recognizing entries for forming the financial capital stock in the business accounting model and determining specific techniques – monetization of financial capital metrics and capitalization of cash which form and change the value of certain items of financial capital.

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*The editor-in-charge of this article was Irina M. Vechkanova*
*Authorized translation by Irina M. Vechkanova*

Nowadays there are numerous definitions of accounting as authors attempt to supplement, specify and even alter the concept of accounting as an economic science. This article is not another guess concerning some aspects that could be integrated or specified, thereby making the accounting discipline more orderly or substantial. According to M.R. Mathews and M.H.B. Perera, the theory has not its own content as a language. It is virtually a combination of tautology. It is meant to be a system (like a catalog) to organize empirical data and make them understandable. It should be viewed through respective criteria [1, p. 209].

The accounting theory originated from some biased constructs in business operations. Its mechanisms should not only be described, but also recognized and clarified. Moreover, accounting concepts should formulate what general ideas are to be verified and scrutinized [2, p. 10].

E.S. Hendriksen and M.F. Van Breda define the accounting theory as a *coherent set of hypothetical, conceptual and pragmatic principles that constitute a general frame of reference to investigate the nature of accounting*. Thus, the main purpose of accounting is to infer a set of logically consistent principles, which lay the basis for evaluating and developing the accounting practice[1].

This definition of accounting theory is quite compliant with the methodology of positive economics: *Viewed as a body of substantive hypotheses, theory is to be judged by its predictive power for the class of phenomena which it is intended to 'explain'* [3, p. 183].

Referring to the above views, let us consider new trends in the development of accounting, i.e. business accounting method and balance sheet generalization method, and characterize it. Making this hypothesis, we should provide the rationale for introducing fundamental concepts of the integrated

reporting framework into the accounting theory. They would substantially enrich it since different types of capital are concerned (financial, manufactured, intellectual, etc.) as corporate assets used in the value creation process in the short, mid and long run.

The hypothesis may be founded on the definition of the business accounting model as put by V.S. Plotnikov and O.V. Plotnikova: *Business accounting is a data set of the business model reflecting the value creation process and value increment, changes in corporate performance. The data set should draw on the information on estimated and factual stock of capitals, which feed or contribute to value creation processes. They are quantified as monetary liabilities, financially supporting the conversion of monetary assets into business facts in the short, mid and long run. The comprehensive result of such conversion should be recognized in integrated reporting*[2] [4, p. 14].

However, we believe it is worth specifying some aspects of this definition. Business accounting constitutes a data model of continuing improvement of corporate value creation and building, which is based on the recognition of estimated and factual stock of different types of capital (financial, manufactured, human, intellectual, social, natural, etc.) driving the value creation processes in the short, mid and long run. It employs financial and non-financial information stakeholders take into consideration for business appraisal purposes.

Furthermore, the definition of the business accounting model should clarify the meaning of the information on estimated and factual stock of capitals. It first concerns capitals qualified as assets, rather than liabilities of the balance sheet theory, such as financial, manufactured, customer, intellectual capital, etc. Unfortunately, such types of capital are not regarded as accounting items in the Conceptual Framework for Financial Reporting. Thus, to avoid any misunderstanding, it is reasonable to explicitly state that estimates underlying

the hypothesis verification should not necessarily be phenomena which have not yet happened. Hence, they should not unavoidably predict the future events. They may be evidence of the past events, which have not been investigated yet or unknown to a forecaster [1, p. 217].

M. Friedman and L.J. Savage's methodological views basically give a methodological hint for explaining how those capitals, which ultimately underlie the business value or its business models, should be recognized in business accounting.

Recognizing the stock value of certain capitals under the International Integrated Reporting Framework, we should bear in mind three key characteristics of assets as mentioned in the Conceptual Framework for Financial Reporting and used to identify assets.

1. It embodies the probable future benefit arising from an ability to directly or indirectly trigger an increment in cash (or in combination with other assets).

2. It helps a business entity derive profit or manage it by other means.

3. Business operations or other events boosting the entitlement for a benefit or control over its have already taken place[3].

Adhering to these indispensable characteristics of assets, we attempt to coordinate it with the concept of stock and cash flows as stated in the International Integrated Reporting Framework:

*The capitals are stocks of value that increases, decreases or transforms through activities and outputs of the organization*[4]. Unfolding the subject of this research, we focus on the concept of financial capital and those relevant accounting procedures that help recognize the formation of stock of its value and use it for transforming stock of financial capital into stock of other capitals.

We also respect the definition of accounting procedure given by Ya.V. Sokolov: *An accounting procedure represents a series of accounting tasks that are addressed by qualifying facts of business operations, that is, recording, grouping and interpreting (analysis). The procedure is designated for decision making* [5, p. 47].

So, financial capital is the pool of funds that is:

– available to an organization for use in the production of goods or the provision of services;

– obtained through financing, such as debt, equity or grants, or generated through operations or investments[5].

However, before financial capital is recognized as the pool of funds, its definition should be compared with the three characteristics of assets. As per IAS 32 – *Financial Instruments: Recognition and Measurements*, the concepts of financial capital and financial assets are collated. So, *financial asset is any asset that is*:

1) *cash*;

2) *an equity instrument of another entity*;

3) *a contractual right*[6].

Cash flow is the principle component of stock of financial capital, which is employed for the following purpose. Investment decision making results from investment planning. It is mainly made of expenditures (reduction in monetary funds) and receipts (increase in monetary funds), i.e. cash flows reflecting streams of payments. Financial planning also involves such concepts as expenditures and receipts in terms of the current corporate solvency [6, p. 1].

It goes without saying that the main volume of monetary funds is the backbone of business operations for creating value in the short, mid and long run.

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[3] Hendriksen E.S., Van Breda M.F. *Teoriya bukhgalterskogo ucheta* [Accounting Theory]. Moscow, Finansy i Statistika Publ., 1997, p. 287.

[4] International Integrated Reporting Framework, paragraph 2.11. URL: http://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

International Integrated Reporting Standard. URL: http://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

[5] International Integrated Reporting Standard, paragraph 2.15. URL: http://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

[6] *Primenenie MSFO: v trekh chastyakh* [International GAAP: Generally Accepted Accounting Practice under International Financial Reporting Standards]. Moscow, Al'pina Pablisher Publ., 2016, p. 681

In the mean time, financial assets of monetary funds, that companies handle, are of short-term nature, marketable and exposed to low risk, being in continuous circulation. Therefore, monetary funds constitute the main component of financial capital recognized as an asset. They can hardly be qualified as the stock of funds since it means that the funds are temporarily withdrawn from the circulation, that is, operating activity. The stock value of monetary funds shows the level of corporate solvency.

Some difference is observed in considering the issue of recognizing equity instruments of the other entity as the stock value of financial capital. The financial assets constitute financial contributions (investments) to the other entity in order to derive variable income in the future. To have power over an investee, an investor must have existing rights that give it the current ability to direct the relevant activities. For the purpose of assessing the power, only substantive rights and rights that are not protective shall be considered[7]. Such financial assets represented with common stocks or other financial instruments of the other entity can be recognized as the stock of financial capital.

The recognition and valuation of financial capital items as part of the business accounting model are scrutinized in the following parts of this article. To substantiate the concept of financial capital at this step, let us focus on another economic concept of *the benefit-cost ratio*. Choosing the concept of the benefit-cost ratio, it is reasonable to consider how it is transformed in the business accounting model since it, too, concerns the verification of the accounting theory, meaning that each approach to construing the accounting theory requires methods to prove it[8]. This is a very appropriate and accurate definition of the theoretical verification. However, we would like to specify it. Each accounting concept needs to be verified in order to determine its significance and status in the accounting theory, reveal the substance of accounting items and set the practical development course of accounting.

As for probable future benefits, IFRS 10 – *Consolidated Financial Statements* provides the following definition: *An investor controls an investee when the investor is exposed, or has rights, to variable returns from its involvement with the investee and has the ability to affect those returns through its power over the investee*[9].

In fact, these characteristics are enough to recognize equity instruments of the other entity as an item of financial capital qualified as a corporate asset. What else should be done is to add the third characteristic: *investment (long-term financial contributions) have already made to gain the control over the investee*.

However, we need to address two more issues to devise the business accounting model of financial contribution. The issues concern the financial capital. What is goodwill? Is it a part of investment? Shall short-term financial investment be qualified as assets?

Addressing the first issues, we should remember that goodwill is inseparable from the business valuation. That is why it is a non-identifiable asset. The future benefit from such an asset can hardly be estimated. Does it make any sense in estimating the economic benefit from a non-identifiable asset, indeed? Thus, it is rather difficult to give any logic explanation when linking its derecognized value with any income.

Nevertheless, goodwill is an asset. It is not intangible as authors and legislature try to label it but rather an asset, the value of which was formed when the investor acquires the control over investees, being an integral part of the price, which is usually quoted in the stock market.

The crucial moment we would like to point out is that goodwill solely results from the valuation of other assets. We mean assets controlled by the acquiring party when it made financial investment in the investee (subsidiary) [7, p. 147].

It is noteworthy that goodwill is the difference between the purchase price and historical cost of all assets and liabilities, i.e. net assets of the investee.

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[7] International Financial Reporting Standard 10 – *Consolidated Financial Statement* [IFRS 10:B9]: Order of the RF Ministry of Finance of December 28, 2015 № 217н. (Edition of June 27, 2016).

[8] Hendriksen E.S., Van Breda M.F. *Teoriya bukhgalterskogo ucheta* [Accounting Theory]. Moscow, Finansy i Statistika Publ., 1997, p. 134.

[9] International Financial Reporting Standard 10 – *Consolidated Financial Statement* [IFRS 10:6]: Order of the RF Ministry of Finance of December 28, 2015 № 217н. (Edition of June 27, 2016).

The fact that the value of financial investment is split into financial investment matching the carrying value of the investee's net assets and goodwill value is mandatory and compliant with IFRS 10 – *Consolidated Financial Statements*[10]. Consolidated financial statements present performance results of a consolidated group of entities as a single unit. However, it should be excluded from the consolidated balance of the investee's net assets at the respective value of the investor's financial contributions. Hence, the value of goodwill shall be left only in the consolidated balance sheet out of the entire pool of long-term investment, while transforming the value of the parent's long-term investment into assets and liabilities of the subsidiary, which are added to the value of the parent's assets and liabilities.

Before reviewing other items of the stock value of financial capital, it is necessary to analyze the financial capital through the balance scorecard of the integrated balance sheet in terms of the balance sheet theory. For this purpose, accounting procedures shall be performed explaining the sequence of accounting tasks to be addressed.

Accounts procedures are based on the equation

$$A=L,$$

where $A$ is a set called *asset*,

$L$ is a set called *liability*. The denotations are nominal and can be transposed.

As mentioned above, the sets can be decreased or increased but it is solely germane to the structure of each set. Changes in the scope of both sets is *modification*, while the changes in the structure of a set is *permutation*.

Every action and/or event reshapes an item of one and/or both sets ($A$ and $L$) because items of the sets are represented with situational facts.

So, if every action and/or event modifies the sets, then

$$A+a=L+a$$

or $A-b=L-b,$

where $a$ is a business fact increasing both sets,

$b$ is a business fact decreasing both sets.

If an action or even rearrange only the structure of one of the sets, two permutation scenarios are possible:

$$A=c+c=L,$$

$$A=L+d-d.$$

The four situations, which A.M. Galagan [8, p. 228]called four types, has a serious impact on the overall accounting theory of the 20th century [5, p. 258]. Notwithstanding all possible arguments about the role and importance of double entry, its significance is hard to negate. Handling the four situations when the balance shifts, we are going to set a model to account for long-term investment made in order to gain the control over an investee, and recognize the result of accounting procedures in the integrated balance sheet.

Bearing in mind the provision of the International Integrated Reporting Framework stating that the primary purpose of an integrated report is to explain to providers of financial capital how an organization creates value over time[11]. It should be noted that providers of financial capital seek for the information about methods the entity intends to use in order to create value. In this case, it concerns the value of business combinations and what resources may be needed.

The International Integrated Reporting Framework provides the definition of information to be presented in the integrated report so as to evaluate the entity's items generating or being capable of generating value, i.e. showing the entity's ability to create value in the future. To solve the issue, the concept of constructive (contractual) obligation should be involved: *like business facts, the obligation and obligatory right are within the scope of accounting practices and determined with elementary moments of the financial and business process, which reinforces or rearranges the financial position of an entity as part of the balance sheet generalization* [9, p. 122].

The concept of constructive obligation, or contractual obligation, which is more

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[10] Ibid.

[11] International Integrated Reporting Framework. URL: http://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

understandable for accountants, implies that the balance sheet shall indicate the desired result of the obligations assumed by parties to an exchange deal. That is, it means forecasting the fact of an exchange deal (conclusion of a contract), which has not occurred yet [2, p. 7].

If used in the business accounting model, the concept of constructive obligation helps mark the future business combination resources within the body of accounts for monetary assets and liabilities. In this case, the legal design of the agency relations, as an analytical concept, plays an important role in the contemporary institutional theory [10, p. 32].

To introduce long-term investment into the business accounting model or even a working chart of accounts, we should add accounts of monetary assets and liabilities. Monetary assets constitute contractual rights of the buyer for an asset but stated as a fixed amount of money for the item to be delivered in the future [11, p. 54].

Intended to gain the control over the investee, long-term investment is formalized as respective contracts in the stock exchange. Such contracts include a call option implying the buyer's contractual right: *A call option gives the holder the right to buy the underlying asset by a certain date for a certain price* [12, p. 44].

A call option confers the buyer's right, rather that an obligation, to make a business combination deal. Therefore, as per IAS 32 – *Financial Instruments: Presentation*, such contracts can be qualified as financial assets. Furthermore, a call option is an item traded on the stock exchange, the value of which is in sync with market conditions. The value of an underlying asset, i.e. common stocks, remains unchanged before the deal is completed or concluded. Hence, the value of an equity instrument of the other entity, as a financial asset, will be expressed as an algebraic sum of the value of common stocks and value of the call option. In the mean time, monetary liabilities constitute contractual obligations to pay the amount stipulated in the contract, notwithstanding the behavior of the asset price and monetary item in the financial market [11, p. 57].

Monetary liability reflects that the holder of the call option intends to pay for the buyer's stocks (holder of the put option) in the future, rather than the factual payment for them. That is why accounts of monetary assets and liabilities may help report accounting procedures for the business combination deal.

Assume that the total value of the business combination deal, which confers the control over the investee, is RUB 500,000 (including RUB 100,000 in the value of the call option). Thus, purchasing a call option on the stock exchange, *Entity A* should recognize its right to buy common stocks of *Entity B* in the following manner:

*Debit Monetary Assets, Subaccount Call Option RUB 500,000.*
*Credit Monetary Liabilities, Subaccount Put Option RUB 500,000.*

*Comment*: Call and put options empower their holders to perform a certain action, that is Entity A's right to buy common stocks of Entity B, and Entity B's right to sell its stocks, but not binding them with obligations to do so. This distinguishes the accounting procedure for monetization of contractual provision from the recognition of the business fact that has already taken place, i.e. the purchase of Entity B's stocks.

Moreover, declaring its intention to buy Entity B's stocks, Entity A acquires a put option, which it is to pay immediately on the stock exchange as much as RUB 100,000. The value is included into the total value of Entity A's financial contributions but Entity A recognizes that the market value of Entity B exceeds their carrying amount as of the acquisition date of the call option:

*Debit Monetary Assets, Subaccount Put Option RUB 100,000.*
*Credit Financial Capital, Subaccount Monetary Funds RUB 100,000.*

*Comment*: This accounting procedure indicates that the payment was made for Entity B's put option that implies Entity A's right to purchase common stocks of Entity B.

Concurrently, monetary assets convert into an item of Entity A's financial capital – goodwill.

*Debit Financial Capital, Subaccount Goodwill*
*RUB 100,000.*
*Credit Monetary Assets, Subaccount Put Option*
*RUB 100,000.*

*Comment*: So, goodwill, a new item of financial capital, is accrued in business accounting. It is an item of financial capital unlike an intangible asset item, which it usually pertains to.

The next step of the business combination deal takes place on the option expiration date, i.e. the date when the terms of the deal become irrevocable.

*Debit Account 62 Settlements with Buyers and Customers RUB 400,000.*

*Credit Monetary Assets, Subaccount Call Option RUB 400,000.*

*Comment*: In fact, at the second step, the accounting procedure shows how *Monetary Assets – Subaccount Call Option* converts into the other monetary asset – accounts receivable, which is carried within amounts due. Whereas the transferring person concedes the right to control the economic income represented with accounts receivable[12]. Moreover, a call option empowers its holder to obtain common stocks. As formulated by E.S. Hendriksen and M.F. Van Breda, the right to control cannot be denied if the transferring party has the ability to resell accounts receivable[13].

At the third step of accounting for the business combination deal, the entity reports business facts in relation to its monetary accounts.

*Debit Account 58 Financial Contributions, Subaccount Common Stocks  RUB 400,000.*
*Credit Account 62 Settlements with Buyers and Customers RUB 400,000.*

*Comment*: In fact, this accounting procedure reports the substitution of a monetary indicator with accounts receivable for obtaining Entity B's common stocks worth RUB 400,000.

However, the account Monetary Liabilities is left unrecognized in accounting records. It means that Entity A is to pay for stocks of Entity B as much as RUB 400,000 in monetary funds.

*Debit Monetary Liabilities, Subaccount Put Option RUB 400,000.*

*Credit Financial Capital, Subaccount Monetary Funds RUB 400,000.*

*Comment*: In fact, the six accounting procedures are confined to the substitution of an item of financial assets – monetary assets – with the other one (equity instruments of the other entity).

As per the International Integrated Reporting Framework, financial capital is regarded as a provision. So, in this case, it is considered as the provision of monetary funds, which is constrained with the amount of retained earnings, which the entity gained, and cash flows reallocated to the provision of financial capital earmarked for the business combination deal. The item Retained Earnings remains unchanged, but the entity is prohibited to use the monetary funds for other purposes whatsoever. For this particular reason, financial capital should be treated as the provision of funds.

However, the accounting procedures are not over even after the transformation of some items of financial capital into the other ones of the business combination deal are recognized. Financial capital undergoes the most crucial rearrangements to fit in the production capital when financial statements of a subsidiary are included into the consolidation perimeter of entities since *the financial reporting entity identifies which subsidiaries', joint ventures' and associates' transactions and related evens are included in the organization's financial report. The financial reporting entity is determined according to applicable financial reporting standards which revolve around the concepts of control or significant influence*[14].

We should add that net assets of the subsidiary and respective percentage of the parent's financial

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[12] Hendriksen E.S., Van Breda M.F. *Teoriya bukhgalterskogo ucheta* [Accounting Theory]. Moscow, Finansy i Statistika Publ., 1997, p. 352.

[13] Ibid.

[14] International Integrated Reporting Framework, paragraph 3.33. URL: http://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

investment are excluded out of the consolidated financial statements. Therefore, the parent's financial capital used to gain the control over the subsidiary is converted into the pool of assets and liabilities in the consolidated financial statements.

The underlying theory of the group formation underlies what method will be chosen to evaluate the effectiveness of the holding group incorporation [13, p. 77]. Thus, IFRS 3 – *Business Combinations* emphasizes that accountants should apply the acquisition method or method for the full integration of accounts as the main technique to recognize the control over the investee. IFRS 3 thereby positions the control acquisition method as a tool to include a subsidiary into the consolidation perimeter [14, p. 146].

Financial capital is transformed in the most interesting way in consolidated accounting and consolidated financial reporting. As required by one of the specific accounting techniques, stocks purchased from the subsidiaries' shareholders are recognized in the balance sheet of the parent entity at the acquisition cost, while the share in the subsidiary's equity is recorded at the carrying amount of the injected assets [15, p. 11].

It should be kept in mind that when preparing consolidated financial statements, the value of the parent's financial investment should correlate with the share in the subsidiary's equity. Both values shall be excluded from the consolidated financial statements.

*Comment*: As we mentioned, the value of the parent's financial investment (net of the value of the option) is RUB 400,000. At the same time, the value of the subsidiary's net assets is RUB 300,000 as of the expiration date of the option. Therefore, this is financial investment worth RUB 350,000 that should be eliminated from the consolidated financial statements.

*Debit 80 Share Capital*   *RUB 200,000.*

*Account 82 Reserve Capital*   *RUB 50,000.*

*Account 84 Retained Earnings*   *RUB 100,000.*

*Credit Financial Capital, Subaccount Financial Investment RUB 350,000*[15].

In this case, two questions are pending. How should RUB 50,000 in the remaining part of financial investment be treated? (RUB 400,000 – RUB 350,000)? To answer the question, let us refer to the following consolidated accounting rule: The positive difference between the offering price (the value of stocks offered as a means of payment or the value of the contributed property) and the value of the subsidiary's net assets is capitalized, being treated as the positive goodwill in consolidation and recorded within intangible assets [15, p. 12], So, the following accounting procedure should be performed:

*Debit Financial Capital, Subaccount Goodwill RUB 50,000.*

*Credit Financial Capital, Subaccount Financial Investment RUB 50,000.*

The second question is much more difficult to answer. Which type of the financial capital transformation is it, if financial capital is eliminated from consolidated financial statements? There are three reference criteria:

– title;

– control over the investee;

– power.

They determine the purpose and structure of the investee. Analyzing the investee's structure, a special focus is put on the adequacy of equity instruments for controlling the investee, which confer the commensurate number of voting rights to the holder through common stocks of the investee.

In the given example, the investor (Parent Entity A) invests RUB 400,000, i.e. redeems Entity B's net assets worth RUB 350,000 as of the consolidation date of entities.

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[15] For more detailed comments on the accounting procedures, please refer to Plotnikov V.S., Plotnikova O.V. *Ob"edinenie biznesa i konsolidirivannaya finansovaya otchetnost': monografiya* [Business combinations and consolidated financial statements: a monograph]. Moscow, INFRA-M Publ., 2018, 278 p. URL: www.dx.doi.org/10.12737/monography_5aafadaa5e5677.15904893

Doing so, the investor (Entity A) gains the total control over the investee's assets, thereby assuming all the obligations of the subsidiary. IFRS 10 – *Consolidated Financial Statements* indicates that *(a) consolidated financial statements combine like items of assets, liabilities, equity, income, expenses and cash flows of the parent with those of its subsidiarie*s[16].

*Comment*: Hence, in the consolidated financial statements, the parent's financial investment (financial capital) is transformed (in line with the share) into assets and liabilities of the subsidiary, which are merged with those of the parent.

Furthermore, it is important and even reasonable to treat financial capital as the provision of funds only in short-term periods (less than a year). Thus, it will be indicative of the real stock value of financial capital earmarked for the reporting period. Such financial capital models have been employed already in the business accounting and analysis model.

However, the provision of funds – the amount of monetary funds at the certain point of time – should be made in line with a quick capitalization of monetary funds into the stock value of other capital or for ensuring the control over the investee or significant influence on it, etc. When an entity makes the substantial provision of monetary funds, which it absorbed from financial investment of other investors or loans for the future plans, the monetary funds are basically immobilized, or withdrawn from the circulation, thereby affecting the value creation process in the short and even mid run. It is absolutely unacceptable to make the provision of monetary funds for a long-term period. Therefore, what the business accounting model pursues is to monetize indicators of monetary funds, which are not indicative of the real figures, but rather estimate them. In this case, indicators of monetary assets may be used since they show the stock value that monetary funds should have in the future (in the mid and long run).

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Finance of Organizations.
Analysis of Accounting Systems

Translated Article†

# OVERDUE ACCOUNTS RECEIVABLE: QUALITY ANALYSIS, OPTIONS FOR PREVENTION AND REGULATION

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**Abstract**

**Importance** The article discusses the risk that counterparts fail to repay their debts in due time. If overdue receivables are timely detected, evaluated and collection measures are undertaken, this will help preserve assets, enhance the use and allocation of corporate resources.

**Objectives** We outline methodological principles and practical recommendations for improving the debtor evaluation mechanism, which is designated to increase the efficacy and economic viability of corporate performance.

**Methods** The research employs a systems approach and statistical data analysis, with the generalization, synthesis, analysis being the principal ones.

**Results** Having analyzed the data on accounts receivable for 2004–2016, we detected that counterparts violated their obligations in a growing number of cases. The fact provides the rationale for developing and introducing accounts receivable, which help manage the credit risk, optimize cash flows and monitor the corporate liquidity on an ongoing basis. The article sets out five key indicators and presents an additional classifier specifying overdue receivables. The classifier is supposed for analyzing the quality of accounts receivable.

**Conclusions and Relevance** The proposed indicators can be used by any entity notwithstanding its size and legal structure and adapted, if needed, and automated into respective business processes.

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*Authorized translation by Irina M. Vechkanova*

The performance of any entity is indispensable without receivables. On the one hand, accounts receivable constitute a portion of current assets

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withdrawn from operations so as to enable a counterpart to fulfill their obligations later on. So, it is nothing if not a credit risk of an entity. On the other hand, accounts receivable serve as a benchmark of business practices, which unavoidably emerges when an entity competes for its clients and market niche. Therefore, this

subsequently requires to analyze accounts receivable of the entity so as to optimize its amount, substance and composition.

There are many researches evaluating whether receivables are effectively managed. For example, T.R. Valinurov, T.V. Trofimov [1], A.R. Galyautdinova [2], M.Yu. Ginzburg, L.N. Krasnova, R.R. Sadykova[1], M.A. Dashuka, L.I. Egorova [3], E.A. Kozhina[2], A.V. Kolodkina, M.A. Saltykova [4], A.P. Kotovich [5], Yu.V. Mezdrikov [6], N.F. Mormul', S.A. Enikeeva [7], T.S. Naumenko [8], S.V. Ovchinnikova [9], E.A. Romanova [10], S.V. Frolova [11], B.A. Shakhmanova [12, 13], S.A. Shelkovnikov, M.N. Fedorov, A.V. Kokorina [14], etc.

Having analyzed receivables management approaches, we found out that business entities tend to use the metrics below most of all, monitoring them throughout certain periods:

– percentage of current assets withdrawn as receivables;

– the median period of receivables collection;

– receivables turnover ratio;

– weighted average term of debt;

– interval indicator of receivables;

– average receivables to sales ratio;

– overdue receivables and its amount (in absolute and relative values), etc.

Every entity may set its own thresholds and adjust its credit policy in line with trends in receivables[3].

However, the contemporary economic situation calls for new approaches to receivables management. This stems from rising negative effects in the Russian economy and subsequent aggravation of payment issues[4]. The factors are accompanied with a slowdown in the sustainable growth of receivables (*Fig. 1*). If unreasonably uncollected, receivables considerably inhibit the turnover of current assets, thus cutting corporate income [2].

In 2012, growth rates of overdue receivables were 4.9 percent, but they reached 21.1 percent, 36 percent and 12.9 percent in 2013, 2014 and 2015 respectively. Negative growth of 1.5 percent was registered only in 2016.

As overdue receivables should be monitored, there should be such key metrics of receivables, which would help manage the credit risk, optimize cash flows and control corporate liquidity on an ongoing basis.

Key metrics include measurable financial ratios, which characterize the result and performance of receivables both in terms of a certain contract (contract manager) and the entity as a whole.

Key metrics of receivables were set for the following improvements:

– better performance of contract managers within an entity;

– control over receivables through a comprehensive approach and coordination of corporate departments and units;

– efficiency of activities for preventing and eliminating overdue receivables.

The contemporary scholarly literature features the following classes of overdue receivables:

• actionable (under enforcement orders and court actions), unperformed, subject to moratorium and uncollectible [15, 16];

• claimed and not yet claimed [17];

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• bad, doubtful and uncollectible [18], etc.

In this article, analyzing the quality of overdue receivables, we specify them viewing the probability of repayment, i.e. liquid, semi-illiquid, illiquid. Liquid receivables shall mean overdue amounts, which is highly likely to be repaid. Such receivables usually arise from a delay in counterparts' finance, incorrect documentation, counterparts' failure to timely deliver the equipment due to a long distance (delayed prepayment, etc.). Receivables are qualified as semi-illiquid if the counterpart regularly fails to perform its obligations for a long period of time (the counterpart is declared bankrupt and subject to bankruptcy proceedings, etc.). Illiquid receivables are amounts due with a strong likelihood that they will not be repaid as the time for claims expires (provided the counterpart is not subject to bankruptcy proceedings and the entity is not on the list of creditors) and/or the counterpart is dissolved.

To evaluate the quality of receivables, we suggest using the following key metrics, which would allow to flag significant areas for receivables monitoring and contribute to transparency of conclusions:

– amount of receivables reduction ( $R_{AR}$ );

– amount of liquid overdue receivables $\left( AR_{Lqd}^{Ovd} \right)$;

– amount of semi-illiquid overdue receivables $\left( AR_{Sillqd}^{Ovd} \right)$;

– amount of illiquid overdue receivables $\left( AR_{Illqd}^{Ovd} \right)$;

– level of overdue receivables optimization (settlement) $\left( Opt_{AR}^{Ovd} \right)$.

The extent to which receivables decrease $R_{AR}$ indicates the time left before receivables could be reclassified from current to overdue (the so called performing receivables period). This metric helps control whether the counterpart is compliant with the time limit given to perform its obligations to the entity. Technically, we suggest expressing it with the following formula:

$$R_{AR} = 100\% - \frac{D_{Fact}}{D_{Contr}} \cdot 100\%,\qquad(1)$$

where $D_{Fact}$ stands for a factual number of days for which the entity provides its counterpart a grace period;

$D_{Contr}$ stands for a maximum number of days for which the entity provides a grace period as per contractual terms.

However, $D_{Contr}$ can be increased if the counterpart produces a letter of guarantee stating its commitment to repaying the debt, repayment schedule (provided the entity agrees with the delay), etc. (*Table 1*).

The amount of liquid overdue receivables $\left( AR_{Lqd}^{Ovd} \right)$ shows a percentage of overdue receivables, the repayment of which is fairly certain:

$$AR_{Lqd}^{Ovd} = \frac{AR_{Ovd}^{Lqd}}{AR},\qquad(2)$$

where $AR$ , $AR_{Ovd}^{Lqd}$ mean total receivables and liquid overdue receivables respectively.

It is acceptable for an entity to have $\left( AR_{Lqd}^{Ovd} \right)$ in its financial and business operations. However, it should not exceed five percent of total receivables[5].

The amount of semi-illiquid overdue receivables is expressed as follows:

$$AR_{Sillqd}^{Ovd} = \frac{AR_{Ovd}^{Sillqd}}{AR},\qquad(3)$$

where $AR_{Ovd}^{Sillqd}$ stands for semi-illiquid overdue receivables.

The amount of illiquid overdue receivables $\left( AR_{Illqd}^{Ovd} \right)$ shows the percentage of uncollectible receivables:

$$AR_{Illqd}^{Ovd} = \frac{AR_{Illqd}^{Ovd}}{AR},\qquad(4)$$

where $AR_{Illqd}^{Ovd}$ is illiquid overdue receivables.

Entities should avoid $AR_{Ovd}^{Sillqd}$ and $AR_{Illqd}^{Ovd}$ in its financial and business operations. Otherwise it should undertake measures for settling and eliminating them completely.

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[5] Every entity is entitled to set up a tolerable amount of liquid overdue receivables.

Furthermore, it should be kept in mind that the ratio of $AR_{Ovd}^{Lqd}$, $AR_{Ovd}^{Sillqd}$ and $AR_{Illqd}^{Ovd}$ reflects the composition of overdue receivables dictating whether the corporate credit policy should be revised:

$$\frac{AR_{Ovd}^{Lqd}}{AR_{Ovd}} + \frac{AR_{Ovd}^{Sillqd}}{AR_{Ovd}} + \frac{AR_{OVd}^{Illqd}}{AR_{Ovd}} = 1. \qquad (5)$$

Analyzing the quality of overdue receivables, the entity can assign credit ratings to its counterparts, that is evaluating their ability (reliability) of an analyzable counterpart to perform obligations. Furthermore, the analysis may spotlight negative changes in the credit risk, thus making the entity remeasure it, choose and conduct preventive measures to cushion adverse effects of credit risk implications. For example, a counterpart may provide an independent guarantee, surety, pledge a marketable asset or adopt prepayment (financial collateral under income-producing contracts) or pay-on-delivery schemes (cost-plus contracts), stipulate covenants, insurance terms in case of the counterpart's default, etc.

The extent to which overdue receivables are optimized (settled) shows the effectiveness of the decision-making process when the entity needs to tackle the credit risk by evaluating a growth in overdue receivables against total receivables:

$$Opt_{AR}^{Ovd} = \frac{AR_{Ovd}^{End}}{AR^{End}} : \frac{AR_{Ovd}^{Beg}}{AR^{Beg}} = \frac{GR_{AR_{Ovd}}}{GR_{AR}}, \qquad (6)$$

where $AR_{Ovd}^{Beg}$, $AR_{Ovd}^{End}$ indicates the amount of overdue receivables at the beginning and end of an analyzable period;

$AR^{Beg}$, $AR^{End}$ stand for total receivables at the beginning and end of an analyzable period;

$GR_{AR}$, $GR_{AR_{Ovd}}$ stand for growth rates in ordinary and overdue receivables for an analyzable period.

When overdue receivables grow faster than total receivables, the credit risks increases as well signifying that the corporate credit policy is ineffective.

The metrics (1), (2), (3), (4), (6) we propose herein and ratios (5) underlie a comprehensive approach as part of measures and activities for preventing and eliminating overdue receivables. This will enhance the use of current assets. It is noteworthy that the metrics are ever changing. Entities constantly refine them and search for new ideas and opportunities.

*Table 1*
**Types of receivables**

| $R_{AR}$ * | Type of receivables | Counterpart's breach of the time limit | Response |
|---|---|---|---|
| ≥ 0% | Current | – | – |
| From –30% to 0% | Overdue liquid | Minor | – |
| From –100% to –30% | | Material | Claims activities |
| From –3,650% to –100% | Overdue semi-illiquid | Fundamental | Court proceedings, termination of a contract, provision for doubtful debts, ongoing monitoring of receivables performance in case of the counterpart's bankruptcy, etc. |
| Below –3,650% and/or entries into the Uniform State Register of Legal Entities/Uniform State Register of Sole Entrepreneurship (EGRUL/EGRIP) on the counterpart's dissolution | Overdue illiquid | – | Proposal to qualify the amount due as uncollectible |

* The above $R_{AR}$ were gauged imperatively for business operation purposes, with the maturity of respective receivables being within 30 consecutive days. The thresholds are advisable and can be adjusted in each particular case.

*Source:* Authoring

**Figure 1**
**Trends in growth rates of overdue receivables in the Russian Federation, 2004–2016**
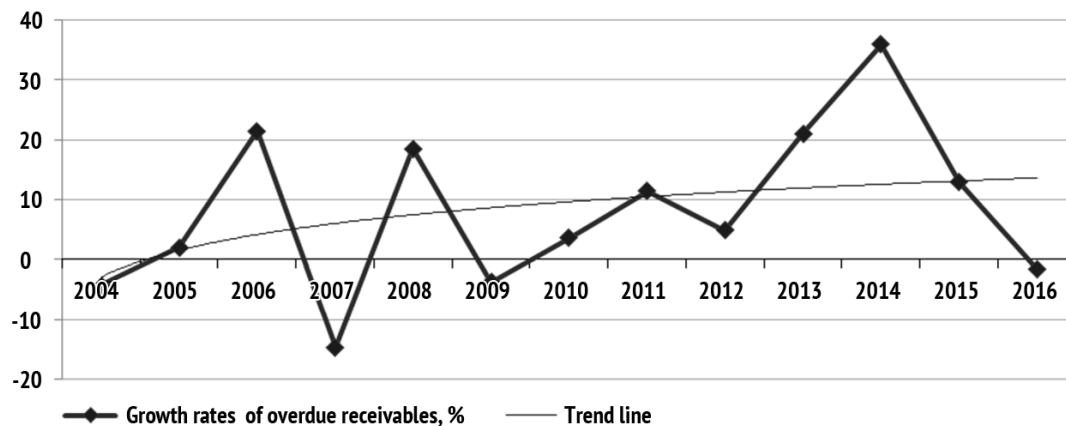


*Source:* Authoring based on the data published on the official website of the Unified Interdepartmental Statistical Information System (EMISS).
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Risk, Analysis and Evaluation

Translated Article[†]

# SETTING THE STOCHASTIC MODEL FOR MID-TERM PREDICTION OF CRYPTOCURRENCY EXCHANGE RATE: THE BITCOIN CASE

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**Abstract**
**Importance** The article discusses the process of economic and mathematical modeling of time series describing the volatility of the bitcoin exchange rate through the Autoregressive Moving Average (ARMA) models.
**Objectives** We search for, and substantiate tools and mechanisms used to predict the cryptocurrency market developments.
**Methods** The research applies tools of stochastic analysis of stationary and non-stationary time series.
**Results** The ARIMA models provide for rather precise estimates of current and future changes in the digital money rates for a three to four month's time.
**Conclusions and Relevance** The bitcoin price will have approximated USD 11,000 by the end of Q3 2018. The methodological approaches to modeling help determine not only future trends, but also changes in exchange rates throughout the entire analyzable period. The findings provide empirical information for cryptocurrency market regulators and business community.

