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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.

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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.

[†]For the source article, please refer to: Султанов И.Р. Анализ влияния различных экономических показателей на спреды доходности российских рублевых корпоративных облигаций. *Финансы и кредит*. 2018. Т. 24. № 7. С. 1669–1688.
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[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/

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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

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

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.

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

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:

$$\frac{(P_t - P_{t-30})}{P_{t-30}}, \quad (3)$$

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:

$$s_t \cdot \sqrt{12}, \quad (4)$$

where $s_t = \sqrt{\frac{1}{29}\sum_{i=1}^{30}(P_{t-i} - \overline{P_{i-i}})^2}$;

$$\overline{P_t} = \frac{\sum_{j=1}^{30} P_{t-j}}{30}.$$

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 $\frac{D_t}{B_t}$, 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.-

[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.)

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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 $\frac{EBIT}{NetInterest}$, 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 $IC = \ln(C_0) - \ln(C_1)$, 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

[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.)

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).

[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.
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[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.
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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

[7] Ibid.

[8] Ibid.

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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 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

[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.
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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 β is the coefficient of the variable (as per the model);

σ 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,

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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.

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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

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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

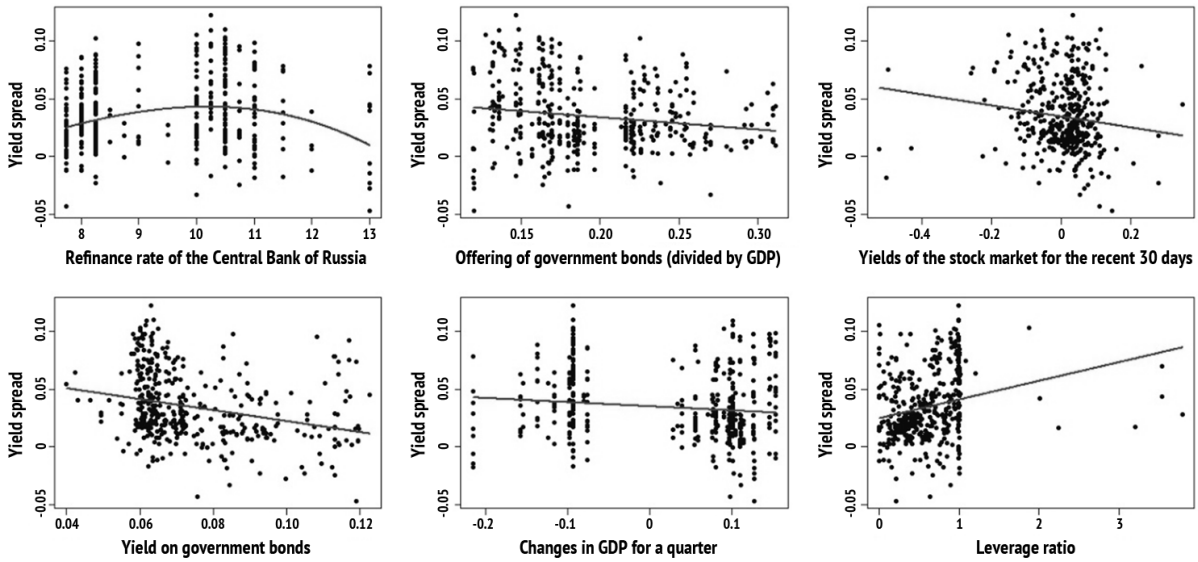
Note. The table presents dynamics of yield spreads in base points when independent variables change: 1) by a standard deviation in the case of ordinary variables; 2) from 0 to 1 in the case of binary variables. When calculating standard deviations of interaction variables, zero values were omitted.

