

## MUNICIPAL BONDS AT BUCHAREST STOCK EXCHANGE: WHAT THE CORRELATIONS ARE REVEALING?

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**ABSTRACT.** As highlighted by Pop & Georgescu (2024), the Romanian academic literature concerning municipal bonds is sparse, while the investigations regarding the factors that can influence the sub-sovereign bond trading at Bucharest Stock Exchange is quasi non-existent, to the best of authors' knowledge.

The present paper continues the work of Pop & Georgescu (2024) by trying to identify which of the public available information regarding various interest rates and Bucharest Stock Exchange (henceforth BVB) indices returns influence the trading activity of municipal bond market segment.

The correlations presented within this paper imply that the modest profile of municipal bond segment at BVB is related to a relative small number of individual investors that dominate the transactions, using mostly observed data to decided when to trade and what to trade. The scarce correlations that appear in relation with the trading volume and trading value point toward the idea that only a small portion of the listed municipal bonds are owned by individual investors.

**Key words:** municipal bond, Romania, correlations

**JEL Classification:** G12

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## **Introduction and a brief literature review**

During the past two decades, the decentralization process that occurred in numerous emerging and frontier economies contributed to the increase of fiscal capabilities for sub-sovereign governments (Mendoza-Velazquez et al., 2023). Therefore, the local (sub-sovereign) administrations and entities garnered access to more diversified and sophisticated debt markets for financing their needs – mainly infrastructure and various other public investments (Bethlendi et al., 2020).

As the recent work of Hutahayan et al. (2023) shows regarding the municipal bond academic literature, USA authors are the most prolific and USA is the most cited country, proving the concentration of most published works concerning sub-sovereign bonds around US market, considered one of the largest in the world with over 50,000 issuers (Bessembinder et al., 2020). Nonetheless, the literature on municipal bonds issued within European Union (EU) is slowly growing (Hutahayan et al., 2023; Pop & Georgescu, 2024). The recent work of Ioannou (2023) presents the Euro-zone notable domestic diversity, based on the analysis of 58 regional and municipal governments under scrutiny.

As highlighted by Pop & Georgescu (2024), the Romanian academic literature concerning municipal bonds is sparse, while the investigations regarding the factors that can influence the sub-sovereign bond trading at Bucharest Stock Exchange is quasi non-existent, to the best of authors' knowledge.

The present paper continues the work of Pop & Georgescu (2024) by trying to identify which of the public available information regarding various interest rates and Bucharest Stock Exchange (henceforth BVB) indices returns influence the trading activity of municipal bond market segment. This paper is concentrating only on the correlations as a first step for a more in-depth analysis. The main research question is: how correlated is the municipal bond trading activity with the public information available regarding various interest rates and indices returns? A secondary research question emerged: how correlated is the municipal bond trading activity with the information that can be derived from the public available information?

To the best of authors' knowledge, no such analysis was performed for Romanian sub-sovereign bonds. Therefore, the paper contributes to the existing knowledge about Romanian municipal bond trading by revealing these correlations.

## **A brief update of municipal bond sector at BVB for 2023**

The data and information presented by Pop & Georgescu (2024) for the period 2001-2022 are here updated for 2023.

Three private municipal bond offerings were registered through BVB system: a) one for the bonds issued by the municipality of Bucharest (PMB30), with the maturity in 2030; this issue was registered in April 2023; b) one for the bonds issued by municipality of Resita, the county residence for Caras-Severin, registered in November 2023 (RES33E); and c) one for the bonds issued by the county of Cluj, registered in December 2023 (CJC33E). The premiere here is represented by the last two municipal bond issues that were denominated in Euros (EUR), can be traded and settled in the same currency. While for corporate segment bonds denominated EUR are available since 2017, and for Treasury segment EUR denominated bonds were introduced in 2020, the municipal bond segment lagged behind until 2023. The last two issues, RES33E and CJC33E have the maturity in 2033 and were listed starting with the first quarter of 2024.

Only one new municipal bond was listed, increasing the number of listed municipal bonds to 35 at the end of 2023. No municipal bond matured during 2023. The new municipal bond listed was the one issued by the municipality of Bucharest, PMB30. PMB30 bonds have the nominal (face) value of RON 10,000 and have a fixed interest rate. Therefore, the structures presented by Pop & Georgescu (2024) in the figures 16.9 to 16.15 are not significantly changed.

The trading activity involved 16 of the listed issues, similar to 2022, recorded an increase in number of trades by 2.7 times compared with 2022, an increase in trading volume by 1.5 times compared with 2022, but the turnover (trading value) was only 40% of the 2022 turnover. Municipal bond trading value represented only 1.31% of the bond market segment in 2023, and 8.22% of total bond offerings at BVB. Therefore, no important changes occurred within the municipal bond segment trading at BVB during 2023.

## **Data and methodology**

The data for this paper are secondary data and were extracted from publicly available sources: BVB, Romanian National Bank (RNB), and the Ministry of Finance (MoF).

Given the fact that municipal bond segment at BVB does not registered transactions every day and only some of the bond are traded, for the present paper the monthly trading activity was used. Another motive for the use of monthly transaction data is given by the fact that an important amount of information regarding various interest rates, that can be linked to municipal bond trading, are reported monthly.

In order to capture the trading activity of municipal bond segment at BVB, the following six variables were considered (note that BVB municipal bond sector does not have a dedicated index):

a) frequency (the % of trading days within a month), calculated as the ration between the days when trading occurred and the total number of trading days within a month; the data were extracted from BVB daily reports.

b) number of trades for each month, based on data extracted from BVB daily reports.

c) volume (number of traded bonds) for each month, based on data extracted from BVB daily reports.

d) value, in Romanian lei (RON), for each month, based on data extracted from BVB daily reports.

e) percent of traded issues is the ratio calculated between the number of municipal issues for each trading occurred and the total number of listed issues; based on data extracted from BVB daily reports.

f) liquidity based on volume (in percent); this ratio was calculated between the traded volume and the total outstanding volume for municipal bonds for each month; since the majority of listed municipal bonds (68 of 75) were amortized bonds, the liquidity based on value was too difficult to compute and the liquidity based on volume was chosen instead.

Two periods were considered: a) Nov.2001 to Dec.2023, the entire period of municipal bond segment existence; and b) July 2007 to Dec.2023 the period for which the Ministry of Finance made available the yield curves for Treasury bills and bonds.

The following interest rates and index returns were taken into consideration as potential influencing factors for municipal bond trading, for both periods:

1. the monthly average of listed bond interest rate, calculated based on BVB data for the outstanding bonds.

2. the monthly inflation rate (annualized) as reported by RNB in monthly bulletins.

3. the inter-bank interest rates ROBID – ROBOR provided by RNB via its interactive data base (<https://www.bnr.ro/Baza-de-date-interactiva-604.aspx>), where the data are reported daily. The monthly average was calculated for: 3.1. ROBID overnight and ROBOR overnight (as proxy for very short term decisions); 3.2. ROBID for 3 months (ROBID 3M) and ROBOR for 3 months (ROBOR 3M); 3.3. ROBID for 6 months (ROBID 6M) and ROBOR for 6 months (ROBOR 6M); 3.4. ROBID for 12 months (ROBID 12M) and ROBOR for 12 months (ROBOR 12M) as a proxy for 1 year horizon decisions; 3.5. the simple average for ROBID 3M

and ROBOR 3M due to the fact that this average is the base for calculating the interest rate of 37 municipal bond issues; 3.6. the simple average for ROBID 6M and ROBOR 6M due to the fact that this average is the base for calculating the interest rate of 22 municipal bond issues.

4. the credit interest rate for non-banking clients as reported by RNB in monthly bulletins.

5. the savings interest rate for non-banking clients as reported by RNB in monthly bulletins.

6. the T-bills average yield as reported by RNB in monthly bulletins; these instruments are discounted T-bills.

7. the T-bonds average interest rate as reported by RNB in monthly bulletins.

8. the annualized monthly returns for the following indices reported by BVB: BET index, BET-C/Plus index, and BET-Fi index. BET (Bucharest Exchange Trading) is the oldest BVB index including in its portfolio the best companies; BET-C/Plus is the former BET-Composite index, currently BET-Plus; it used to include almost all BVB companies; currently is the index with the largest portfolio of companies listed at BVB; BET-Fi or BET-Financial is a sector index that comprises the 6 closed-end funds listed on BVB main market.

For the period July 2007 – Dec.2023, the following new series of data were added:

9. The yields for <1year, 3 years, 5 years, and 10 years as reported within the monthly reports of MoF

10. the annualized monthly returns for the following indices reported by BVB: ROTX, and index developed by BVB and Wiener Borse AG, reflecting the BVB blue chips and serving as underlying asset for various derivatives at Vienna Stock Exchange; BET-XT or BET extended which is a combination between BET and BET-Fi index; and BET-NG a sector index dedicated to the companies related to the energy sector. This 3 indices were all launched after February 2005.