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*Authorized translation by Irina M. Vechkanova*

Nowadays the habitual world of money and finance undergoes profound transformations. Innovation in finance, new technologies, tools and systems dramatically reshape conventional financial constructs. The origination of cryptocurrencies is one of the crucial milestones in such transformation. This process concurs with the energetic development of related technologies. However, the future landscape of the ecosystems is very foggy.

There are about 100 cryptocurrencies today. Some of them are of high capitalization, while the others resemble a *soap bubble*. For example, the bitcoin market capitalization has reached USD 322 billion. It approximated USD 27 billion in Q1 2017[1].

Notwithstanding rather a vivid dynamism of the digital money market in 2017, the legal nature of cryptocurrency is not equal in most countries. Some countries treat it as digital currency, while the others argue that cryptocurrencies could be regarded as money or currency, handling it like goods, intangible assets, medium of exchange [1].

Like money, cryptocurrencies serve as a medium of exchange in the market. They are currently used to pay for goods and services or transfer funds, i.e. as a medium of payment or exchange[2]. However, although many market actors do so to buy or sell goods and services, few of them recognize cryptocurrency as a unit of account.

In the mean time, some cryptocurrency market actors involve cryptocurrencies in their speculative schemes, making short- and long-term investments and profiteering from exchange transactions. As long as they exist, cryptocurrencies and bitcoin, in particular, generally proved to be profitable items to invest in, winning an increasing confidence of

the public[3] [2–5]. Therefore, cryptocurrencies work for saving purposes of the above group of market actors, allowing them to have additional earnings in the future.

It is still worth mentioning that the cryptocurrency market is highly volatile, though the exchange rate is very expected to grow due to the limited issue of cryptocurrency. High volatility is registered not only in stock exchange, but also predicted by respectable experts. For instance, according to an interview with one of the bitcoin developers, this cryptocurrency has not yet ceased to be more than an experiment[4]. Jamie Dimon, top executive of J.P. Morgan Chase, expresses his skepticism about cryptocurrencies, calling bitcoin *a fraud*. Warren Buffett warned that bitcoin is a *mirage*[5].

Despite skeptical views on the cryptocurrency market, demand for financial instruments based on crypto-transactions remains stable and even gains momentum. The global community and national regulators demonstrate an increasing interest in the instrument, thus reinforcing the legitimacy of the cryptocurrency market worldwide.

To understand how countries treat cryptocurrency and scrutinize the legal status worldwide, we performed a respective analysis showing the position of cryptocurrencies per each quarter starting from 2013 through 2017 across 26 countries.

We referred to the following system of points to determine the position of cryptocurrencies:

–1 is assigned in the case of negative attitude to cryptocurrencies/total prohibition;

0 is assigned when the status of cryptocurrency is indefinite;

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[1] According to Coin Market Cap.

[2] El'shin L.A., Abdukaeva A.A. [Financial instruments revitalizing business activities: Distinctions and prospects]. *Problema riska v sovremennykh krizisnykh usloviyakh mirovoi ekonomiki: materialy mezhdunarodnoi nauchnoi konferentsii* [Proc. Int. Sci. Conf. The Matter of Risk in the Current Crisis Situation in the Global Economy]. Ufa, Aeterna Publ., 2017, pp. 74–77.

[3] El'shin L.A., Abdukaeva A.A. [Opportunities for generating business activities through digital money]. *Metody, mekhanizmy i faktory mezhdunarodnoi konkurentosposobnosti natsional'nykh ekonomicheskikh sistem: materialy mezhdunarodnoi nauchnoi konferentsii* [Proc. Int. Sci. Conf. Methods, Mechanisms and Factors of International Competitiveness of National Economic Systems]. Ufa, Aeterna Publ., 2017, pp. 91–94.

[4] Vigna P., Casey M.J. *Epokha kriptovalyut. Kak bitkoin i blokchein menyayut mirovoi ekonomicheskii poryadok* [The Age of Cryptocurrency: How Bitcoin and the Blockchain Are Challenging the Global Economic Order]. Moscow, Mann, Ivanov i Ferber Publ., 2018, 432 p.

[5] Ibid.

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0.5 is assigned when countries are contemplating legalization issues;

1 is assigned when the cryptocurrency is recognized as private money, goods, asset;

2 is assigned when the cryptocurrency is duly accepted and subject to tax.

Please see the result in *Table 1* and *Fig. 1*.

As the analysis reveals, the legal status of cryptocurrencies is disputable and needs to be finally settled in most of the countries. In the mean time, although nations are not unanimous in their attitude to the cryptocurrency market, the latter is on the upswing as countries confer the legitimacy on it. The average points per quarter add to a time series with the apparently linear trend. *Fig. 1* showcases the situation. Consequently, the global community's confidence in cryptocurrencies grows stronger as we move from an analyzable period to another.

Notwithstanding the reassuring dynamism in legalizing and developing the cryptocurrency market, the digital money market is yet to reach its maturity. The Russian Federation crystallizes its approach to cryptocurrencies, urging various governmental agencies to consider the legalization of cryptocurrencies and formulate their legal identity. The saving function of cryptocurrencies may subsequently take a new turn in the nearest future. It is enough to say that the Ministry of Finance of the Russian Federation even suggested including cryptocurrencies into the 2017–2019 national financial literacy program[6]. Bearing in mind the opinion of A. Siluanov, Russia's Minister of Finance, the scientific community conducts multiple studies into investment in electronic currency, which may supposedly be a big risk. Investment in such an unregulated asset and possible consequences will be constantly on the agenda of the Russian authorities until 2023.

As the cryptocurrency market is insufficiently developed in Russia, if not being in its infancy, the business community is noticeably indifferent to

the model that helps evaluate and forecast the future trends in the cryptocurrency market [6]. However, it is worth mentioning speculative schemes in the market and recent cryptocurrency legalization efforts of the Russian regulatory authorities, thus raising the need in this methodological tool. In 2017, there was a series of large-scale researches into this issue, which include, for instance, *Scenario-Based Modeling of the Cryptocurrency Market Development in the Russian Federation and Its Impact on Future Payments for Airflight Services in Aeroflot's Operations* (ordered by Aeroflot), *Legislative Regulation of Implementation and Practical Use of Modern Financial Technologies, Analysis of Global Expertise and Adaptation Mode for the Russian Federation* (ordered by the State Duma of the Federal Assembly of the Russian Federation). The State Duma of the Russian Federation announced a tender to examine ways to legislatively regulate the use of the blockchain technology in the financial market.

These efforts are taken as the Russian President instructed the Russian Government in 2017 to create the regulatory framework for cryptocurrency in the national economy[7]. In January 2018, the RF Ministry of Finance and the Central Bank of Russia elaborated and released the draft federal law *On Digital Financial Assets*[8].

Furthermore, although the global cryptocurrency market has been growing exponentially for the recent years and governmental regulators have been searching for mechanisms to control cryptocurrency circulation, many economists and governmental officials still believe it insignificantly impacts the macroeconomic and financial stability. These assumptions stem from an extremely low share of the cryptocurrency market in the total balance-of-payment system. For example, bitcoin accounts for 0.006 percent of total fiat money and 0.001 percent of money supply in the Russian Federation [7, 8].

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[6] *Kriptovalyutu vstrechayut v Rossii s rasprostertymi ob"yatiyami* [Cryptocurrency is warmly welcome in Russia]. URL: https://mining-bitcoin.ru/news/kriptovalyuty-v-rossii?utm_referrer=https%3A%2F%2Fzen.yandex.com (In Russ.)

[7] *Perechen' poruchenii po itogam soveshchaniya po voprosu ispol'zovaniya tsifrovykh tekhnologii v finansovoi sfere* [The list of instructions following the meeting on the use of digital technologies in finance]. URL: http://kremlin.ru/acts/assignments/orders/55899 (In Russ.)

[8] *Proekt federal'nogo zakona O tsifrovykh finansovykh aktivakh* [Draft Federal Law On Digital Financial Assets]. URL: https://www.minfin.ru/ru/document/?id_4=121810 (In Russ.)

There is a strong likelihood that in the foreseeable future the cryptocurrency market will continue rising and penetrating national economic systems in different ways. Hence researchers and experts need to focus on the issue today as much as possible. The capitalization of the cryptocurrency market may be spurred if it is not only promoted as an advanced tool for transactions, but also driven by an increasing exchange rate (as a result of a limited issue of cryptocurrency like 21 million units of bitcoin, and speculative processes and deals in cryptocurrency exchanges) [9].

As aforementioned, it seems very important to find and devise a special toolkit to foresee and predict the way exchange rates of modern digital money will develop in the future.

It is fair to note that there are few scholarly publications on the subject. Studies mainly provide an expert assessment of the current and future developments in the cryptocurrency market or focus on the usage of special methods for technical analysis of stock exchanges so as to reveal the specifics and trends in the digital money exchange rates.

It is noteworthy that those scarce publications on the cryptocurrency market development seldom, if never, pursue creating models to predict a growth in the digital money market capitalization for the mid- and long-term horizon. It is quite understandable as the analyzable market is very difficult to interpret and model through traditional forecasting methods due to its infancy and its development paradigm, which implies decentralized regulation, unpegging from the so called underlying assets. It considerably complicates building multivariate economic-mathematical models allowing to make forecasts for a certain date in the future. However, as the cryptocurrency market rapidly intrudes into the global system of economic operations, such models would serve for the purpose.

If we conduct an in-depth analysis of the existing approaches to modelling and forecasting stock exchange rates of cryptocurrency, it would be fair to state the nontrivial nature of such exchange rate forecasts. Fundamental analysis proves to be ineffective for predicting the volatility of stock exchange quotations since the exchange rate is not pegged to any economy. Technical analysis falters too since it is impossible to determine the market situation because demand and supply depend on persons willing to buy or sell certain goods and services all over the world [10–13].

However, it is still necessary to address the issue by forging appropriate tools for predicting future development in the mid-term horizon. We believe it is possible to do so through the Autoregressive Integrated Moving Average (ARIMA) and Autoregressive Moving Average (ARMA) models. This approach proves useful when there are no proper tools to forecast changes in exchange rates of such financial assets. Their exchange rates unevenly fluctuate over time, being not pegged to underlying assets and depending on numerous speculative positions, etc.

ARMA, ARIMA models represent an important class of parametric models which help describe stationary and non-stationary series. As part of this research, we intend to find an autoregression model and integrated moving average with a minimum order of parameters, which allow to make plausible short-term forecasts of cryptocurrency volatility [14].

As the empirical and expert analysis shows, it is reasonable to refer to bitcoin for purposes of the research due to multiple reasons. For example:

– prevalence in global capitalization of cryptocurrencies (about 45 percent);

– the highest popularity among others cryptocurrencies, with its changes totally influencing the volatility of other types of cryptocurrencies in the market.

Dealing with methodological issues, we should note that the use of the above models requires five basic iterations:

1) constructing a time series;

2) testing the time series for stationarity, thus defining whether it relates to the ARMA or ARIMA model;

3) selecting properties of the model;

4) evaluating the reliability and adequacy of the model;

5) setting predictive parameters of the analyzable time series.

We showcase the modeling process providing a detailed account of the sequence of iterations we perform.

Computations are based on data reflecting monthly fluctuations of bitcoin within the period from January 1, 2014 through March 18, 2018 (*Fig. 2*). The data proceed from Bitcoin.info virtual service of cryptocurrency wallets. The computations were processed via Eviews, IBM, SPSS software packages.

Stationary times series or series of probable stationarity can be modeled using the ARMA model combining two models, i.e. autoregression *p* and moving average *q*. In a generalized form, the ARMA model (*p, q*) is expressed as follows:

$$Y_t = a_0 + a_1 X_{t-1} + a_2 X_2 \ldots + a_n X_{t-n} + \varepsilon_t - \beta_1 \varepsilon_{e-1} - \beta_2 \varepsilon_{e-2} - \ldots - \beta_n \varepsilon_{t-n}.$$

G. Jenkins and G. Box offered the ARIMA (*p, d, q*) model for non-stationary data, which can be presented in a stationary form after successive differences *d* are subtracted [15], where *p, d, q* are structural parameters describing the order of corresponding parts of the model, whether it is autoregressive, integrated and moving average.

The model selection methodology comprises several steps.

First, the model is identified.

At the initial step of the research, it is necessary to determine whether the analyzable series is stationary.

A stationary series has such behavior and properties which remain the same in the future and in the past.

Various methods can be employed to evaluate the stationarity of the series. The augmented Dickey–Fuller test, autocorrelation function (*ACF*) and partial autocorrelation function (*PACF*) constitute the main approaches to checking the stationarity *BP*. *ACF* is computed as follows:

$$\rho_k = \frac{\gamma_k}{\gamma_0} = \frac{cov(k)}{var} = \frac{cov(y_t ; y_{t-k})}{var(y_t)} ; |\rho_k| \leqslant 1.$$

*PACF* is assessed as a partial correlation of values $y_t$ and $y_{t-k}$, that is purified from an effect the evolving variable has on them[9].

We set the *ACF* and *PACF* for the input series (*Fig. 3*).

*ACF* coefficients demonstrate a slow decline in *ACF*, falling exponentially from the coefficient approximating 1. The autocorrelation coefficient is high in *PACF* within the first lag and approximates 0 within the following lags.

Thus, we infer that the input time series is non-stationary.

In addition to a visual analysis, we performed the augmented Dickey–Fuller test (*ADF test*) to check the stationarity of the time series. The test verifies the null hypothesis of a unit root in the equation:

$$y_t = \alpha \, y_{t-1} + \varepsilon_t.$$

The stationarity *BP* is proven if the test estimates exceed the statistic $t_{observ}$ ($t_{crit} > t_{observ}$). *Fig. 4* displays the results of the test.

$t_{observ}$ is set to equal –3.11 for the analyzable time series. Whereas the resultant values are lower than $t_{observ}$ at different significance (1, 5 and 10 percent), we agree with the hypothesis of non-stationarity *BP*.

Therefore, we modeled the exchange rate of bitcoin using the ARIMA model.

1. Criteria for setting the model parameters.

After the model is chosen, its parameters should be configured. After the first difference is subtracted, the input time series is presented in a stationary form. Hence, *d* =1.

To model trends in exchange rates of cryptocurrencies, we tested models ARIMA (1,1,1), ARIMA (1,1,2), ARIMA (2,1,0), ARIMA (2,1,1), ARIMA (2,1,2).

To choose a model, we referred to the *ACF* and *PACF* and the Akaike information criterion – *AIC* (1) and Bayesian information criterion – *BIC* (2).

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[9] Kantorovich G.G. [Time series analysis]. *Ekonomicheskii zhurnal VshE = HSE Economic Journal*, 2002, no. 1.
URL: https://ej.hse.ru/data/2010/12/31/1208182144/06_01_06.pdf (In Russ.)

The criteria help choose the most appropriate model out of possible models. The model with the lowest *AIC* and *BIC* wins. The assessment is based on the following formulas:

$$AIC = \ln \hat{\delta}^2 + \frac{2}{n} r ; \qquad (1)$$

$$BIC = \ln \hat{\delta}^2 + \frac{\ln\ n}{n} r , \qquad (2)$$

where ( $\hat{\delta}^2$ ) is the residual amount of squares divided by the number of observations;

*r* is the total number of summands of the ARIMA model.

The ARIMA model (2,1,1) has the lowest *AIC* and *BIC*.

Thus, the final model is expressed as follows:

$$\Delta X = 17{,}849 + 0{,}047\,\Delta X_{t-1} - 0{,}296\,\Delta X_{t-2} - $$
$$- 1{,}602\,\varepsilon_{t-1} - 0{,}845\,\varepsilon_{t-2} + \varepsilon_t .$$

2. Predictive Estimation.

Using the final model, we forecasted the bitcoin exchange rate for a four point distance. *Fig. 5* shows the results.

*Table 2* characterizes the quality of the resultant model.

The reliability and adequacy of the results were verified by comparing factual and projected parameters of the bitcoin rate, and with the high value of *R*-square (Fig. 6).

As depicted in the graph, the projected values provide a very accurate view of the future fluctuations, being corroborated with the very precise forecast of daily changes in the trends.

We unavoidably observe an insignificant variance of absolute values of time series. This is quite acceptable, falling within standard error thresholds.

So, referring to the resultant estimates, we infer that the bitcoin exchange rate will have stable positive trends within the coming four months (*Fig. 7*).

The market value of bitcoin will have approximated USD 11,000 by the end of Q3 2018. It is noteworthy that the methodological approaches to modeling we use in this research enable us to foresee not only future trends shaping possible developments, but also changes in stock exchange rates throughout the analyzable period. The expected change in May 2018 will be insignificant, without seriously influencing the projected positive trend within the analyzable period.

The results provide much evidence confirming that the proposed forecast tools are promising, being based on autoregression mechanisms and integrated moving average. However, we ought to mention that the proposed model needs to be refined. For instance, due to frequent changes in the analyzable time series, it would be reasonable to apply stochastic volatility models.

The proposed toolkit may come in handy to model business processes involving crypto-transactions. First of all, it will help understand and predict stock exchange rates of cryptocurrencies since their use engenders high risks of financial loss in business operations due to considerable volatility [16].

Subsequently, the proposed methodological approaches open new opportunities for predicting and forecasting the digital market developments for a three/four month time, thus giving reasonable grounds to model the behavior of economic agents involved in crypto-transactions. Furthermore, considering active efforts worldwide and nationwide for legalizing the cryptocurrency market, it is necessary to forecast the analyzable market for more distant time horizons as compared with most models used as part of technical analysis, which is indispensable for generating analytical estimates in stock exchanges. The proposed methodological approach is capable of solving such vital and significant issues for today's economy, as the computations show.

*Table 1*
**Analysis of the legal status of cryptocurrencies**

| Country | 2013 | | | | 2014 | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Russian Federation | 0 | 0 | 0 | 0 | −1 | −1 | −1 | −1 |
| Germany | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Croatia | 0 | 0.5 | 0.5 | 2 | 2 | 2 | 2 | 2 |
| Denmark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sweden | 0 | 0.5 | 0.5 | 0.5 | 1 | 1 | 1 | 1 |
| South Korea | 0 | 0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Thailand | 0 | 0 | −1 | −1 | 0 | 0 | 0 | 0 |
| China | 1 | 1 | 1 | −1 | −1 | −1 | −1 | −1 |
| USA | 0.5 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 |
| Singapore | 0 | 0 | 0.5 | 0.5 | 1 | 1 | 1 | 1 |
| Norway | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| Ukraine | 0 | 0 | 0 | 0 | 0 | 0 | −1 | −1 |
| France | 0 | 0 | 0 | −1 | −1 | −1 | 0.5 | 0.5 |
| India | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Australia | – | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Belgium | 0 | 0 | 0 | 0 | −1 | −1 | −1 | −1 |
| Canada | 0 | −1 | −1 | −1 | −1 | 1 | 1 | 1 |
| Cyprus | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Hong Kong | 0 | 0 | 0 | −1 | −1 | −1 | −1 | −1 |
| Israel | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Japan | 0 | 0 | 0 | −1 | −1 | 0.5 | 0.5 | 0.5 |
| New Zealand | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Slovenia | 0 | 0 | 0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Spain | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| United Kingdom | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Bulgaria | 0 | 0 | 0 | 0.5 | 0.5 | 2 | 2 | 2 |

*Continued from Table 1*

| Country | 2015 | | | | 2016 | | | | 2017 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 |
| Russian Federation | −1 | −1 | −1 | −1 | −1 | −1 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Germany | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Croatia | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Denmark | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Sweden | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| South Korea | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 2 | 2 |
| Thailand | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| China | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 |
| USA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Singapore | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Norway | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Ukraine | −1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| France | 0.5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| India | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Australia | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Belgium | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 | −1 |
| Canada | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cyprus | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Hong Kong | −1 | −1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Israel | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 1 | 1 | 1 |
| Japan | 0.5 | 0.5 | 0.5 | 0.5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| New Zealand | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | −1 | −1 | −1 |
| Slovenia | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Spain | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| United Kingdom | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Bulgaria | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

*Source:* Authoring

*Table 2*
**Qualitative characteristics of the model**

| Fitting statistics | Mean |
|---|---|
| Stationary *R*-square | 0.871 |
| *R*-square | 0.999 |
| Root Mean Square Error (RMSE) | 165.930 |
| Mean Absolute Percentage Error (MAPE) | 4.182 |
| Maximum Absolute Percentage Error (MaxAPE) | 39.607 |
| Mean Absolute Error (MAE) | 102.682 |
| Maximum Absolute Error (MaxAE) | 634.788 |

*Source:* Authoring

*Figure 1*
**Average rating of the legal status of cryptocurrencies (the graph is generated on the basis of *Table 1* data)**
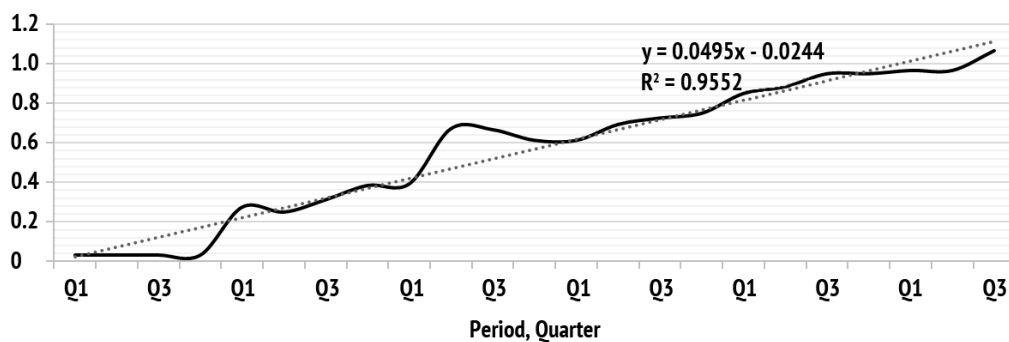


*Source:* Authoring

*Figure 2*

**Trends in the bitcoin exchange rate, by month, USD**
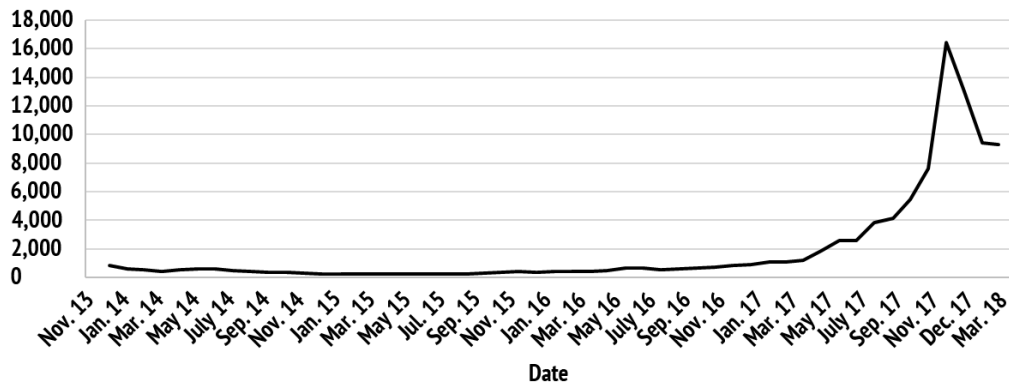


*Source:* Blockchain. URL: https://blockchain.info

*Figure 3*

**Autocorrelation function (AC), Partial Autocorrelation Function (PAC)**

| Autocorrelation | Partial Correlation | | AC | PAC |
|---|---|---|---|---|
| | | 1 | 0.856 | 0.856 |
| | | 2 | 0.700 | -0.126 |
| | | 3 | 0.538 | -0.111 |
| | | 4 | 0.344 | -0.225 |
| | | 5 | 0.253 | 0.273 |
| | | 6 | 0.193 | 0.012 |
| | | 7 | 0.144 | -0.035 |
| | | 8 | 0.092 | -0.196 |
| | | 9 | 0.062 | 0.145 |
| | | 10 | 0.034 | 0.011 |
| | | 11 | 0.014 | 0.025 |
| | | 12 | 0.001 | -0.136 |
| | | 13 | -0.011 | 0.054 |
| | | 14 | -0.023 | -0.009 |
| | | 15 | -0.032 | 0.044 |
| | | 16 | -0.040 | -0.092 |
| | | 17 | -0.046 | 0.027 |
| | | 18 | -0.052 | -0.033 |
| | | 19 | -0.061 | 0.024 |
| | | 20 | -0.069 | -0.064 |
| | | 21 | -0.078 | 0.012 |
| | | 22 | -0.086 | -0.036 |
| | | 23 | -0.092 | 0.017 |
| | | 24 | -0.097 | -0.048 |

*Source:* Authoring

*Figure 4*
**ADF test results**

|  |  | t-Statistic | Prob.* |
| --- | --- | --- | --- |
| Augmented Dickey-Fuller test statistic |  | 3.110313 | 1.0000 |
| Test critical values: | 1% level | -3.588509 |  |
|  | 5% level | -2.929734 |  |
|  | 10% level | -2.603064 |  |

*Source:* Authoring

*Figure 5*
**Predicted values of bitcoin exchange rate through the ARIMA model (2,1,1), BTC/USD**
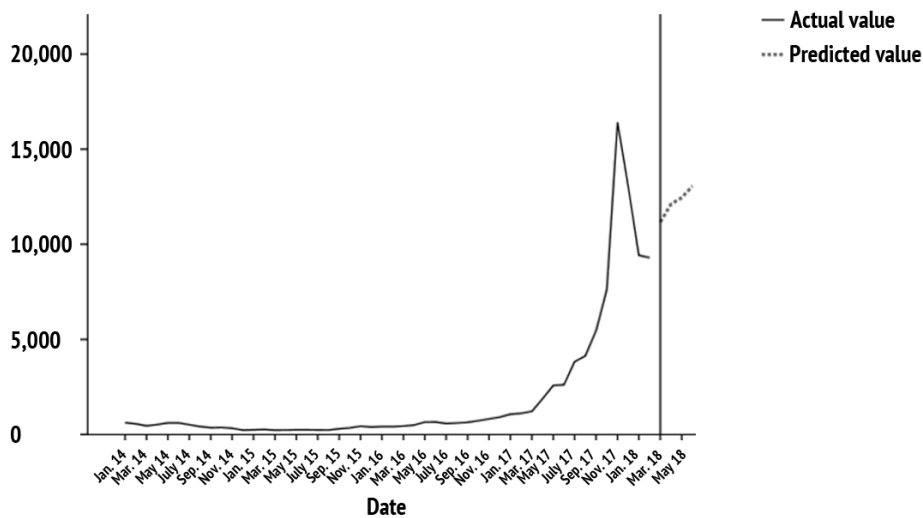


*Source:* Authoring

*Figure 6*
**Convergence of predicted and factual values of the BTC/USD rate, BTC/USD**
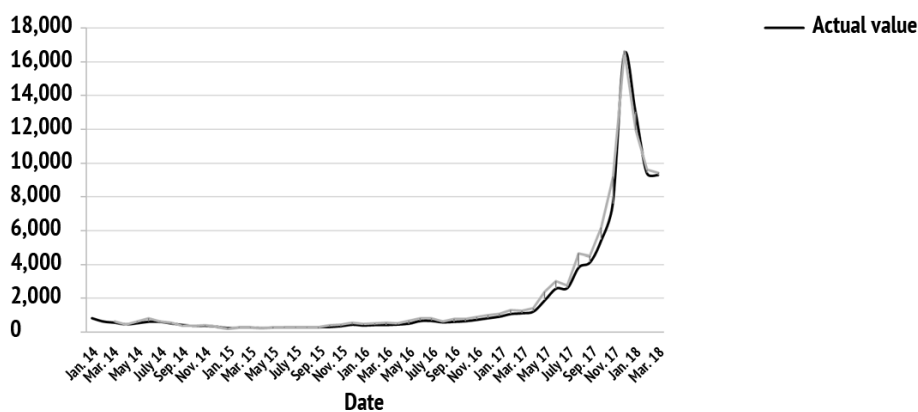


*Source:* Authoring

*Figure 7*
**Predicted values**
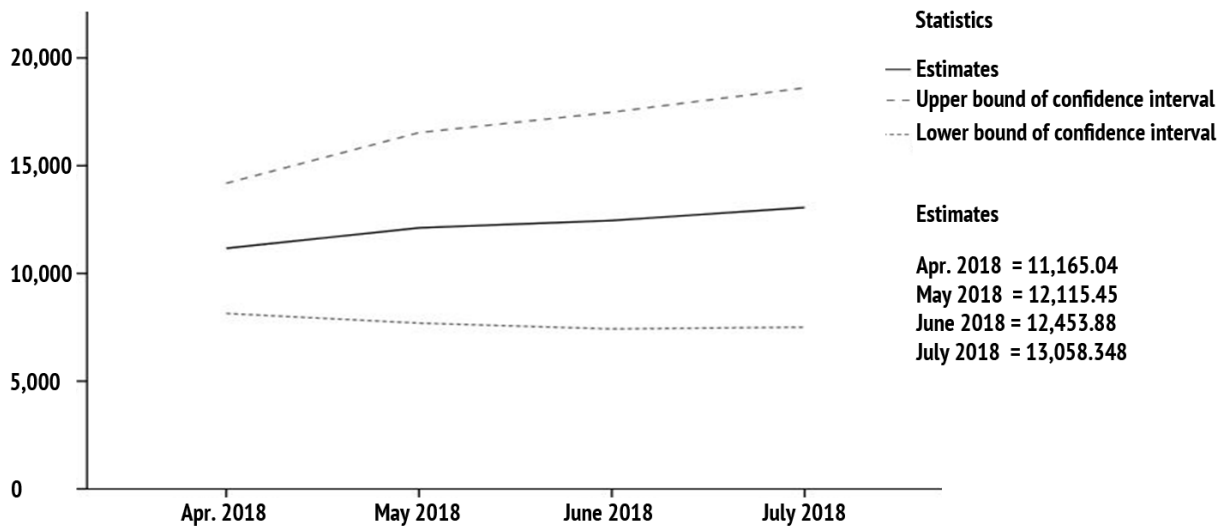


*Source:* Authoring

## Acknowledgments

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Risk, Analysis and Evaluation

Translated Article[†]

# UPDATING THE EXISTING APPROACHES TO GAUGING THE LENGTH OF OPERATING AND CASH CONVERSION CYCLES

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**Abstract**

**Importance** Operating and cash conversion cycles are one of the key performance indicators of working capital management. If they last longer, more working capital is required, while their decrease has the opposite effect. The duration measurement methodology is a frequent subject of discussion in the scholarly and training literature. However, there are dissenting opinions on their substance and measurement technique.

**Objectives** The research comprehensively studies challenging aspects of the methodology for measuring the duration of operating and cash conversion cycles and substantiates my own viewpoint on the issues.

**Methods** The theoretical and methodological framework comprises proceedings of the national and foreign economists majoring in financial analysis. I also use the historical approach, generic and special methods of analysis, synthesis and analogy.

**Results** I specify the economic substance and technique to gauge the duration of operating and cash conversion cycles and their constituents. To make the computations more precise, it is advisable to estimate inventories, receivables and payables using monthly or even daily balances, which are quite feasible as accounting and analytical data are processed electronically.

**Conclusions and Relevance** The proposed approach may serve as a basis for further development of the financial analysis methodology and methodological guide for business entities to monitor and make business decisions in the process of working capital management.

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The operating cycle means a period of time, during which working capital makes the entire turn in operations (procurement, production and distribution). During the operating cycle, business entities purchase inventories, manufacture finished goods and sell them for cash or on credit, and clients repay their amounts due. In other words, it is the average time between the acquisition of resources and materials and collecting cash from the sale of products, goods and services.

The operating cycle consists of:

- inventory period, that is the amount of time which starts as inventories are entered for storage and ends when finished goods are shipped to buyers;

- accounts receivable period, that is the period of time when buyers repay their debts arising from purchases on credit.

Most authors advocate this particular concept for determining the substance of the operating cycle.

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However, there are still other opinions in some publications.

For instance, many definitions commonly falter by qualifying the duration of the operating cycle as the time required for money to convert from the moment of being invested in inventories till the moment it is recovered as revenue form products sold[1] [1, p. 275; 2, p. 10–15; 3, p. 30; 4, p. 205].

According to the definition, the operating cycle is fed with monetary capital. In fact, it depends not only on monetary funds, but also on creditors since entities pay to suppliers and other creditors after a certain time lag. Therefore, the operating cycle duration is considered to start when the entity undertakes to pay for its purchases, rather than upon the fact of money remittance [5, p. 266]. The entity may become bound to pay not only for purchases, but also incur other operating expenses. In this respect, it is worth considering how A.I. Alekseeva[2] defines the substance of the operating cycle, stating that it is a period of time required for the entity to bind itself to incur production expenses and collect cash from the sale of products and services.

According to another view, which is different from the generally accepted one, the operating cycle should be regarded as the duration of deals with tangible working assets, period of time from the purchase of resources up to the finished product output, that is the inventory period. The idea behind this statement is that many Russian entities can receive prepayments for their products, thus distorting the common perception of the operating cycle.

As for this point of view, I should note that such aggressive financial policy is also typical of businesses from other countries due to the monopolistic nature or other reasons. However, as stated in the existing literature, those countries do not exclude the distribution process from the operating cycle. There is hardly any company in Russia, which sells only on a prepayment basis and has no trade receivables. How should the situation be qualified? Shall it be regarded as the operating cycle? In my opinion, some standalone cases or temporary difficulties should not make businesses revise conceptual principles of the existing categories and techniques. It goes without saying that the operating cycle will be equal to the inventory period if the entity sells its products and services only on the prepayment basis.

The cash conversion cycle is the amount of time needed for the entire turnover of monetary capital invested in working assets, from paying for procurement, incurring other operating expenses to collecting cash for products shipped and services delivered. Entities usually lack finance when they face a gap between the maturity of receivables and proceeds from buyers.

Therefore, I should mention the most common inaccuracies found in some authors' definitions of the substance of the cash conversion cycle.

What falters first of all is that the cash conversion cycle is defined as the period of the operating cycle when the entity is financed with its own working capital [4, p. 209; 6, p. 24]. The period is equated to the time of working capital turnover. As a matter of fact, financial needs are satisfied with equity or loans and borrowings[3].

As for the second inaccuracy, most authors measure the cash conversion cycle by focusing on trade payables, which reduce financial needs to purchase the inventories, rather than the entire trade payables. Moreover, there are no cash flows while other working assets are constructed since many expenses relating to construction in progress, cost of finished products are recognized on an accrual basis, rather than on a payment basis. Thus, determining the length of the cash conversion cycle and needs to finance working assets, in addition to trade payables, it is necessary to consider the average wages payable, social security charges, taxes and levies, deferred income, provision for future expenses and payments, i.e. overall accounts payable, other than

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[1] Dybal' S.V. *Finansovyi analiz: teoriya i praktika* [Financial analysis: theory and practice]. St. Petersburg, Biznes pressa Publ., 2004, 304 p.