Source: Authoring

Figure 1
MOEX Russia index chart

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/

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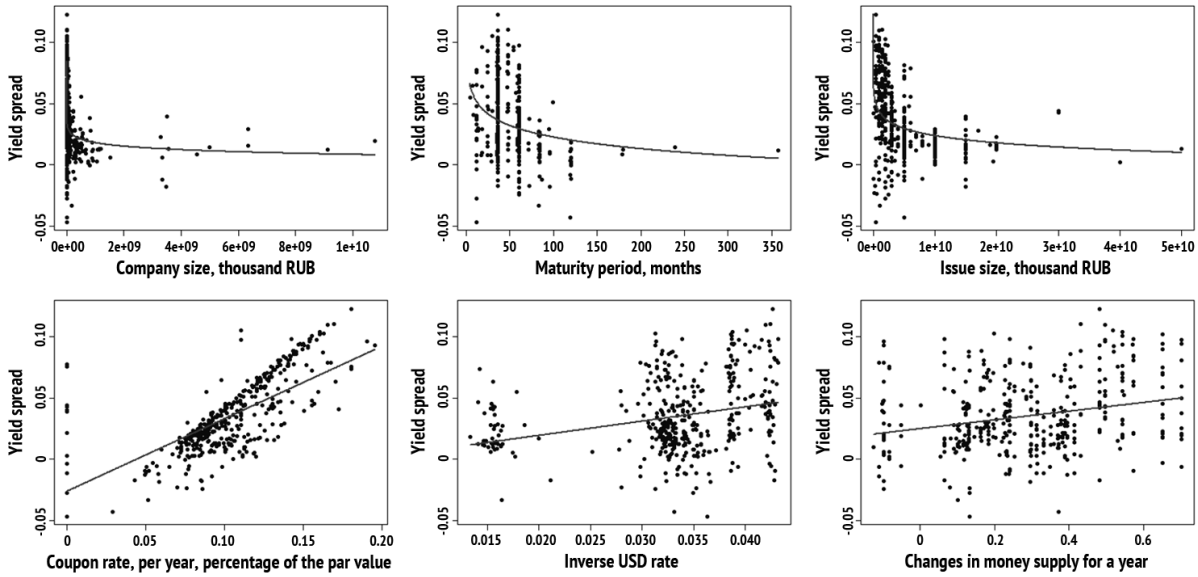
Figure 3

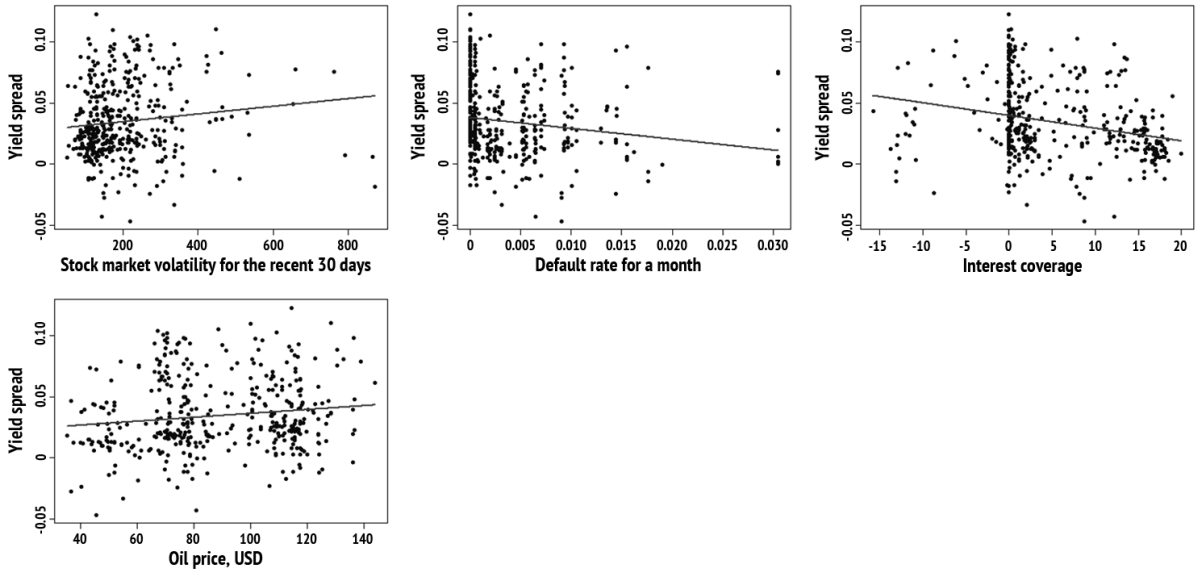
Graphical analysis of the dependency of yield spread on variables: Company size, maturity period, issue size, coupon rate, inverse USD rate, and money supply change



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 4

Graphical analysis of the dependency of yield spread on variables: Stock market volatility, default rate, interest coverage, and oil price



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/

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