For both periods the following premiums were calculated:

i) the premium (+/-) of average interest rate of municipal bonds over all the other inflation, interest rates, and returns presented above.

ii) the premium (+/-) of all the considered interest rates over the monthly inflation rate; the monthly inflation rate was used as a proxy for a reference interest rate.

iii) the premium (+/-) of all the considered interest rates over T-bills average yield; the T-bills average yield was used as a proxy for the risk-free rate.

For the period July 2007 – Dec.2003 a fourth premium was introduced: iv) the premium (+/-) of all the considered interest rates over the yield for <1 year; the yield for <1 year maturities was also used as a proxy for the risk free rate. It must be specify that since July 2007 when MoF started reporting this yield, no yield for 3 months was announced.

For both periods, the monthly variations (expressed in percentages) of all the series were also calculated.

The descriptive statistics for the data series are available in Annex 1.

The correlation coefficients were calculated using JASP program. For the significant correlation coefficients the following degrees of strength (see Table 1) would be used within this paper.

Table 1. Degrees of strength for significant correlation coefficients

Correlation intervals	Degree of strength
Between -0.199 and 0 & 0 and +0.199	Very weak
Between -0.349 and -0.200 & +0.200 and +0.349	Weak
Between -0.499 and -0.350 & +0.350 and +0.499	Weak to moderate
Between -0.650 and -0.500 & +0.500 and +0.650	Moderate

Source: authors compilation

## Findings and discussions

### *Period Nov.2001 to Dec.2023*

Table 2, below, presents the significant correlation coefficients at a confidence level of 95% and down to 90%.

**Table 2.** The correlation coefficients for the municipal bond segment trading activity (observed values) between Nov.2001 and Dec.2023

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
<b>Observed data series</b>						
Listed muni.bonds average interest rate p-value	-0.438 <0.001	-0.312 <0.001	NS*	NS	NS	NS
Monthly inflation rate p-value	-0.187 0.002	NS	NS	NS	0.105 0.086	NS
ROBID overnight p-value	-0.392 <0.001	-0.271 <0.001	NS	NS	NS	NS
ROBID 3M p-value	-0.413 <0.001	-0.286 <0.001	NS	NS	NS	NS
ROBID 6M p-value	-0.404 <0.001	-0.278 <0.001	NS	NS	NS	NS

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	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
ROBID 12M p-value	-0.391 <0.001	-0.267 <0.001	NS	NS	NS	NS
ROBOR overnight p-value	-0.408 <0.001	-0.289 <0.001	NS	NS	NS	NS
ROBOR 3M p-value	-0.427 <0.001	-0.303 <0.001	NS	NS	NS	NS
ROBOR 6M p-value	-0.428 <0.001	-0.305 <0.001	NS	NS	NS	NS
ROBOR 12M p-value	-0.418 <0.001	-0.297 <0.001	NS	NS	NS	NS
(ROBID3M+ROBOR3M)/2 p-value	-0.421 <0.001	-0.295 <0.001	NS	NS	NS	NS
(ROBID6M+ROBOR6M)/2 p-value	-0.418 <0.001	-0.293 <0.001	NS	NS	NS	NS
Credits interest rates (non-banking clients) p-value	-0.500 <0.001	-0.376 <0.001	NS	NS	NS	NS
Savings interest rates (non-banking clients) p-value	-0.417 <0.001	-0.282 <0.001	NS	-0.104 0.091	NS	NS
T-bills average yield p-value	-0.408 <0.001	-0.289 <0.001	NS	-0.105 0.088	NS	NS
T-bonds average interest rate p-value	-0.378 <0.001	-0.232 <0.001	NS	NS	NS	0.119 0.053
BET monthly returns p-value	-0.110 0.075	NS	NS	NS	NS	NS
BET-C/Plus monthly returns p-value	-0.115 0.061	NS	NS	NS	NS	NS
BET-Fi monthly returns p-value	NS	NS	NS	NS	NS	NS

**Premium (+/-) of average muni.bonds interest rate over various rates**

Muni.bonds interest rate – monthly inflation rate p-value	-0.211 <0.001	-0.185 0.002	NS	NS	NS	NS
Muni.bonds interest rate – ROBID overnight p-value	-0.351 <0.001	-0.270 <0.001	NS	NS	-0.131 0.033	NS
Muni.bonds interest rate – ROBID 3M p-value	-0.349 <0.001	-0.280 <0.001	NS	NS	-0.106 0.085	NS
Muni.bonds interest rate – ROBID 6M p-value	-0.394 <0.001	-0.313 <0.001	NS	NS	-0.113 0.066	NS
Muni.bonds interest rate – ROBID 12M p-value	-0.421 <0.001	-0.335 <0.001	NS	NS	-0.127 0.039	NS
Muni.bonds interest rate – ROBOR overnight p-value	-0.137 0.025	-0.106 0.083	NS	NS	-0.158 0.010	NS
Muni.bonds interest rate – ROBOR 3M p-value	NS	NS	NS	NS	-0.140 0.022	NS

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
Muni.bonds interest rate – ROBOR 6M p-value	NS	NS	NS	NS	-0.143 0.020	NS
Muni.bonds interest rate – ROBOR 12M p-value	-0.124 0.044	NS	NS	NS	-0.185 0.002	NS
Muni.bonds interest rate – (Robid3M- Robor3M)/2 p-value	-0.231 <0.001	-0.189 0.002	NS	NS	-0.133 0.030	NS
Muni.bonds interest rate – (Robid6M- Robor6M)/2 p-value	-0.282 <0.001	-0.224 <0.001	NS	NS	-0.138 0.024	NS
Muni.bonds interest rate – credits interest rates p-value	0.517 <0.001	0.479 <0.001	NS	NS	0.172 0.005	NS
Muni.bonds interest rate – savings interest rates p-value	-0.377 <0.001	-0.291 <0.001	NS	NS	NS	NS
Muni.bonds interest rate – T-bills average yield p-value	-0.322 <0.001	-0.238 <0.001	NS	NS	NS	0.136 0.026
Muni.bonds interest rate – T-bonds average interest p-value	-0.281 <0.001	-0.234 <0.001	NS	NS	NS	NS
Muni.bonds interest rate – BET returns p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – BET-C/Plus returns p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – BET-Fi returns p-value	NS	NS	NS	NS	NS	NS

**Premiums (+/-) of various rates over the monthly inflation rate**

ROBID overnight – monthly inflation rate (MIR) p-value	-0.105 0.086	-0.106 0.085	NS	NS	NS	NS
ROBID 3M – monthly inflation rate p-value	-0.144 0.018	-0.133 0.030	NS	NS	NS	NS
ROBID 6M – monthly inflation rate p-value	-0.130 0.034	-0.122 0.047	NS	NS	NS	NS
ROBID 12M – monthly inflation rate p-value	-0.115 0.062	-0.110 0.074	NS	NS	NS	NS
ROBOR overnight – monthly inflation rate p-value	-0.182 0.003	-0.163 0.008	NS	NS	NS	NS
ROBOR 3M – monthly inflation rate p-value	-0.212 <0.001	-0.185 0.003	NS	NS	NS	NS



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	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
ROBOR 6M – monthly inflation rate p-value	-0.208 <0.001	-0.183 0.003	NS	NS	NS	NS
ROBOR 12M – monthly inflation rate p-value	-0.196 0.001	-0.175 0.004	NS	NS	NS	NS
(ROBID3M+ROBOR3M)/2 – MIR p-value	-0.180 0.003	-0.160 0.009	NS	NS	NS	NS
(ROBID6M+ROBOR6M)/2 – MIR p-value	-0.171 0.005	-0.154 0.012	NS	NS	NS	NS
Credits interest rates (non-banking clients) – MIR p-value	-0.289 <0.001	-0.257 <0.001	NS	NS	-0.112 0.067	NS
Savings interest rates (non-banking clients) – MIR p-value	NS	NS	NS	NS	NS	NS
T-bills average yield – monthly inflation rate p-value	-0.155 0.012	-0.145 0.018	NS	NS	NS	NS
T-bonds average interest rate – MIR p-value	NS	NS	NS	NS	-0.131 0.033	NS
BET monthly returns – monthly inflation rate p-value	-0.104 0.091	NS	NS	NS	NS	NS
BET-C/Plus monthly returns – MIR p-value	-0.107 0.080	NS	NS	NS	NS	NS
BET-Fi monthly returns – monthly inflation rate p-value	NS	NS	NS	NS	NS	NS