[2] Alekseeva A.I., Vasil'ev Yu.V., Maleeva A.V. et al. *Kompleksnyi analiz khozyaistvennoi deyatel'nosti* [Comprehensive analysis of business performance]. Moscow, KnoRus Publ., 2015, 720 p.

[3] Efimova O.V. *Finansovyi analiz: sovremennyi instrumentarii dlya prinyatiya ekonomicheskikh reshenii* [Financial analysis: Modern tools for economic solutions]. Moscow, Omega-L Publ., 2010, 351 p.

amounts due for transactions with long-term assets. There is also a time lag between the accrual and repayment of liabilities, during which the funds are used in operations, reducing the financial needs.

As for the third inaccuracy, when determining the cash conversion cycle, short-term loans and credit are included into current liabilities in addition to accounts payable. These are sources of finance, which mainly satisfy needs in monetary working capital.

The forth inaccuracy is that the cash conversion cycle is regarded as the time when monetary funds are withdrawn from the circulation [2, p. 10–15; 7, p. 50]. As a matter of fact, they are involved into operations. Money is taken out of operations if it is deposited with bank accounts or works as short-term financial investment.

The economic literature also provides different views on the technique for measuring the length of operating and cash conversion cycles.

According to L.A. Bernstein [8, pp. 407–413], J.C. Van Horne, J.M. Wachowich [5, p. 266], T.P. Carlin, A.R. McMeen[4], B. Colass[5], Cheng Lee, J. Finnerty[6] and others, the length of the operating cycle is gauged as follows:

$$P_{OC} = P_I + P_{AR},\qquad(1)$$

where $P_I$ is the amount of time, during which capital is kept as inventories (raw materials, supplies, semi-finished products of construction in progress, finished products);

$P_{AR}$ is the amount of time, during which capital is kept as accounts receivable.

The same technique is applied by many Russian authors, such as V.V. Kovalev [9, p. 532], E.S. Stoyanova[7], N.N. Selezneva, A.F. Ionova[8],

A.D. Sheremet[9], S.N. Morozova [10, p. 81], D.Yu. Busygin [11, p. 48], etc.

The second algorithm for the operating cycle measurement, which is very frequently mentioned in the Russian literature, is as follows:

$$P_i = P_{PI} + P_{CIP} + P_{FP} + P_{AR},\qquad(2)$$

where $P_{PI}$ is the amount of time, during which capital is kept as production inventories and materials;

$P_{CIP}$ is the amount of time, during which capital is kept as construction in progress;

$P_{FP}$ is the amount of time, during which capital is kept as stock of finished products;

$P_{AR}$ is the amount time, during which capital is kept as accounts receivable.

This is an augmented model that allows to pinpoint the circulation phase when the working capital turnover accelerates or slows down as part of operations. Its weakness is that prepayments made to suppliers are included into accounts receivable, being less liquid than amounts due from customers. They cannot morph into cash as fast as amounts due from customers. First of all, the entity obtains materials from suppliers, use them for production purposes. It gains income by selling its finished products. Thus, prepayments and retainers are a virtually less marketable working asset. If they are recognized as current receivables, this extends the time they are held for sale of products and concurrently reduces the duration of the inventory period. In this respect, O.V. Efimova [12, p. 167] quite reasonably distinguishes prepayments to suppliers in the operating cycle – $P_{adv}$:

$$P_{OC} = P_{Adv} + P_{PI} + P_{CIP} + P_{FP} + P_{AR}.\qquad(3)$$

Likewise the length of the operating cycle shall be decreased by the time, during which it is served with customers' prepayments. However, scholars dissent from this statement. As some scholars opine,

[4] Carlin T.P., McMeen A.R. *Analiz finansovykh otchetov (na osnove GAAP)* [Analyzing Financial Statements]. Moscow, INFRA-M Publ., 1998, 448 p.

[5] Colass B. *Upravlenie finansovoi deyatel'nost'yu predpriyatiya. Problemy, kontseptsii i metody* [Gestion financière de l'entreprise : problématique, concepts et méthodes]. Moscow, Finansy, YUNITI Publ., 1997, 576 p.

[6] Lee Cheng, Finnerty J. *Finansy korporatsii: teoriya, metody i praktika* [Corporate Finance: Theory, Method, and Applications]. Moscow, INFRA-M Publ., 2000, 686 p.

[7] *Finansovyi menedzhment: teoriya i praktika* [Financial management: Theory and practice]. Moscow, Perspektiva Publ., 2002, 656 p.

[8] Selezneva N.N., Ionova A.F. *Finansovyi analiz. Upravlenie finansami* [Financial analysis. Financial management]. Moscow, YUNITI-DANA Publ., 2003, 639 p.

[9] Sheremet A.D., Ionova A.F. *Finansy predpriyatii: menedzhment i analiz* [Corporate Finance: Management and Analysis]. Moscow, INFRA-M Publ., 2008, 479 p.

customers' prepayments reduce the time capital is held for sale of products. The same is true for the operating cycle respectively. According to other authors [11, p. 44; 13, p. 97–98] who I agree with, prepayments have no impact on the length of the operating cycle. Like accounts payable, they decrease financial needs, i.e. shorten the cash conversion cycle. Unlike retainers given to suppliers, which are treated as capital expenditures for corporate assets extending, under other conditions being equal, the cash conversion cycle, I believe prepayments from customers should be regarded as a source of operational finance reducing the cash conversion cycle.

Models (1)–(3) characterize the capital turnover directly as is in the operating process. In the mean time, working assets include funds that do not directly relate to the phases of production and product sale. First of all, it concerns cash and cash equivalents, short-term financial investment, which are temporarily out of corporate circulation. Operations are also indispensable without some cash reserve. Thus, determining the duration of the operating process, I.A. Blank [1, p. 275], L.S. Vasil'eva and M.V. Petrovskaya[10], M.A. Vakhrushina, N.S. Plaskova[11], T.V. Timofeeva[12] consider the average time capital is held as balance with banks and short-term financial investment, i.e. $P_{MA}$:

$$P_{OC} = P_{PI} + P_{CIP} + P_{FP} + P_{AR} + P_{MA}. \qquad (4)$$

I share the point of view expressed by O.V. Efimova [12, p. 170], E.A. Gudkova [14, p. 51] stating that the algorithm can be used to analyze each element of the turnover time of comprehensive capital invested in current assets. Its duration will be longer than the cash conversion cycle. Funds held with banks for a long time or as short-term financial investment inhibit the capital turnover as a whole and working capital in particular. However, they do not influence the length of the operating and cash conversion cycles.

As for the length of the cash conversion cycle $P_{CCC}$, that is the cycle of monetary capital circulation, all the authors unanimously surmise that it is shorter than the operating process due to the period, when the operating cycle is served with creditors' funds $P_{AP}$.

The cash conversion cycle can also be negative if accounts payable cover financial needs of the operating cycle. In this case, as V.M. Purlik notes, the corporate operating cycle turns into a cash pipeline [15, p. 244]. According to O.V. Efimova, the situation is quite probable in the case of trading and servicing businesses[13].

The model for gauging the cash conversion cycle length can be formalized as follows:

$$P_{CCC} = P_{OC} - P_{AP} \qquad (5)$$

or

$$P_{CCC} = P_I + P_{CIP} + P_{FP} + P_{AR} - P_{AP}. \qquad (6)$$

The models represent a general approach to calculating the cash conversion cycle, when settlements with customers and suppliers are based on the credit scheme.

Therefore, some customers make prepayments, while some suppliers require them. In this case, it is possible to use the augmented model of the cash conversion cycle in line with the period of prepaid expenses turnover $P_{PE}$ and the period when the operating cycle is served with customers' prepayments $P_{CP}$:

$$P_{CCC} = P_{PE} + P_I + P_{CIP} + P_{FP} + P_{AR} - P_{AP} - P_{CP}. \quad (7)$$

I agree with N.O. Kozlova and T.P. Markeeva [16, p. 92] who unfold the model splitting the period, when the operating cycle is financed with creditors' funds, in two components:

- the period when the operating cycle is served with suppliers' funds $P_{Suppl}$;

- the period when the operating cycle is served with other creditors' funds $P_{Cred}$.

$$P_{CCC} = P_{PE} + P_I + P_{CIP} + P_{FP} +$$
$$+ P_{AR} - P_{Suppl} - P_{Cred} + P_{CP}. \qquad (8)$$

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[10] Vasil'eva L.S., Petrovskaya M.V. *Analiz khozyaistvennoi deyatel'nosti* [Analysis of business performance]. Moscow, KnoRus Publ., 2016, 606 p.

[11] *Analiz finansovoi otechetnosti* [Analysis of financial statements]. Moscow, Vuzovskii uchebnik Publ., 2007, 367 p.

[12] Timofeeva T.V. *Analiz denezhnykh potokov predriyatiya* [Analysis of corporate cash flows]. Moscow, Finansy i Statistika Publ., 2010, 368 p.

[13] Efimova O.V. *Finansovyi analiz: sovremennyi instrumentarii dlya prinyatiya ekonomicheskikh reshenii* [Financial analysis: Modern tools for economic solutions]. Moscow, Omega-L Publ., 2010, 351 p.

*Table 1* depicts constituents of the operating and cash conversion cycles.

The operating cycle management mainly relates to technology and marketing, without being a part of financial management, while its financial sources and their formation are within the scope of financial management. However, they should be regarded through their correlation and mutual dependence. Managers of both disciplines should have a clear understanding of their economic substance and calculation techniques.

It is noteworthy that scholars seriously dispute not only constituents of the operating and cash conversion cycles but also the technique to calculate summands of the models.

Most literature sources suggest treating the capital turnover period at certain phases of the operating cycle through the ratio of the average balance of some working assets to:

• average sales per day;

• average daily cost of products sold;

• average daily credit turnover of corresponding constituents of working assets which pass to the following phase of the operating cycle.

If based on different methods, the calculations of turnover period will seriously diverge.

M.N. Dokuchaeva suggests the first and second type of indicators should be called *partial* given they are based on revenue or cost of products sold, while the third type is meant to be *individual* [17, p. 8]. A.D. Sheremet, R.S. Saifullin and E.V. Negashev[14] call them *summands* and *partial*. I believe the first and second types of indicators had better be called *constituents* since they have a common denominator and can be summed, while the second type is *partial*. Constituents totally make the general indicator of the working capital turnover in the operating cycle:

• based on revenue:

$$\frac{PE \cdot G}{Rev} + \frac{I \cdot G}{Rev} + \frac{CIP \cdot G}{Rev} +$$

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[14] Sheremet A.D., Saifullin R.S., Negashev E.V. *Metodika finansovogo analiza* [Financial analysis technique]. Moscow, INFRA-M Publ., 2002, 202 p.

$$+ \frac{FP \cdot G}{Rev} + \frac{AR \cdot G}{Rev} = \frac{WA \cdot G}{Rev} \qquad (9)$$

• based on the cost of products sold:

$$\frac{PE \cdot G}{Cost_{PS}} + \frac{I \cdot G}{Cost_{PS}} + \frac{CIP \cdot G}{Cost_{PS}} +$$

$$+ \frac{FP \cdot G}{Cost_{PS}} + \frac{AR \cdot ER \cdot G}{Cost_{PS}} = \frac{WA \cdot G}{Cost_{PS}} \qquad (10)$$

where *PE* is prepaid expenses;

$Cost_{PS}$ shall mean the cost of products sold;

*I* is the average balance of inventories;

*CIP* is the average backlog of construction in progress;

*FP* is the average stock of finished products;

*AR* is the average balance of accounts receivable for profit-making activities;

*ER* is the efficiency ratio of products and services (the ratio of the cost of products sols and gross revenue);

*WA* is the average amount of working assets in the operating process.

Comparing the turnover indicators made of the constituents as they develop or with benchmarks, it is possible to trace the phase when the turnover of working capital invested in operations slows down or accelerates.

The operating cycle under the model can be endlessly specified to clarify how each type of inventories, semi-finished products, finished products, customers influences the time of working capital turnover.

As many authors note, the formula for decomposing the total duration of working capital turnover by constituent is correct in its general presentation since the real turnover of certain constituents can be assessed through the turnover of a specific constituent, rather than the total revenue.

Therefore, most scholars unanimously suggest using the partial turnover of a respective account, rather than the overall sales turnover in order to measure the time when capital is held at certain phases of the operating cycle (inventories, construction in progress, finished products, accounts receivable).

However, discrepancies arise anyway arguing what turnover should be taken into account, that of debit or credit? Some authors refer to debit turnover for this purpose. For example, J.C. Van Horne [5, p. 260–263], L.A. Bernstein [8, p. 407], L.V. Prykina[15], etc.

Other authors, such as O.V. Efimova [12, p. 152], S.B. Barngol'ts [18], J. Richard [19, p. 202], N.A. Rusak [20, p. 134], whose opinion I support, tend to the opposite idea. For instance, O.V. Efimova states that it is necessary to handle amounts debited from the account, i.e. those ones recognized as credit of active accounts (since the debit turnover characterizes how property is accumulated or an increase in customers' liabilities) [12, p. 152]. If generally presented, at certain phases of the circulation the algorithm for calculating partial metrics of capital turnover can be expressed as follows:

*Turnover period = (Average account balance * Duration) / Credit turnover for the period* (11)

In this formula, the average balance constitutes a chronological value of certain assets, which are carried on a specific account.

The turnover is understood as the value of credit turnover on the corresponding account for the analyzable period:

• in the case of construction in progress, credit turnover of the Core Operations account, which shows the factual cost of finished products manufactured in the reporting period;

• in the case of inventories, credit turnover of the Materials account, i.e. their factual use for product output, which is not equivalent to tangible costs since they include the cost of electric power, thermal power, gas, which is not covered with an allowance;

• in the case of the stock of finished products, the cost of products shipped to customer (credit turnover of the Finished Products accounts);

• in the case of accounts receivable, it relates to the amount of accounts receivable which were repaid for the reporting period (credit turnover of trade receivables).

The computations in *Table 2* demonstrate the difference in the duration of the inventory and operating cycles, depending on the base they are calculated on, i.e. revenue, cost of sales or partial turnover passing to the following phase of the operating cycle.

The difference relates to the inventory period only since the accounts receivable period depends on the ratio of the average outstanding balance to sales per day.

If measured through turnover constituents based on revenue, cost of products sold, partial turnover, the length of the inventory period is 67.6 days, 83.8 days and 109.7 days respectively.

If partial metrics of capital turnover are based on revenue from sale of products, their totality will match the overall period of the inventory period:

$$P_{OC} = \frac{18,762*360}{99,925} = 67.6 \text{ days};$$

$$P_{OC} = 35 + 14.2 + 18.4 = 67.6 \text{ days}.$$

They will coincide if computed through the cost of products sold:

$$P_{OC} = \frac{18,762*360}{80,600} = 83.8 \text{ days};$$

$$P_{OC} = 43.4 + 17.6 + 22.8 = 83.8 \text{ days}.$$

In the mean time, it is impossible to sum partial metrics of capital turnover at some phases of the operating cycle, which are measured through interim turnover, since they do not have a common denominator.

$$\frac{9,750*360}{49,960} + \frac{3,942*360}{84,168} + \frac{5,105*360}{80,600} +$$

$$+ \frac{7,772*360}{99,925} \neq \frac{26,534*360}{99,925}.$$

However, the error is quite widely spread[16]. First of all, metrics should be converted to the lowest common denominator through the percentage of all

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[15] Prykina L.V. *Ekonomicheskii analiz predpriyatiya* [Economic analysis of an entity]. Moscow, Dashkov i K Publ., 2016, 256 p.

[16] Savitskaya G.V. *Kompleksnyi analiz khozyastvennoi deyatel'nosti predpriyatiya* [Comprehensive analysis of corporate business operations]. Moscow, INFRA-M Publ., 2016, 608 p.

the partial turnovers in the total turnover (revenue or cost of products sold) and subsequently summed up:

$$P_{OC} = \sum P_{T_i} * Percentage_i + P_{AR}. \qquad (12)$$

Let us do this calculation with figures given in *Table 2*, referring to the percentage of partial turnover in the total turnover:

a) revenue from sale of products and services:

$$P_{OC} = \frac{70 * 49,960}{99,925} + \frac{16.9 * 84,168}{99,925} +$$

$$+22.8 * \frac{80,600}{99,925} + 28 = 70 * 0.5 + 16.9 * 0.842 +$$

$$+22.8 * 0.807 + 28 = 35 + 14.2 + 18.4 + 28 =$$

$$= 95.6 \text{ days}$$

b) manufacturing cost of products sold and services provided:

$$P_{OC} = \frac{70 * 49,960}{80,600} + \frac{16.9 * 84,168}{80,600} +$$

$$+\frac{22.8 * 80,600}{80,600} + 28 =$$

$$= 70 * 0.62 + 16.9 * 1.004 + 22.8 +$$

$$+28 = 43.4 + 17.6 + 22.8 + 28 = 111.8 \text{ days}.$$

As we can see, after partial metrics of capital turnover are converted to a common denominator through the percentage of interim turnovers in the total turnover (revenue or cost of products sold), this gives the same result as the direct method does. However, the calculation procedure gets much more complicated.

The divergence of partial and general metrics are especially visible when their dynamics and trends are observed (*Table 3*).

If capital turnover is evaluated through partial metrics, the duration of the operating cycle decreases by 3.8 days, whereas it increases by 12.8 days if measured through general ones. Capital turnover is seen to accelerate at the initial phases, but the shipment of finished products and collection of receivables subsequently slows down. Therefore, the total turnover slightly rises from RUB 99,925 thousand to RUB 100,500 thousand, i.e. only 0.6

percent, while the average amount of working assets spiked by 14 percent in the operating cycle.

Turnover may speed up at any phase of the operating cycle as the average balance of working assets drops or partial turnover rises passing to the following phase. Capital had better flow from one phase of the operating cycle to another one simultaneously. If turnover accelerates at one phase and slows down at the other, this deteriorates the effect of capital speeding up at the initial phases.

If at any phase of the production cycle the entity's output is higher than the demand, this will generate surplus inventory at the following phases of production. Products are stored until the following phase of production is launched. As a result, the value creation process loses momentum at one line and stretches out due to construction in progress, stocks of finished products, etc. [21, p. 63–65].

So, partial metrics of capital turnover cannot be used to determine the length of the operating cycle. In the mean time, they should not be underestimated as an efficient tool that production and commercial units may rely on in operational management of inventories and accounts receivables. Analyzing partial (local) metrics of turnover, it is possible to quickly identify what changes the speed of capital turnover at certain phases of the operating cycle and influences the withdrawal of capital from the circulation by leveraging inventories and receivables. They can be linked with general indicators through a set of capital mobility or a condensed technique by multiplying their values times the percentage of partial turnover in the total turnover.

It is necessary to clarify which calculation option is more reasonable – revenue or cost of products sold.

As mentioned above [22, p. 981–996], there are differing opinions in literature. Whereas revenue includes not only the cost of resources consumed, but also a portion of the cost of surplus products, some authors opine that it overstates capital turnover indicators. Thus, the cost of products sold would be better to use for the calculation.

Other authors tend to the opposite idea stating that, if entities with the increasing cost of products use it to measure the working capital turnover, it will raise the turnover ratio, i.e. the length of one turnover round will fall by days. If the cost of products decreases, the turnover will slow down and a turnover round will take more days[17].

In my opinion, both groups of authors are not very convincing. The rise in the cost of products cannot accelerate the capital turnover since this boosts not only the turnover volume, but also the average balance of working assets, such as construction in progress, cost of finished and shipped products.

Advocates of the revenue technique also fail to provide the sound rationale. As they say, revenue inflates turnover metrics. The scholars overlook the fact that the cost of surplus product raises not only the turnover volume but also the average amount of corporate assets. Therefore, revenue can be used to measure the speed of the comprehensive capital turnover and working capital, in particular.

Trying to determine the duration of the operating cycle and its constituents – inventory period and accounts receivable period, we face another issue because numerators and denominators of the calculation models are not comparable since inventories are recognized in the balance sheet at cost, while accounts receivable are recognized at the selling price.

The operating cycle through revenue:

$P_{OC}$ = *Average balance of current assets in the operating cycle (inventories and receivables) / Daily revenue from payments*;

$P_{OC}$ = 26,534 / (99,925 / 360) = 95.6.

The operating cycle through the cost of products sold:

$P_{OC}$ = *Average balance of current assets in the operating cycle (inventories and receivables) / Daily sales through the cost*;

$P_{OC}$ = 26,534 / (80,600 / 360) = 118.5.

As I see it, the optimal solution can be found if the length of the operating cycle is calculated on

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[17] Ermolovich L.L. *Analiz khozyaistvennoi deyatel'nosti predpriyatii* [Analysis of corporate business operations]. Minsk, Sovremennaya shkola Publ., 2006, 736 p.

the phase-by-phase basis through model (1), as widely used in the Western practices:

$$P_{OC} = P_I + P_{AR},$$

where $P_I$ is the amount of time, during which capital is kept as inventories (raw materials, supplies, semi-finished products of construction in progress, finished products);

$P_{AR}$ is the amount of time, during which capital is kept as accounts receivable.

Whereas,

$$P_I = \frac{Average\,inventory\,stock * Days\,of\,the\,period}{Cost\,of\,products\,sold} =$$

$$= \frac{18,762 * 360}{80,600} = 83.8\,days\,;$$

$$P_{AR} = \frac{Average\,debts * Days\,of\,the\,period}{Revenue\,from\,sales\,on\,credit}\,.$$

The operating cycle will totally last 111.8 days (83.8 + 28).

It is noteworthy that the technique for the phase-based calculation of the operating cycle is quite elaborate because it ensures the comparability of the numerators and denominators in the algorithm used to measure the inventory period and accounts receivable period. Inventories recognized at cost are split into the cost of products shipped and accounts receivable, which are expressed as selling prices and divided by revenue from sales on credit. Both indicators have a different base. According to L.A. Bernstein, the total length of the operating cycle depends on the mutually related indicators [8, p. 417]. In this case there is no need to adjust accounts receivable and revenue from sale of products by the gross profitability and VAT since they are equally flexible and resilient to changes in these factors. Reducing the revenue and average balance of accounts receivable by gross income (in this case, 19.34 percent ((99,925 – 80,600)/99,925), we arrive at the same result as was before the adjustment:

$$P_{AR} = \frac{7,772(1 - 0.1934)360}{99,935(1 - 0.1934)} =$$

$$= \frac{6,269 * 360}{80,600} = 28\,days\,.$$

Hence, the technique for the phase-based calculation of the operating cycle time seems to be the most reasonable and sound. In this case, there is no room for discussing the non-comparability of the numerator and denominator in the calculation algorithm.

The operating cycle time can be analyzed more profoundly by studying the time it takes an entity to renew each type of raw materials, supplies, semi-finished products, finished products, and time it takes to collect amounts due from key customers, using partial metrics of turnover.

The production inventory turnover period (supplies and materials) equals the time production inventories are stored from the date they are accepted for storage until the date they are transferred to the production phase. The shorter this period, under all other conditions being equal, the shorter the production and commercial cycle and the lower the need in working capital. It is calculated by dividing the average stock of materials by daily consumption of respective material. The result should be compared with the benchmark.

The actual duration of inventory turnover is much higher than the benchmark as a whole and by type of materials. The stock of material $C$ is intended to suffice during 2.5 years, being tenfold as high as the benchmark. This is evidence that inventories are not very well managed in the reporting period (*Table 4*).

The inventory turnover may decelerate as surplus, unmarketable, long-unused materials are accumulated, and additional inventories are purchased as the entity may expect a growth in the inflation rate and shortage of the materials in pursuit of its operations security.

To identify how much each type of materials influences the average period capital is held at this phase, it is necessary to multiply the change in the period, during which capital is held as the stock of materials $i$, times the factual percentage of each one in the total daily turnover of inventories:

$$P_I^{Part} = \Sigma \Delta P_i * Percentage_{i1} = 14 * 0.1576 -$$

$$-5 * 0.351585 + 810 * 0.002161 ... =$$

$$= 2.2 - 1.76 + 1.75 ... = 10 \, \text{days}.$$

To evaluate what impact each type of materials has on the total length of the operating cycle, the results should be multiplied by the percentage of materials consumed in the cost of products sold (in this case, they should be multiplied by 0.62 (49,960 / 80,600)).

$$P_I^{Total} = \Sigma \Delta P_i * Percentage_I = 2.2 * 0.62 -$$

$$-1.76 * 0.62 + 1.72 * 0.62 ... =$$

$$= 1.36 - 1.1 + 1.09 + ... = 6.2 \, \text{days}.$$

The similar technique is applied to analyze partial indicators of capital turnover in relation to backlog of construction in progress, finished products and outstanding accounts receivable.

Therefore, analysis of partial indicators helps assess the local speed of capital turnover at certain phases of the operating cycle, identify why cash flows slow down and find resources to reduce financial needs of the operating process.

The technique for calculating the cash conversion cycle and its constituents is another topic for discussion. As mentioned above, current assets are formed with equity, borrowings (short-term loans) and debts (accounts payable). As part of operations, financial needs arise from a time gap between the collection of cash and repayment of amounts due. Thus, it is very important to know the period, during which the operating process is served with creditors' funds, including prepayments of buyers.

Overviewing the relevant literature, it is possible to note that the period, during which the operating process is financed with creditors' funds, is measured by comparing the average amount of liabilities with the following indicators:

• the amount of accounts payable discharged in the analyzable period, i.e. debit turnover of creditors' accounts;

• purchase of goods before tax, i.e. credit turnover of creditors' accounts;

• revenue from sale of products;

• cost of products sold.

Such differing opinions emerge because scholars equate the following constructs:

• the time it takes an entity to repay its liabilities;

- average time needed to extend a commercial loan;

- the period, during which the operating process is financed with creditors' funds.

They are virtually and essentially different. Each of them plays a certain role in financial management.

The first indicator works for measuring the time needed to discharge accounts payable. It is gauged by dividing accounts payable by discharged accounts payable for the analyzable period, i.e. by debit turnover of creditors' accounts. Whereas the fact of payment signifies the completion of accounts payable turnover, amounts of payments remitted to cover debts should be used to measure the period of accounts payable turnover [23, p. 53]. Many authors agree on this point.

The second indicator is mentioned in the Western publications by J.C. Van Horne [5, p. 263], L.A. Bernstein [8, p. 417], J. Richard [19, p. 198], B. Colass[18] and some other Russian scholars[19]. It is measured by dividing the average accounts payable by average sales per day. It indicates the number of days, for which suppliers grant a grace period, rather than the time it takes an entity to pay off its debts.

In literature the time for repayment of accounts payable and grace period are often regarded as identical concepts.

Their difference is illustrated with the following example.

The opening amount due to suppliers was RUB 4,500 thousand. The entity acquired goods on credit worth RUB 44,200 thousand. During this period, it paid off its debts of RUB 38,460 thousand. The closing amount due was RUB 10,240 thousand. The average amount of the operational loan granted by suppliers is RUB 7,370 thousand ((4,500+10,240)/2).

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[18] Colass B. *Upravlenie finansovoi deyatel'nost'yu predpriyatiya. Problemy, kontseptsii i metody* [Gestion financière de l'entreprise : problématique, concepts et méthodes]. Moscow, Finansy, YUNITI Publ., 1997, 576 p.

[19] *Finansovyi menedzhment: problemy i resheniya* [Financial management: Issues and solutions]. Moscow, Yurait Publ., 2014, 903 p.; *Finansovyi menedzhment* [Financial management]. Moscow, KnoRus Publ., 2013, 654 p.; Prykina L.V. *Ekonomicheskii analiz predpriyatiya* [Economic analysis of an entity]. Moscow, Dashkov i K Publ., 2016, 256 p.

If the amount is divided by daily purchase on credit, the average loan period granted by suppliers is assessed:

$$P_{Grace} = \frac{\overline{AP}}{\text{Daily purchase on credit}} =$$

$$= \frac{7{,}737}{44{,}200/360} = 60\,\text{days}.$$

Indeed, the average time for repayment of accounts payable is:

$$P_{Grace} = \frac{\overline{AP}}{\text{Average repayment of AP per day}} =$$

$$= \frac{7{,}370}{38{,}460/360} = 69\,\text{days}.$$

The period (third indicator) is measured by collating average accounts payable involved in corporate turnover with the cost of products sold. For example, the supplier grants a 60-day grace period. The buyer pays off the debt every 60 days. However, the average outstanding amount due accounts for 20 percent of the total working assets employed in operations. If the operating cycle lasts 180 days, it is financed with creditors' funds for 36 days only. During the remaining 144 days, equity and interest-bearing loans are used.

As showed in *Table 2*, the duration of the operating cycle is 83.8 days. The average balance of working assets in the inventory period is worth RUB 18,762 thousand. Accounts payable make 39.28 percent of working assets (7,370 / 18,762 * 100). Hence, the operating cycle is fed with creditors' funds for 32.9 days (83.8 × 39.28%).

If average accounts payable are divided by average sales per day (at cost), the same result is observed:

$$P_{Serv} = \frac{\overline{AP}}{\text{Average sales per day}} =$$

$$\frac{7{,}370}{80{,}600/360} = 32.9\,\text{days}.$$

The similar technique may help quantify the period, during which the operating cycle is served with buyers' prepayments and other creditors' funds, that is, the ratio of average balances to average sales per day.

Hence, the operating cycle is financed with equity and borrowings for the remaining period of time. In the above examples, the length of the cash conversion cycle will be

$$P_{CCC} = P_{OC} - P_{AP} = 111.8 - 32.9 = 78.9 \, \text{days}.$$

If augmented, the length of the cash conversion cycle can be expressed as follows:

$$P_{CCC} = \frac{PE}{Cost_{PS}} + \frac{I}{Cost_{PS}} + \frac{CIP}{Cost_{PS}} + \frac{FP}{Cost_{PS}} +$$

$$+ \frac{AR}{Revenue_{PS}} - \frac{AP}{Cost_{PS}} - \frac{SP}{Cost_{PS}}.$$

It is possible to measure the period during which the operating cycle is financed with own working capital. For this, its average value is divided by revenue per day. Some authors erroneously describe the indicators as the speed of equity turnover [6, p. 24]. As a matter of fact, as mentioned above, equity and borrowings, which stream into the operating process, are a part of the overall cash flow, demonstrating the equal speed at each phase of the operating cycle, starting from purchase of inventories to the collection of money from buyers for products, goods and services [22, p. 981–996].

Therefore, scrutinizing the literature, I reveal a significant discrepancy in defining the substance of the operating cycle and cash conversion cycle and setting the calculation technique. The critical analysis underlies the following conclusions.

It is the most reasonable and appropriate option to measure the length of the operating cycle by calculating model (1) on the phase-by-phase basis as the sum of the production cycle duration and accounts receivable turnover.

The duration of the inventory period and its constituents should be gauged by dividing the average stock of materials, backlog of construction in progress and finished product by the cost of products shipped. Assessing the accounts receivable turnover period, it is necessary to collate its balance with the amount repaid per day.

Constituents (summands) and partial indicators can be used to observe the speed of capital turnover at certain phases of the operating cycle. The first type will be appropriate for studying what made the duration of the operating cycle change.

The second one will work in operational management of stocks and accounts receivable for their optimization.

Being used for the local assessment of the working capital turnover at certain phases, partial metrics will not do to determine its duration. First of all, the indicators should be converted to a common denominator by multiplying their values times the percentage of partial turnover, which are accepted for their calculation, in the total turnover (revenue or cost of products sold) and summed up subsequently. The same result will be obtained eventually like the one measured by a direct method, i.e. the ratio of average balance of some working assets to total turnover per day.

Quantifying the duration of the cash conversion cycle, the entity should consider not only commercial credits of suppliers and buyers' prepayments, but also the remaining accounts payable, including payroll liabilities, tax liabilities and others. There is a time lag between the accrual and repayment of liabilities, during which they float in the operating process.

It is practicable to distinguish the time it takes an entity to repay its debts, commercial loan period and period when the operating cycle is served with creditors' funds. They are measured by dividing the average balance of trade payables by the amount repaid per day, average purchase on credit per day, sales per day (at cost of products) respectively. Only the third indicator can be employed to measure the length of the cash conversion cycle.

The cash conversion cycle is served with equity and borrowings (loans). The period, during which the operating cycle is financed with them and depends on their percentage in working assets, should not be equated with the speed of their turnover. If they are added to the general stream, they flow at equal speed throughout the phases of the operating cycle, from purchase to revenue.

To calculate the duration of the operating and cash conversion cycles more precisely, average stock, receivables and payables should be observed by monthly or daily balance, which is even better. It is quite feasible using computer-aided technologies for processing accounting and analytical information.

*Table 1*

**Constituents of the operating and cash conversion cycles**

| Inventory period | | | | |
|---|---|---|---|---|
| Prepayments to suppliers | Stock of resources and materials | Backlog of construction in Progress | Stock of finished products | Accounts receivable period |
| **Operating cycle period** | | | | |
| Servicing period of the operating cycle | | | | |
| Suppliers' funds | Other creditors' funds | Prepayments of buyers | Equity | Loans and borrowings |
| | | | **Period of the cash conversion cycle (money turnover cycle)** | |

*Table 2*

**Options to measure the length of the operating cycle, thousand RUB**

| Assets | Opening balance | Turnover | | Closing balance | Average balance | Turnover period, days | | |
|---|---|---|---|---|---|---|---|---|
| | | Debit | Credit | | | Total turnover | | Partial turnover |
| | | | | | | Revenue | Cost | |
| Stock of materials | 9,500 | 50,390 | 49,960 | 9,930 | 9,715 | 35 | 43.4 | 70 |
| Construction in Progress | 3,500 | 85,052 | 84,168 | 4,384 | 3,942 | 14.2 | 17.6 | 16.9 |
| Finished products | 3,321 | 84,168 | 80,600 | 6,889 | 5,105 | 18.4 | 22.8 | 22.8 |
| Total inventories (inventory period) | 16,321 | – | – | 21,203 | 18,762 | 67.6 | 83.8 | 109.7 |
| Accounts receivable | 5,735 | 104,000 | 99,925 | 9,809 | 7,772 | 28 | 28 | 28 |
| *Total...* | *22,056* | *323,610* | *314,653* | *31,012* | *26,534* | *95.6* | *111.8* | *137.7* |

*Source:* Authoring

*Table 3*

**Comparison of partial and general indicators of capital turnover and their development**

| Indicator | Average balance, thousand RUB | | Credit turnover, thousand RUB | | Length of turnover, days | | Change in the length of turnover, days | Effect of accelerating turnover, thousand RUB |
|---|---|---|---|---|---|---|---|---|
| | $t_0$ | $t_1$ | $t_0$ | $t_1$ | $t_0$ | $t_1$ | | |
| Stock of materials | 9,715 | 9,200 | 49,960 | 58,300 | 70 | 56.8 | −13.2 | −2,137 |
| Construction in Progress | 3,942 | 3,750 | 84,168 | 99,500 | 16.9 | 13.6 | −3.3 | −910 |
| Finished products | 5,105 | 7,500 | 80,600 | 95,250 | 22.8 | 28.3 | 5.5 | 1,467 |
| Accounts receivables | 7,772 | 9,800 | 99,925 | 100,500 | 28 | 35.1 | 7.1 | 1,983 |
| Sum of partial indicators of turnover length | – | – | – | – | 137.7 | 133.8 | −3.8 | 403 |
| Length of the operating cycle (Total turnover) | 26,534 | 30,250 | 99,925 | 100,500 | 95.6 | 108.4 | 12.8 | −3,563.3 |

*Source:* Authoring

*Table 4*

**The period of inventory turnover**

| Type of inventories | Average balance, thousand RUB | Amount of materials consumed per day | | Stock, days | | |
|---|---|---|---|---|---|---|
| | | Thousand RUB | Percentage | Benchmark | Actual | Variance |
| A | 1,400 | 21.875 | 15.76 | 50 | 64 | 14 |
| B | 1,220 | 48.8 | 35.1585 | 30 | 25 | −5 |
| C | 270 | 0.3 | 0.2161 | 90 | 900 | 810 |
| … | … | … | … | … | … | … |
| *Total…* | *9,715* | *138.8* | *100* | *60* | *70* | *10* |

*Source:* Authoring

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Risk, Analysis and Evaluation

Translated Article[†]

# THE ECONOMIC FALLOUT OF EXCLUSION OF THE ISLAMIC REPUBLIC OF IRAN FROM THE SWIFT INTERNATIONAL PAYMENT NETWORK

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**Abstract**

**Importance** Sanctions, which the USA and EU imposed on Iran in 2012, shattered the economic situation in the Islamic Republic of Iran. Restrictions affected not only the Central Bank of the Islamic Republic of Iran and dozens of national commercial banks but also the SWIFT network as the most crucial mechanism of global financial transactions. The article reviews the economic fallout of Iran's disconnection from the SWIFT global payment network.

**Objectives** The research seeks an alternative method for cross-bank settlements, which would make Iran independent from the SWIFT network.

**Methods** The research relies upon statistical, comparative and logic methods.

**Results** The sanctions against the Islamic Republic of Iran undermines GDP and export of goods, fueled the inflation nationwide and devaluation of the national currency. They also brought more than a half of the Iranian enterprises on the brink of crisis.

**Conclusions and Relevance** If the Central Bank of Russia modernizes and promotes its financial messaging system, it may turn up a competitive product in the global market of payment processing systems. The combination of the blockchain technology and the Russian developments may attract foreign financial institutions to seek cooperation in banking, lure new customers worldwide and in those environments, which are exposed to the risk of being disconnected from the widely spread and monopolistic payment network.

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*Authorized translation by Irina M. Vechkanova*

January 1, 2012, the U.S. Federal Government imposed sanctions against the Central Bank of the Islamic Republic of Iran. January 23, 2012, the European Union countries gradually slow down their cooperation with the oil sector of the Islamic Republic of Iran and its Central Bank. From January to February, the United States Department of the Treasury placed restrictions on Iran's Tejarat Bank and Dubai-based Noor Islamic Bank as the USA

spotted the assistance it provided to Iran in evading international sanctions. In March 2012, the SWIFT network put a halt to servicing Iran's financial institutions, which were subject to the EU sanctions[1]. In 2012 three packages of sanctions were taken into effect. As part of the first sanctions package, the Iranian banks were cut off from the SWIFT network. In fact, it isolated the Iranian banks from the rest of the world making the national financial

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institutions look at less effective, costly and legally dubious schemes for international trade and currency deals, primarily, in the oil sector. The second package prohibited the insurance coverage for oil tankers transporting the Iranian hydrocarbons. Finally, the third package marked the beginning of the EU embargo on purchase of the Iranian oil [1]. In this article I solely discuss the disconnection of the Iranian banks from SWIFT and further propose my own solutions, which may be effectuated with the help and for the interests of the Russian Federation. The above measures of the Western countries are a fairly reasonable response to the nuclear program of Iran. It is noteworthy that the Iranian government presided by Mahmoud Ahmadinejad accelerated the nuclear program development, thus agitating the global community and invoking new sanctions against Iran. The restrictions are certain to have undermined the economic development of Iran, while the exclusion of the Iranian banks from the SWIFT network weakened the foreign trade of Iran.

It is important to understand what the SWIFT payment network looks like. Being developed by the global community, the SWIFT payment network is a leading international system of financial communications transporting financial messages in a prompt, secure and reliable manner worldwide.

The SWIFT community was created in 1973 by 239 banks and 15 countries in accordance with the Belgian laws [2]. The number of its users has grown more than 40 times, embracing nowadays about 10 thousand financial companies in 200 various States [3]. The SWIFT network is an absolute leader among the existing international payment processing systems. It transfers over one million transactions, which amount to over 2.5 billion annually[2]. Furthermore, according to some sources of the National Security Agency of the United States of America has access to information about all transactions passing within the system[3].

What mainly affects the development of the Russian – Iranian economic relationship is a lack of effective mechanisms for banking and financial activities as part of foreign trade. Both parties certainly maintain a continuous dialogue to improve respective activities and even settle their accounts in national currencies. However, the cooperation between Russia and Iran stalled due to the Western sanctions against the latter [4]. In my opinion, the economic cooperation between Russia and Iran suffered the most painful blow when the Central Bank of Iran was kicked off the network and Iranian banking institutions were excluded from the SWIFT network. The sanctions were not long standing. In 2016, the Iranian government headed by Hassan Rouhani succeeded in defying most of the economic sanctions and had access to the international interbank system resumed [5]. However, I believe, the Iranian economy was teetering on the brink of abyss during the period. For example, GDP decreased by USD 75.5 billion during the first year of the sanctions, while the export of goods fell by USD 21.5 billion against a 12.5-percent increase in inflation[4]. I also should mention that the disconnection from SWIFT inflicted the devaluation of currency [6]. Over six thousand production enterprises (about 67 percent of their total number) were almost bankrupt [7] (*Fig. 1*).

Iran's economic losses could cause more detrimental fallouts if the business community of Iran did not expect such sanctions and adapted to respective measures. Iran made active attempts to bypass the barriers trying alternative methods of interbank payments. For instance, numerous settlements in national currencies, barter deals, usage of gold in trade, exchange of third county's currency, *Hawala* money transfers and *U*-turn transactions. Paragraphs below overview all the main methods of trade deals, which Iran resorted to, when trying to bypass the sanctions against its banking sector.

It got much more complicated to settle international deals with the U.S. dollars due to the measures against Iran. In 2012–2013 Iran had at least three

foreign exchange rates – the official rate of the Central Bank, convertible rate for import and export purposes and free rate (market). Therefore, if the client had a deposit in the U.S. dollar with the Iranian bank, the bank did not extend them to the client, but rather was ready to buy them at its official rate. Such conversion entailed certain losses for the client. Moreover, if the currency was needed for some individual purposes, the U.S. dollar could be bought in the free market at triple price [8]. Thus responding to the sanctions, Iran had to transact using only national currencies. Iran agreed with India, China and Turkey to use rupee, yuan and lira respectively for payments. Using the national currencies of the above countries, Iran purchased local goods.

Hydrocarbons are the main products which Iran exchanged for goods or money. In 2015, Russia and Iran made barter arrangements obliging Iran to supply oil to Russia, while Russia was to deliver construction materials, equipment and grain crops. Such deals were also clinched with India and China. For example, India undertook to supply rice, pharmaceuticals and steel in exchange for the Iranian oil[5].

Being laden with the sanctions, Iran did not disdain to accept gold as a means of payment. This can be illustrated with the Turkish–Iranian deal for exchange of gas for gold. There a 37-fold increase in the imported goal from Turkey was recorded. However, the deal enabled the USA and EU to exert much political pressure on Turkey, thus forbidding to sell gold and other precious metals in Iran [9].

If Iran faced any difficulties in settling deals with national currencies, it could obtain the U.S. dollar by simply exchanging the Iranian rial for the U.S. dollar in other countries. In September 2012, there were more instances of exchange of the Iranian rial for the U.S. dollar in Afghanistan. The Afghan intermediaries were found to exchange a given amount and transfer money to Iran using, indeed, rather a trivial method, i.e. Iranian taxis running across the Iranian – Afghan border and Herāt.

The Hawala payment transfer system is interesting as well. The Hawala system is distinctive as all financial transactions are not supported with documents, but rather rest upon the confidence of parties. Brokers of the Hawala system are the main actors in the scheme since they arrange cross-country transfers of money. Money physically remains in the country since the remitter channels money to the broker in the same country. It receives a secret code, which generally consists of digits indicated on one of the banknotes, while the beneficiary in the other country shall produce this code only to a second broker in order to obtain the equivalent amount in the local currency. As a result, brokers settled their accounts through a clearance system, which may involve gold, precious metal and services in certain cases in order to close off the balance. The Hawala system does not entail numerous bureaucratic technicalities, having the maximum threshold for money transfer (usually up to USD 100 thousand) and channeling the transfer within 48 hours. The Hawala systems charge rather low fees for transactions, ranging from 1 to 1.5 percent of the transferred amount. Such characteristics enables brokers to remain inconspicuous for the U.S. regulator, which monitored whether the anti-Iran sanctions are observed, and countered money laundering practices. The Hawala system could wire money from Iran to a certain country of the Middle East and then stream it to various banks of Asia, Europe and the USA[6]. Confidentiality of the Hawala system is another merit, making it attractive, though vulnerable to abuses [10].

The *U*-turn cooperation between the Iranian and European banks became one of the most popular schemes in Iran during the sanctions. I should note that the USA qualified such transactions as money laundering. The *U*-turn scheme is designed so that the customer purchases the oil from the Iranian party for its national currency. Payment is debited to the bank account located outside Iran. Afterwards it was wired to a U.S. bank account. There money is converted into the U.S. dollars and subsequently

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[5] [Iran lures oil buyers with low prices]. *Vedomosti*, 2012, August 8. URL: https://www.vedomosti.ru/finance/articles/2012/08/08/iran_zaman ivaet_pokupatelej_nefti_nizkimi_cenami (In Russ.)

[6] Reshchikov O. [Iran: Countering the Western sanctions in banking]. *Novoe Vostochnoe Obozrenie = New Eastern Outlook*, 2015, January 30. URL: https://ru.journal-neo.org/2015/01/30/iran-protivodejstvie-zapadny-m-sanktsiyam-v-bankovskoj-sfere/ (In Russ.)

transferred to the other foreign bank on an account releasing it to Iran. Iran receives the amount in a currency it needs (U.S. dollars). In December 2012, there were announcements that Standard Chartered Bank managed to make more than 60 thousand transactions through the *U*-turn scheme for the Iranian financial institutions. The U.S. authorities then condemned the bank for money laundering for Iran. As a result, Standard Chartered Bank paid USD 327 million in penalties to the USA. Royal Bank of Scotland, UniCredit, HSBC, Deutsche Boerse, Société Générale and Crédit Agricole were also involved into the case, being accused of violation of the sanctions against Iran. Despite the U.S. sanctions, many renowned European banks continued the cooperation with the Iranian clients[7].

Responding to the sanction in the above manner, the Iranian business sector managed to inhibit the economic slump and sustain business relations as active as possible in the given circumstances. However, in my opinion, the adverse effect of the Western restrictions could be mostly prevented. The Iranian business could have better tackled the banking restrictions, if the alternative interbank payment processing mechanism had been timely implemented with other things being equal.

There is a similar alternative in the Russian Federation nowadays, but it still has some limitations. This is the Central Bank of Russia's System for Transfer of Financial Messages (SPFS) running through the ICT system of the Central Bank of Russia and serving as an alternative interbank communication channel transmitting electronic messages about financial transactions in a steady and smooth manner. Russia's SPFS was launched at the end of 2014 after the European Parliament and foreign offices of the European countries warned about a possible exclusion of Russia from the SWIFT network. It is worth mentioning that the European Parliament called for such measures as part of the economic sanctions against Russia. However, the SWIFT network is formally independent from the EU and USA. According to its official statement, obeying this recommendation will tarnish its reputation and violate its right since the SWIFT remains a large and independent provider of

financial services, without being bound by any political resolutions[8].

The Russian analogue was designed to ensure the uninterrupted transfer of financial messages if the global service is banned. According to bank clerks, SPFS is not exposed to any external threats, thus being able to ensure the stability of the banking sector. As of December 1, 2017, 355 Russian banks were connected to SPFS. Hence, 46 percent of all credit institutions have already put SPFS into practice. Currently ministries elaborate how the BRICS nations could be linked to the Russian analogue of SWIFT[9]. However, the Russian product did have some flaws at the moment this article was written. Such flaws may include few financial and credit institutions connected to SPFS, insufficient presence in the international market, regulatory restrictions obstructing foreign entities to become clients of the Central Bank of Russia's SPFS, non-working days and public holidays interrupting the SPFS operations. In my opinion, *pros* overwhelm *contras* since some conceptual aspects, such as zero fee for accession and servicing, lower messaging costs and ongoing system upgrade. These are important competitive advantages of the product in the international banking market. For the sake of comparison, SWIFT charges up to USD 200 thousand on each new customer connected to the network. The annual cost of service amounts to EUR 10 thousand[10].

Trying to upgrade the Russian alternative payment processing network, the Central Bank of Russia intends to integrate blockchain technologies into the product. In this context it would be reasonable to describe the blockchain technology, summing up positive effects of its implementation in SPFS. Blockchain offers another method to store data or keep the digital ledger of transactions, deal and

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[8] Belousov A.L. [Alternatives to the Society Worldwide Interbank Financial Telecommunications (SWIFT) for the Russian banking system]. *Finany i kredit = Finance and Credit*, 2016, no. 16, pp. 19–26. URL: https://cyberleninka.ru/article/v/alternativy-mezhdunarodnoy-mezhbankovskoy-telekommunikatsionnoy-seti-swift-dlya-rossiyskoy-bankovskoy-sistemy (In Russ.)

[9] Tikhonov I. [SPFS vs SWIFT: Almost a half of the Russian banks adopted the homegrown financial messaging system]. *Seichas.ru*, 2016, January 16. URL: https://www.lawmix.ru/banki/3568 (In Russ.)

[10] SWIFT, SPFS and CyberFT. URL: https://cyberft.ru/about/comparison (In Russ.)

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[7] Ibid.

contracts. They mainly constitute the information that shall be separately and independently recorded and verified, if needed. Blockchain may store details of granted loans, titles, breaches in road traffic rules, marriage registrations and any other sensitive information. What makes it so different and advantageous is that the ledger is not concentrated in one source but fragmented among several hundreds and even thousands of computers worldwide. In the technology, digital notes are aggregated into blocks, which are cryptographically and chronologically linked into a chain through complex mathematical algorithms. Each block is tied to the previous one, encompassing a set of records, while new blocks are inevitably added at the end of the chain. The encryption process, also known as hashing, is run by numerous computers connected to the same network. If their computations completely coincide, the block is assigned a unique digital signature. Once the ledger is updated and a new block is generated, it no longer can be altered, thus being unfalsifiable [11].

It should be noted that the ledger is renewed on all the computers of the network simultaneously. Therefore, the ramified nature of blockchain databases almost rules out the possibility of computer attacks because hackers would need to get access to databases of all the computers in the network. The blockchain technology also protects personal details of the sender, anonymizing the entire process. Even if the original document or transaction is modified in the future, they will be attached the other digital signature, signifying an instance of incompliance in the system [12]. Digital signatures serve for authorizing and modifying transactions since an intruder will not be able to make changes whatsoever without having a digital signature [13] (*Fig. 2*).

As for the hands-on usage of the blockchain technology, the financial sector may take the lead. The reason may be that blockchain-based transactions as part of financial services may significantly reduce costs and increase the efficiency of processes within a short period of time [14].

I believe that Central Bank of Russia's SPFS will be substantially improved and upgraded if it is fitted

with the distributed ledger technology. The development and subsequent entry of the blockchain-based SPFS into the international market will not only secure transactions, protect personal details of communicating parties and streamline the exchange of information among clients, but also considerably reduce consumers' costs and handle transactions uninterruptedly 24/7. The tool will enable eligible banks to spend less resources and time on daily financial transactions, thereby optimizing their operations and circumvent international political and economic restrictions, like sanctions.

At the end of 2016, the Russian authorities resumed the digital economy development initiative. In his address to the Federal Assembly Russian President Vladimir Putin called for domestic advanced research and scientific solutions to move the economy and social sector forward. Vladimir Putin also emphasized the need to focus on the so called cross-cutting technologies, i.e. digital technologies bringing the robust technological potential and shaping the overall picture of the economy. Furthermore, the Russian President suggested launching a large-scale program for developing the economy of a new technological generation, which is to be created and implemented by the Russian corporations and research centers. Vladimir Putin also stressed the importance of the issue for the national security and technological independence of Russia [15]. In this respect, it is possible to say that the blockchain technology in SPFS revoices the mission of the digital economic development.

The Islamic Republic of Iran clearly demonstrated possible fallouts of economic sanctions. The EU and U.S. barriers to international financial flow of Iran turned to be very palpable for the economic situation there. As I mention above, an alternative international interbank payment system would reduce Iran's economic losses. The Russian payment system based on the blockchain technology would be primarily interesting for Iran since further sanctions against it are not improbable.

The blockchain-based SPFS is supposedly capable of morphing into a competitive and cost-effective product for financial institutions. Messages

transmitted through the system will be processes at any time, without being trapped due to days-off and holidays because the technology will be unmanned.

Political background is not the last thing to mention in this context since global political and economic confrontations often induce restrictions and bans. The solution will back domestic banks in the case of such restrictions, facilitating their international financial transactions.

The EU countries may possibly become partners to cooperate and implement the Russian technology in the banking sector of a certain country [16]. According to experts, Iran considers the EAEU as a would-be strategic partner [17]. It may be a sign of possible economic cooperation between the EAEU countries and Iran, without using any Western payment mechanisms.

Currently, the Central Bank of Russia supervises and monitors the existing system of financial messaging on its own, thereby ensuring the security, stability and efficiency of its operations [18]. However, the role of the Central Bank of Russia should be revised in order to implement new technology into its SPFS from perspectives of its regulatory and supervisory functions since there is strong likelihood of illegal transactions, such as terrorism financing and money laundering. The Central Bank of Russia

should also appoint a body to be responsible for security and protection of those who may use the payment system since they are exposed to hacking and other cyber threats [19].

Banking sanctions against Iran seriously affected its foreign trade relations. Iran revealed its dependence on the Western payment systems when the Iranian credit and financial institutions and companies were cut off from the SWIFT network. Pursuing the multipolarity of the world, it is sensible to consider not only geopolitical and military interests but also economic ones, especially in banking. Currently, SPFS operates in the Russian Federation as an alternative method for transacting. It is not widely spread since few users need to opt for the system and it has limited working hours.

If the Russian payment system is upgraded and fitted with the blockchain technology, it will unleash its potential and successfully enter the international market. The Russian alternative significantly reduces costs of financial institutions and decreases the dependence on the Western payment mechanisms. I believe, Iran is a priority for Russia's SPFS using the blockchain technology as its not only contributes to the cooperation of the nations in banking, but also bolsters the Russian–Iranian trade and economic relations and friendship.

*Figure 1*
**Trends in the Gross Domestic Product of the Islamic Republic of Iran (2005 – 2015), billion USD**
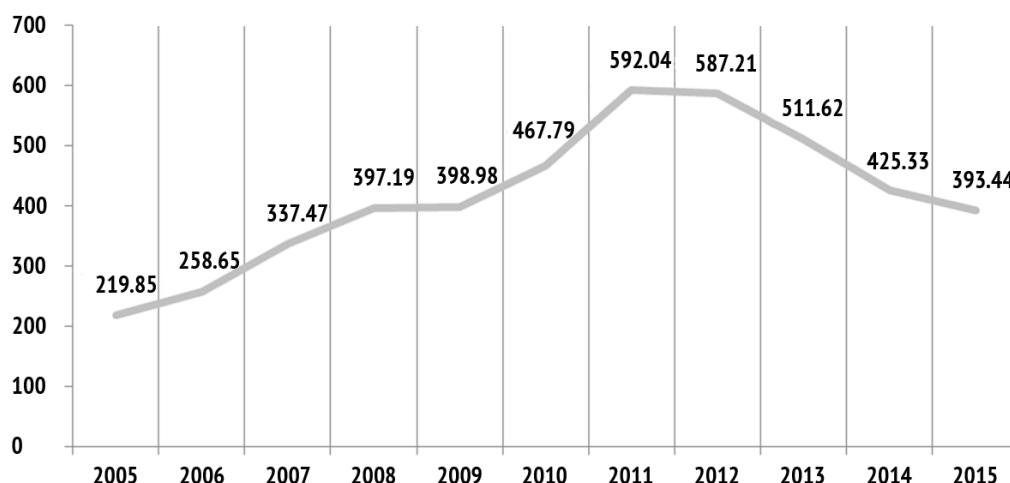


*Source:* The World Bank data

*Figure 2*
**Blockchain technology: An operation scheme**
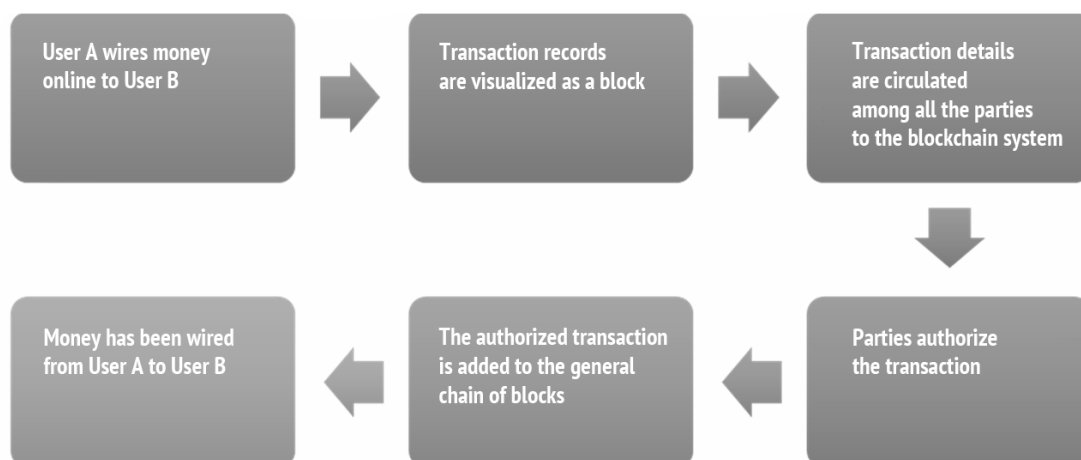


*Source:* Authoring based on materials published on URL: www.rocit.ru (In Russ.)

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I, the author of this article, bindingly and explicitly declare of the partial and total lack of actual or potential conflict of interest with any other third party whatsoever, which may arise as a result of the publication of this article. This statement relates to the study, data collection and interpretation, writing and preparation of the article, and the decision to submit the manuscript for publication.

Monetary System
and Currency Circulation

# THE FUTURE OF MONETARY INTEGRATION IN THE EEU

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**Abstract**
**Importance** Almost all regions experience active processes of economic integration. As a result, national currencies become more usable for international payments. The trends are observed in the Eurasian Economic Union (EEU), with the Russian ruble obviously dominating the other currencies.
**Objectives** We identify factors that streamline invoicing processes denominated in national currencies throughout the EEU.
**Methods** We refer to China to analyze the main reasons for using the home currency in international payments, scrutinize the payment mechanism under stringent constraints on the currency laws. Summarizing and analyzing the renminbi internationalization practices, we conclude on the most important factors that intensified payments in national currencies throughout the EEU.
**Results** The article names key factors making the countries use their home currencies to close trade deals. We also express our opinion on the future of payments denominated in the Russian rubles and EEU currencies.
**Conclusions and Relevance** National currencies are used for international invoicing purposes due to profound trade ties with partners and accessibility of finance, stability of the exchange rate and intention to reduce the USD dominance. The Russian ruble becomes more influential throughout the EEU due to a special status of Russia in the EEU. Russia is the main supplier of energy resources, having the most developed financial market and being free from any legislative barriers to making payments in national currencies throughout the EEU countries.

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*Authorized translation by Irina M. Vechkanova*

The Russian ruble demonstrably tends to become a regional currency for a growing number of reasons seen for the recent years. This statement can be illustrated with the active use of the Russian ruble in the EEU cross-border payments. Thus, there should be effective measures to maintain the high volume of payments in the Russian ruble throughout the geography of integration processes.

The U.S. dollar still circulates for the EEU payments, remaining rather competitive. In 2014–2015, the devaluation of the Russian ruble undermined mutual trade and seriously affected the confidence of Russia's Eurasian partners in the integration project. However, they voice absolutely controversial views on strengths and weaknesses of the Eurasian Economic Space and Customs Union, including payment issues.

Home currencies are no longer considered as a means of payment outside the EEU (Ukraine, Turkey, Egypt), though such plans were quite realistic. This is a testimony of risks which should not be overlooked in relationships with the EEU partners. Hence, it is worth the effort to maintain the existing position and status of the Russian ruble in payments throughout the Eurasian integration space and give a new impetus to the project.

China demonstrates impressive results in promoting its national currency worldwide [1, 2]. Before 2009, when there were no bans to use the yuan for foreign trade deals between the mainland and Hong Kong, trade in goods and services was almost null. In 2015, payments were made on a quarterly basis as much as CNY 1.5–2 trillion (equivalent to USD 300–400 billion).

According to the Society for Worldwide Interbank Financial Telecommunications – SWIFT, in 2015, the yuan went fifth among the most circulating international currencies (*Fig. 1*). However, the yuan internationalization contradicts some key ideas of the factors that contribute to its involvement into international payments.

The Chinese monetary legislation is not liberal. As a matter of fact, the yuan held in mainland China and offshore areas cannot be considered as one and the same currency, circulating concurrently and independently and being subject to different jurisdictions. The *home* yuan can be used only for the export and import of goods, while the *offshore* yuan can also serve for the same purpose, but including other current and capital transactions.

Nonresidents and residents were gradually permitted to invest in the Chinese or foreign financial markets respectively, but the pace of the process was still slower than the increasing use of the yuan for foreign trade deals, but rather keeping the pace of the latter, if needed. Furthermore, the legislative and regulatory framework became even more stringent to support the weakening yuan.

Currently, China Foreign Exchange Trading System (CFETS, Chinamoney) features sections of 23 currency pairs including the yuan. This implies the currencies should have market quotations, which traders may consider as reference values. However, they are not very representative.

For example, in February 2017, the CNY/USD pair accounted for 96.2 percent of total deals closed. Percentage of trade based on CNY/EUR and CNY/JPY exceeded 1 percent. 13 currencies were lower than 1 percent, with seven of them falling below 0.1 percent (CNY/RUB pair is 0.03 percent). The rest seven currencies were not involved in any transaction.

In China the existing system of international payments and invoicing is run through correspondence banking and Chinese offshore clearing banks. In 2015, China began implementing the China Interbank Payment System – CIPS, which settles the yuan-based payments among clearing banks and the China National Advanced Payment System – CNAPS. The system is a product of non-liberal currency laws. Single-currency settlements are handled within the CIPS [3].

It is worth mentioning how the People's Bank of China created the China Domestic Foreign Currency Payment System – CDFCPS for real-time interbank

settlement in foreign currency, such as EUR, JPY, GBP, CHF, USD, CAD and HKD [4]. As part of this Y-system, the People's Bank of China receives payment orders for transfer of loans, carries the netting of each currency and circulates orders for transfer of funds among direct participants' accounts to all settlement agents[1].

This example does not serve as an immediate applied solution to arrange multicurrency settlements among two or several countries since it constitutes a domestic payment mechanism (the mainland part, to be more exact). However, CDFCPS does not process settlements relating to currency conversion transactions.

It is important to mention that multicurrency settlements were arranged between CDFCPS in mainland China and real-time gross settlement systems (RTGS) in Hong Kong through Clearing House Automated Transfer Systems – CHATS. To do so, the People's Bank of China appointed settlement institutions[2] to be in charge of four currencies (EUR, GBP, USD and HKD). Settlement institutions partner with agent banks in Hong Kong, which are mainly their subsidiaries. Settlement banks and agent banks can exchange orders and settle accounts with other banks through local RTGS (CDFCPS and CHATS), with the information being transferred via interbank channels and RTGS means (*Fig. 2*).

The above example illustrates how an international multicurrency system operates and makes real-time settlements, but we should remember its purpose. It is expected to process money transfers denominated in freely circulating foreign currencies, which have no relation to the region, but are actively involved in domestic and bilateral payments. It is generally intended to circumvent the unbundling of payments through correspondents in the countries of the currencies, cut costs and information risks. This justifies costs for creating and organizing the system and its operation.

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[1] Settlements are made by direct participants, which have their own accounts with settlement agents of the system, and indirect participants, which act through direct participants. Both of them serve payments of their customers.

[2] Bank of China (USD), Industrial and Commercial Bank of China (EUR), Shanghai Pudong Development Bank (GBP) and China Construction Bank (HKD).

Experts in the Asian Development Bank cite four reasons explaining a rapid growth in international yuan-based payments, notwithstanding the above unfavorable legislative factors [5, 6]:

- considerable increase in the circulation of commodities between China and neighboring Southeast Asia in 2010;

- stable position of the yuan exchange rate against the U.S. dollar due to the inflexible foreign exchange regime in China. However, China pursued to gradually strengthen the yuan, thus making the yuan-based revenue more substantial for foreign suppliers of goods. Doing so, China actually paid for imported goods with its national currency;

- setting up a network of currency swaps (yuan-based liquidity charged upon the national currency of the second party to the agreement) between the People's Bank of China and central banks of respective counties willing to do so due to the unstable situation in financial markets after 2008;

- return of Hong Kong to China (1997), thus letting China take control over the financial center with well established international ties and infrastructure.

Considering the effects of the above factors, China laid the fundamental basis for the yuan internationalization project and seized its available opportunities to integrate into foreign financial systems by setting up a network of banks tuning the payment and settlement infrastructure. This becomes possible since substantial financial resources are concentrated in the national banking system and the government controls *too-big-to-fail* banks.

In early 2015, the pool of the yuan-denominated liquidity held outside mainland China was estimated as much as CNY 2 trillion, being equivalent to about USD 400 billion).

Relying upon the yuan internationalization practice, we can make some meaningful conclusions on key factors influencing settlements in national currencies of the EEU countries.

1. The primary importance of the extent of trade ties with partners and accessibility of funding, while legislative and infrastructure aspects are secondary;

2. Stability of the foreign exchange rate against the reference currency (freely floating) is more important than the existence of exchange rates that are directly pegged to trade partners' currencies, while the growing currency is welcome by counterparts as a means of payment for supplies;

3. The situation in the international monetary system during and after the 2008–2012 crises contributed to promotion of regional currencies as a means of international payments.

The strategy for the development of mutual settlements in the EEU raises the question of priority. Shall the EEU countries opt for the Russian rubles when trading with Russia? Shall they take efforts expanding the area of using the partners' national currencies for payments? The first scenario seems more auspicious, while the second one is a matter of a more distant future.

In the EEU the Russian ruble is actively used for trade invoicing between Russia and the partners and money transfers from Russia. However, few mutual settlements among the Eurasian partners of Russia are denominated in the Russian ruble. Their own national currencies are almost out of use (*Fig. 3* and *4*). As mutual trade volumes and reciprocal transfers are not substantial, except for the economic cooperation between Kazakhstan and Kyrgyzstan, the situation is unlikely to change considerably. The EEU countries have yet to make a long way towards an integrated payment space in retail markets of goods and services and financial markets[3] [7, 8].

Therefore, costs for the ambitious project of multicurrency payment infrastructure can hardly be justified economically.

Low liquidity of markets of the EEU currencies conversion is another hindrance, not to mention macroeconomic conditions and policy which are not conductive to stable exchange rates. In other words, high foreign exchange risk impedes the initiative[4] [9–11].

The EEU countries hold multiple meetings discussing the currency integration and concerted currency policy so as to put an end to their ambivalence between stable prices or stable exchange rate [12, 13].

After the Central Bank of Russia embarked on inflation targeting through the ruble free float regime, Kazakhstan followed the practice and subsequently became incapable of steering the tenge within the former currency policy. Belarus also allowed its national currency to be flexible, configuring its monetary policy so as to control a growth in money supply. In both cases, the revision of the monetary policy led to the devaluation and increased volatility of national currency exchange rates against the Russian ruble and the U.S. dollar. The Kyrgyzstani som and Armenian dram have been growing more volatile since 2013.

There is little likelihood that central banks will reassume the exchange rate stability course in the mid run due to, *inter alia*, the existing situation in the global hydrocarbon market and limited liquidity denominated in freely circulating currencies. Lowering the inflation (stable prices) will remain the priority, being regarded as a key driver of the favorable investment climate and departure from the overwhelming use of the U.S. dollar.

However, it does not seem realistic to set the uniform benchmark inflation rate within the EEU as offered by the Eurasian Economic Commission in order to stabilize the exchange rates of the national currencies due to a number of reasons.

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The five economies still preserve their fundamental and structural distinctions and vulnerability to asymmetric shocks, which may fuel the volatility of exchange rates of certain currencies. Furthermore, remaining on the focus of economic regulators, the exchange rate of each national currency cannot but be subject to their decisions and actions guided by economic reasons and motivation.

The five economies would hardly have agreed upon the rate to which the inflation should have been reduced. It is mainly due to the fact that they have no elaborated and generally accepted framework for mathematical modeling, which would underlie such a coordination effort. Central banks of the EEU countries apply different mechanisms to attain operational goals of their monetary policies, with their efficiency also being unequal.

What seems even more difficult is to coordinate the monetary and fiscal policy as part of the multinational union. However, it is a crucial requirement to make inflation targeting efficient, especially considering the concerted monetary policy of several countries.

It is difficult to capture benefits of inflation targeting as a framework for the monetary policy in transition economies. As seen from the case of Armenia, this has not made prices less volatile for a ten year time, but curbed the economic growth. The central bank of Armenia has reoriented its attention from the stability of prices to the stability of exchange rates, i.e. the policy followed the opposite trend as compared with other EEU countries.

It is reasonable to remember that the EEU countries will be configuring their monetary policy in the mid run so as to stabilize internal inflationary processes but still pursuing their own goals of lowering the inflation and leaving a considerable room for mutual exchange rates and USD exchange rate to fluctuate.

More stable (predictable) exchange rates can hardly ever urge the EEU countries to settle their accounts with national currencies. Right be those experts who believe that the existing extent to which the Russian ruble is used for payments between Russia and the EEU partners and its further increase will give impetus to the performance of the EEU Treaty, including its provisions on concerted macroeconomic and currency policy.

Hence, the long-term currency integration program should focus on the use of the Russian ruble as a unit of account, with legislative and infrastructure aspects being of secondary significance.

Under the existing currency laws, the EEU countries got to use the Russian ruble more actively through interbank correspondence and over-the-counter exchange of currencies, though quotations are not very representative so far.

Considering all the above statements, we suppose that the situation greatly depends on measures for increasing the potential for mutual trade within the EEU. In this respect, different options could be practicable, ranging from dedicated proactive solutions to adaptive tactics.

It is essential for the Eurasian integration to expand the circulation of commodities among the EEU countries (*Fig. 5*), diversify its composition, remain competitive and expand their share, if possible. Another important step is to minimize withdrawals from the general trade regime and cut non-tariff barriers.

Mutual trade and investment should be financially supported.

As for weaknesses of inflation targeting, the EEU countries will not manage to tackle a steadily high interest rate, even if they attain their interim goals and ensure the appropriate price growth rate. If the economy needs some transformation, high interest rates will prevent it from abolishing outdated and lagging constructs and trigger unproductive effects due to the inflation of costs.

As their monetary policy is primarily aimed to reduce inflation (ensure the stability of prices), large developing economies often create concurrent systems to sustain the economic growth with affordable loans. For example, Brazil, India and South Korea.

As the Russian practice shows, export growth and SME support programs, which were financed by Vnesheconombank, failed to be sufficiently effective [14, 15]. Budgetary funding was not enough to

decrease the effective interest rate on loans down to the expected level, and entities within the Vnesheconombank system needed additional capitalization.

Whereas fiscal revenue from oil and gas (considering circumstances impeding the recovery of global oil prices to the former level of 2014), fiscal deficit and reduction in sovereign funds, the Russian government cannot provide the same State aid to Russian economic growth and export projects as it used to. The Western sanctions obstruct access to the global financial market.

It may take much more time for the domestic financial market to reach such a development phase, which would allow it to finance its economic needs in the long run, as compared with the available time to enjoy the existing competitive advantages after the Russian ruble devaluation and reaffirm its results in the EEU integration project.