**Premiums (+/-) of various rates over the T-bills average yield**

ROBID overnight – T-bills average yield (T- bAY) p-value	0.203 <0.001	0.164 0.007	NS	NS	0.130 0.035	NS
ROBID 3M – T-bills average yield p-value	NS	0.106 0.084	NS	NS	NS	NS
ROBID 6M – T-bills average yield p-value	0.211 <0.001	0.197 0.001	NS	0.107 0.081	0.119 0.052	NS
ROBID 12M – T-bills average yield p-value	0.304 <0.001	0.269 <0.001	NS	0.116 0.058	0.153 0.013	NS
ROBOR overnight – T-bills average yield p-value	-0.150 0.015	-0.106 0.085	NS	NS	0.121 0.049	NS
ROBOR 3M – T-bills average yield p-value	-0.333 <0.001	-0.238 <0.001	NS	NS	NS	0.145 0.018
ROBOR 6M – T-bills average yield p-value	-0.348 <0.001	-0.255 <0.001	NS	NS	NS	0.151 0.014
ROBOR 12M – T-bills average yield p-value	-0.293 <0.001	-0.215 <0.001	NS	NS	0.121 0.048	0.148 0.016
(ROBID3M+ROBOR3M)/2 – T-bAY p-value	-0.188 0.002	-0.115 0.061	NS	NS	NS	0.128 0.037

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
(ROBID6M+ROBOR6M)/2 - T-bAY p-value	-0.137 0.025	NS	NS	NS	0.113 0.066	0.134 0.028
Credits interest rates (non-banking clients) - T-bAY p-value	-0.507 <0.001	-0.429 <0.001	NS	NS	-0.134 0.028	0.107 0.080
Savings interest rates (non-banking clients)- T-bAY p-value	0.279 <0.001	0.222 <0.001	NS	NS	NS	NS
T-bonds average interest rate - T-bAY p-value	0.210 <0.001	0.178 0.004	NS	NS	NS	NS
BET monthly returns - T-bAY p-value	NS	NS	NS	NS	NS	NS
BET-C/Plus monthly returns - T-bAY p-value	-0.101 0.099	NS	NS	NS	NS	NS
BET-Fi monthly returns - T-bAY p-value	NS	NS	NS	NS	NS	NS

Note\*: NS means not significant correlation

Source: authors' calculation using JASP

As it can be observed from Table 2, above, for the majority of observed data series there exists a weak to moderate negative correlation with the frequency (% of trading days). A moderate negative correlation is registered in relation with the credit interest rates (-0.500), while a very weak negative correlation (-0.187) appears in relation with the monthly inflation. Further, the majority of observed data series have a weak negative correlation with the number of trades. Like in the case of frequencies, credit interest rates have a stronger influence (a weak to moderate negative correlation of -0.376), while the monthly inflation rate does not have any influence. One must note the appearance of two very weak correlations with the traded value, though these correlations have a confidence level between 90% and 95%.

The negative correlation might be explained by the inversely proportional relation between the price of a bond and almost any rate/return considered for calculation. It seems that this relation was transferred in the calculated correlations.

In the case of municipal bond interest rates premium over the other interest rates/returns, significant correlations exist in the case of frequency (% of trading days), number of trades, and percent of traded issues. An isolated very weak positive correlation exists between liquidity and the premium of municipal bonds interest rate over T-bills average yield. In the case of frequency, the majority of correlations are negative and weak or weak to moderate, while in

two cases are very weak. The following exceptions must be noted: the moderate positive correlation in the case of municipal bonds interest premium over credit interest rates (+0.517) and the absence of significant correlations in the case of the municipal bonds interest premiums over ROBOR 3M and ROBOR 6M. Also in the case of number of trades, the majority of the correlations are negative and weak and very weak in two cases. The exception of the weak to moderate positive correlation between the municipal bonds interest premium over credit interest rates (+0.479) persist, while the absence of correlation appears for ROBOR 3M, 6M, and 12M. For the percent of traded issues, the majority of reported correlations are negative and very weak, with the persistent positive (but very weak) correlation in the case of municipal bonds interest premium over credit interest rates.

In the case of premiums of various rates/returns over the monthly inflation rate, the correlations are concentrated (similar with the observed data) on frequency and number of trades. In both cases, the majority of correlations are negative and very weak, with the exceptions in the case of credit interest rates premiums over monthly inflation rate which are negative and weak (-0.289 for frequency and -0.257 for number of trades. Two random negative and very weak correlations appear for the percent of traded issues.

In the case of premiums of various rates/returns over the T-bills average yield, one can observe that the highest number of correlations occurred. Correlation were not only registered in the case of frequency and number of trades, but also in the case of percent of traded issues and liquidity. In the case of frequency and number of trades, a mix of negative and positive very weak and weak correlations are registered, with the exception of negative and moderate of -0.507 (for frequency) and weak to moderate of -0.429 (for number of trades) in the case of credit interest rate premium over T-bills average yield. In the cases of percent of traded issues and liquidity, the majority of correlations are positive and very weak. One must note the appearance of two very weak correlations with the traded value, though these correlations have a confidence level between 90% and 95%.

For the monthly variations of the series of data, the correlation coefficients significant at 95% and down to 90% confidence levels are presented in Table 3, below:

**Table 3.** The correlation coefficients for the municipal bond segment trading activity for the monthly variations, period Nov.2001-Dec.2023

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
<b>Monthly variations of observed data series</b>						
ROBID overnight p-value	NS	-0.110 0.073	NS	NS	NS	NS
ROBOR overnight p-value	-0.111 0.072	-0.123 0.046	NS	NS	NS	NS
T-bonds average interest rate p-value	NS	NS	0.336 <0.001	0.246 <0.001	NS	0.336 <0.001
<b>Monthly variations of premium of average muni.bonds interest rate over various rates</b>						
Muni.bonds interest rate – ROBID 6M p-value	NS	-0.153 0.012	NS	NS	-0.123 0.046	NS
Muni.bonds interest rate – ROBID 12M p-value	NS	-0.130 0.034	NS	NS	-0.126 0.040	NS
Muni.bonds interest rate – BET-C/Plus returns p-value	NS	NS	NS	NS	0.124 0.043	NS
<b>Monthly variations of premiums of various rates over the monthly inflation rate</b>						
ROBOR 3M – monthly inflation rate p-value	NS	-0.116 0.060	NS	NS	NS	NS
BET monthly returns – monthly inflation rate p-value	NS	NS	NS	NS	0.311 <0.001	NS
BET-C/Plus monthly returns – MIR p-value	NS	NS	NS	-0.189 0.002	NS	NS
<b>Monthly variations of Premiums of various rates over the T-bills average yield</b>						
ROBID overnight – T-bills average yield (T-bAY) p-value	NS	0.120 0.051	NS	NS	NS	NS
ROBID 3M – T-bills average yield p-value	NS	-0.148 0.016	NS	NS	NS	NS
ROBID 6M – T-bills average yield p-value	NS	0.127 0.039	NS	NS	NS	NS
ROBOR 12M – T-bills average yield p-value	NS	NS	NS	-0.102 0.099	NS	NS

Note\*: NS means not significant correlation

Source: authors' calculation using JASP

As presented in Table 3, above, the correlation for monthly variations of data series are few and for the majority of cases are a mix of positive and negative and very weak and in 3 cases the confidence level is between 90% and

905%. The only exceptions occur in the cases of a) T-bonds average interest rates which have a positive weak correlation with the trading volume, trading value, and liquidity; and b) premium of BET over monthly inflation rate which has a positive weak correlation with the percent of traded issues.

For both Tables 2 and 3, the very weak correlation with a confidence level lower than 95% but higher than 90% are difficult to interpret since they seem to appear randomly. They were reported for highlighting rather the curious pattern of their occurrence.

### ***Period Jul.2007 to Dec.2023***

Table 4, below, presents the significant correlation coefficients at a confidence level of 95% and down to 90%.

**Table 4.** The correlation coefficients for the municipal bond segment trading activity (observed values) between Jul.2007 and Dec.2023

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
<b>Observed data series</b>						
Listed muni.bonds average interest rate p-value	-0.250 <0.001	NS*	NS	NS	NS	NS
Monthly inflation rate p-value	NS	NS	NS	NS	NS	NS
ROBID overnight p-value	-0.167 0.019	NS	NS	NS	0.218 0.002	NS
ROBID 3M p-value	-0.221 0.002	NS	NS	NS	0.168 0.018	NS
ROBID 6M p-value	-0.221 0.002	NS	NS	NS	0.159 0.025	NS
ROBID 12M p-value	-0.213 0.003	NS	NS	NS	0.163 0.021	NS
ROBOR overnight p-value	-0.174 0.014	NS	NS	NS	0.223 0.002	NS
ROBOR 3M p-value	-0.216 0.002	NS	NS	NS	0.181 0.011	NS
ROBOR 6M p-value	-0.237 <0.001	NS	NS	NS	0.156 0.028	NS
ROBOR 12M p-value	-0.231 0.001	NS	NS	NS	0.160 0.024	NS
(ROBID3M+ROBOR3M)/2 p-value	-0.219 0.002	NS	NS	NS	0.175 0.014	NS
(ROBID6M+ROBOR6M)/2 p-value	-0.230 0.001	NS	NS	NS	0.158 0.026	NS