Therefore, the establishment of the EEU currency union and the use of a new collective unit of account still remains a relevant topic for discussion, though it is not stipulated in the Treaty on the Eurasian Economic Union.

Currently, there are neither economic, nor political premises for the single currency to be introduced. However, as the European experience shows us, it takes quite a long time to form a currency union, with a good start often paving the way to the final success. For example, experts share promising ideas concerning the concept of settlements implying that customs duties on import are distributed among the EEU countries.

It is noteworthy that an increase in cashless payments for goods and services may significantly contribute to the development of the integrated payment zone within the EEU in the case of retail operations [16,17] and departure of Armenia and Kazakhstan from the U.S. dollar. In this respect, the countries should undertake measures to make financial services more affordable and increase the financial literacy of their population.

Hence we can make the following conclusions on the current situation in trade settlements among the EEU countries.

1. Russia is the main supplier of resources, including energy, to other participants of the integration process. It also has the largest or one of the most promising markets consuming or manufacturing industrial (agricultural) products, which is not very competitive in other markets. This opens opportunities to involve other participants into the project, with Tajikistan being one of the most obvious candidates.

2. Under all other things being equal, the Russian financial market is lucrative for investors from other EEU countries, in terms of its capacity, liquidity, business volume and sustainability of institutions (intermediaries), development of trading and post-trade facilities, supervisory and regulatory apparatus. The EEU countries should make additional efforts, including regulatory and legislative ones, to make their financial markets equally attractive for they are not homogeneous in terms of their development level.

3. The EEU countries have liberal currency laws. The specifics of the Belarus laws does not obstruct the settlements in currencies, other than freely circulating ones. According to the community of experts, there are not legislative impediments for the countries to use their national currencies for invoicing purposes. The issues will be ultimately resolved after the countries sign a document on concerted approaches to regulating currency transactions and undertaking liberalization measures. April 14, 2017, the RF Government released Instruction of the RF Government № 697-p to do so.

*Figure 1*

**The use of the currencies in global payments and trade, 2014**
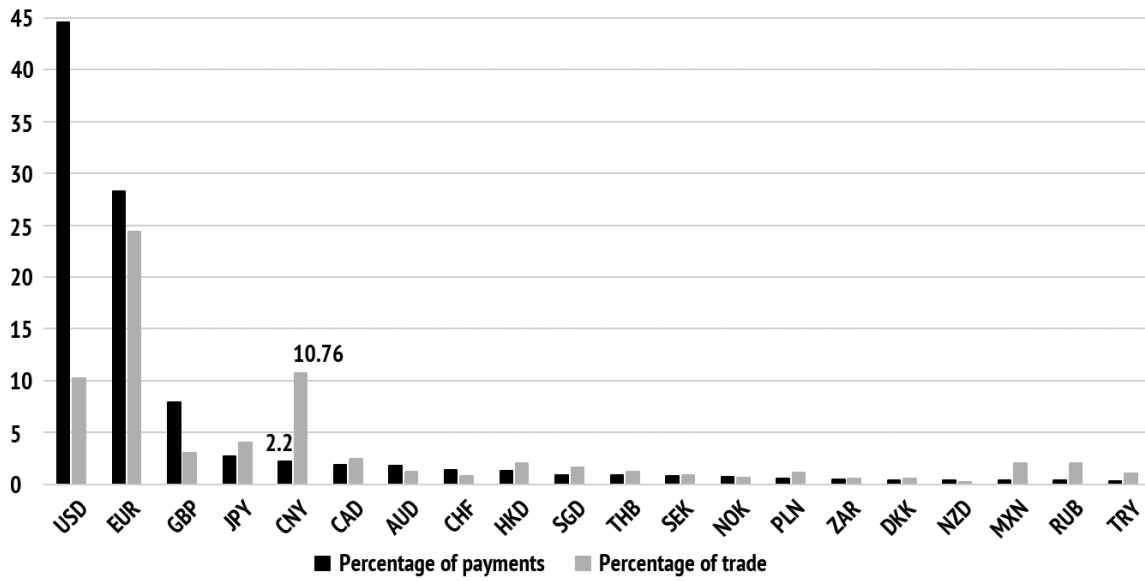


*Source:* SWIFT, The International Monetary Fund data

*Figure 2*

**The operational model of cross-border transfers from Hong Kong to mainland China**
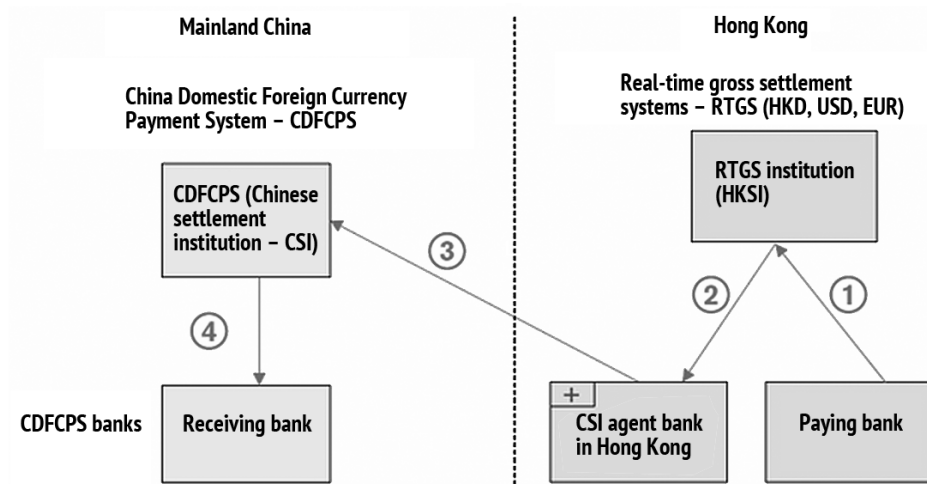


*Note.* 1 stands for a paying bank in Hong Kong sends a payment order via RTGS and wires money to the receiving bank on the continent through an intermediary bank in a respective currency in Hong Kong; 2 refers to the case when an intermediary bank in Hong Kong receives money through the RTGS system; 3 refers to the case when an intermediary bank in Hong Kong credits CSI account held with it and notifies CSI on payment details; 4 refers to the case when CSI transfers a loan to the receiving bank through CDFCPS. Plus is for CSI's account in a respective intermediary bank in Hong Kong.

*Source:* Multi-currency cross-border payment arrangements between Hong Kong and Mainland China. Feature Article by HKMA Financial Infrastructure Department. *Hong Kong Monetary Authority Quarterly Bulletin*, June 2009

*Figure 3*

**The mix of currencies flowing into Russia as part of trade in goods and services, 2016, percentage**
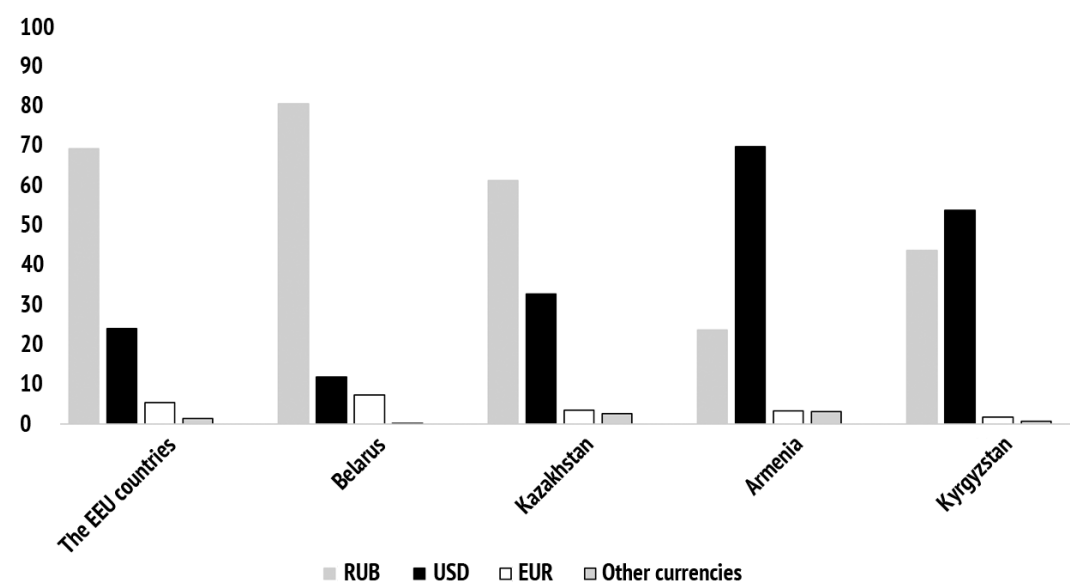


*Source:* The Central Bank of Russia data

*Figure 4*

**The mix of currency flowing from Russia as part of trade in goods and services, 2016, percentage**



■ **RUB**   ■ **USD**   □ **EUR**   □ **Other currencies**
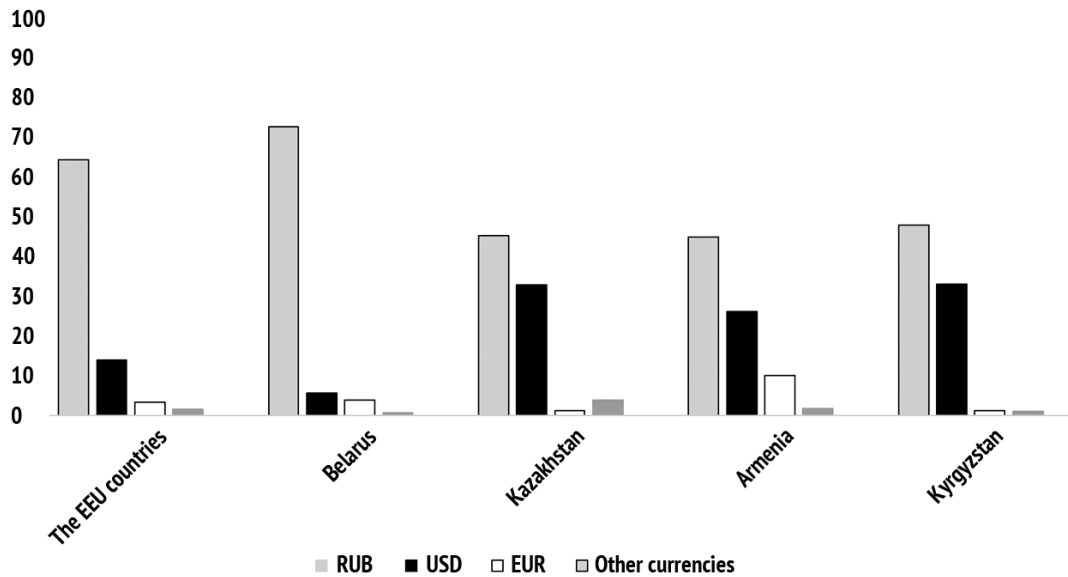
*Source:* The Central Bank of Russia data

*Figure 5*

**Foreign trade of Russia with the EEU countries in 2016, billion USD**



■ **Export**   ■ **Import**
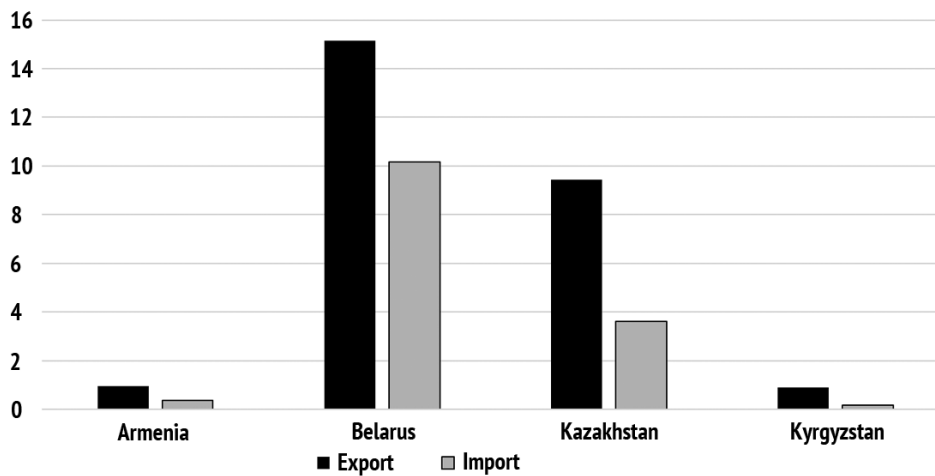
*Source:* The Federal Customs Service of Russia data

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**Conflict-of-interest notification**

We, the authors of this article, bindingly and explicitly declare of the partial and total lack of actual or potential conflict of interest with any other third party whatsoever, which may arise as a result of the publication of this article. This statement relates to the study, data collection and interpretation, writing and preparation of the article, and the decision to submit the manuscript for publication.

Translated Article[†]

# ANALYSIS OF BUSINESS MODELS FOR THE TAKAFUL FUND MANAGEMENT

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**Abstract**
**Importance** Whereas *Takaful* implies mutual guarantees, it does not contravene fundamental principles of Federal Law of November 29, 2007 № 286-ФЗ *On Mutual Insurance* as non-profit mutual insurance. The *Takaful* fund management mechanism does not dramatically diverge from the conventional European or American insurance. However, the implementation models differ significantly, laying the basis for this research.
**Objectives** The research substantiates *Takaful* fund management models in accordance with the effective Russian laws on insurance, and infers a more adequate model.
**Methods** The research involves analysis, synthesis, systematization, classification, generalization, comparative analysis of structure and systems approach.
**Results** I perform a comparative analysis of the existing business models for *Takaful* fund management. The article substantiates such models in terms of the effective Russian laws on insurance and introduces an adequate business model which would unfold the potential of *Takaful* in the insurance system of Russia.
**Conclusions and Relevance** If business models for *Takaful* fund management are implemented in accordance with the existing laws on insurance, this will lure the Muslim population into the insurance sector. Their participation in financial operations will contribute to the development of Islamic finance and overall financial market of Russia.

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*Authorized translation by Irina M. Vechkanova*

Although regulatory documents point out two segments of insurance – property and personal, various scholars crystallize three, four or even five ones. For example, V.G. Larionov, M.N. Skrypnikova [1] indicate insurance of person, property, liability and business risks. The same views are expressed by Yu.T. Akhvlediani [2], N.A. Chigasova [3], L.M. Sadykova, E.V. Korobeinikova [4]. Some authors (R.S. Rodin [5], I.P. Khominich [6], M.A. Fedotova[1], I.M. Shor [7], E.G. Knyazeva [8]) discuss only three

segments, such as insurance of property, person and liability. It is worth mentioning that the Russian laws (Chapter 48 of the Civil Law of the Russian Federation and Law of the Russian Federation of November 27, 1992 № 4015-1 *On the Insurance Business Process in the Russian Federation*) set forth two segments of insurance, i.e. personal and property one. Property insurance, indeed, includes three segments, such as insurance of possessions, civil liability and business risks, being generally compliant with Article 6 of Sharia Standard No. 26, which envisages insurance of property (general Takaful) and person (family Takaful).

1. *Property insurance* (known as the general Takaful in some countries and Russia) defrays actually incurred

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[†]For the source article, please refer to: Магомадова М.М. Анализ бизнес-моделей управления такафул-фондом. *Финансы и кредит*. 2018. Т. 24. № 6. С. 1366–1384.
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URL: https://cyberleninka.ru/article/v/riski-strahovoy-kompanii (In Russ.)

costs in case of genuine damage and provides coverage in case of fire, road accidents, aviation accidents, incidence of liability, attorney-in-fact's breaches, etc.

The general Takaful provides for short-term contracts. It rests upon the idea of indemnification, reimbursement of losses through mutual assistance. Therefore, the general Takaful is to protect from tangible losses or damage to the Takaful contributors' property, using the common Takaful fund made up of contributions.

The pool of Takaful funds for insurance benefits may be scarce. Such situations are common during the first years of the Takaful company's operations. The Takaful operator grants an interest-free loan to the Takaful holders, or Takaful holders regain the balance of the Takaful fund by making additional contributions.

As part of the profit-making model of the general Takaful, return on investment is distributed among Takaful holders and Takaful operation on principles of the Mudharabah contract. As per Article 12 of Shariah Standard No. 26, the Sharia Supervisory Board for Takaful approve the terms on which policyholder surplus is allocated.

What matters in the general Takaful and resembles the conventional property insurance is that the Takaful operator monitors the insured item. That is, Takaful operators evaluate the item insured on a regular basis. The reason is that the item insured can get impaired during the Takaful contract period because it causes the uncertainty and usury, giving profiteering opportunities for one party with respect to the other one.

The Takaful operator's profit depends on a type of the Takaful fund management model it adopts.

Hence the following structure is typical of the general Takaful (property insurance) (*Fig. 1*).

In the general Takaful practice, the term of an insurance contract usually equals one year. When an insurance policy expires, it is prolonged and renewed. Some Muslim scholars underline the nexus of the Takaful contract and various financial institutions of the Sharia community.

2. *Family Takaful, or personal insurance*, applies to risks of disability or death against the life insurance accepted in the conventional insurance system.

Disability or death risks are insured if the following conditions are met:

– an application is filed for joining the plan, indicating all personal details and characteristics which shall be available to provide insurance coverage. There shall also be detailed information about expected payouts and the Takaful holder's liabilities;

– the contribution amount shall be indicated;

– reimbursement amounts shall be specified as due to the beneficiary in accordance with the contract.

There are three principal models of Takaful companies and conclusion of contracts used in their operations, mutual, commercial and agency. The mutual model is sometimes called cooperative by some scholars (for example, S.P. Fukin [9], A.S. Sholoiko [10]) but it turns to be incorrect in terms of the Russian laws on insurance. I review their distinctions in paragraphs below.

The Muslim legal experts initially intended to forge the Takaful practice as a mutual model relying upon the idea of brotherhood and mutual help, thus echoing the ideal of conventional mutual insurance. As per the elementary mutual model, Takaful funds are not invested but rather used to make payouts to contributors upon an insurable event. However, the mutual insurance principle, as is construed in Federal Law of November 29, 2007 № 286-ФЗ *On Mutual Insurance*, is observed in case when the Takaful funds are invested through an agency (Wakalah) contract and subsequent return on investment is earmarked to increase the Takaful funds. The mutual insurance model was pioneered in Saudi Arabia and Sudan as the basic one. However, insurers searched for profit-making opportunities, thus fostering commercial business models of Takaful, which were discovered in Malaysia. As set forth in Article 21 (paragraph 21.7) of Act 312 (Takaful Act 1984, Malaysia), the pool of Takaful funds, which are not earmarked for administrative and other expenditures, can be invested in accordance with the Minister's instructions provided they comply with the Sharia

principles. The return on investment will be remitted to the Takaful guarantee scheme.

As Kh.S. Umarov puts it [11], the basic commercial model is based on an ordinary contract of the so called pure Mudharabah for the Takaful fund investment (*Fig. 2*).

Pure Mudharabah is mainly suitable for personal insurance purposes (family Takaful), rather than for property insurance (general Takaful). The Takaful operator handles funds of contributors, who are entitled to get the entire policyholder surplus (profit from insurance). The return on investment of Takaful funds is shared among the contributors and Takaful operator in line with their agreed shares. Before the return on investment is shared, deductions are not allowed. All costs the Takaful company incurs are defrayed with its share in profit.

In the future, hybrid Mudharabah came into practice (the general Takaful) (*Fig. 3*).

What distinguishes the mutual Takaful model from the commercial one is that the mutual model requires to share policyholder surplus among contributors and Takaful operators, rather than profit, as much as stipulated in the insurance contract. Surplus arises when the total contributions for the financial period and reinsurance premiums exceed total insurance payouts for the same period and after costs and changes in technical reserves are deducted as corroborated in the research referred to hereinafter [12, 13].

It is incorrect to say that the commercial model is based on the Mudharabah contract only. As mentioned above, Shariah Standard No. 26 stipulates investments through the Wakalah agency contract without a Takaful operator having interest in ROI. The commercial and agency-based models and their substance coincide, borrowing certain components from one another.

As per the general rule of the agency-based model, relationships between contributors and Takaful operator are governed by an agency contract (Wakalah). The Takaful operator derives its agency fees for the Takaful fund management from a part of contributions. Under the agency model the Takaful operator receives a flat amount (fee) from

contributors, which the Takaful operator uses to cover its expenditures. The agency-based model assigns all risks to the Takaful holders. For example, if the amount of insurance benefits exceed the amount of insurance premiums, which contributors donate, the latter shall cover the difference by making additional contributions (*Fig. 4*).

However, the Takaful operator is not entitled to a surplus since it pertains to contributors, being used in the conventional mutual insurance to decrease insurance premium. The same requirement is set in Article 19 of Federal Law of November 29, 2007 № 286-ФЗ *On Mutual Insurance*. Like the others, the agency-based model has a hybrid format (*Fig. 5*).

The kernel of the hybrid agency-based model is that relationships between the Takaful operator and contributors are regulated with the Wakalah contract (agency contract).

Moreover, the Takaful operator acquires the right for a portion of policyholder surplus, which is shared among stakeholders and Takaful operators in a previously agreed proportion after insurance benefits are paid to the insured.

Some international experts in finance recommend to apply the hybrid Wakalah–Mudharabah model, which virtually combines the above models. Under the hybrid model, as a result of its insurance activities the Takaful operator is entitled to a fixed portion of contributions and share in ROI (*Fig. 6*).

Arabic countries mainly employ the Wakalah agency-based model. In Malaysia the model also involves Mudharabah-based profit. It is noteworthy that the hybrid Wakalah- and Mudharabah-based models proved to be viable and competitive.

*Table 1* illustrates the difference between the main models.

Therefore, Mudharabah makes the management of the insurance fund's assets and underwriting the core activity of the Takaful operator. ROI is shared between the Takaful operator and the insured in a preliminarily agreed proportion, while the policyholder surplus (the difference between monetary contributions and insurance benefits in insurable events) is retained within

the Takaful fund, that is owned by the contributors. To the contrary, in the hybrid Mudharabah model, the policyholder surplus is allocated in a preliminarily agreed proportion among contributors. The Takaful operator's share in ROI is often higher than the immediate share of the Takaful fund. The Wakalah model obliges the Takaful operator act as an agent (Wakil) for the insured (client). In this model, the previously agreed amount of compensation (amount of contributions made by the insured) is put at the disposal of the Takaful operator. In the hybrid Wakalah model like in the hybrid Mudharabah model, policyholder surplus are allocated among contributors and Takaful operator as previously agreed. However, the models are not ultimate from perspectives of the Shariah standards.

Some researchers (I.L. Logvinova [14]) suggest introducing the Waqf construct into the agency-based model (*Fig. 7*). The insured make their contributions (Tabarru) into the Waqf fund, which is spent to make payouts in case of insurable events.

Shareholders (owners) of the Takaful operator make initial contributions as voluntary donations, thus losing their titles for the funds. However, the title is not conferred on the insured either.

The Waqf model is less common, being applicable in Pakistan, in particular.

Notwithstanding some common traits, the above models diverge when it concerns the fact and method of paying for the Takaful operator's services, and its share in profit:

– share in profit under the Mudharabah model;

– share in profit under the hybrid Mudharabah model;

– agency fees under the Wakalah model;

– agency fees and share in profit under the hybrid Wakalah model;

– share in profit and agency fees under the hybrid Wakalah–Muharabah model;

– share in profit and agency fees under the Waqf model.

The *share in profit* has the following meaning:

1) ROI under the Mudharabah model;

2) ROI and a portion of policyholder surplus (underwriting income) under the hybrid Mudharabah model;

3) share in profit is not supposed under the Wakalah model;

4) a portion of policyholder surplus under the hybrid Wakalah model;

5) ROI under the Wakalah–Mudharabah model;

6) ROI under the Waqf model. A portion of ROI is generated with contributions the Takaful operator's shareholders make to the Waqf fund.

If we try to compare the Takaful models and types of commercial insurance, the Wakalah model is evident to resemble those ones used in some countries, like Kazakhstan. It is a model that underlies mutual insurance companies' operations. The hybrid Wakalah model can be compared with the model adopted in the conventional commercial insurance.

Despite its conventionality, the Waqf model has a unique distinction in the way the Waqf fund is formed, thus being rather competitive during market research aimed to attract clients.

As for the hybrid models – hybrid Mudharabah and hybrid Wakalah, Takaful holders consider them least lucrative, being very reluctant to let the Takaful operator take some surplus since it hardly ever deserves any credit for the surplus.

As I see it, the Wakalah model and the combination of Wakalah – Mudharabah – Waqf would be reasonable to use in Russia in order to implement the Takaful practice (*Fig. 8*).

What distinguishes the combined financial business model from the conventional hybrid one is that the Takaful operator acquires legal rights and obligations for donations to the Waqf fund. Waqf arises from the Waqf contract. The pool of the Waqf fund made by contributors can be nominal. The capital serves for conferring the status of right holder on Waqf, rather than for ensuring the solvency of the Takaful company. Shareholders provide funds needed for performance, while the solvency can be supported with the Waqf fund.

The financial model of Takaful adapts the family Takaful by virtually rearranging business operations of existing life insurers (it is forbidden in Russia, like in many other countries, to combine life insurance and other types of insurance) to comply with the Takaful principles on cost effective terms for insurers. The model will be used if insurers intend to enter a new segment of the Islamic insurance market, on the one hand, and integrate the Islamic finance principles into the effective laws, on the other hand. Pension insurance will reach another development phase in conventional systems and family Takaful if the personal income tax on social security charges remitted to insurance companies for pension benefits is no longer levied when paid by the insured third parties (employers, etc.).

Hence Waqf is supposed to support those who make their contributions to Waqf, become its beneficiaries for the period indicated in donation contracts in the case of losses and financial damages.

The combined financial business model implies distinctive methods for deriving profit – from investment of the Waqf fund and Takaful fund. This makes it very competitive and attractive for clients. The Waqf fund is formed by shareholders, i.e. initial contributions proceed from their donations. Some insurance premiums of shareholders are also added to the Waqf fund as contributions, however shareholders and contributors lose their ownership right for the funds.

The combined financial business model is preferable for the Takaful operator and contributors. The Takaful operator gains agency fees (Wakalah), return on investment of the Takaful fund (Mudharaba), share in profit from the Waqf fund investment management and the Waqf fund management fees (Waqf). In the case of an insurable event contributors is entitles to insurance benefits from the Waqf fund, Takaful fund and return on these funds invested.

The reduction in the insufficient Takaful fund risk is another advantage of the model since insurance benefits will be paid out of two pools of funds, i.e. the Takaful fund and Waqf fund. In the other models, if there is shortage of funds, the Takaful operator grants interest-free loan to the Takaful fund or stakeholders make additional contributions (Tabarru) to cover the difference.

At initial stages of the Takaful company's growth and development, the combined financial business model is preferable since the Takaful company experiences a shortage of funds during the period. The shortage of funds can be offset with the Waqf fund. It takes a certain period of time (two to three years) for the Takaful fund, like any other, to accumulate some surplus and reach the break-even point.

Act 312 (Takaful Act 1984, Malaysia) requires to involve agents and brokers. In such a case the operator appoints an agent at its own discretion. The agent (Wakil) may be employed on a part-time or full-time basis. The agent is supposed to promote insurance products, attract new clients, explain the terms and substance of an insurance policy to the would-be insured before they sign a Takaful contract. Agents act as if they are employees of the company. That is why they take part in sharing the Takaful operator's profit like the other parties to the contract.

Unlike agents (Wakil), brokers shall be duly registered and act as intermediaries on their own behalf as the insurer or insured instructs them to do so. The broker is subject to double liability to parties of the Takaful contract. It serves interests of a contractual party providing them with relevant advice, and those of the Takaful operator promoting its products and attracting new clients. In the Takaful practice the brokerage income is twice as much as the income of an ordinary agent working with the Takaful operator. The broker's income is based on the two systems of Waqf and Mudharabah.

I believe there should be intermediaries in the Takaful scheme since Takaful is rather a new financial institutions that shall be disseminated among the population. Intermediaries may be involved in Takaful deals as part of the combined financial business model proposed herein.

Hence Takaful can be practiced in Russia if the above Takaful fund management models are implemented, thus creating the competition.

*Table 1*
**Distinctions of various Takaful models**

| Indicator | Wakalah | Mudharabah | Wakalah–Mudharabah |
|---|---|---|---|
| Takaful operator's performance | Takaful operator acts as an agent for the insured. The Takaful operator receives a portion of contributions made by the insured as previously agreed and has no interest in underwriting income or ROI | Takaful operator acts as an attorney-in-fact, while contributors are the principal. The Takaful operator is responsible for investment management of the insurance fund's assets and underwriting | Takaful operator receives a certain portion of contributions made by the insured, and portion of ROI. Making their initial donations, owners (shareholder) of the Takaful operator lose their title for their contributions. The operator makes an initial contribution to the fund, assets of which are used in investing activities. Shareholders are entitled to specify terms on which their contributions are utlizied. The insured make their donations for the fund |
| Profit sharing | Policyholder surplus is shared among stakeholders and operators as previously agreed. Operating expenses are borne by the Takaful operator | ROI is allocated as previously agrred. Policyholder surplus is retained within the Takaful fund or can be distributed betwee the Takaful fund and Takaful operator as previously agreed. Operating expenses are borne by the Takaful operator | ROI is allocated as previously agreed. Agency fees are also taken into consideration. Policyholder surplus passes into the ownership of the Takaful fund |

*Source:* Authoring

*Figure 1*
**The general Takaful model**
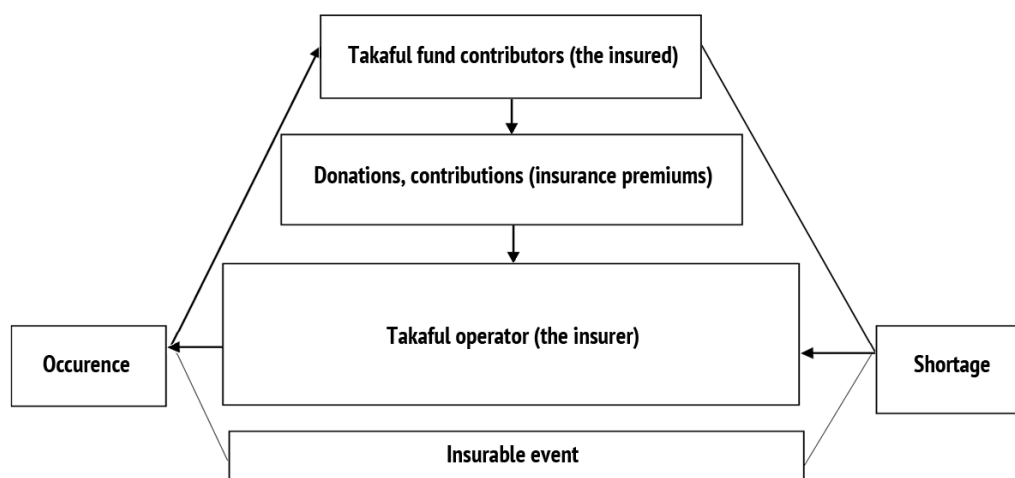


*Source:* Authoring

*Figure 2*
**The commercial model of Takaful through pure Mudharabah**
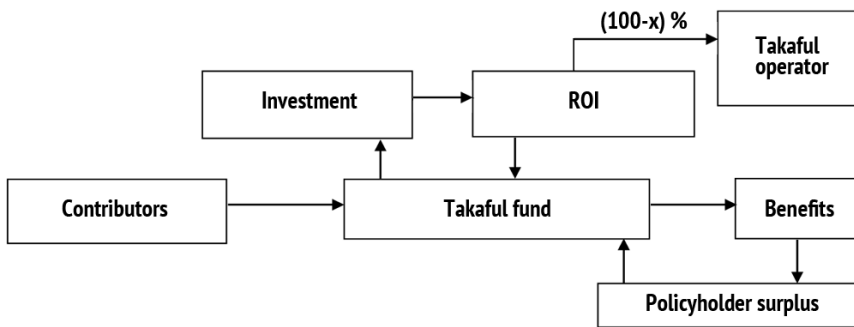


*Source:* Authoring

*Figure 3*
**The commercial model of Takaful through hybrid Mudharabah**
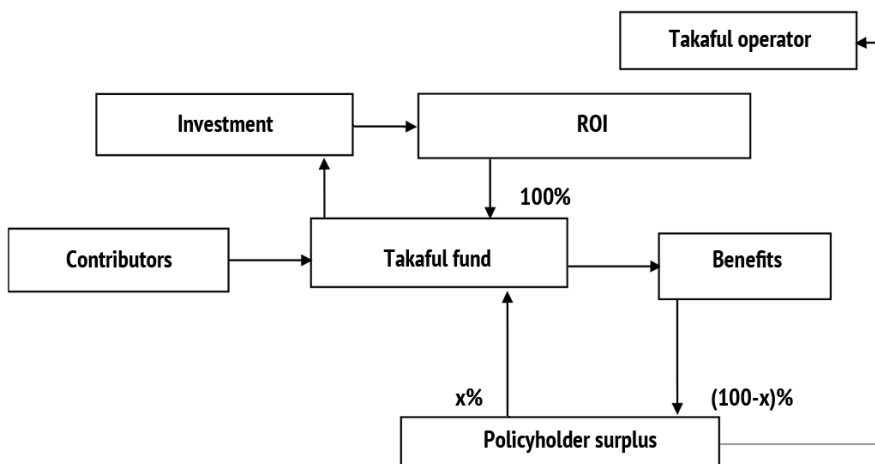


*Source:* Authoring

*Figure 4*
**The agency-based model of Takaful through Wakalah**
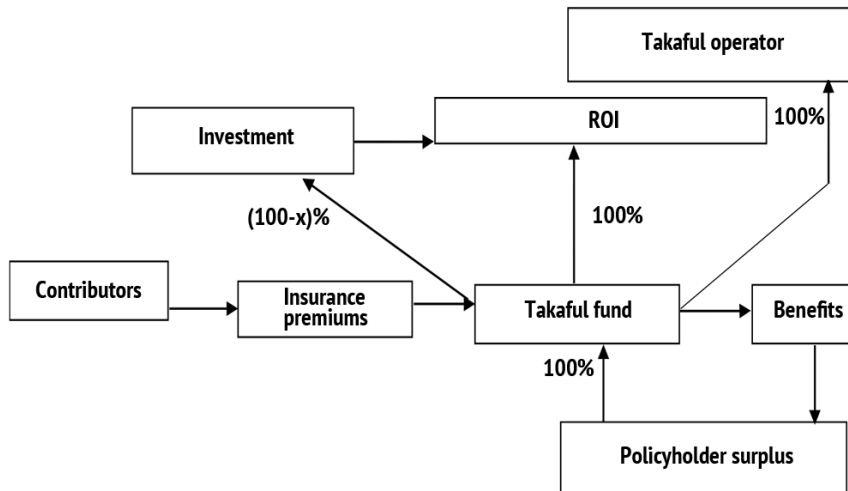


*Source:* Authoring

*Figure 5*
**The agency-based model of Takaful through hybrid Wakalah**
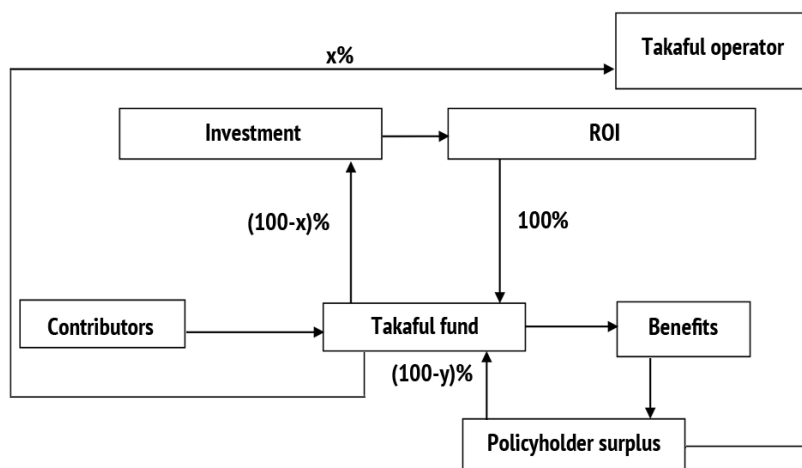


*Source:* Authoring

*Figure 6*
**The hybrid model through Wakalah and Mudharabah contracts**
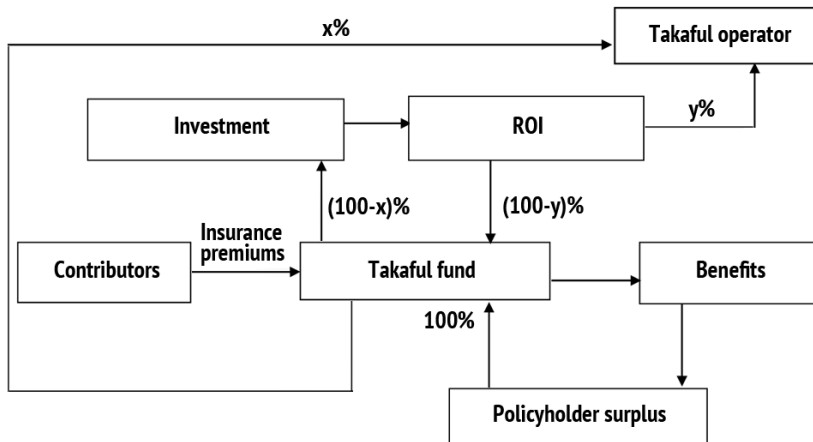


*Source:* Authoring

*Figure 7*
**The agency-based model through Waqf**
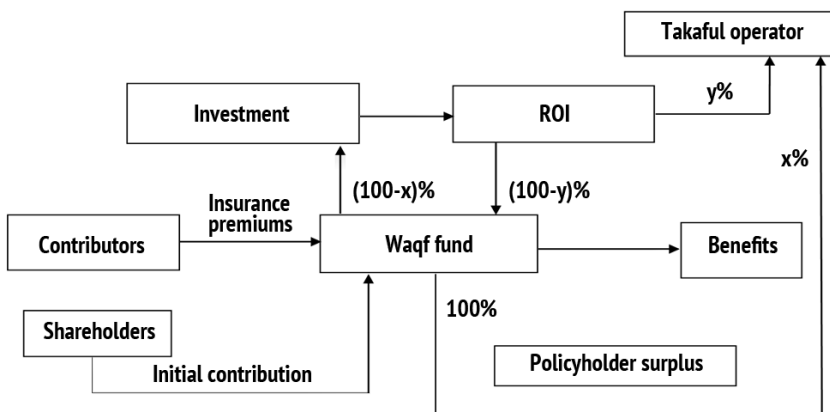


*Source:* Authoring

*Figure 8*
**The financial model of Takaful through the Wakalah–Mudharabah–Waqf model**
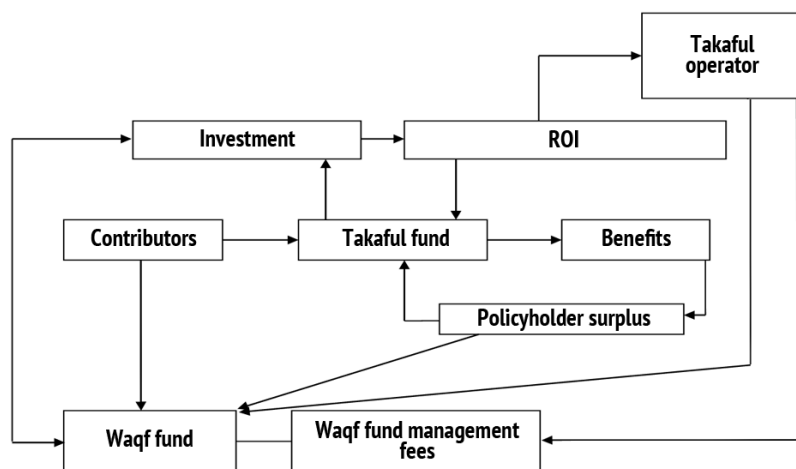


*Source:* Authoring

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I, the author of this article, bindingly and explicitly declare of the partial and total lack of actual or potential conflict of interest with any other third party whatsoever, which may arise as a result of the publication of this article. This statement relates to the study, data collection and interpretation, writing and preparation of the article, and the decision to submit the manuscript for publication.

Translated Article[†]

# MODELING THE EFFICIENCY OF INVESTMENT IN AGRICULTURAL BUSINESS

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**Abstract**

**Importance** The article discusses how agricultural business can be made more lucrative for investors since there are not appropriate mechanisms to support investment decision-making. Financial measures are not enough to stimulate investing activities of agricultural producers, while the organizational and economic mechanism for creating the favorable investment climate got outdated. Key investment maneuvers are intended to find appropriate ways for outlining a strategy.

**Objectives** The research systematizes available research tools to evaluate the efficiency of investment, substantiate and devise strategic models for supporting investment decisions in agricultural business.

**Methods** The research is based on a financial management technique to evaluate the Economic Value Added (EVA) in agricultural business. We supplemented the technique with respective econometric models for measuring the efficiency of investment.

**Results** The research presents our model showing how the yield spread functionally depends on capital invested in agricultural business. We refer to the Penza oblast to perform all model and analytical computations, which reveal the existing motivation for capital investment and potential for raising the efficiency of agricultural investment.

**Conclusions and Relevance** There should be tools to substantiate the efficiency of possible investment and visualize the return on investment in the agricultural business so that the agricultural policy could be properly adjusted.

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*Authorized translation by Irina M. Vechkanova*

Russia has been attempting to depart from the natural resource export paradigm of its national economic development for the recent years. Under the current socio-economic circumstances and restrictions, it is the right time to abandon the *oil-for-food* rule. To put this idea in practice, rather than simply declare it, the RF Government makes a lot of efforts to raise additional finance and create the favorable climate for the agricultural sector. Following this initiative, first of all, the RF

Government amended the legislative framework for investment management.

General metrics of capital expenditures and investing activities were updated, with the agroindustrial complex (AIC) being conferred a legal status. Russia has implemented the Priority National Project *The Development of Agroindustrial Complex*, adopted Federal Law of December 29, 2006 № 264-ФЗ
*On the Development of Agriculture*, enacted the Food Security Doctrine, articulated two national programs for agricultural development and regulation of agricultural food markets, materials and food within 2008–2012 and 2013–2020.

Drawing upon the improved legislative grounds, the government is able to expand and reassure its guarantees to agricultural producers. This mobilized budgetary allotments to agriculture, increased credit resources and attracted private investment. In the Penza oblast, the total investment demonstrated 2.7-fold increase in 2015 as compared with 2010 (*Fig. 1*).

Internal sources of finance for agricultural production grew 2.3 times within 2011–2015, while borrowed sources tripled.

However, this proved to be insufficient. The existing volume of financial resources and applicable tools are only capable of kick-starting the stagnating agricultural economy, ensuring only a 3-percent growth without contributing to extended reproduction of labor tools, objects and resources. A considerable part of agricultural land is still idle. Fiscal limitations necessitate additional financial injections, new sources of funding, which require to apply organizational and economic tools for making agricultural business more lucrative for investors.

If market prices are simply raised, it will cause a food catastrophe. Thus, it cannot be regarded as an alternative option. The banking sector is already involved into the finance of agricultural production through governmental guarantees for subsidizing the interest rate. The other investors demonstrate their reluctance due to high investment risks in the sector. Many of them prefer keeping their funds as bank deposits, government and corporate securities, handling them in financial markets, etc.

To ignite the consumer demand and put investors' focus on the real production sector, central banks outside Russia and national governments introduced the negative interest rate on loans and deposits.

The Russian regions have their own experience in luring investments into the agricultural economy through investment sites for agriculture. They help investors understand the current situation in the food market.

An investment site constitutes a free land plot or a plot with buildings, facilities and utilities, which is provided for investment projects.

We should also mention the program, which was launched in 2014 and designated to support investment projects implemented in Russia. The program was intended to raise the volume of loans extended to the real economy on long-term and beneficial terms. It can be viewed from positive perspectives, considering financial premises it creates for investors. However, there are still organizational and economic issues.

Investment sites in different regions differ considerably in terms of natural and economic aspects, thus having unequal productive capabilities. A would-be investor have no access to such information, being unable to realistically understand competitive profile of different investment sites. Due to this reason, it is not always clear which type of agricultural production will be financially and economically effective, and what food is in high demand inside and outside the regional market.

We analyzed the agrifood policy using the technique of the Organisation for Economic Co-operation and Development (OECD) to outline agricultural profiles of regions. In some cases, the demand for certain types of agricultural products does not always go with their effective production in the regions. The same is true about the supply since highly effective types of products are not always needed in some regions.

As one of the optimal and sensible options, investors may search for reasonable and sound recommendations on projects, which are worth being implemented on certain investment sites, in terms of market efficiency and social relevance,

provided investors have some governmental guarantees to protect their income.

Such projects should be launched by regional ministries for agriculture. In the case of some investment sites, it is reasonable to prepare alternative projects and justify cash flows, specifying internal financial resources needed, types and volume of the State aid, amount of loan facilities.

Ordinary approaches to investment project feasibility studies should be supplemented with financial management techniques, which would technically streamline investment decision-making processes.

Discounted Cash Flow method (DCF method) may appear to be one of the main techniques to evaluate agricultural business. It is impossible to evaluate the present value of future cash flows without the discount rate. Economically, the Rate of Return on Capital Employed (*ROCE*), which investors expect, serves as the discount rate concerning investment targets, which are comparable in terms of risk exposure.

The discount rate can also be defined as the value of capital raised from different sources. Cash flows from invested capital are subject to the discount rate that equals the sum of weighted average cost of capital and borrowings, with equity-to-debt ratios of the capital being regarded as percentages (*WACC*). The metric is used to gauge Economic Value Added (*EVA*).

*EVA* represents a method to measure the corporate financial position through real income. What *EVA* fundamentally means is that corporate capital shall work as effective as possible to ensure *ROCE* the investor or other shareholder require.

*EVA* arises if the return on investment turns to be higher for a certain period of time than the rate of return expected by the investor.

The *EVA* analysis methodology comprises several steps and includes some indicators (*Table 1*).

The indicators were measured with the software application, *Automated System for Comprehensive Financial, Economic and Managerial Analysis of Business*.

Several interim iterations are performed to appraise the equity.

1. Risk-free rate of return constitutes a rate on time deposits adjusted for a 12-month inflation.

2. The average return on shares in the stock market is a difference between the market risk premium and risk-free rate of return.

3. The risk of corporate investment in sectoral entities (a beta of listed firms) is assessed through the rating of the borrower's financial position. The assessed beta shall be adjusted for the ratio reflecting the extent to which the return on shares of the agricultural companies fluctuate in comparison with the general stock market return.

4. The risk of investment in small business is assessed through the selling cost of corporate assets and current loan liabilities and payables, when the adjusted liquidity ratio is measured (*Table 2*).

The nominal risk-free rate turned out to be lower than the inflation. In today's Russia, the nominal risk-free rate based on the government bonds yield cannot be used in the DCF method. However, the negative risk-free rate is unacceptable for *WACC* computations.

It is very risky to invest in shares of the Russian entities nationwide since the risk premium exceeds the return on shares in the stock market.

Agricultural businesses pertain to the second class of creditworthiness. Therefore, the risk of investment can be assessed as moderate in terms of the market. Beta is considered to equal 0.82.

According to statistical data, the general return on agricultural companies' shares ranges with the amplitude of 1.

Total beta of goods producers in the Penza oblast is 0.91 in 2015. Privacy premium accounts for 75 percent of the risk-free rate, being equal to 2.53 percent.

Thus, as the analysis shows, the risk of investment in agriculture of the Penza oblast can be assessed as high, being equal to 0.35.

At the final step of the analysis, we evaluate the *EVA* metrics (*Table 3*).

As per *Table 3*, *WACC* of agricultural businesses in the Penza oblast equals the average return on shares in the stock market, i.e. the return can be considered as medium in the sector from perspectives of owners.

For the analyzable period, the cost of debt held by agricultural business considerably exceeds the cost of equity. It means it is a reasonable measure to secure loans for the sector.

*WACC* is rather low, signifying an increase in the corporate value over time.

Generally, during the analyzable period, the capital employed and its return grow, which is a positive trend.

The following reasoning should be behind the interpretation of *EVA* metrics. Positive *EVA* signifies an increase in the market value in comparison with the carrying amount of net assets and motivates owners to continue business investment. Negative *EVA* decreases the market value of the entity and loss of owners' investment as they do not derive an alternative yield.

Researches based on the Penza oblast data reveal that the market value of agricultural entities has increased for the recent years as compared with the carrying amount of assets, and identified a respective positive trend. In 2013, equity owners did not manage to recover their invested capital in 2013 due to the loss of return. In 2014 and 2015 they were motivated to make additional investments in agricultural business.

The yield spread reflects the portion of *EVA*, which was gained per ruble of the capital employed. It shows how much the market value of the entity rises if additional contributions are made. In the Penza oblast, each ruble invested in 2014 and 2015 boosted the market value of business by over 2.3 kopecks. This provides grounds to justify a certain amount of financial injections into the real sector of agriculture provided the business has a specific value (*Fig. 2*).

We analyzed the trend in the *ROCE* spread by scrutinizing 220 agricultural enterprises of the Penza oblast. As a result of the trend analysis, we captured the power law dependence of the market value on the capital employed. There is a 98-percent probability that each ruble invested will result in the higher market value. The elasticity of the model proves that a 1-percent increase in the capital employed makes the market value go up by 1.04 percent.

Summarizing results of the research, we conclude that a variety of tools and mechanisms are used in today's Russia to manage the investment attractiveness of the agricultural sector. We should emphasize positive changes and trends that have already been observed in this sector. Successful developments primarily proceed from budgetary allotments and the involvement of the banking sector secured with certain governmental guarantees. However, the measures have not yet lured other investors and streamed their private funds into agricultural business.

The framework of investment and financial management is the most appropriate tool to justify the feasibility of possible investments, payback of the capital employed.

*Table 1*

**The methodology for Economic Value Added analysis**

| Metric | Calculation method |
|---|---|
| The cost of debt (*Rd*) | $\dfrac{IP}{D} \cdot 100$, <br> where *IP* stands for interests payable (Form 2 Line 2330); <br> *D* is borrowed capital (Form 1 Line 1410 + Form 1 Line 1510) |
| Debt-to-capital ratio (*D/E*) | $\dfrac{D}{A}$, <br> where *A* is balance (Form 1 Line 1700) |
| The cost of equity (*PCK*) | $R + bt^* (Rm - R) + x + y + f$, <br> where *R* is the risk-free rate of return; <br> *bt* is the risk of investing corporate money through the rating of the borrower's financial position; <br> *Rm* is the average return on shares in the stock market; <br> *x* is the risk of putting money into the sector; <br> *y* is the privacy premium; <br> *f* is the country risk premium |
| Equity-to-capital ratio (*dCK*) | $\dfrac{SC}{A}$, <br> where *SC* is the share capital (Form 1 Line 1310) |
| Weighted Average Cost of Capital (*WACC*) | $Rd \cdot D/E + PCK \cdot dCK$ |
| Capital Employed (*CE*) | $A - AP$, <br> where *AP* are accounts payable |
| Return on Capital Employed (*ROCE*) | $\dfrac{NP}{CE} \cdot 100\,\%$, <br> where *NP* is net profit |
| Economic Value Added (*EVA*) | $\left( ROCE - WACC \right) \cdot \dfrac{CE}{100\,\%}$ |
| Yield spread (*Spread*) | $\dfrac{EVA}{CE} \cdot 100$ or $ROCE - WACC$ |

*Source:* Authoring

*Table 2*

**Analysis of the cost-of-equity factors in relation to agricultural enterprises of the Penza oblast, 2013–2015**

| Metrics | 2013 | 2014 | 2015 |
|---|---|---|---|
| Risk-free rate of return | 2.17 | 0.09 | 3.37 |
| Market risk premium | 8.05 | 7.4 | 7.4 |
| Average return on equity market | 5.88 | 7.31 | 4.03 |
| Risk of putting corporate capital into agricultural enterprises | 0.91 | 0.81 | 0.91 |
| Adjusted liquidity ratio | 1.253 | 1.432 | 1.265 |
| Risk of putting money into small business | 0.35 | 0.32 | 0.35 |
| Privacy premium | 1.63 | 0.07 | 2.53 |

*Source:* Authoring

*Table 3*

**Assessment of Economic Value Added metrics in the agricultural business of the Penza oblast**

| Metrics | 2013 | 2014 | 2015 |
|---|---|---|---|
| The cost of debt | 7.886 | 7.297 | 10.415 |
| Debt-to-capital ratio | 0.547 | 0.521 | 0.524 |
| The cost of equity | 9.35 | 8.83 | 9.78 |
| Equity-to-capital ratio | 0.096 | 0.11 | 0.082 |
| Weighted Average Cost of Capital (*WACC*) | 5.101 | 4.748 | 6.564 |
| Capital Employed | 44,882,280 | 50,872,846 | 61,113,795 |
| Return on Capital Employed | 1.158 | 7.101 | 8.882 |
| Economic Value Added | −1,769,637 | 1,197,172 | 1,416,337 |
| Spread on the yield of capital employed, kopecks / RUB | −3.94 | 2.35 | 2.32 |

*Source:* Authoring

*Figure 1*

**The growth rate of investments in agriculture of the Penza oblast in 2011–2015 against 2010, percent**
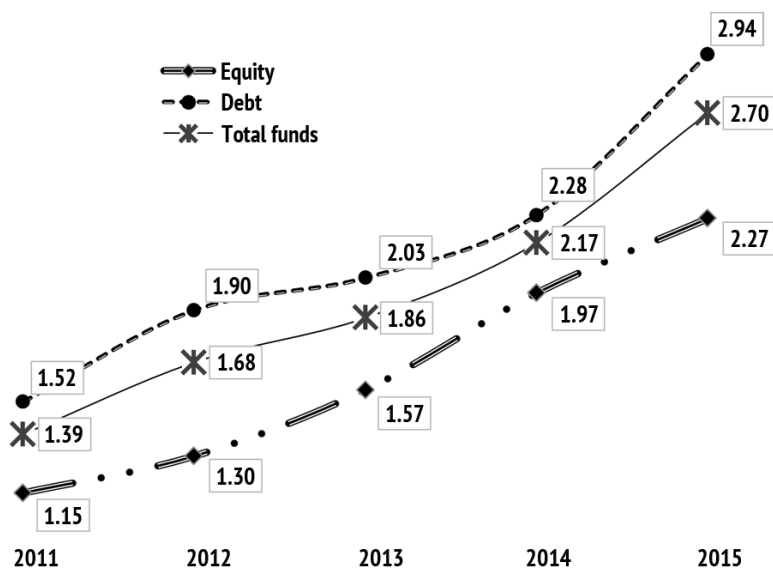


*Source:* Authoring

*Figure 2*

**Models of the correlation between the yield spread and capital invested in the agricultural business**
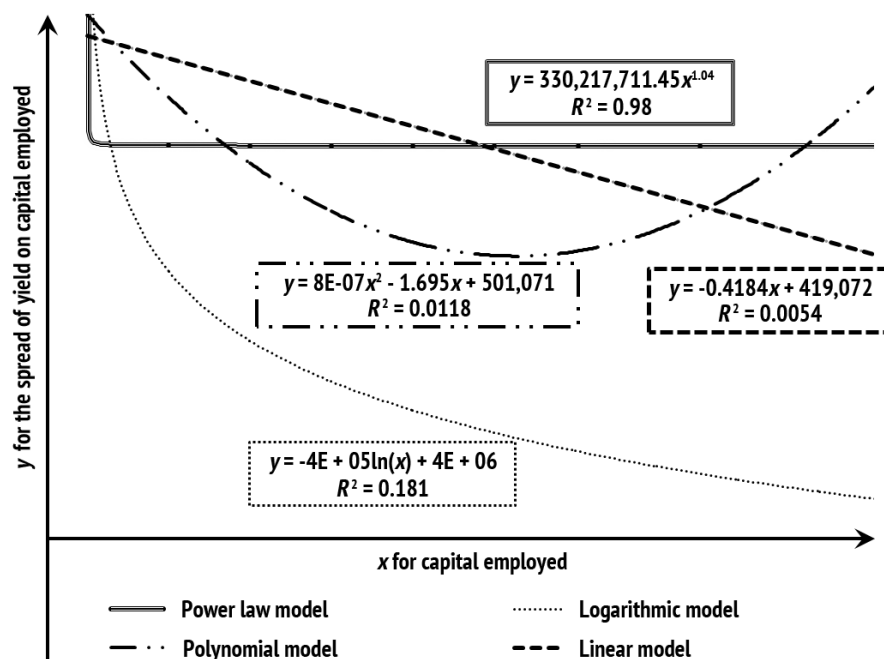


$y = 330{,}217{,}711.45x^{1.04}$
$R^2 = 0.98$

$y = 8\text{E-}07x^2 - 1.695x + 501{,}071$
$R^2 = 0.0118$

$y = -0.4184x + 419{,}072$
$R^2 = 0.0054$

$y = -4\text{E} + 05\ln(x) + 4\text{E} + 06$
$R^2 = 0.181$

*x* for capital employed

— Power law model  ········· Logarithmic model
— ·· Polynomial model  − − − Linear model

*y* for the spread of yield on capital employed

*Source:* Authoring

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**Conflict-of-interest notification**

We, the authors of this article, bindingly and explicitly declare of the partial and total lack of actual or potential conflict of interest with any other third party whatsoever, which may arise as a result of the publication of this article. This statement relates to the study, data collection and interpretation, writing and preparation of the article, and the decision to submit the manuscript for publication.

Securities and Financial Markets

Translated Article[†]

# INTEGRATION OF STOCK MARKETS OF RUSSIA AND SOUTHEAST ASIA

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**Abstract**
**Importance** This article deals with the regulated economic mechanisms of the stock markets of Russia and Southeast Asian countries (listing).
**Objectives** The article aims to analyze the legislation regulating the activities of the stock markets of Russia and Southeast Asian countries and develop and offer certain measures to ensure the organizational and regulatory compliance with the requirements of exchange trade on the Russian and Southeast Asian stock markets (road map elements).
**Methods** We used the methods of logical modeling and comparative analysis.
**Results** The article outlines a road map that includes certain measures to ensure the organizational and regulatory compliance of exchange trade mechanisms.
**Conclusions and Relevance** The trends in the stock markets' development are being expected to get changed in Russia, in particular. Changes in infrastructure, staffing capacity and resources will affect and change the attitudes towards the Asian countries.

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*Authorized translation by Irina M. Vechkanova*

The increasing role of stock markets is an inseparable aspect of the contemporary economy, having a global significance as part of financial markets. The financial world and community tends to become financially fragmented, thus hindering international relationships. The Euro-Atlantic region is more and more likely to lose their

economic hegemony. This will clear new horizons to would-be global actors.

Observing geopolitical developments, the power-that-be and business community are primarily conscious of the revitalizing economic activity in Siberia and Far East, international ties with China, India, Japan, South Korea and other eastern countries [1–4].

The connection of the Russian and Asia trade platforms is one of the points to diversify the Russian

economy. We analyzed legislative documents governing the Russian and Asian stock markets in terms of their consistency [5–10].

Nowadays the Russian stock exchanges are presented by 10 trading platforms. However, the genuine trade in securities is concentrated on four stock exchanges. Moscow Exchange is the main trading venue of Russia. It was founded by merging The Moscow Interbank Currency Exchange (MICEX) Group and Russian Trading System (RTS) Group in December 2011[1].

The exchange mainly forms prices in the financial market by concentrating liquidity and promulgating strict trading rules[2]. As seen in international practices, exchanges serve as a versatile method to obtain access to a variety of investors, including institutional ones, which are entitled to put their money into financial instruments in accordance with strict requirements (*Table 1*)[3, 4, 5, 6].

However, if the issuing entity is restructured, it is subject to the rule requiring to prepare and publish its audited (consolidated) financial statements under IFRS/U.S. GAAP starting from the year when the restructuring was completed. If the restructuring is completed after October 1, it shall publish financial statements starting from the year following the one when the restructuring took place. Furthermore, as for bonds issued by the Russian entities, the requirement is also applicable to the guarantor in case of the issuer's restructuring.

The metrics below are important on a stock exchange. They are measured for periods indicated in *Table 1*: $PnL_e$ is the financial result (profit or loss) of the issuer as per its annual (consolidated) financial statements under IFRS/U.S. GAAP for the last cut-off reporting year. $PnL_g$ is the financial result (profit or loss) of the guarantor as per its annual (consolidated) financial statements for the last cut-of reporting year.

If the issuer and guarantor pertain to the same group, $GPn_L$ is equal to profit (loss) as per the audited consolidated financial statements prepared by the group under IFRS/U.S. GAAP for the last cut-off reporting year. $GPn_L$ is the sum of the two indicators. If $PnL_e$ is positive, $GPn_L$ is equal to $PnL_e$.

The stock market of the Asian countries is concentrated on two major trading venues. It is noteworthy that the exchanges are on the World Top-7 list of the best exchanges, going fifth and sixth respectively. Both trading venues offer issuers certain listing terms (*Table 2, 3*).

We believe it is reasonable to explain what requirements resource supplying companies have to meet operating on the Hong Kong Stock Exchange.

A resource supplying company is a business, which primarily conducts geological surveys as its core activity in order to produce mineral resources, including minerals, oil, gas and solid fuels. The core activity can be qualified as such if it involves more than 25 percent of corporate assets, gross revenue or operating expenses.

Listing requirements are the same as for the other companies. However, would-be issuers seeking to be listed on the principal trading venue may not be subject to two-year profit, capitalization and commercial activity requirements, if the Hong Kong Stock Exchange gets assured that the board of directors or top executives collectively have appropriate experience in geological survey or mining. Members of the board of directors and top executives should have relevant professional experience in the sector of at least five years.

The company should posses the estimated amount of natural resources and conditional resources,

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[1] Moscow Exchange. URL: https://www.moex.com/en/

[2] Popovich V., Blackwell T., Dubovitskaya E. *Rukovodstvo dlya emitenta: podgotovka k IPO* [Issuer's Guide: Preparing for an IPO]. URL: https://ipoguide.moex.com/section-2-1.html (In Russ.)

[3] Akuev M., Murygin A., Belyasov I., Potok L. *Rukovodstvo dlya emitenta: podgotovka k IPO* [Issuer's Guide: Preparing for an IPO]. URL: https://ipoguide.moex.com/section-3.html (In Russ.)

[4] Civil Code of the Russian Federation. URL: https://www.consultant.ru/document/cons_doc_LAW_5142/ (In Russ.)

[5] Federal Law *On Organized Bidding* of November 21, 2011 № 325-ФЗ. URL: https://www.consultant.ru/document/cons_doc_LAW_121888/ (In Russ.)

[6] Order of the RF Ministry of Finance *On the Procedures for the Admission of Securities to Organized Bidding* of July 30, 2013 № 13-62/пз-н. URL: https://www.consultant.ru/document/cons_doc_LAW_197599/ (In Russ.)

which encompass a considerable and sufficient percentage of valuable components, being measured in accordance with one of the globally accepted reporting standards and corroborated with the report of independent and credible appraisers dealing with natural resource cases.

The company should hold sufficient working capital accounting for 125 percent of its current financial needs as estimated for the following year.

The resource producing company, which has not started the mining process yet, must disclose its mining commencement plans, indicating approximate dates and costs, which shall be verified at least with preliminary surveys and confirmed with the independent and credible appraiser's report.

The listing prospectus shall inform of social and environmental aspects, if they are material[7].

Shares in the Shanghai Stock Exchange[8] are split into two segments:

– A-Shares, which are available for foreign investment only under the Qualified Foreign Institutional Investor (QFII) program and denominated only in the yuan;

– B-Shares, which are available for all foreign partners and investment and denominated in USD.

Unlike the Hong Kong Stock Exchange, the Shanghai Stock Exchange is not fully accessible for foreign investors and controlled by the China Securities Regulatory Commission – CSRC. Whereas Hong Kong is supposed to attract foreign capital, Shanghai retains and develops the domestic one.

Overviewing the requirements to trading mechanisms of each trade venue, we analyzed their concordance, regulation and interpretation on each of them. The findings are presented in *Table 4*.

Comparing the existing requirements, we detected some mismatch of several aspects, i.e. capitalization and debt, internal control system, forecast of working capital adequacy, profit forecast.

Having scrutinized and specified the mismatch, we managed to outline the draft road map for integrating the Russian and Southeastern stock exchanges (*Table 5*).

As the analysis proves, the discordance is not critical and conceptually important, without seriously hampering its elimination. According to our estimates, it may take from two to three years to reverse the discordance and make respective amendments to the legislative and regulatory documents. As part of the research, we revealed dominating aspects of the current global and national trends in the development. In the nearest future, stock markets are expected to demonstrate different development trends, including the Russian ones.

Developments in infrastructure, talent, resources will change sentiments about the Asian (eastern) countries. *Turn to the east* used to be just a phrase. The integration process cannot be left unnoticed. Further goals and development strategies should be clarified. The proposed research and findings will contribute to the development of the Russian economy during the difficult turbulent time.

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[7] *Rynki kapitala v 2025: Budushchee fondovykh rynkov* [Capital Markets in 2025: The Future of Equity Capital Markets]. URL: https://www.pwc.ru/en/capital-markets/publications/assets/capital_markets_in_2025_rus.pdf (In Russ.)

[8] *Osobennosti fondovogo rynka Kitaya* [Distinctions of the Chinese stock market]. URL: http://goldok.ru/rynki-i-birzhi/osobennosti-fondovogo-rynka-kitaya.html (In Russ.)

*Table 1*

**Going-public conditions in the Russian Federation: the total market value of the issuer's float and the shares: Listing on the Moscow Exchange**

| Requirements | Level 1 | Level 2 |
|---|---|---|
| ***Stocks issued by the Russian companies*** | | |
| Common stocks | At least RUB 3 billion and at least 10 percent of total common stocks issued, respectively (if the market capitalization of the issuer exceeds RUB 60 billion) | At least RUB 1 billion and at least 10 percent of all common stocks issued, respectively |
| | At least RUB 3 billion and at least FF of total common stocks issued, respectively (if the market capitalization of the issuer is RUB 60 billion or less); $$FF = (0.25789 - 0.00263 \cdot \mathrm{Cap}) \cdot 100\,\%,$$ where $\mathrm{Cap}$ is the market capitalization of the issuer, billion RUB | |
| Preferred stocks | At least RUB 1 billion and at least 50 percent of total preferred stocks issued, respectively | At least RUB 500 million and at least 50 percent of total preferred stocks issued, respectively |
| The life period of the issuer or legal entity underlying the issuer as a result of its restructuring, which controls one or more businesses as per consolidated financial statements, on condition that the business (businesses) accounts for at least 50 percent of total business of the group, which the issuer pertains to | At least three years | At least one year |
| Preparation and release of audited (consolidated) financial statements compiled under IFRS/U.S. GAAP | For three cut-off years preceding the date when stocks were admitted to IPO Level 1 | For one cut-off year preceding the date when stocks were admitted to IPO Level 2 |
| Compliance with specific corporate government requirements | Yes | Yes |
| ***Bonds issued by the Russian companies*** | | |
| Number of bonds issued | At least RUB 2 billion | At least RUB 500 million |
| Par value of bonds | Below RUB 50 thousand | Below RUB 50 thousand |
| The life period of the issuer or guarantor (the requirement is in applicable if a collateral is provided, which is at least worth the amount of bonds issued) | At least three years | At least one year |
| The issuer's stocks and/or bonds listed on the Moscow Exchange (applicable only to the issue of exchange-traded bonds) | Yes | Yes |
| Preparation and release of audited (consolidated) financial statements of the issuer (and the guarantor, if applicable) under IFRS/U.S. GAAP | For the three cut-off years preceding the date when bonds wee admitted to Level 1 | For one cut-off year preceding the date when bonds were admitted to Level 2 |

| No losses | GPn$_L$ is positive as per results for the most recent three years | GPn$_L$ is positive as per results of one year out of the most recent three years |
|---|---|---|
| No default of the issuer | No default, or lat least three years passed from the date when the issuer extinguished the defaulted liabilities | No default, or at least two years passed from the date when the issuer extinguished the defaulted liabilities |
| Credit rating of the issuer, the issue of bonds or the guarantor | Yes | – |
| Compliance with specific corporate governance requirements | Yes | – |

*Source:* Moscow Exchange. URL: http://www.moex.com

*Table 2*

**Listing requirements on the main market of the Hong Kong and Shanghai Stock Exchanges**

| Requirements | Hong Kong Stock Exchange | Shanghai Stock Exchange |
|---|---|---|
| | Information on commercial activities for three most recent financial years | Publicly listed shared shall be more than 25 percent of total share capital. Equity is over CNY 30 million (USD 4.3 million). In the case of companies with the share capital exceeding CNY 400 million, the ratio of publicly listed shares and total share capital shall be more than 15 percent. The company's operations should be active for more than three years, generating profit for the three most recent years |
| | The stable and unchanged composition of officers for three preceding financial years | |
| | The stable and unchanged composition of owners and controlling persons within at least one financial year before an IPO | |
| | At least 25 percent of freely floating shares or 15–25 percent of shares in case of capitalization exceeding HKD 10 billion (about USD 1.3 billion) | |
| | At least 300 shareholders | At least 300 shareholders. In the case of a holding group, at least 1,000 people |
| | Three independent directors, who are not members of the company's management, including one director certified in accounting or financial management | |
| | Audit committee | Full disclosure of information in relation to controlling shareholders |
| | Controlling shareholders or directors are allowed to have competing entities given they duly disclose respective information | Good and legitimate business |

*Source:* Hong Kong Stock Exchange. URL: https://www.hkex.com.hk; Shanghai Stock Exchange; URL: https://www.sse.com.cn

*Table 3*

**Revenue and market capitalization requirements on the main trading venue of the Hong Kong Stock Exchange**

| Requirements | Profit and cash flows | Market capitalization | Revenue |
|---|---|---|---|
| | Profit of at least HKD 20 million (about USD 2.6 million) for the recent financial year | At least HKD 2 billion (about USD 256 million) | At least HKD 500 million (about USD 64 million) for the previous financial year |
| | Profit of at least HKD 30 million (about USD 3.8 million) for two most recent financial years | At least HKD 4 billion (about USD 513 million) | At least HKD 500 million (about USD 64 million) for the most recent financial year |
| | Operating profit of at least HKD 100 million (about USD 13 million) for three most recent financial years totally | | |

*Source:* Hong Kong Stock Exchange. URL: https://www.hkex.com.hk

*Table 4*

**Comparison of the exchange trading mechanisms of the Russian and Asian stock markets**

| Requirements | Hong Kong Stock Exchange | Shanghai Stock Exchange |
|---|---|---|
| Information on commercial activities for three financial years | Identical requirements | Identical requirements |
| The stable and unchanged composition of management within three most recent financial years | Identical requirements | Identical requirements |
| The stable and unchanged composition of owners and those charged with governance | The stable composition of owners and those charged with governance within the period of at least one financial year, which was audited immediately before the IPO | No specific requirements |
| The minimum percentage of freely floating shares is about or less than 25 percent in case of high market capitalization | Identical requirements | Identical requirements |
| Three independent directors, who are not members of the company's management, including one director certified in accounting or financial management | Identical requirements | Identical requirements |
| Audit Committee | Identical requirements | Identical requirements |
| Controlling shareholders or directors are allowed to have competing entities given they duly disclose respective information | Identical requirements | Identical requirements |
| Jurisdiction | IPO is permitted to companies registered in one of 26 jurisdictions | Qualified Foreign Institutional Investors (QFII) |
| Sponsor to be appointed | Required | Required |
| Auditor's Report: Three years and interim period under GAAP | Hong Kong Financial reporting Standards or IFRS | China Securities Regulatory Commission or IFRS |
| Profit estimation | On a voluntary basis. If the information is included into the prospectus, the auditor's report shall be attached | No specific requirements |
| Forecast of working capital adequacy. The Auditor's Report is usually required | Included into the financial and business performance analysis | Detailed report included into the comprehensive report on the financial and business performance analysis |
| Pro-forma financial information | Required, including the Auditor's Report | Required, including the Auditor's Report |
| Capitalization and debt | The report is required (within an eight week time before the prospectus is released) | The report is required (within an eight to ten week time before the prospectus is released) |
| Comprehensive report on the financial and business performance analysis | No specific requirements | Required |
| Internal controls | Form-PN 21. The agreed-upon procedures report of the auditor is usually required | China Securities Regulatory Commission is responsible for control, requiring the agreed report issued by the auditor |