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	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
Credits interest rates (non-banking clients) p-value	-0.388 <0.001	-0.215 0.002	NS	NS	NS	NS
Savings interest rates (non-banking clients) p-value	-0.278 <0.001	NS	NS	NS	NS	NS
T-bills average yield p-value	-0.263 <0.001	NS	NS	-0.122 0.086	NS	NS
T-bonds average interest rate p-value	-0.247 <0.001	NS	NS	NS	NS	NS
BET monthly returns p-value	NS	NS	NS	NS	NS	NS
BET-C/Plus monthly returns p-value	NS	NS	NS	NS	NS	NS
BET-Fi monthly returns p-value	NS	NS	NS	NS	NS	NS
Yield <1 year p-value	-0.254 <0.001	NS	NS	-0.123 0.085	NS	NS
Yield 3 years p-value	-0.260 <0.001	NS	NS	NS	NS	NS
Yield 5 years p-value	-0.245 <0.001	NS	NS	NS	NS	NS
Yield 10 years p-value	-0.256 <0.001	NS	NS	NS	NS	NS
ROTX monthly returns p-value	NS	NS	NS	NS	NS	NS
BET-XT monthly returns p-value	NS	NS	NS	NS	NS	NS
BET-NG monthly returns p-value	NS	NS	NS	NS	NS	NS
<b>Premium (+/-) of average muni.bonds interest rate over various rates</b>						
Muni.bonds interest rate – monthly inflation rate p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – ROBID overnight p-value	-0.348 <0.001	-0.292 <0.001	NS	NS	-0.214 0.002	NS
Muni.bonds interest rate – ROBID 3M p-value	0.416 <0.001	0.355 <0.001	NS	NS	0.134 0.060	NS
Muni.bonds interest rate – ROBID 6M p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – ROBID 12M p-value	-0.123 0.085	-0.124 0.081	NS	NS	NS	NS
Muni.bonds interest rate – ROBOR overnight p-value	-0.167 0.019	-0.125 0.080	NS	NS	-0.281 <0.001	NS

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	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
Muni.bonds interest rate – ROBOR 3M p-value	NS	NS	NS	NS	-0.209 0.003	NS
Muni.bonds interest rate – ROBOR 6M p-value	0.247 <0.001	0.191 0.007	NS	NS	NS	NS
Muni.bonds interest rate – ROBOR 12M p-value	0.177 0.013	0.119 0.095	NS	NS	0.331 <0.001	NS
Muni.bonds interest rate – (Robid3M- Robor3M)/2 p-value	-0.266 <0.001	-0.192 0.007	NS	NS	-0.123 0.085	NS
Muni.bonds interest rate – (Robid6M- Robor6M)/2 p-value	-0.125 0.079	NS	NS	NS	NS	NS
Muni.bonds interest rate – credits interest rates p-value	0.631 <0.001	0.580 <0.001	NS	NS	0.503 <0.001	NS
Muni.bonds interest rate – savings interest rates p-value	0.261 <0.001	0.236 <0.001	NS	NS	NS	NS
Muni.bonds interest rate – T-bills average yield p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – T-bonds average interest p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – BET returns p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – BET-C/Plus returns p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – BET-Fi returns p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – Yield <1 year p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – Yield 3 years p-value	-0.123 0.085	NS	NS	NS	NS	NS
Muni.bonds interest rate – Yield 5 years p-value	-0.177 0.013	NS	NS	NS	NS	NS
Muni.bonds interest rate – Yield 10 years p-value	-0.189 0.008	NS	NS	NS	0.141 0.047	NS
Muni.bonds interest rate – ROTX returns p-value	NS	NS	NS	NS	NS	NS
Muni.bonds interest rate – BET-XT returns p-value	NS	NS	NS	NS	NS	NS

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
Muni.bonds interest rate – BET-NG returns p-value	NS	NS	NS	NS	NS	NS
<b>Premiums (+/-) of various rates over the monthly inflation rate</b>						
Credits interest rates (non-banking clients) – MIR p-value	-0.137 0.054	-0.141 0.048	NS	NS	NS	NS
<b>Premiums (+/-) of various rates over the T-bills average yield</b>						
ROBID overnight – T-bills average yield (T-bAY) p-value	0.328 <0.001	0.244 <0.001	0.126 0.077	0.145 0.042	0.320 <0.001	0.134 0.060
ROBID 3M – T-bills average yield p-value	0.161 0.024	0.146 0.040	0.145 0.042	0.158 0.026	0.332 <0.001	0.174 0.014
ROBID 6M – T-bills average yield p-value	0.206 0.004	0.193 0.007	0.162 0.023	0.179 0.012	0.332 <0.001	0.187 0.008
ROBID 12M – T-bills average yield p-value	0.263 <0.001	0.246 <0.001	0.160 0.025	0.184 0.01	0.353 <0.001	0.180 0.011
ROBOR overnight – T-bills average yield p-value	0.206 0.004	0.162 0.022	NS	NS	0.324 <0.001	0.128 0.072
ROBOR 3M – T-bills average yield p-value	NS	NS	NS	NS	0.327 <0.001	0.141 0.048
ROBOR 6M – T-bills average yield p-value	NS	NS	NS	NS	0.245 <0.001	0.139 0.050
ROBOR 12M – T-bills average yield p-value	NS	NS	NS	NS	0.263 <0.001	0.139 0.051
(ROBID3M+ROBOR3M)/2 – T-bAY p-value	NS	NS	NS	NS	0.348 <0.001	0.163 0.022
(ROBID6M+ROBOR6M)/2 – T-bAY p-value	NS	NS	NS	NS	0.295 <0.001	0.167 0.019
Credits interest rates (non-banking clients) – T-bAY p-value	-0.421 <0.001	-0.381 <0.001	NS	NS	-0.348 <0.001	NS
Savings interest rates (non-banking clients)-T-bAY p-value	-0.155 0.030	-0.131 0.066	NS	NS	NS	NS
T-bonds average interest rate – T-bAY p-value	0.246 <0.001	NS	0.139 0.051	0.164 0.021	NS	NS
BET monthly returns – T-bAY p-value	NS	NS	NS	NS	NS	NS
BET-C/Plus monthly returns – T-bAY p-value	NS	NS	NS	NS	NS	NS
BET-Fi monthly returns – T-bAY p-value	NS	NS	NS	NS	NS	NS



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	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
Yield <1 year – T-bAY p-value	0.120 0.093	0.126 0.077	NS	NS	NS	NS
Yield 3 years – T-bAY p-value	0.184 0.010	NS	0.185 0.009	0.178 0.012	-0.136 0.056	0.135 0.058
Yield 5 years – T-bAY p-value	0.240 <0.001	NS	NS	NS	-0.120 0.093	NS
Yield 10 years – T-bAY p-value	0.227 0.001	NS	NS	0.133 0.062	-0.163 0.021	NS
ROTX monthly returns – T-bAY p-value	NS	NS	NS	NS	NS	NS
BET-XT monthly returns – T-bAY p-value	NS	NS	NS	NS	NS	NS
BET-NG monthly returns – T-bAY p-value	NS	NS	NS	NS	NS	NS
<b>Premiums (+/-) of various rates over the Yield &lt;1 year</b>						
ROBID overnight – Yield <1 year p-value	0.243 <0.001	0.155 0.029	NS	0.118 0.096	0.387 <0.001	0.135 0.059
ROBID 3M – Yield <1 year p-value	NS	NS	NS	NS	0.352 <0.001	0.142 0.046
ROBID 6M – Yield <1 year p-value	NS	NS	NS	NS	0.347 <0.001	0.143 0.044
ROBID 12M – Yield <1 year p-value	NS	NS	NS	NS	0.365 <0.001	0.139 0.051
ROBOR overnight – Yield <1 year p-value	0.129 0.069	NS	NS	NS	0.355 <0.001	0.121 0.089
ROBOR 3M – Yield <1 year p-value	NS	NS	NS	NS	0.330 <0.001	0.118 0.099
ROBOR 6M – Yield <1 year p-value	NS	NS	NS	NS	0.261 <0.001	NS
ROBOR 12M – Yield <1 year p-value	NS	NS	NS	NS	0.275 <0.001	NS
(ROBID3M+ROBOR3M)/2 – Yield <1 year p-value	NS	NS	NS	NS	0.350 <0.001	0.132 0.065
(ROBID6M+ROBOR6M)/2 – Yield <1 year p-value	NS	NS	NS	NS	0.304 <0.001	0.130 0.069
Credits interest rates (non-banking clients) – Yield <1year p-value	-0.486 <0.001	-0.449 <0.001	NS	NS	-0.289 <0.001	NS
Savings interest rates (non-banking clients) – Yield <1year p-value	-0.223 0.002	-0.205 0.004	NS	NS	NS	NS
T-bills average yield – Yield <1 year p-value	-0.120 0.093	-0.126 0.077	NS	NS	NS	NS