*Continued*

| Requirements | Moscow Exchange |
|---|---|
| Information on commercial activities for three financial years | Identical requirements |
| The stable and unchanged composition of management within three most recent financial years | Yes |
| The stable and unchanged composition of owners and those charged with governance | The stable and unchanged composition of owners and those charged with governance within a period of at least three years, which were subject to auditing immediately before the IPO |

| | |
|---|---|
| The minimum percentage of freely floating shares is about or less than 25 percent in case of high market capitalization | Yes |
| Three independent directors, who are not members of the company's management, including one director certified in accounting or financial management | At least three members on the board of director, one independent director qualified in the preparation, evaluation and audit of financial statements |
| Audit Committee | Yes, only independent directors. If it is impossible due to objective reasons, the majority of the Audit Committee members shall be independent directors, with the rest of them being represented with members of the Board of Directors, without being the sole executive body and/or members of a collective executive body of the issuer |
| Controlling shareholders or directors are allowed to have competing entities given they duly disclose respective information | Yes |
| Jurisdiction | The Procedures for Admission of Securities to Organized Bidding regulates access to IPO. If the IPO concern any international matters like the place of the issuer's securities outside Russia, the issuer has to get the permission of the Central Bank of Russia. Placing securities only in Russia, involving foreign investors, no permission of the Central Bank of Russia is required |
| Sponsor to be appointed | Required |
| Auditor's Report: Three years and interim period under GAAP | IFRS |
| Profit estimation | Inapplicable |
| Forecast of working capital adequacy. The Auditor's Report is usually required | No specific requirements |
| Pro-forma financial information | The Auditor's Report shall be included |
| Capitalization and debt | Figures are given as of the date of the most recent cut-off reporting year and recent cut-off reporting period before the date of the prospectus approval |
| Comprehensive report on the financial and business performance analysis | Yes, economic analysis of the issuer's profit/loss is conducted, considering trends in the given figures |
| Internal controls | There should be detailed and full account of the design of functions responsible for internal control over the issuer's financial and business performance and their competence in accordance with the article of association (constituent documents) and internal regulations of the issuer. The issuer should inform of the way it manages risks and performs internal control over its financial and business operations (internal audit), including: – information on the existence of the Committee for Audit of the Board of Directors (Supervisory Board), its functions, members and their numbers; – information on the existence of a dedicated unit (units) for risk management and internal control (other than the revision commission (revision officer), body (structural unit) controlling the issuer's financial and business performance, its tasks and functions; – information on the existence of the issuer's dedicated structural unit (service) for internal audit, its tasks and functions. The issuer should describe its policy for risk management and internal control, and state the existence of its internal regulation governing the prevention of confidential and insider information misuse |

*Source:* Authoring

*Table 5*

**Measures to ensure the organizational and regulatory concordance of the stock market trading requirements in Russia and Southeast Asian countries: The road map elements**

| Defaulting requirement | IPO Action Plan | |
|---|---|---|
| | **Shanghai Stock Exchange** | **Hong Kong Stock Exchange** |
| Total market value of the issuer | Increasing total market value of an entity up to USD 4.3 billion | Increasing total market value of an entity up to USD 26 million |
| The stable composition of owners and those charged with governance | The aspect is not taken into consideration in case of IPO | Compliance is required |
| Audit Committee | The audit committee should be made up of independent directors only. That is, eliminating circumstances requiring a majority of the Audit Committee members to be independent directors only, while the other members may be members of the Board of Directors, who are not the sole executive body and/or members of the collective executive body of the issuer | Identical plan |
| Jurisdiction | The Qualified Foreign Institutional Investor (QFII) Committee shall be established to purchase A-shares | The procedure for ratifying the Double Tax Avoidance Agreement |
| GAAP | Allowing the certified auditors from Hong Kong to access financial statements (Reports and Financial Statements, Auditor's Report) | China Securities Regulatory Commission shall be empowered to govern the circulation of securities |
| Internal control | Amendments shall be made to subparagraph 5.4 of *the Regulation on Disclosures by Issuers of Securities*, which would comply with Form-PN 21 | Amendments shall be made to subparagraph 5.4 of the Regulation on Disclosures by Issuers of Securities allowing to observe listings and Initial Public Offering |
| Capitalization and debt | Amendments shall be made to subparagraph 6.7 *Regulation on Disclosures by Issuers of Securities* binding them them to submit the report within eight weeks before the prospectus is released as part of IPO on the Asian stock exchanges | Identical plan |
| Forecast of working capital adequacy. The Auditor's Report is required | Before the Board of Directors makes a decision on the issue and placement of securities, it is necessary to forecast the working capital adequacy (performed by the independent audit) and do it as one of the mandatory procedures | Identical plan |

*Source:* Authoring

## Acknowledgments

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Translated Article[†]

# ANALYZING THE IMPACT OF VARIOUS ECONOMIC METRICS ON YIELD SPREADS OF THE RUSSIAN RUBLE-DENOMINATED CORPORATE BONDS

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**Abstract**
**Importance** In this research, I analyze the impact of various economic metrics on yield spreads of the Russian ruble-denominated corporate bonds. The sample includes data from January 1, 2007 through December 31, 2016.
**Objectives** The research is aimed to build econometric models for explaining which indicators the yield spread of the Russian ruble-denominated corporate bonds depends on. I also evaluate the economic significance of the impact the indicators have.
**Methods** I conducted a graphic analysis, selected and set the best econometric models, which are assessed through the least square method. The article also presents the economic significance of the impact that variables have on yield spreads of corporate bonds, and interprets their substance.
**Results** The article outlines two econometric models. The first one is not configured to any structural (temporary) bends, while the second one is designed in line with them.

**Conclusions and Relevance** Some variables are found to have a different impact depending on an economic period. Variables, which are specific to a certain issue of bonds and entity, demonstrate a greater impact on yield spreads in comparison with the other ones.

*The editor-in-charge of this article was Irina M. Vechkanova*
*Authorized translation by Irina M. Vechkanova*

## Introduction

This research evaluates the effect of various economic indicators on yield spreads of the Russian corporate bonds. This research is dedicated to those indicators which have never been examined in the Russian market. However, their impact on yield spreads of corporate bonds was proved in developed bond markets. I also refer to indicators which were found to influence yield spreads of the Russian corporate bonds, as stated in proceedings by N.I. Berzon and T.M. Militskovoi[1] [1]. Data for the research were collected from various electronic sources[2]. The following part describes variables under study. The article also presents empirical results and respective conclusions.

[1] Berzon N.I., Militskova T.M. [Determinants of yields of ruble corporate bonds during their placement]. *Finansy i kredit = Finance and Credit*, 2013, no. 16, pp. 24–32.
URL: https://cyberleninka.ru/article/v/determinanty-dohodnosti-rublevyh-korporativnyh-obligatsiy-pri-ih-razmeschenii (In Russ.)

[2] URL: http://ru.cbonds.info/ (In Russ.); http://spark-interfax.ru/ (In Russ.); https://www.moex.com/en/ (In Russ.); https://www.cbr.ru/ (In Russ.); http://www.gks.ru/ (In Russ.);
https://www.bloomberg.com/professional/solution/bloomberg-terminal/

## Yield Spread

For purposes of this research, yield spread is a dependent variable, being assessed as the difference of yield to maturity between a corporate bond and yield calculated by the zero coupon yield curve for government bonds.

## Refinance Rate of the Central Bank of Russia

In their research, T. Cenesizoglu и B. Essid [2] demonstrate a positive effect of unexpected changes in the federal fund target rate on yield spreads of bonds with different ratings during a downturn. Surprise metric was assessed as the difference between the federal fund target rate, which is supposed to be applicable due to futures quotes and the real federal fund target rate. Whereas there are no available data on the federal fund target rate for the entire period of the sample, the refinance rate of the Central Bank of Russia is employed for purposes of this research. In this research, the refinance rate is supposed to have a positive impact on yield spreads of the Russian corporate bonds. However, surprise metric cannot be estimated for the refinance rate since there are not refinance rate futures in the market. That is why this research refers to absolute values of the refinance rate.

## Offering of Government Securities

In their research A. Krishnamurthy и A. Vissing-Jorgensen [3] show that an increased supply of Treasuries influences multiple yield spreads. In particular, it decreases yield spreads of the U.S. corporate bonds. The supply of Treasuries is assessed as the gross supply of Treasuries in monetary value and circulation divided by GDP. The researchers expect the indicator will have an adverse effect on yield spreads. Treasury supply was calculated as the gross supply of Treasuries in circulation and monetary values divided by GDP.

## Money in Circulation

F.K. Reilly, D.J. Wright and J.A. Gentry [4] illustrate that changes in money supply have a positive impact on yield spreads of corporate bonds in the U.S. market. The money supply is calculated as follows

$$\frac{(M2-M1)_t}{(M2-M1)_{t-12}} - 1, \tag{1}$$

where $M2$ and $M1$ are aggregate money indicators;

$t$ denotes the number of a month.

Whereas there are no available data of $M1$ for the entire period, an alternative indicator of money in circulation is assessed.

$$\frac{(M2-M0)_t}{(M2-M0)_{t-12}} - 1. \tag{2}$$

In the research, the money in circulation is expected to have a negative effect on yield spreads.

## Seasonality

K. Matsui [5] investigates the seasonality of yield on corporate bonds in the Japanese market. The researcher notes a significant decrease in yields from April through August and the opposite trend from September through December. The reason is that most companies in Japan cut-off their reporting period in March. However, it should be noted that K. Matsui [5] makes its computations in relation to the secondary bond market. The computations involve 11 dummy variables that equal 1, if the month of a dummy variable coincides with the placement month.

## Stock Market

Whereas the stock market can be indicative of the current economic situation and investors' expectations about its future development, it is reasonable to consider how this indicator may influence. Y. Hong, H. Lin, и C. Wu [6] conduct the Granger causality test to prove the adverse effect of yield on S&P 500 index on the yield of corporate bonds in the U.S. market. A.M. Hibbert, I. Pavlova, J. Barber и K. Dandapani [7] detect the negative impact of Russel 2000 index on yield spreads of corporate bonds in the U.S. market. The MOEX Russia index works for the calculations relating to the Russian market. In this research, the MOEX Russia index hypothetically has the negative impact on yield spreads of the Russian corporate bonds. The yield is assessed for a 30-day period before the placement date, using the following formula:

$$\frac{(P_t - P_{t-30})}{P_{t-30}}, \tag{3}$$

where $P_t$ denotes values of the MOEX Russia index on the *t*-day;

$P_{t-30}$ denotes values of the MOEX Russia index on the *t-30* day.

## The Stock Market Volatility

Rising volatility in the stock market may be evidence of the deteriorating economic situation and increased investment risk. F.K. Reilly, D.J. Wright and J.A. Gentry [4] demonstrate that the volatility of the NYCE and Russel 2000 indices had a positive effect on yield spreads of corporate bonds in the U.S. market. For the Russian market, the volatility of the MOEX Russia index can be measured. In this research, the volatility of the MOEX Russia index is supposed to have a positive effect on yield spreads of the Russian corporate bonds. The volatility of yields in the stock market was assessed using the following formula:

$$s_t \cdot \sqrt{12}, \qquad (4)$$

where $s_t = \sqrt{\dfrac{1}{29} \sum_{i=1}^{30} \left( P_{t-i} - \overline{P_{i-i}} \right)^2}$;

$$\overline{P_t} = \frac{\sum_{j=1}^{30} P_{t-j}}{30}.$$

## Industrial Production Index

Whereas the Industrial Production Index reflects the situation in one of the crucial economic constituents, it would be very reasonable to consider the effect of the index too. T. Cenesizoglu and B. Essid [2] unveil the negative impact of the industrial production index on yield spreads of corporate bonds in the U.S. market. In this research, the Russian Industrial Production Index allegedly affects the yield on the Russian corporate bonds. Computations are based on values of the Russian Industrial Production index in percent against the average monthly value of 2010.

## Yield on Government Bonds

Treasuries yield often serves as the check variable in researches into the U.S. market. K. Shaw [8], A.M. Hibbert, I. Pavlova, J. Barber и K. Dandapani [7]

and H.H. Huang, H.-Y. Huang and J.J. Oxman [9] observe changes in the yield on 10-year-old Treasuries, revealing their negative impact. Y.C. Jin and G. Gerard [10] analyze the yield on Treasuries with maturity being equal to the maturity of a corporate bond, registering the negative impact too. T.M. Militskova [1] verifies the negative impact of the Russian government bonds (Federal loan bonds) on yield spreads of the Russian corporate bonds. In this research, I also guess that the yield on government bonds affects yield spreads of corporate bonds.

## Gross Domestic Product

Whereas GDP is indicative of the overal economic situation, it can influence yield spreads of corporate bonds. F.K. Reilly, D.J. Wright and J.A. Gentry [4] illustrate how changes in GDP affect yield spreads of corporate bonds in the U.S. market. As for the Russian market, T.M. Militskova [1] confirms the adverse effect of changes in GDP on yield spreads of the Russian ruble-denominated corporate bonds. In this research, changes in GDP are assumed to affect yield spreads of corporate bonds placed. Increments in GDP are computed as percentage points against the previous quarter.

## Default Rate

In their researches, N.I. Berzon and T.M. Militskova[3] [1] testify that the default rate has the positive impact on yield spreads of the Russian corporate bonds. In this research, I also make the same guess.

The default rate is assessed as $\dfrac{D_t}{B_t}$, where $D_t$ means the par value of all the bonds defaulted in the *t*-month, and $B_t$ is the par value of all the bonds in circulation during the *t*-month.

## Leverage

Leverage is applied most frequently as a proxy for the issuer's risk. It serves as the check variable in studies by J. Elliott, A. Ghosh and D. Moon [11], T.-

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[3] Berzon N.I., Militskova T.M. [Determinants of yields of ruble corporate bonds during their placement]. *Finansy i kredit = Finance and Credit*, 2013, no. 16, pp. 24–32.
URL: https://cyberleninka.ru/article/v/determinanty-dohodnosti-rublevyh-korporativnyh-obligatsiy-pri-ih-razmeschenii (In Russ.)

K. Chen, H.-H. Liao and H.-C. Huang [12], A. Kecskés, S.A. Mansi and A. (Jianzhong) Zhang [13], H.H. Huang, H.-Y. Huang and J.J. Oxman [9], S. Mansi, W. Maxwell and D. Miller [14], T. Chuluun, A. Prevost and J. Puthenpurackal [15], A. Nashikkar, M.G. Subrahmanyam and S. Mahanti [16], C.-L. Chiou, M.-W. Hung and P.-G. Shu [17], Tsung-Kang Chen and Yi-Ping Liao [18]. The above studies proved the leverage ratio influences yield spreads considerably and positively. In this research, the leverage ratio is assumed to have a positive impact on yield spreads of corporate bonds too.

### Business Size

The larger the company (in comparison with the issue of bonds), the higher the probability of debt repayment. The indicator is used as the check variable in the following researches: J. Elliott, A. Ghosh and D. Moon [11], R. Gopalan, F. Song and V. Yerramilli [19], A. Kecskés, S.A. Mansi and A. (Jianzhong) Zhang [13], T. Chuluun, A. Prevost and J. Puthenpurackal [15], K. Shaw [8], A. Shuto and N. Kitagawa [20], V. Venkiteshwaran [21], C.-L. Chiou, M.-W. Hung and P.-G. Shu [17]. In the above researches, the business size was found to have the negative effect. I suppose the business size affects yield spreads of corporate bonds. The calculations are based on the logarithm of the total corporate assets in monetary value (thousand RUB).

### Interests Coverage

Interest coverage shows whether entities are able to pay their current debts. That is why the indicator is also applied as a proxy for the corporate risk. Interest coverage serves as the check variable in the following studies: R. Gopalan, F. Song and V. Yerramilli [19], H.H. Huang, H.-Y. Huang and J.J. Oxman [9], V. Venkiteshwaran [21]. The researchers unveil the adverse effect of interest coverage on yield spreads. I verify this statements in relation to corporate bonds. Interest coverage is measured as $\dfrac{EBIT}{NetInterest}$, where EBIT is Earnings Before Interest and Tax, Net Interest is the net interests payment (that is, the amount of interests due net of interests receivable). Whereas some

companies have zero net interest, in this research the interest-based indicator is assessed as follows:

Afterwards I follow the properties of a logarithm

$$IC = \ln(C_0) - \ln(C_1), \quad \text{where}$$

$$C_0 = \begin{cases} EBIT \text{ ; if } EBIT > 1 \\ 1 \end{cases};$$

$$C_1 = \begin{cases} NetInterest \text{ ; if } NetInterest > 1 \\ 1 \end{cases}.$$

### Industry

Notwithstanding equal financial indicators, risk exposure of companies from different industries may also vary. Yield spreads are industry-specific (or segment-specific). This metric is used as the check variable in the studies by A. Kecskés, S.A. Mansi and A. (Jianzhong) Zhang [13], T. Chuluun, A. Prevost and J. Puthenpurackal [15], G. Batta, A. Ganguly and J. Rosett [22]. As for the Russian market, N.I. Berzon and T.M. Militskova[4] [1] record the difference between yield spreads of the Russian companies depending on an industry they operate in.

I would like to affirm the conclusion in this research. The list of industries is based on the applicable sample. The sample includes companies operating in 1) power engineering; 2) mechanical engineering; 3) commerce; 4) oil and gas; 5) telecommunications; 6) iron and steel industry; 7) food production; 8) non-ferrous metals industry; 9) agriculture; 10) chemical industry; 11) transport; 12) construction and development; 13) mining; 14) light industry; 15) pulp and paper and wood processing industry; 16) mass media and entertainment and others. Calculations involve binary variables taking on a value of 1 if the industry of the binary variable coincides with the company's industry.

### Maturity Period

The longer the investment period, the higher the uncertainty and risk of the issuer's default. That is why investors require higher yields on long-maturity bonds, under all other conditions being equal. According to the researches conducted by

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[4] Berzon N.I., Militskova T.M. [Determinants of yields of ruble corporate bonds during their placement]. *Finansy i kredit = Finance and Credit*, 2013, no. 16, pp. 24–32.
URL: https://cyberleninka.ru/article/v/determinanty-dohodnosti-rublevyh-korporativnyh-obligatsiy-pri-ih-razmeschenii (In Russ.)

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K. Matsui [5], D. Michayluk and R. Zhao [23], H.H. Huang, H.-Y. Huang and J.J. Oxman [9], K. Shaw [8], A. Shuto and N. Kitagawa [20], V. Venkiteshwaran [21], Tsung-Kang Chen and Yi-Ping Liao [18], S. Han, W. Moore, Y. Shin and S. Yi [24], the maturity period has the positive impact on yield spreads. However, other researchers, such as A. Nashikkar, M.G. Subrahmanyam and S. Mahanti [16], C.-L. Chiou, M.-W. Hung and P.-G. Shu [17], E. Blankespoor, T.J. Linsmeier, K.R. Petroni and C. Shakespeare [25] register the negative effect of the maturity period on yield spreads. As for the Russian market, N.I. Berzon and T.M. Militskova[5] [1] prove that the maturity period affects yield spreads of the Russian ruble-denominated corporate bonds. I affirm this conclusion and express the tenor of bonds as the logarithm of the month-based maturity period.

## The Issue Size

The issue size often works as a proxy for the liquidity of bonds. Under other conditional being equal, more marketable bonds has the lower yield spread. S. Mansi, W. Maxwell and D. Miller [14], A. Shuto and N. Kitagawa [20], V. Venkiteshwaran [21], E. Blankespoor, T.J. Linsmeier, K.R. Petroni and C. Shakespeare [25], B.W. Ambrose, Y. Cheng and T.-H. Dolly King [26] observe the negative impact of the issue size on yield spreads of corporate bonds. Other researchers, such as J. Elliott, A. Ghosh and D. Moon [11], K. Shaw [8], A. Nashikkar, M.G. Subrahmanyam and S. Mahanti [16], K. Cai [27] report on the positive effect of the issue size on yield spreads. As for the Russian market, N.I. Berzon and T.M. Militskova[6] [1] demonstrate that the issue size In this research, I tend to the latter opinion about the negative impact of the issue size on yield spreads of the Russian corporate bonds. The issue size is expressed as the logarithm of the issue size in monetary value (RUB).

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[5] Berzon N.I., Militskova T.M. [Determinants of yields of ruble corporate bonds during their placement]. *Finansy i kredit = Finance and Credit*, 2013, no. 16, pp. 24–32.
URL: https://cyberleninka.ru/article/v/determinanty-dohodnosti-rublevyh-korporativnyh-obligatsiy-pri-ih-razmeschenii (In Russ.)

[6] Berzon N.I., Militskova T.M. [Determinants of yields of ruble corporate bonds during their placement]. *Finansy i kredit = Finance and Credit*, 2013, no. 16, pp. 24–32.
URL: https://cyberleninka.ru/article/v/determinanty-dohodnosti-rublevyh-korporativnyh-obligatsiy-pri-ih-razmeschenii (In Russ.)

## Coupon Payment

A coupon payment is another frequent check variable. As a rule, the higher the coupon rate, under all other conditions being equal, the higher the yield spread of bonds. This indicator is employed by H.H. Huang, H.-Y. Huang and J.J. Oxman [9], T. Chuluun, A. Prevost и J. Puthenpurackal [15], Tsung-Kang Chen and Yi-Ping Liao [18], B.W. Ambrose, Y. Cheng and T.-H. Dolly King [26]. In the above researches, the coupon rate was found to have the positive impact on yield spreads of corporate bonds. This indicator was omitted since it was the coupon rate that investors considered on the basis of the desired return when placing their bonds in the case of more than 90 percent of bonds on the sample.

## Placement Format

According to T.M. Militskova [1], the Russian corporate bonds were offered for the first time through book building in February 2008. They used to be placed through bids only, through coupons or at face value since the bookbuilding process allows the company to influence the allotment of bonds, without constantly preferring the low-price demands. Yield on bonds placed through a bookbuild is higher, under all other conditions being equal. This statement is verified in the research by N.I. Berzon and T.M. Militskova[7]. In their research, they expect the yield on corporate bonds placed through a bookbuild will be higher. Assuming that other formats of placement also can influence the yield on corporate bonds, the calculations consider coupons, confidential underwritting, conversion (from the other bond). The calculations are based on binary variables taking on a value of 1 in the case of respective bonds.

## Bond Type: Unsecured and Registration-Exempt

In 2008 the Russian issuers listed on the Moscow Exchange were allowed to offer their bonds (registration-exempt bonds) for sale through a simplified procedure [1]. As N.I. Berzon and T.M. Militskova prove[8] [1], registration-exempt bonds generate lower yields, under all other conditions

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[7] Ibid.

[8] Ibid.

being equal. In this research, I also tend to this opinion. Calculations are based on a binary variable that equals 1 for the issue of registration-exempt bonds.

### Type of Organizer

According to N.I. Berzon and T.M. Militskova[9] [1], under all other conditions being equal, the yield spread of the Russian corporate bonds is lower if they are placed by the first-tier organizers. The first-tier organizers shall mean companies which arrange for the placement of bonds more frequently and substantially than the other market actors do. In this research, the yield on the first-tier organizers is expected to be lower, under all other conditions being equal. Calculations are based on a binary variable taking on a value of 1 for the issue of bonds issued by the first-tier organizer. Such organizers are represented by VTB Group, Troika Dialog, Gazprombank, Reiffeisen Bank, TransCreditBank, Renaissance Capital, Sberbank of Russia, Uralsib, Rosbank, Bank of Moscow. The list of the first-tier organizers proceeds from the research by N.I. Berzon and T.M. Militskova[10].

### Oil Prices

Russia is an oil exporting country. Hence oil prices shape the national economy as a whole and the rate of return on the Russian securities, which investors may expect. T.M. Militskova [1] illustrates that oil prices affect the yield on the Russian corporate bonds. In this research, I intend to prove the negative impact of oil prices on yield spreads of the Russian corporate bonds. Brent oil price denominated in USD is used for purposes of this research.

### USD Exchange Rate

USD exchange rate are among those indicators that influence the Russian economy. According to N.I. Berzon and T.M. Militskova[11] [1], the strengthening position of the Russian ruble

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[9] Ibid.

[10] Ibid.

[11] Berzon N.I., Militskova T.M. [Determinants of yields of ruble corporate bonds during their placement]. *Finansy i kredit = Finance and Credit*, 2013, no. 16, pp. 24–32.
URL: https://cyberleninka.ru/article/v/determinanty-dohodnosti-rublevyh-korporativnyh-obligatsiy-pri-ih-razmeschenii (In Russ.)

affects yield spreads of the Russian-ruble denominated corporate bonds. In this research, the inverse exchange rate is assumed to have the negative impact on yield spreads of the Russian corporate bonds.

### Temporary Effects

The sample comprises bonds that are offered during a stable economic period and a crisis. Whereas some dependencies may vary in different economic period, the above variables were supplemented with time binary variables taking on a value of 1 in the case of a respective period. Economic periods were selected by analyzing the daily history of the MOEX Russia index (built on the basis of closing prices) (*Fig. 1*). Five time periods were pointed out 1) January 2007 through June 2008; 2) July 2008 through February 2009; 3) March 2009 through April 2011; 4) May 2011 through October 2014; 5) November 2014 through December 2016.

### Sample

The research is supposed to draw upon data on the primary bond market since the Russian bond market is not sufficiently liquid, making it difficult to find prices of all the issues of bonds in each trading period [1]. The research is based on data on the Russian primary market of the Russian ruble-denominated bonds for the period from January 1, 2007 through December 31, 2016. The bonds placed during the period amounts to RUB 14.461 trillion (2,497 issues), where RUB 7.534 trillion (1,175 issues) pertaining to bonds of the real economy (rather than the financial sector). I also investigated data on bonds offered by enterprises of the real economy. I excluded convertible bonds, bonds with embedded options, bonds with at least some coupons assessed after the placement, bonds with floating coupon rate, bonds with the par value discounted by external factors, government-guaranteed bonds. If compared with bonds of the real economy, such bonds (without special requirements for the placement) account for 35.46 percent and 57.7 percent (or 678 issues worth RUB 2.672 trillion) in terms of value and numbers respectively. I subsequently eliminated issues of bonds without data relevant to the research. The final sample includes 470 issues worth RUB 2.2 trillion. The sample accounts for 29.19 percent and 40

percent in terms of value and number of offerings among bonds of the real economy.

## Empirical Calculations and Findings

Initially, I eliminated outliers or lines of observations with yield spreads being higher that 0.15 or lower than –0.05, leverage ratio being higher that 4, and coupon payment exceeding 0.2. I totally deleted six issues of bonds worth RUB 3.184 billion. Afterwards, graphical analysis was conducted as presented in *Fig. 2–4* so as to find the most appropriate way yield spreads may depend on some variables

Setting various econometric models, I selected those ones, which best explain values of yield spread. I also considered that changes in the USD exchange rate and oil prices may have different impact on yield spreads of bonds offered by companies operating in different industries. To display the non-linear effect the refinance rate has, I raised the variable RF into the power of four. The power of four seemed appropriate because the power of two resulted into multicollinearity. Thus, the research provides two models, with one of them being specific to a breakpoint and the other one being free from it.

## Conclusions

I set two models. Signs of respective ratio meet the expected value in the case of most variables (*Table 1*).

As proved by the econometric analysis, the refinance rate has the non-linear effect on yield spreads of corporate bonds, with the highest yield being generated at a 10.16 percent refinance rate. As expected, yields in the stock market affects yield spreads of corporate bonds, which is also consistent with findings on developed markets (A.M. Hibbert, I. Pavlova, J. Barber and K. Dandapani [7], Y. Hong, H. Lin and C. Wu [6]). The yield on government bonds has the negative impact on yield spreads of corporate bonds. An increase in GDP also undermines yield spreads of corporate bonds. The conclusions echo the earlier findings on the Russian market [1]. As for the issuer's characteristics, the leverage ratio is seen to influence yield spreads pf corporate bonds positively, while the size of a company undercuts yield spreads of corporate bonds. Interest coverage has the negative

impact on yield spreads. As for characteristics of a certain issue of bonds, the longer the tenor of bonds, the less the yield spread. The issue size is another factor cutting yield spreads. The inverse USD exchange rate was discovered to have a positive effect on yield spreads. Furthermore, it is stronger for bonds issued by construction and development companies. Oil price is found to be influential for power engineering enterprises only. This is to emphasize that yield spreads vary across industries.

Having analyzed structural breakpoints, I discovered that the magnitude of certain variables changes over time. For instance, as the second model shows, the strongest effect of government bonds, oil price and default rate was captured only in the second period, third period and fourth period respectively.

Afterwards, I evaluated to what extent independent variables influence yield spreads in terms of economic significance. For this purposes, I assess how many base points the yield spread loses or gains if an independent variable demonstrates a standard deviation. The calculations are based on the following formula:

$$\beta \cdot \sigma \cdot 10\,000,$$

where $\beta$ is the coefficient of the variable (as per the model);

$\sigma$ is the value of one standard deviation of a variable.

The value of a standard deviation was taken as 1 for binary variables, thus reflecting the variance from 0 to 1). As for interaction variables, that is an ordinary variable times a binary variable, zero values were not taken into account to assess a standard deviation. The findings are given in *Table 2*.

As per *Table 2*, yield spreads depends most on a type of placement. In the case of confidential underwriting, the yield spread is lower by about ~300 base points. As for the issue of the first-tier organizer's bonds, the yield spread is lower by about ~100 base points. Yields on bonds pertaining to companies of the fifteenth sector (pulp, paper and wood processing) are lower by ~280 base points. The other industry-specific difference may arise from different economic periods companies choose to offer their securities. As ordinary variables show,

yield spreads of bonds mostly depend on the issuer's characteristics and issue of bonds. Global macroeconomic variables have a slightly weaker impact. Although the refinance rate reaches high values as per *Table 2*, they alone with the power function of the refinance rate partially offset one another. Their pure effect turns up to be about ~20 base points (or 224–204). As the second model shows, economic periods feature different global macroeconomic indicators that may be crucial in determining the yield spread. Nevertheless, this may be due to the fact that different types of companies choose different economic periods to offer their securities.

## Conclusions

In this article I investigated how different economic indicators influence yield spreads of the Russian ruble-denominated corporate bonds. The research draws upon data on the primary market of the Russian ruble-denominated corporate bonds. The sample covered the period from January 1, 2007 through December 31, 2016, focusing on bonds of the real economy only. The bonds of the real economy account for 29.19 percent and 40 percent of the total sample in terms of value and number of placements. The research produces two econometric models built by the least square method. The first model is not configured for structural (time) breakpoints. The second one is specifically designed for time breakpoints. Some variables were illustrated to have different effects depending on an economic period. The economic significance of various variables and their impact was also within the scope of this research. Variables of a specific issue and company have a greater impact on yield spreads than the other variables under study.