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
T-bonds average interest rate – Yield <1 year p-value	0.140 0.049	NS	NS	0.128 0.072	NS	NS
BET monthly returns – Yield <1 year p-value	NS	NS	NS	NS	NS	NS
BET-C/Plus monthly returns – Yield <1 year p-value	NS	NS	NS	NS	NS	NS
BET-Fi monthly returns – Yield <1 year p-value	NS	NS	NS	NS	NS	NS
Yield 3 years – Yield <1 year p-value	NS	NS	0.184 0.010	0.163 0.022	NS	0.153 0.032
Yield 5 years – Yield <1 year p-value	0.171 0.016	NS	NS	NS	NS	NS
Yield 10 years – Yield <1 year p-value	0.191 0.007	NS	NS	0.129 0.070	-0.127 0.075	NS
ROTX monthly returns – Yield <1 year p-value	NS	NS	NS	NS	NS	NS
BET-XT monthly returns – Yield <1 year p-value	NS	NS	NS	NS	NS	NS
BET-NG monthly returns – Yield <1 year p-value	NS	NS	NS	NS	NS	NS

Note\*: NS means not significant correlation

Source: authors' calculation using JASP

For the observed data series, for the new period, the correlations appear in the case of frequency and percent of traded issues, while there are no significant correlations (with the exception of credit interest rates case) for the number of trades, the main difference compared with the period Nov.2001-Dec.2023. In the case of frequencies the majority of correlations are negative and weak, with the exception of a negative and weak to moderate correlation in the case of credit interest rates, and the negative and very weak correlation in the case of ROBID overnight. One also must note the absence of correlation in the case of monthly inflation rate. In the case of percent of traded issues all the correlation are positive, most of them very weak and, in two cases, weak. Similar with the situation for the period Nov.2001-Dec.2003, two very weak correlations appear for value, but at a confidence level between 90% and 95%. It is worth pointing out that yields communicated by the MoF are in the range of negative and weak correlations related only to frequency.

In the case of premiums of municipal bond rates over various rates/returns, the situation up to a point similar with results the period Nov.2001-Dec.2023, with correlations appearing mostly for frequency, number of trades, and percent of traded issues. However, the main differences are generated by a mix of positive and negative correlations, while for the period Nov.2001-Dec.2023 the majority of the correlations were negative. In the majority of cases for Jul.2007-Dec.2003 the correlations are very weak and weak, the only notable exception occurring in the case of the premium of municipal bond rates over credit interest rates which shows moderate correlations for frequency (0.631), for the number of trades (0.580), and for percent of traded issues (0.507). One must highlight that the yields communicated by MoF either have no correlation with the municipal bond trading activity (for yield <1 year) or the correlation is very weak and only in the case of frequency. Further, the absence of correlation in the case of premium of municipal bond interest rates over monthly inflation deserves to be mentioned.

In the case of premiums of various rates over monthly inflation rates, only two very weak correlations occur for the premium of credit interest rates over monthly inflation rates, in line with the case mentioned for the premium of municipal bond interest rates over monthly inflation deserves to be mentioned. It seems that the premiums over monthly inflation rates do not play any role in decisions related to municipal bond trading since July 2007.

For premiums of various rates over T-bills average yield the correlations with the municipal bond trading activity are more numerous, covering all six variables that capture this activity. The most correlated variables are the frequency and the percent of traded issues (a mix of negative and positive correlations, ranging from very weak to weak), followed by number of trades and liquidity (most correlations being weak or very weak and positive). It is worth noting that within this cluster of data the most numerous correlation for trading volume and trading value can be found, though all the correlations are very weak. The premiums of yields reported by MoF have a modest influence over the municipal bond trading activity.

The premiums of various rates/returns over the Yield <1 year are mostly concentrated on frequency and percent of traded issues, while registering some correlations related to the number of trades. In the case of frequency (% of trading days) the correlations are a mix of negative and positive, mostly very weak and weak, with the exception of the negative and weak to moderated correlation (-0.486) of credit interest rates premiums over Yield <1 year. In the case of percent of traded issues, the majority of correlations are positive and either weak or weak to moderates. The only exception is the negative weak correlation (-0.289) for credit interest rates premiums over Yield <1 year.

For the monthly variations of the series of data, the correlation coefficients significant at 95% and down to 90% confidence levels are presented in Table 5, below:

**Table 5.** The correlation coefficients for the municipal bond segment trading activity for the monthly variations, period Jul.2007-Dec.2023

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
<b>Monthly variations of observed data series</b>						
ROBID overnight p-value	-0.118 0.099	-0.122 0.087	NS*	NS	NS	NS
ROBOR overnight p-value	-0.126 0.078	-0.135 0.065	NS	NS	NS	NS
T-bonds average interest rate p-value	NS	NS	0.364 <0.001	0.277 <0.001	NS	0.364 <0.001
Yield 3 years p-value	NS	NS	0.449 <0.001	0.287 <0.001	NS	0.449 <0.001
<b>Monthly variations of premium of average muni.bonds interest rate over various rates</b>						
Muni.bonds interest rate – ROBID 3M p-value	NS	-0.208 0.003	NS	NS	NS	NS
Muni.bonds interest rate – ROBID 12M p-value	NS	-0.132 0.064	NS	NS	NS	NS
Muni.bonds interest rate – ROBOR overnight p-value	NS	NS	NS	NS	0.121 0.091	NS
Muni.bonds interest rate – BET- C/Plus returns p-value	NS	NS	NS	0.125 0.081	NS	NS
<b>Monthly variations of premiums of various rates over the monthly inflation rate</b>						
Yield 5 years – monthly inflation rate p-value	0.124 0.082	NS	NS	NS	NS	NS
BET-C/Plus monthly returns – MIR p-value	NS	NS	NS	-0.220 0.002	NS	NS
<b>Monthly variations of premiums of various rates over the T-bills average yield</b>						
ROBID overnight – T-bills average yield (T-bAY) p-value	0.161 0.023	0.204 0.004	NS	NS	NS	NS
ROBID 3M – T-bills average yield p-value	NS	0.139 0.051	NS	NS	NS	NS
ROBOR 12M – T-bills average yield p-value	NS	NS	NS	-0.120 0.092	NS	NS
Yield 3 years – T-bAY p-value	NS	NS	NS	NS	0.143 0.045	NS

	Frequency (% of trading days)	No. of trades	Trading volume	Trading value	Percent of traded issues	Liquidity (based on volume)
<b>Monthly variations of premiums of various rates over the Yield &lt;1 year</b>						
ROBID overnight – Yield <1 year p-value	0.181 0.011	NS	NS	NS	NS	NS
ROBID 6M – Yield <1 year p-value	NS	-0.180 0.011	NS	NS	-0.272 <0.001	NS
ROBID 12M – Yield <1 year p-value	NS	NS	NS	NS	-0.238 <0.001	NS
ROBOR 6M – Yield <1 year p-value	NS	NS	NS	0.162 0.023	NS	NS
ROBOR 12M – Yield <1 year p-value	NS	NS	NS	0.208 0.003	NS	NS
Savings interest rates (non-banking clients) – Yield <1 year p-value	NS	NS	NS	NS	0.119 0.096	NS
T-bonds average interest rate – Yield <1 year p-value	NS	-0.174 0.014	NS	NS	NS	NS

Note\*: NS means not significant correlation

Source: authors' calculation using JASP

The results in the Table 5, while showing a slightly increase number of correlations in comparison with the period Nov.2001-Dec.2023, also reveal that most of the correlations are weak or very weak. Only in the case of T-bond average interest rate variation and Yield 3 years variation the correlations with the trading volume and liquidity are moderate to strong, while the correlations with the trading value remain weak.

## Conclusions

The research questions were: how correlated is the municipal bond trading activity with the public information available regarding various interest rates and indices returns? A secondary research question emerged: how correlated is the municipal bond trading activity with the information that can be derived from the public available information?

To the first research question the answer is that the correlation is mostly weak and moderate to weak for the period Nov.2001-Dec.2023 and weak for the period Jul.2007-Dec.2023. For the second research questions the answer is that the correlation is varying from very weak to weak to moderate, depending on the information derived from the observed data.

Most of the data used influence mainly the frequency (% of trading days), the number of trades and the percent of traded issues, for both periods under scrutiny.

Also for both periods the premiums of various rates over T-bills average yield generate the highest number of correlations, suggesting that T-bills average yield might play a role as risk free rate for investors.

The results in all the tables above also show that there is almost no relation between the returns exhibited by BVB equity market and municipal bonds market. However, some random weak correlations occurred. These results confirm indirectly the different profiles for investors in equity and municipal bonds.

The weak to very weak influence of the yields communicated by the MoF for T-bills and T-bonds show that this information is relatively ignored by municipal bond investors. The yield <1 year does not seem to play the role of risk free rate. This yield might be ignored due to the fact that until August 2012 the MoF reports mentioned just less than a year and since August 2012 recorded this information as yield at 6 months. The absence of T-bills with the classic maturity at 3 months for risk free rate might also determine MoF reports to be ignored.

All the results presented above point toward that the trading activity within the municipal bond segment is dominated by small, individual investors, that generate a relative small number of trades, trading volume and value. These information are further confirmed by the data in Annex 1a mainly regarding the number of tradings and trading volume which are relatively low, consistent with the dominance of individual investors. Also the data point toward a relative small number of individual investors.

Nonetheless, the credit interest rates, either directly observed or under the form of various premiums have the strongest correlations (often weak to moderate or moderate) with frequency (% of trading days), number of trades and sometime with percent of traded issues. Further investigations are needed to understand why this information seems to influence the presumed individual investors that dominate the trading within municipal bond sector.

The correlations presented within this paper imply that the modest profile of municipal bond segment at BVB is related to a relative small number of individual investors that dominate the transactions, using mostly observed data to decided when to trade and what to trade. The scarce correlations that appear in relation with the trading volume and trading value point toward the idea that only a small portion of the listed municipal bonds are owned by individual investors. Also the trading activity indicates that the institutional investors have the tendency to treasure their bonds. These indirect findings are

in line with Pop & Georgescu (2024) results related to the fact that the majority of municipal bonds are issued via private offerings, results enhanced by the same type of offerings chosen for 2023.

Therefore one can conclude that as long as the municipal bond segment will be dominated by the institutional investors ownership in combination with a limited number of issued bonds, this BVB segment will remain peripheral and low interest for various investors.

Though, it must be added that informal discussions with various intermediaries of Romanian financial market revealed that the municipal bonds are perceived in relation with the political influence/dominance at municipality and county levels and there is a disinclination to recommend these securities to their clients. While this aspect is difficult (and very sensitive) to investigate, these informal discussions are in line with the finding of Vasa et al. (2021) and Vasvari (2020) for Hungary showing that there is a political influence that impacts the access of local administrations to the credit market(s). This situation opens new avenues for research and indicate the need for higher levels of transparency regarding the use of the funds obtained via municipal bond issuance that can counterbalance the shady political influences.

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MUNICIPAL BONDS AT BUCHAREST STOCK EXCHANGE: WHAT THE CORRELATIONS ARE REVEALING?

**Annex 1: Descriptive statistics**

**Annex 1a**

**Descriptive statistics for the variables representing the trading activity for municipal bond segment for Nov.2001-Dec.2023**

	Mean	Median	St.dev.	Minim	Maxim	Q1	Q3	Obs.
Frequency (%)	29.644	23.810	24.464	0.000	90.909	9.524	45.455	266
No.of trades	16	9	20	0	116	2	21	266
Volume	22.132	1.651	231.400	0	3,748,000	217	6.365	266
Value (RON mil.)	2,380,000	121.311	14,990,000	0	218,600,000	22.128	698,674	266
Percent of traded issues (%)	17.581	16.216	13.369	0.000	100.000	7.692	25.000	266
Liquidity (%)	0.484	0.020	2.380	0.000	33.677	0.004	0.178	266

**Descriptive statistics for the variables representing the trading activity for municipal bond segment for Jul.2007-Dec.2023**

Frequency (%)	36.290	34.058	24.387	0.000	90.909	14.464	55.000	198
No.of trades	21	14	22	0	116	5	30	198
Volume	28.024	1.814	267.599	0	3,748,000	416	6.365	198
Value (RON mil.)	3,073,000	130,898	17,320,000	0	218,600,000	37,618	1,037,000	198
Percent of traded issues (%)	17.629	18.421	10.971	0.000	50.000	8.571	24.324	198
Liquidity (%)	0.321	0.018	2.420	0.000	33.677	0.004	0.065	198

**Descriptive statistics for the monthly variation of the variables representing the trading activity for municipal bond segment for Nov.2001-Dec.2023**

Frequency (%)	12.895	0.000	79.679	-100.000	354.545	-31.818	30.435	265
No.of trades (%)	41.979	0.000	166.255	-100.000	1,250.000	-50.000	61.538	265
Volume (%)	3,530,818	0.000	41,260,760	-100.000	666,842,705	-72.754	141,538	265
Value (%)	1,627,546	0.000	8,404,551	-100.000	102,843,590	-77,147	194,027	265
Percent of traded issues (%)	13.461	0.000	89.701	-100.000	580.556	-33.333	28.571	265
Liquidity (%)	3,513,675	0.000	41,242,448	-100.000	666,842,705	-72.754	125.503	265

**Descriptive statistics for the monthly variation of the variables representing the trading activity for municipal bond segment for Jul.2007-Dec.2023**

Frequency (%)	14.036	0.000	77.262	-100.000	354.545	-30.000	31.250	197
No.of trades	45.019	0.000	169.205	-100.000	1,250.000	-50.000	75.000	197
Volume	4,627,054	0.000	47,822,734	-100.000	666,842,705	-72.754	150,990	197
Value (RON mil.)	1,909,844	0.000	9,196,422	-100.000	102,843,590	-76.402	297,243	197
Percent of traded issues (%)	13.013	0.000	82.470	-100.000	580.556	-27.344	28.571	197
Liquidity (%)	4,599,353	0.000	47,802,262	-100.000	666,842,705	-72.754	150,990	197

Source: authors' calculations using JASP

**Annex 1b**

**Descriptive statistics for the variables representing the influence factors of municipal bond segment for Nov.2001-Dec.2023**

	Mean	Median	St.dev.	Minim	Maxim	Q1	Q3	Obs.
Muni.bonds avg.interest rate (%)	8.804	6.728	7.694	1.684	36.500	3.396	10.441	266
Monthly inflation (%)	6.617	5.158	8.443	-30.616	58.083	1.723	9.642	266
ROBID overnight (%)	5.923	3.760	6.133	0.040	29.530	1.645	7.535	266
ROBID 3M (%)	6.844	5.300	6.573	0.320	31.980	2.198	8.102	266
ROBID 6M (%)	6.825	5.645	6.420	0.420	32.390	2.268	8.045	266
ROBID 12M (%)	6.793	5.870	6.324	0.560	33.220	2.328	8.002	266
ROBOR overnight (%)	7.086	4.510	7.564	0.400	39.920	2.052	8.770	266
ROBOR 3M (%)	8.056	6.030	7.821	0.700	36.780	2.598	9.340	266
ROBOR 6M (%)	8.189	6.450	7.703	0.930	37.670	2.845	9.498	266
ROBOR 12M (%)	8.190	6.630	7.639	1.080	39.590	2.895	9.412	266
(Robid3M+Robor3M)/2 (%)	7.450	5.620	7.186	0.510	34.215	2.393	8.651	266
(Robid6M+Robor6M)/2 (%)	7.507	6.080	7.049	0.675	34.995	2.506	8.631	266
Credit interest rates (%)	12.757	10.600	8.185	5.145	40.570	6.691	15.140	266
Savings interest rate (%)	5.997	5.293	4.988	0.555	23.480	1.936	7.444	266
T-bills avg.yield (%)	7.264	5.780	6.896	0.510	35.700	2.658	8.338	266
T-bonds avg. interest rate (%)	6.839	6.470	4.430	0.000	26.000	3.832	7.818	266
BET month.returns (%)	61.209	11.616	258.069	-99.288	3,315.219	-17.569	65.742	266
BET-C/Plus month.returns (%)	50.353	10.691	191.093	-99.283	2,099.914	-18.073	70.175	266
BET-FI month.returns (%)	1,151.524	10.099	14,438.103	-99.997	230,200.550	-29.513	76.584	266

**Descriptive statistics for the variables representing the influence factors of municipal bond segment for Jul.2007-Dec.2023**

Muni.bonds avg.interest rate (%)	5.554	4.112	3.363	1.684	15.617	2.828	7.384	198
Monthly inflation (%)	4.988	4.033	7.689	-30.616	58.083	0.843	7.667	198
ROBID overnight (%)	3.484	2.480	3.100	0.040	14.420	1.085	5.195	198
ROBID 3M (%)	4.294	3.045	3.391	0.320	14.270	1.677	6.160	198
ROBID 6M (%)	4.410	3.075	3.352	0.420	14.020	1.763	6.277	198
ROBID 12M (%)	4.497	3.200	3.326	0.560	14.000	1.805	6.367	198
ROBOR overnight (%)	3.958	2.925	3.413	0.400	23.260	1.518	5.695	198
ROBOR 3M (%)	4.816	3.405	3.687	0.700	22.150	2.042	6.587	198
ROBOR 6M (%)	5.059	3.570	3.667	0.930	22.330	2.165	6.905	198