*Table 1*
**The main results**

| Variables | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | **Coefficient** | **se** | **Coefficient** | **se** |
| Refinance rate | 0.01635*** | [0.00596] | – | – |
| [Refinance rate] ^ 4 | −0.0000039** | [0.0000017] | – | – |
| Yields in the stock market | −0.03299** | [0.01549] | −0.05239*** | [0.01666] |
| Yield on government bonds | −0.19971** | [0.08352] | – | – |
| GDP | −0.02597** | [0.01082] | – | – |
| Leverage ratio | 0.00665** | [0.00291] | 0.00575** | [0.00285] |
| Size of company | −0.00149*** | [0.0005] | −0.00142*** | [0.00048] |
| Interest coverage | – | – | −0.00032** | [0.00014] |
| Maturity period | −0.00856*** | [0.00222] | −0.0103*** | [0.00202] |
| Issue size | −0.00349** | [0.00158] | – | – |
| Bookbuilding | −0.03599** | [0.01655] | −0.02997** | [0.01192] |
| Registration-exempt bonds | – | – | −0.00619** | [0.00256] |
| First-tier organizer | −0.00939*** | [0.00335] | −0.0103*** | [0.00314] |
| Inverse USD exchange rate | – | – | 0.70919*** | [0.16427] |
| Transport | 0.00782** | [0.00351] | – | – |
| Construction and development | 0.01636*** | [0.00372] | – | – |
| Light industry | −0.02417*** | [0.00394] | 0.03144*** | [0.00607] |
| Pulp, paper and wood processing industry | – | – | −0.03302*** | [0.00347] |
| [Oil price]* [Power engineering] | – | – | −0.00008*** | [0.00003] |
| [Inverse USD rate]* [Construction and development] | – | – | 0.42053*** | [0.11144] |
| [Yields of government bonds]* [Second period] | – | – | −0.32165*** | [0.09569] |
| [Default rate]* [Fourth period] | – | – | −6.86912*** | [2.14774] |
| [Oil price]* [Third period] | – | – | −0.00009*** | [0.00003] |
| Invariable | 0.06442 | [0.04781] | 0.08834*** | [0.01343] |
| Number of observations | 464 | – | 464 | – |
| *R*-squared | 0.41684 | – | 0.43583 | – |

\* $p < 0.1$
\*\* $p < 0.05$
\*\*\* $p < 0.01$

*Source:* Authoring

*Table 2*

**Susceptibility of the yield spread to changes in variables**

| Variables | Model 1 | Model 2 |
|---|---|---|
| **Ordinary variables** | | |
| Refinance rate | 224 | – |
| [Refinance rate] ^ 4 | –204 | – |
| Yields in the stock market | –31 | –49 |
| Yield on government bonds | –35 | – |
| GDP | –28 | – |
| Leverage ratio | 29 | 25 |
| Size of company | –47 | –45 |
| Interest coverage | – | –25 |
| Maturity period | –46 | –55 |
| Issue size | –42 | – |
| Inverse USD rate | – | 50 |
| **Binary variables** | | |
| Bookbuilding | –360 | –300 |
| Registration-exempt bonds | – | –62 |
| First-tier organizer | –94 | –103 |
| Transport | 78 | – |
| Construction and development | 164 | – |
| Light industry | – | 314 |
| Pulp, paper and wood processing industry | –242 | –330 |
| **Interaction variables** | | |
| [Oil prices] [Power engineering] | – | –21 |
| [Inverse USD rate] [Construction and development] | – | 30 |
| [Yield on government bonds] [Second period] | – | –54 |
| [Default rate] [Fourth period] | – | –51 |
| [Oil price] [Third period] | – | –16 |

*Note.* The table presents dynamics of yield spreads in base points when independent variables change: 1) by a standard deviation in the case of ordinary variables; 2) from 0 to 1 in the case of binary variables. When calculating standard deviations of interaction variables, zero values were omitted.
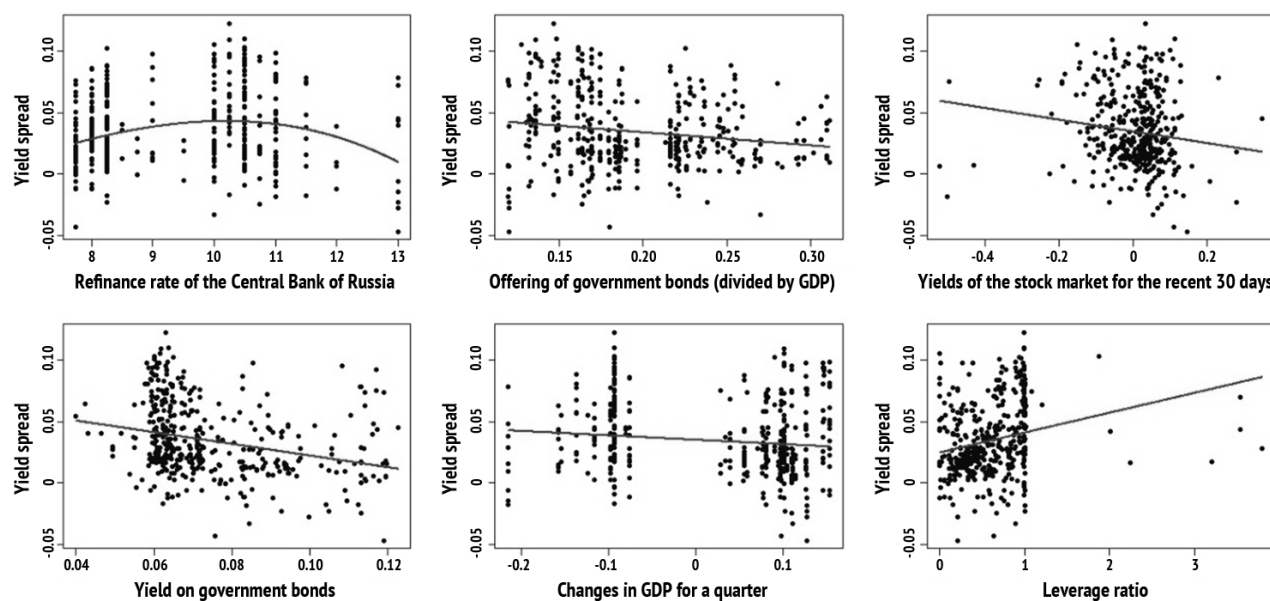
*Source:* Authoring

*Figure 1*
**MOEX Russia index chart**

**MOEX Russia index**



— MOEX Russia index

*Source:* Authoring based on the MOEX data

*Figure 2*
**Graphical analysis of the dependency of yield spread on variables: Refinance rate, offering of government bonds, stock market yield, government bond yield, quarterly changes in GDP, and leverage ratio**



*Source:* URL: http://ru.cbonds.info/ (In Russ.); http://spark-interfax.ru/ (In Russ.); https://www.moex.com/en/ (In Russ.); https://www.cbr.ru/ (In Russ.); http://www.gks.ru/ (In Russ.); https://www.bloomberg.com/professional/solution/bloomberg-terminal/
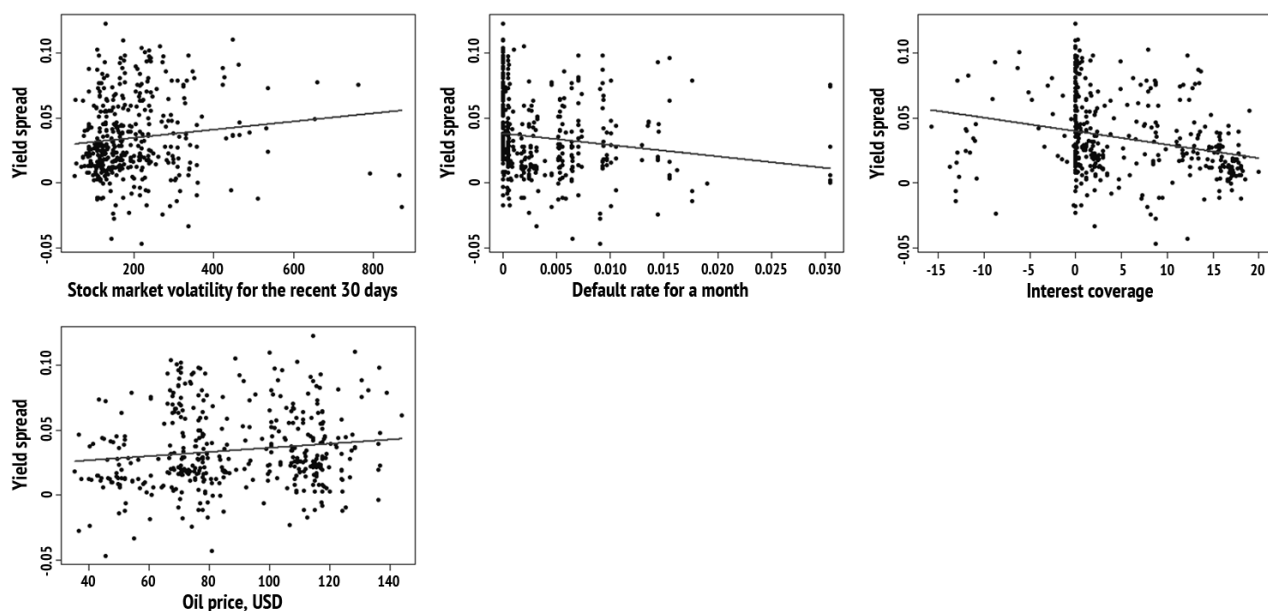
*Figure 3*
**Graphical analysis of the dependency of yield spread on variables: Company size, maturity period, issue size, coupon rate, inverse USD rate, and money supply change**
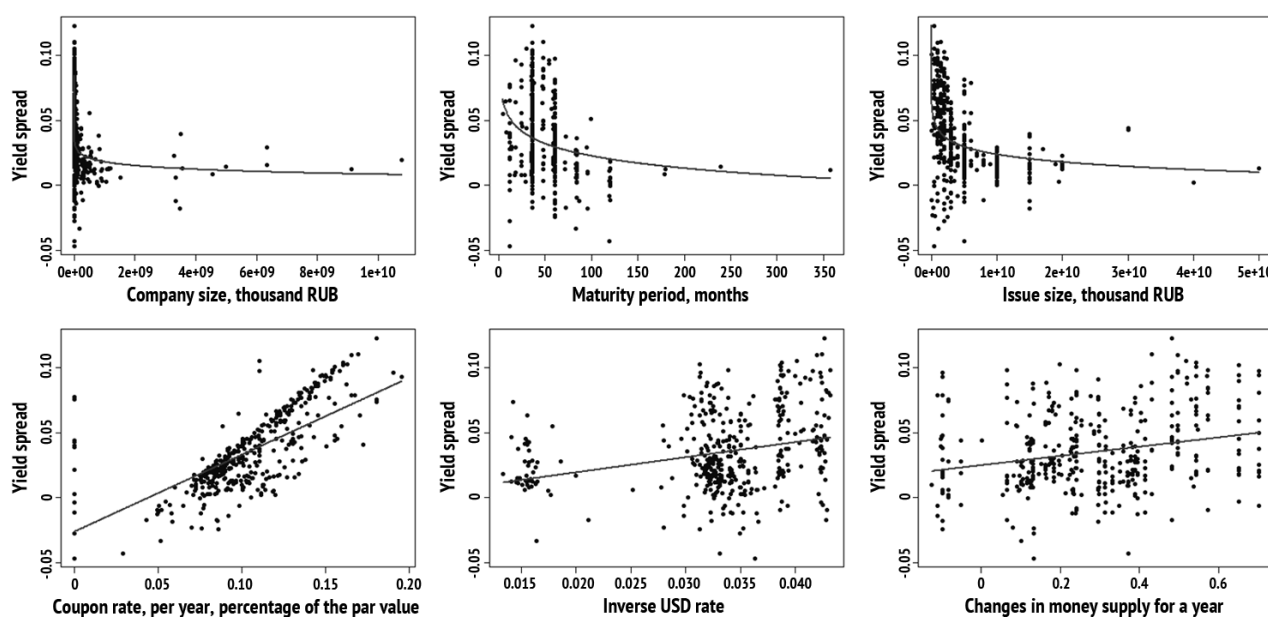
*Figure 4*
**Graphical analysis of the dependency of yield spread on variables: Stock market volatility, default rate, interest coverage, and oil price**

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Securities and Financial Markets

Translated Article[†]

# ASSESSMENT OF TIME EFFECTS IN BRICS MARKETS[*]

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**Abstract**

**Importance** This article considers and discusses the issues related to the determination of temporal effects on the securities markets of the BRICS nations.

**Objectives** The article aims to identify temporal effects on the stock markets of the BRICS countries, as well as determine the efficiency of these markets, and provide practical recommendations for increasing the yield of the securities portfolio.

**Methods** For the study, I used the regression and econometric analyses approaches applying the Microsoft Excel and Gretl software.

**Results** The article presents certain results of identification and evaluation of five temporal effects on the stock markets of the BRICS countries, as well as it determines the efficiency of these markets. Also, it submits practical recommendations to increase the yield of the investment portfolio. The revealed temporal effects testify to the inefficiency of the stock markets and assume the possibility to derive excess return if they are taken into account when building a trade strategy.

**Conclusions and Relevance** For a number of the indexes considered, temporal effects are typical. This contradicts the efficient-market hypothesis, according to which the financial asset quotes get formed independently, which does not allow to draw an excess yield.

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*Authorized translation by Andrey V. Bazhanov*

## Introduction

The leading hypothesis of pricing on stock markets is the *Efficient-Market Hypothesis* by Eugene F. Fama [1]. According to this hypothesis, there are three forms of market efficiency.

- *Weak Form Efficiency*. The value of the asset reflects all past information regarding the asset.

- *Semi-Strong Form Efficiency*. The value of the asset reflects past information plus all available public information.

- *Strong Form Efficiency*. The value of the asset reflects all the information: past, public, and the insider one.

Considering the given classification, it is clear that it is not possible to build a trading strategy with profitability surpassing the market profitability on the strong form securities market, as all information is already reflected in prices.

However, in practice, repeated quote movements were found, depending on a certain period of time, which were later called *Temporal Effects*. Their

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existence testifies to the weak form of the stock market efficiency, and it potentially allows to derive excess return.

This article discusses the five most common temporal effects: the *Day-of-the-Week effect*, *Turn-of-the-Month effect*, *Month-of-the-Year effect*, *Quarter-of-the-Year effect* (*Santa Claus rally effect*), and the *Quarter-End effect*.

The objective of deriving additional profits when setting-up the investment portfolio of securities is a priority for each portfolio manager. The trader builds a trading strategy taking into account his own idea of pricing on the securities market. Therefore, the issue of the possibility of using the knowledge obtained in the field of temporal effects to increase the overall portfolio yield without changing its risk is acute.

Moreover, in terms of expanding the area of scientific knowledge, a clear understanding of the temporal effects and their stability provides an opportunity to determine the market efficiency of each particular stock market.

Based on the results obtained, I am going to form an efficiency rating of the BRICS nations' stock markets. This will help expand the area of scientific knowledge, and it also makes possible to apply it in practice and theory terms in related areas.

## The Month-of-the-Year Effect Study Coverage

This article discusses the temporal effects that are attributed to the so-called cyclic class when the prices of financial assets depend on a certain period of time. In particular, the results are presented on the following:

• *Day-of-the-Week effect*. It indicates a dispersion of financial asset prices depending on the day of the week. The varieties of this effect are the *Monday effect* (securities market returns on Mondays are less than the other days of the week), the *Weekend effect* (stocks exhibit abnormally large returns at the end of the week), the *Friday effect* (stocks exhibit abnormally large returns on Fridays compared to those on the other days of the week), etc.

• *Turn-of-the-Month (TOM) effect*. According to this effect, it is revealed that the stocks returns in the last days of the month are higher than in the first days.

• *Month-of-the-Year effect*. It indicates a dispersion of financial asset prices depending on the month of the year. The most common type is the January effect, which suggests an abnormally high yield in January compared to other months.

• *Quarter-of-the-Year effect (Santa Claus rally effect)*. It indicates a dispersion of stocks returns depending on the quarter of the year. If the yield in the fourth quarter is higher than the yields in all the previous ones, the phenomenon is called the Santa Claus rally effect.

• *Quarter-End effect*. It indicates a dispersion of stocks returns within the quarter, namely, that the returns at the end of the quarter are higher than the other quarter periods.

The *Efficient-Market Hypothesis* is the object of great attention in the world scientific community, and it is fundamental in determining the fair value of assets. According to the theory by Louis Bachelier [2] underlying the definition of the three forms of market efficiency formulated by Eugene F. Fama, the prices get formed in much the same manner as random walking and take into account all the information available on the market.

In 1980, Kenneth R. French introduced the concept of *Monday effect* on the U.S. stock market for the first time, studying the Standard & Poor's 500 for the period from 1953 to 1977 (6,024 observations) [3].

He suggested that the stock returns, calculated on the basis of close-to-close prices, should stay consistent throughout all trading days of the week according to the price random-walk hypothesis. So two assumptions are made.

1. Stock returns are generated only during active trading and the expected return is the same for each day of the week.

2. It is necessary to take into account the weekend accumulated returns and respectively, the expected return for Monday should be three times the expected return for other days of the week.

However, the results obtained rejected both the assumptions. It turned out that the average stock

return for Monday was significantly negative. This phenomenon was called the *Monday effect*.

This finding evoked a wide response. R.J. Rogalski [4], L. Harris [5], R.A. Ariel [6], J. Lakonishok and S. Smidt [7], G.N. Pettengill and B.D. Jordan [8], K. Liano and J.T. Lindley [9], S.P. Keef and M.L. Roush [10] conduct additional studies, which confirm the inconsistency of returns depending on a certain period of time (day, week, month, year).

Moreover, similar temporal effects are found by J. Jaffe and R. Westerfield for the stock markets of Europe [11], R. Aggarwal and P. Rivoli for the stock markets of Asia [12], G.E. Marrett and A. Worthington for Australia [13], D. Mbululu and C. Chipeta for South Africa [14]. In Russia, the study of temporal effects was done by M. Kurashinov [15], C.B. McGowan and I. Ibrihim [16].

In addition, J.C. Singleton and J.R. Wingender confirm the existence of calendar anomalies for debt instruments [17], J.S. Thatcher and L.P. Blenman – for currencies markets [18], K. Liano, G.-C. Huang and B.E. Gup – for OTC markets [19], E.T. Johnston, W.A. Kracaw and J.J. McConnell – for derivatives markets [20], and A.L. Redman, H. Manakyan, K. Liano – for fiscal asset markets [21].

Different authors explain the reasons for the existence of temporal effects in the following way: R.W. Sias and L.T. Starks say of the irrational behavior of individual investors [22]; A. Abraham and D.L. Ikenberry say of the stock market freeze [23]; A. Damodaran says of the non-uniform spread of information releases [24]; G.N. Pettengill, J.R. Wingender and R. Kohli say of the microeffects [25]; and G.N. Pettengill says of the psycho-behavioral models of actions of individual investors [26].

A number of publications are considering the possibility of deriving excess return from temporal effects, such as the articles by E.H. Chow, P. Hsiao and M.E. Solt [27], and E.M. Miller, L.J. Prather and M.I. Mazumder [28].

However, there are no studies on the cross-country analysis of temporal effects on the stock markets of the BRICS nations. Neither there is any BRICS stock exchange efficiency rating on the basis of the obtained results.

## The Investigated Data

As the data for study, we take the values of the indexes of IBOV, MICEX, RTS, SENSEX, NIFTY, HSI, SHCOMP, and TOP40, which are the major market ones for the Brazilian Stock Exchange (BM & FBOVESPA), the Russian Exchange (PAO Moskovskaya Birzha – Moscow Exchange), Bombay Stock Exchange Ltd. (BSE), National Stock Exchange of India Limited (NSE), Hong Kong Exchanges and Clearing Limited (HKEx), Shanghai Stock Exchange (SSE), and the Johannesburg Stock Exchange Limited (JSE Limited). Thus, all the stock markets of the BRICS nations are under consideration.

Simultaneous considering of several trading floors within the framework of portfolio set-up helps diversify risk, and also take into account the peculiarities of formation of the Turn-of-the-Month effect for each particular country.

In order to determine the stability of the considered temporal effect for each country, the total sample is divided into five-year sub-periods. All the data taken cover the period from the beginning of data publication till June 30, 2015. *Fig. 1* shows the periods of study of each particular index as a time axis.

## The Research Methodology

The GARCH (1,1) model (which stands for *Generalized Autoregressive Conditional Heteroscedasticity*), first developed by Tim Bollerslev (1986)[1], is used as the principal one. It helps determine temporal effects and take into account autocorrelation and heteroscedasticity peculiar for time series of stock indexes.

Using the other two models with conditional heteroscedasticity GRJ-GARCH (or TGARCH) developed by Lawrence R. Glosten, Ravi Jagannathan and David E. Runkle[2], and EGARCH developed by Daniel B. Nelson[3] is inexpedient, as it was confirmed

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by Elena A. Fedorova and Evgenii V. Gilenko [29], because the factors that are responsible for the effect of negative values of the previous series are insignificant.

The index yield is a dependent variable, which gets calculated by the following formula

$$R_t = \ln\left(I_t / I_{t-1}\right) \cdot 100,$$

where $R_t$ is the index yield on day t, calculated as a yield in logarithmic form from the previous trading day closing to the current trading day closing;

$I_t$ is the $I$-index value at-the-close of day $t$;

$I_{t-1}$ is the $I$-index value at-the-close of day $t - 1$.

When considering the *Day-of-the-Week effect*, the values of daily yields are used as independent variables.

$$R_t = D_{Mo} R_{Mo} + D_{Tu} R_{Tu} + D_{We} R_{We} + D_{Th} R_{Th} + \\ + D_{Fr} R_{Fr} + \varphi R_{(t-1)} + \epsilon_t,$$

where $D_{Mo}...D_{Fr}$ is the daily dummy variable equal to 1, if the day falls on the studied day, and 0, if otherwise;

$R_{Mo}...R_{Fr}$ are the regression coefficients;

$R_{t-1}$ is the index yield on the previous trading day;

$\varphi$ is the time series autocorrelation factor.

The model removes the constant in order to avoid full multicollinearity, for if maintaining it, the sum of the dummy variables would be equal to the constant. That would be a question of linear dependence of regressors.

The hypothesis on equality of coefficients on each day of the week is tested (constant return is independent from the day of the week).

When considering the *Turn-of-the-Month effect*, the values of yields of the first and last nine trading days of the month are used as independent variables.

$$R_t = const + D_1 R_1 + D_2 R_2 + D_3 R_3 + D_4 R_4 + D_5 R_5 + \\ + D_6 R_6 + D_7 R_7 + D_8 R_8 + D_9 R_9 + D_{-9} R_{-9} + \\ + D_{-8} R_{-8} + D_{-7} R_{-7} + D_{-6} R_{-6} + D_{-5} R_{-5} + \\ + D_{-4} R_{-4} + D_{-3} R_{-3} + D_{-2} R_{-2} + D_{-1} R_{-1} + \epsilon_t,$$

where $D_1...D_9$ is the first-to-ninth-trading-day-at-the-beginning-of-the-month dummy variable equal to 1, if the day falls on the studied day, and 0, if otherwise;

$D_{-9}...D_{-1}$ is the ninth-to-first-trading-day-at-the-end-of-the-month dummy variable equal to 1, if the day falls on the studied day, and 0, if otherwise;

$R_1...R_{-1}$ are the regression coefficients.

If the null hypothesis on equality of coefficients regardless of the beginning or end of the month is rejected, then there is a yield dispersion, which indicates the existence of the Turn-of-the-Month effect.

The GARCH model for determining the *Month-of-the-Year effect* is as follows:

$$R_t = D_{Jan} R_{Jan} + D_{Feb} R_{Feb} + D_{Mar} R_{Mar} + \\ + D_{Apr} R_{Apr} + D_{May} R_{May} + D_{Jun} R_{Jul} + \\ + D_{Aug} R_{Aug} + D_{Sep} R_{Sep} + D_{Oct} R_{Oct} + \\ + D_{Nov} R_{Nov} + D_{Dec} R_{Dec} + \epsilon_t,$$

where $D_{Jan}...D_{Dec}$ is the dummy variable equal to 1, if the yield on the studied day falls on a certain month of the year, and 0, if otherwise;

$R_{Jan}...R_{Dec}$ are the regression coefficients.

The constant is also removed in the model. If the null hypothesis on equality of regression coefficients deviates in each of the months, the existence of the Month-of-the-Year effect can be asserted.

When considering the *Santa Claus rally effect*, the values of yields of one of the quarters of the year are used as independent variables.

$$R_t = D_{Q1} R_{Q1} + D_{Q2} R_{Q2} + D_{Q3} R_{Q3} + \\ + D_{Q4} R_{Q4} + \epsilon_t,$$

where $D_{Q1}...D_{Q4}$ is the dummy variable equal to 1, if the yield on the studied day falls on a certain quarter of the year, and 0, if otherwise;

$R_{Q1}...R_{Q4}$ are the regression coefficients.

The null hypothesis on equality of coefficients (constant return is independent from the quarter of the year).

When considering the *Quarter-End effect*, the values of yields of one of the six periods of the quarter (two periods per month) are used as independent variables. This can be presented as follows:

$$R_t = D_{P1} R_{P1} + D_{P2} R_{P2} + D_{P3} R_{P3} + D_{P4} R_{P4} + \\ + D_{P5} R_{P5} + D_{P6} R_{P6} + \epsilon_t,$$

where $D_{P1}...D_{P6}$ is the one-of-the-six-periods-of-the-quarter dummy variable equal to 1, if the day yield falls on the studied period, and 0, if otherwise;

$R_{P1}...R_{P6}$ are the regression coefficients.

If the null hypothesis on equality of coefficients is rejected, then there is a yield dispersion in each particular period of the quarter. This indicates the existence of the temporal effect within the quarter.

Thus, based on the collected information and to estimate each of the five temporal effects, I have constructed a unique econometric model for each of the considered calendar anomalies. The consistency of temporal effects is assessed for both the total sample and the five-year sub-periods.

## The Research Findings and the Interpretation

The results of estimation of the *Day-of-the-Week*, *Turn-of-the-Month*, *Month-of-the-Year*, *Quarter-of-the-Year effect* (*Santa Claus rally*), and the *Quarter-End effects* for the maximum period of each of the indexes are presented in *Table 1*.

The IBOV index of the Brazilian Stock Exchange (BM & FBOVESPA) is characterized by the Weekend effect, the reverse Turn-of-the-Month effect, and the January effect.

In Russia, the Moscow Exchange MICEX index shows the Weekend effect, the reverse Turn-of-the-Month effect, the Santa Claus rally effect, and the reverse Quarter-End effect. The RTS index with regard to the MICEX index additionally shows the February effect, but it shows no Santa Claus rally effect.

The indexes of the two stock exchanges are also considered in India. The SENSEX index of the Bombay Stock Exchange (BSE) shows the Weekend and Turn-of-the-Month effects. The National Stock Exchange of India Limited (NSE) NIFTY index shows the reverse Wednesday effect, the Santa Claus rally effect, and the Quarter-End effect.

The Hong Kong Exchanges and Clearing Limited HSI index shows the Weekend, Santa Claus rally, and the reverse Quarter-End effects. The Shanghai Stock Exchange SHCOMP index shows the reverse Monday effect, Thursday effect, the reverse Turn-of-the-Month effect, and the reverse Quarter-End effect.

The Johannesburg Stock Exchange Limited TOP 40 index is the final one in the list to consider. This stock market shows all the studied temporal effects, namely the reverse effects of Thursday, Turn-of-the-Month, December effects, Santa Claus rally effects, and the reverse Quarter-End effects.

Based on the results obtained, *Table 2* presents a roadmap of the BRICS countries' temporal effects. Due to transaction costs, deriving excess returns is unlikely, but *ceteris paribus*, it is necessary to use the findings when making trade decisions.

The information provided helps draw conclusions and develop an efficiency rating of the BRICS markets, taking into account the assumption about the dependence of the number of revealed temporal effects on the form of their efficiency:

- SENSEX index: Two temporal effects;

- IBOV, NIFTY, HSI, SHCOMP indexes: Three temporal effects per each;

- MICEX and RTS indexes: Four temporal effects per each;

- TOP 40 index: Five temporal effects.

## Conclusion

The article achieved the main objective in the form of the results of the cross-country analysis of temporal effects on the stock markets of the BRICS nations. As well, it determines the forms of efficiency of the markets under consideration and raises an issue of opportunities to increase the investment portfolio yield.

The objects of the study were the Russian Exchange (PAO Moskovskaya Birzha – Moscow Exchange), Brazilian Stock Exchange (BM & FBOVESPA), Bombay Stock Exchange Ltd. (BSE), National Stock Exchange of India Limited (NSE), Hong Kong Exchanges and Clearing Limited (HKEx), Shanghai Stock Exchange (SSE), and the Johannesburg Stock Exchange Limited (JSE Limited).

To achieve the objective, the results obtained earlier on the *Day-of-the-Week*, *Turn-of-the-Month*, *Month-of-the-Year*, *Quarter-of-the-Year effect* (*Santa Claus rally*), and the *Quarter-End effects* were summarized. The possible causes of temporal effects were also considered.

Based on the collected information and to estimate each of the five temporal effects, I have constructed a unique econometric model for each of the considered calendar anomalies. The consistency of temporal effects is assessed for both the total sample and the five-year sub-periods. In order to provide certain recommendations to increase the investment portfolio yield in each country, it is necessary to take into consideration the revealed temporal effects in each of them.

According to the efficient-market concept, all factors are taken into account in the stock prices, therefore deriving excess returns is impossible, and the pricing is completely described by the risk-yield relationship function.

However, the detected temporal effects testify to the inefficiency of stock markets and suggest the possibility to derive excess returns, considering the temporal effects when developing a trade strategy.

It should be borne in mind that a calendar anomaly can only be considered detected if it is consistent and capable of generating excess returns with consideration for transaction costs.

Thus, it is highly likely that an investment strategy based only on yield from temporal effects can not be built, due to transaction costs.

However, taking into account a particular calendar anomaly with all other things being equal will reduce the likelihood of a failed exchange purchase associated with a particular time period.

*Table 1*

**Evaluation of temporal effects of the BRICS countries**

| Index | IBOV | RTS | MICEX | SENSEX | NIFTY | HSI | SHCOM | TOP 40 |
|---|---|---|---|---|---|---|---|---|
| **1. Day-of-the-Week effect** | | | | | | | | |
| Monday | −0.03 | 0.13*** | 0.13** | 0.06** | 0.05 | 0.02 | 0.07* | 0.11*** |
| Tuesday | 0.05 | 0.04 | 0.06 | 0.01 | 0.01 | 0.06** | 0.04 | 0.05 |
| Wednesday | 0.22*** | 0.05 | 0.03 | 0.08** | 0.18*** | 0.11*** | 0.08** | 0.02 |
| Thursday | 0.21*** | 0.19*** | 0.16*** | 0.06* | 0.06 | 0.07*** | −0.07** | 0.12*** |
| Friday | 0.27*** | 0.15*** | 0.2*** | 0.12*** | 0.09** | 0.15*** | 0.17*** | 0.05 |
| j | 0.15*** | 0.1*** | 0.03** | 0.1*** | 0.08*** | 0.09*** | 0.07*** | 0.01 |
| **2. Turn-of-the-Month effect** | | | | | | | | |
| *Const* | 0.148*** | 0.069 | 0.045 | 0.068 | 0.083* | 0,094*** | −0,034 | 0,13*** |
| 1 | 0.281*** | 0.423*** | 0.443*** | 0.221*** | 0.2002** | 0.1102* | 0.275*** | 0.434*** |
| 2 | 0.197** | 0.319** | 0.324** | 0.092 | 0.067 | 0.158*** | 0.216** | −0.1506 |
| 3 | 0.034 | 0.103 | 0.047 | −0.021 | 0.006 | 0.041 | 0.192** | −0.135 |
| 4 | −0.025 | 0.304** | 0.274** | 0.068 | 0.085 | 0.056 | 0.095 | −0.027 |
| 5 | 0.183** | 0.124 | 0.204 | −0.035 | −0.025 | −0.0502 | 0.214** | −0.092 |
| 6 | −0.162** | 0.029 | 0.025 | −0.007 | −0.029 | −0.042 | 0.113 | −0.077 |
| 7 | −0.051 | −0.006 | −0.066 | −0.012 | −0.129 | −0.063 | 0.031 | −0.025 |
| 8 | −0.033 | −0.286** | −0.327** | 0.007 | −0.006 | −0.094 | 0.05 | −0.066 |
| 9 | 0.023 | 0.265* | 0.307** | −0.088 | −0.064 | −0.009 | 0.023 | −0.099 |
| −9 | 0.028 | 0.072 | 0.024 | 0.052 | −0.021 | −0.104* | 0.168* | 0.075 |
| −8 | 0.029 | 0.082 | −0.026 | −0.033 | −0.008 | −0.017 | 0.106 | 0.039 |
| −7 | 0.029 | −0.0007 | 0.038 | −0.099 | −0.085 | −0.004 | 0.0209 | −0.117 |
| −6 | −0.024 | −0.0206 | −0.077 | −0.139* | −0.181** | −0.074 | 0.226*** | −0.177** |
| −5 | −0.166** | 0.038 | 0.134 | 0.0106 | 0.032 | −0.0501 | −0.112 | −0.172** |
| −4 | −0.1506* | −0.122 | −0.105 | −0.002 | −0.011 | −0.053 | −0.012 | −0.139 |
| −3 | 0.114 | −0.024 | 0.061 | −0.098 | −0.127 | −0.015 | 0.176** | −0.152 |
| −2 | 0.076 | −0.035 | 0.117 | 0.076 | 0.134 | 0.005 | 0.023 | −0.1108 |
| −1 | 0.079 | 0.121 | 0.254* | 0.261*** | 0.243 | 0.189*** | 0.189** | −0.084 |
| **3. Month-of-the-Year effect** | | | | | | | | |
| January | 0.287*** | 0.161* | 0.186** | 0.019 | 0.007 | 0.14*** | 0.096 | 0.07 |
| February | 0.253*** | 0.347*** | 0.376*** | 0.066 | 0.065 | 0.097** | 0.152** | 0.078 |
| March | 0.15*** | 0.035 | 0.013 | 0.024 | 0.0601 | −0.049 | −0.001 | 0.007 |
| April | 0.227*** | 0.102 | 0.063 | 0.044 | 0.015 | 0.1608** | 0.049 | 0.015 |
| May | 0.228*** | 0.007 | 0.032 | 0.087 | 0.098 | 0.097** | 0.089 | 0.079 |
| June | 0.058 | 0.148 | 0.103 | 0.154*** | 0.153*** | 0.042 | 0.007 | −0.011 |
| July | 0.152*** | 0.078 | 0.037 | 0.058 | 0.015 | 0.162*** | 0.0104 | 0.125** |
| August | 0.2*** | 0.154* | 0.111 | 0.081 | 0.059 | −0.011 | 0.058 | 0.087 |
| September | 0.223*** | 0.10005 | 0.109 | 0.15*** | 0.158** | 0.0405 | −0.023 | 0.126* |
| October | 0.042 | 0.202* | 0.235*** | 0.042 | 0.088 | 0.205*** | 0.1101* | 0.122** |
| November | 0.032 | 0.071 | 0.073 | 0.107** | 0.168*** | 0.112*** | 0.127** | 0.07 |
| December | 0.169*** | 0.165* | 0.161 | 0.119** | 0.16*** | 0.113*** | 0.137** | 0.156** |

\* Significance level: 10%

\*\* Significance level: 5%

\*\*\* Significance level: 1%.

*Source:* Authoring

*Table 2*

**The roadmap of time effects of the BRICS countries**

| Index | IBOV | MICEX | RTS | SENSEX |
|---|---|---|---|---|
| Day-of-the-Week effect | – Monday effect (Not observed in recent years); <br> – Weekend effect | Weekend effect | Weekend effect | Weekend effect |
| Turn-of-the-Month effect | Reverse Turn-of-the-Month effect | Reverse Turn-of-the-Month effect | Reverse Turn-of-the-Month effect | Turn-of-the-Month effect |
| Month-of-the-Year effect | January effect | Not observed | February effect | Not observed |
| Quarter-of-the-Year effect (Santa Claus rally effect) | Not observed | Santa Claus rally effect | Not observed | Not observed |
| Quarter-End effect | Not observed | Reverse Quarter-End effect | Reverse Quarter-End effect | Not observed |
| *Total...* | *3* | *4* | *4* | *2* |

*Continued*

| Index | NIFTY | HSI | SHCOM | TOP 40 |
|---|---|---|---|---|
| Day-of-the-Week effect | Reverse Wednesday effect | Weekend effect | – Reverse Monday effect; <br> – Thursday effect | Reverse Thursday effect |
| Turn-of-the-Month effect | Not observed | Not observed | Reverse Turn-of-the-Month effect | Reverse Turn-of-the-Month effect |
| Month-of-the-Year effect | Not observed | Not observed | Not observed | December effect |
| Quarter-of-the-Year effect (Santa Claus rally effect) | Santa Claus rally effect | Santa Claus rally effect | Not observed | Santa Claus rally effect |
| Quarter-End effect | Quarter-End effect | Reverse Quarter-End effect | Reverse Quarter-End effect | Reverse Quarter-End effect |
| *Total...* | *3* | *3* | *3* | *5* |

*Source:* Authoring

*Figure 1*
**BRICS Index Review Periods, 1965–2016**
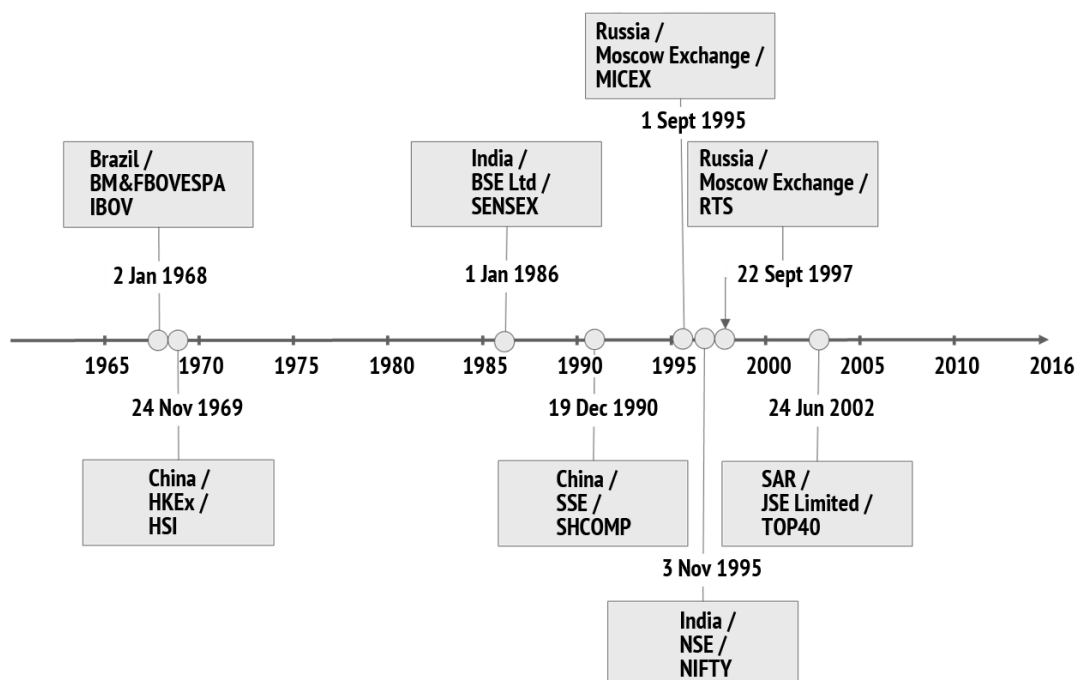


*Source:* Authoring

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## Conflict-of-interest notification

I, the author of this article, bindingly and explicitly declare of the partial and total lack of actual or potential conflict of interest with any other third party whatsoever, which may arise as a result of the publication of this article. This statement relates to the study, data collection and interpretation, writing and preparation of the article, and the decision to submit the manuscript for publication.