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ROBOR 12M (%)	5.152	3.655	3.634	1.080	22.110	2.203	6.945	198
(Robid3M+Robor3M)/2 (%)	4.555	3.247	3.528	0.510	18.210	1.880	6.373	198
(Robid6M+Robor6M)/2 (%)	4.734	3.270	3.499	0.675	18.175	1.958	6.559	198
Credit interest rates (%)	9.071	7.885	3.611	5.145	20.130	6.022	11.102	198
Savings interest rate (%)	4.429	3.085	3.626	0.555	16.715	1.590	6.385	198
T-bills avg.yield (%)	4.700	3.355	3.266	0.510	14.230	2.070	6.740	198
T-bonds avg. interest rate (%)	5.565	4.660	2.627	2.110	13.000	3.377	7.218	198
BET month.returns (%)	35.654	8.926	150.625	-99.288	1,460.512	-19.707	53.534	198
BET-C/Plus month.returns (%)	29.103	3.537	132.307	-99.283	1,278.860	-24.826	50.888	198
BET-Fi month.returns (%)	304.280	6.236	3,551.105	-99.997	49,874.177	-27.707	60.844	198
Yield <1 year (%)	4.397	3.370	3.048	0.420	13.360	2.000	6.317	198
Yield 3 years (%)	5.203	4.555	2.712	1.390	12.220	3.077	6.808	198
Yield 5 years (%)	5.438	4.840	2.452	1.810	11.060	3.232	6.925	198
Yield 10 years (%)	5.678	5.265	1.965	1.860	10.350	3.905	7.170	198
ROTX month.returns (%)	48.656	8.343	273.212	-99.463	3,458.364	-23.028	53.445	198
BET-XT month.returns (%)	53.549	8.214	351.749	-99.826	4,482.983	-20.318	54.158	198
BET-NG month.returns (%)	27.667	1.815	100.662	-99.869	757.452	-26.901	53.356	198
<b>Descriptive statistics for the monthly variations of variables representing the influence factors of municipal bond segment for Nov.2001-Dec.2023</b>								
Muni.bonds avg.interest rate (%)	-0.446	0.000	5.959	-20.290	28.450	-2.244	0.915	265
Monthly inflation (%)	1.419	-18.126	474.951	-3,531.517	3,258.711	-74.832	67.264	265
ROBID overnight (%)	5.516	-0.173	39.625	-90.533	221.591	-12.218	12.542	265
ROBID 3M (%)	0.419	-0.702	15.655	-49.757	110.606	-5.738	4.372	265
ROBID 6M (%)	-0.047	-0.722	11.315	-38.136	90.541	-3.699	2.968	265
ROBID 12M (%)	-0.196	-0.333	9.631	-32.347	63.333	-3.286	2.385	265
ROBOR overnight (%)	2.277	-0.374	26.033	-71.233	141.304	-10.658	8.672	265
ROBOR 3M (%)	-0.123	-1.124	11.128	-31.698	71.698	-4.984	3.195	265
ROBOR 6M (%)	-0.307	-0.926	9.085	-25.705	67.895	-3.600	2.446	265
ROBOR 12M (%)	-0.377	-0.617	8.319	-25.192	67.120	-3.495	1.788	265
(Robid3M+Robor3M)/2 (%)	0.009	-0.885	12.202	-34.792	86.628	-5.603	3.788	265
(Robid6M+Robor6M)/2 (%)	-0.241	-0.744	9.517	-25.667	71.939	-3.675	2.595	265
Credit interest rates (%)	-0.496	-0.548	4.001	-14.237	15.113	-2.835	1.688	265
Savings interest rate (%)	-0.233	-0.987	8.041	-19.467	48.413	-3.876	2.400	265

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T-bills avg.yield (%)	0.515	0.000	20.228	-58.537	272.308	-3.736	2.003	265
T-bonds avg. interest rate (%)	-0.253	0.000	7.420	-28.636	40.851	-3.226	1.938	265
BET month.returns (%)	99.720	-95.007	4.105.913	-26.200.687	52.784.302	-165.838	23.651	265
BET-C/Plus month.returns (%)	-1.49.777	-97.432	2.864.948	-40.820.863	14.092.800	-192.066	22.645	265
BET-FI month.returns (%)	1.239.746	-94.159	20.945.947	-12.722.705	336.335.553	-168.538	15.662	265
<b>Descriptive statistics for the monthly variations of variables representing the influence factors of municipal bond segment for Jul.2007-Dec.2023</b>								
Muni.bonds avg.interest rate (%)	0.062	0.000	6.096	-17.054	28.450	-1.891	0.901	197
Monthly inflation (%)	-16.498	-23.679	539.369	-3.531.517	3.258.711	-85.902	58.945	197
ROBID overnight (%)	6.494	-0.173	40.183	-90.533	221.591	-12.183	15.730	197
ROBID 3M (%)	1.093	-0.702	16.659	-49.757	110.606	-5.516	6.400	197
ROBID 6M (%)	0.520	-0.722	11.386	-32.353	90.541	-3.583	3.398	197
ROBID 12M (%)	0.382	-0.317	9.490	-29.612	63.333	-3.093	2.837	197
ROBOR overnight (%)	3.242	-0.165	27.254	-71.233	141.304	-10.676	11.111	197
ROBOR 3M (%)	0.580	-1.082	12.418	-31.698	71.698	-4.930	4.672	197
ROBOR 6M (%)	0.355	-0.888	10.018	-25.705	67.895	-3.284	2.992	197
ROBOR 12M (%)	0.292	-0.302	9.139	-25.192	67.120	-2.959	2.381	197
(Robid3M+Robor3M)/2 (%)	0.700	-0.929	13.336	-34.792	86.628	-5.565	5.714	197
(Robid6M+Robor6M)/2 (%)	0.392	-0.791	10.129	-25.667	71.939	-3.566	3.180	197
Credit interest rates (%)	-0.067	-0.251	4.190	-14.237	15.113	-2.685	2.217	197
Savings interest rate (%)	0.242	-0.909	8.298	-17.705	48.413	-3.601	2.914	197
T-bills avg.yield (%)	1.300	0.000	22.775	-35.052	272.308	-4.747	2.985	197
T-bonds avg. interest rate (%)	0.248	-0.208	7.818	-18.545	40.851	-4.113	2.751	197
BET month.returns (%)	-18.296	-95.007	2.069.349	-12.090.467	20.294.052	-191.541	5.098	197
BET-C/Plus month.returns (%)	-197.619	-97.432	3.246.671	-40.820.863	14.092.800	-205.679	19.341	197
BET-FI month.returns (%)	63.721	-94.248	3.844.391	-12.722.705	47.215.195	-177.558	4.598	197
Yield <1 year (%)	2.162	0.000	30.134	-59.603	350.769	-3.659	0.614	197
Yield 3 years (%)	0.560	0.000	11.523	-37.500	75.127	-4.545	3.583	197
Yield 5 years (%)	0.312	0.000	8.793	-27.798	47.601	-3.400	3.750	197
Yield 10 years (%)	0.325	0.000	9.427	-31.111	75.269	-4.110	2.680	197
ROTX month.returns (%)	-345.380	-101.672	3.465.894	-44.924.194	8.453.946	-227.500	-8.370	197
BETXT month.returns (%)	-213.619	-106.604	1.141.406	-9.354.876	3.328.672	-196.088	12.025	197
BET-NG month.returns (%)	-241.794	-96.925	3.011.532	-23.048.986	19.133.954	-177.731	5.159	197

Source: authors' calculations using JASP

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**Annex 1c**

**Descriptive statistics for the premium of muni.bonds avg.interest rates over various rates/returns for Nov.2001-Dec.2023**

	Mean	Median	St.dev	Minim	Maxim	Q1	Q3	Obs.
muni.rate - monthly inflation (%)	2.187	2.304	8.444	-54.229	33.016	-1.696	6.582	266
muni.rate - Robid overnight (%)	2.881	1.923	2.739	-1.990	17.380	1.472	3.317	266
muni.rate - Robid 3M (%)	1.960	1.476	1.879	-2.004	11.270	1.085	1.476	266
muni.rate - Robid 6M (%)	1.979	1.381	1.967	-2.104	11.240	0.985	2.266	266
muni.rate - Robid 12M (%)	2.011	1.271	2.126	-2.234	11.390	0.860	2.338	266
muni.rate - Robor overnight (%)	1.718	1.411	2.026	-10.830	9.950	0.902	2.319	266
muni.rate - Robor 3M (%)	0.748	0.876	1.402	-9.720	5.849	0.306	1.207	266
muni.rate - Robor 6M (%)	0.615	0.721	1.335	-9.900	5.720	0.138	1.018	266
muni.rate - Robor 12M (%)	0.614	0.596	1.388	-9.680	6.229	0.090	0.940	266
muni.rate - avg.Robid-Robor 3M (%)	1.354	1.131	1.481	-5.780	8.320	0.744	1.636	266
muni.rate - avg.Robid-Robor 6M (%)	1.297	1.026	1.497	-5.745	8.310	0.682	1.506	266
muni.rate - credit rate (%)	-3.953	-3.746	1.406	-8.906	-0.530	-4.494	-3.027	266
muni.rate - savings rate (%)	2.807	1.342	3.416	-1.742	16.060	0.979	2.461	266
muni.rate - T-bills yield (%)	1.540	1.092	1.720	-3.134	10.239	0.556	2.076	266
muni.rate - T-bonds rate (%)	1.965	0.298	5.602	-4.377	36.500	-0.491	2.629	266
muni.rate - BET returns (%)	-52.405	-4.618	255.963	-3.278.719	112.148	-53.322	26.759	266
muni.rate - BET-C/Plus returns (%)	-41.549	-2.832	188.972	-2.063.414	112.461	-57.387	28.043	266
muni.rate - BET-Fi returns (%)	-1.142.720	-2.930	14.426.311	-230.164.050	128.428	-70.102	36.763	266

**Descriptive statistics for the premium of muni.bonds avg.interest rates over various rates/returns for Jul.2007-Dec.2023**

muni.rate - monthly inflation (%)	0.565	0.773	7.839	-54.229	33.014	-2.166	4.460	198
muni.rate - Robid overnight (%)	1.981	1.830	1.185	-5.750	4.899	1.493	2.401	198
muni.rate - Robid 3M (%)	0.294	0.045	3.190	-8.220	11.050	-1.560	1.510	198
muni.rate - Robid 6M (%)	0.579	0.394	7.531	-31.506	53.593	-3.081	3.187	198
muni.rate - Robid 12M (%)	-0.203	-0.160	0.322	-3.220	0.610	-0.270	-0.060	198
muni.rate - Robor overnight (%)	1.596	1.408	1.483	-10.830	5.586	1.003	2.208	198
muni.rate - Robor 3M (%)	-0.406	-0.290	0.647	-8.130	0.370	-0.450	-0.220	198
muni.rate - Robor 6M (%)	-0.561	-0.485	0.648	-8.330	0.040	-0.720	-0.280	198
muni.rate - Robor 12M (%)	-0.336	-0.300	0.259	-1.330	0.360	-0.420	-0.190	198

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muni.rate - avg.Robid-Robor 3M (%)	0.504	0.445	0.366	-0.100	4.120	0.291	0.559	198
muni.rate - avg.Robid-Robor 6M (%)	0.418	0.385	0.283	0.185	3.935	0.320	0.440	198
muni.rate - credit rate (%)	-3.517	-3.546	0.887	-6.137	-1.245	-3.993	-2.913	198
muni.rate - savings rate (%)	1.124	1.133	0.634	-1.724	2.738	0.831	1.499	198
muni.rate - T-bills yield (%)	0.854	0.885	0.924	-3.134	4.147	0.423	1.261	198
muni.rate - T-bonds rate (%)	0.024	-0.062	1.420	-4.337	7.030	-0.631	0.594	198
muni.rate - BET returns (%)	-30.101	-3.778	149.727	-1,445.245	112.148	-49.298	25.578	198
muni.rate - BET-C/Plus returns (%)	-23.550	-0.804	131.537	-1,236.555	112.461	-46.917	30.079	198
muni.rate - BET-FI returns (%)	-298.727	-0.504	3,550.258	-49,858.911	112.656	-56.228	32.533	198
muni.rate - yield <1 year	1.156	1.092	0.886	-2.254	5.316	0.694	1.450	198
muni.rate - yield 3 years	0.350	0.271	1.109	-2.658	4.966	-0.173	0.767	198
muni.rate - yield 5 years	0.115	-0.033	1.356	-3.667	4.937	-0.536	0.596	198
muni.rate - yield 10 years	-0.125	-0.507	1.788	-3.587	6.566	-1.338	0.512	198
muni.rate - ROTX returns (%)	-43.012	-4.036	272.338	-3,443.059	114.873	-49.065	26.066	198
muni.rate - BETXT returns (%)	-47.996	-3.039	350.853	-4,467.717	112.865	-51.209	26.265	198
muni.rate - BET-NG returns (%)	-22.114	2.058	99.966	-742.186	112.299	-47.801	32.389	198
<b>Descriptive statistics for the monthly variations of premium of muni.bonds avg.interest rates over various rates/returns for Nov.2001-Dec.2023</b>								
muni.rate - monthly inflation (%)	31.825	-29.954	696.715	-2,616.908	8,826.714	-109.976	41.397	265
muni.rate - Robid overnight (%)	9.567	-2.785	116.167	-922.618	768.832	-20.598	15.635	265
muni.rate - Robid 3M (%)	2,753.262	0.506	44,732.687	-282.375	728,200.000	-14.286	14.863	265
muni.rate - Robid 6M (%)	3.528	0.284	92.180	-414.529	1,157.440	-14.258	14.282	265
muni.rate - Robid 12M (%)	-2.906	0.075	72.566	-685.730	348.207	-13.425	15.487	265
muni.rate - Robor overnight (%)	-48.006	-4.167	687.846	-8,197.470	2,993.764	-36.671	17.363	265
muni.rate - Robor 3M (%)	-10.258	-1.163	283.652	-2,172.619	2,341.093	-30.717	25.887	265
muni.rate - Robor 6M (%)	22.722	-0.885	225.645	-1,012.683	2,149.254	-30.867	30.009	265
muni.rate - Robor 12M (%)	-50.767	-1.233	519.461	-5,850.000	871.767	-35.859	28.538	265
muni.rate - avg.Robid-Robor 3M (%)	44.695	0.131	487.661	-613.407	7,383.889	-19.516	23.718	265
muni.rate - avg.Robid-Robor 6M (%)	7.536	1.284	174.696	-869.164	1,718.593	-19.203	22.487	265
muni.rate - credit rate (%)	5.254	0.286	78.566	-75.349	1,237.736	-8.259	6.737	265
muni.rate - savings rate (%)	7.414	-0.346	89.006	-215.971	1,101.254	-8.477	8.358	265
muni.rate - T-bills yield (%)	6.332	-0.443	254.871	-2,728.863	1,675.325	-25.478	24.803	265

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muni.rate - T-bonds rate (%)	-86.029	-4.725	882.539	-12,171.647	1,004.972	-35.334	17,456	265
muni.rate - BET returns (%)	-528.466	-95.381	7,092.081	-95,687.316	38,880.211	-179.527	23,204	265
muni.rate - BET-C/Plus returns (%)	-195.778	-102.622	1,210.580	-8,756.112	8,156.748	-220.732	5,473	265
muni.rate - BET-FI returns (%)	3,346.219	-94.510	46,015.057	-32,588.947	720,889.156	-171.828	13,603	265
<b>Descriptive statistics for the monthly variations of premium of muni.bonds avg.interest rates over various rates/returns for Jul.2007-Dec.2023</b>								
muni.rate - monthly inflation (%)	19.535	-38.379	748.745	-2,616.908	8826.714	-124.348	44,723	197
muni.rate - Robid overnight (%)	5.307	-0.588	63.712	552.929	275.174	-12.107	16,979	197
muni.rate - Robid 3M (%)	-4.338	-0.538	281.333	-3,050.000	1,600.000	-14.189	6,542	197
muni.rate - Robid 6M (%)	-142.910	-54.306	964.206	-9,621.838	1,510.041	-122.912	34,574	197
muni.rate - Robid 12M (%)	25.046	-3.448	278.219	-833.333	2,600.000	-37.500	25,974	197
muni.rate - Robor overnight (%)	-86.662	-3.703	755.308	-8,197.470	693.912	-28.888	10,418	197
muni.rate - Robor 3M (%)	-10.140	-3.030	304.557	-3,800.000	1,050.000	-16.129	10,526	197
muni.rate - Robor 6M (%)	3.756	-1.370	69.324	-112.500	891.667	-6.522	4,348	197
muni.rate - Robor 12M (%)	-20.064	-2.326	208.734	-2,100.000	633.333	-21.053	14,754	197
muni.rate - avg.Robid-Robor 3M (%)	9.008	0.000	107.023	-280.000	1,273.333	-10.000	10,526	197
muni.rate - avg.Robid-Robor 6M (%)	5.001	0.000	82.768	-66.455	1,149.206	-5.755	5,063	197
muni.rate - credit rate (%)	0.711	0.321	14.237	-44.487	66.987	-6.632	6,643	197
muni.rate - savings rate (%)	10.425	0.278	102.747	-215.971	1,101.254	-9.578	10,283	197
muni.rate - T-bills yield (%)	9.201	-1.193	281.724	-2,728.863	1,675.325	-28.911	27,865	197
muni.rate - T-bonds rate (%)	-115.442	-13.622	1,022.492	-12,171.647	1,004.972	-47.736	24,508	197
muni.rate - BET returns (%)	-691.986	-90.844	7,103.424	-95,687.316	11,525.562	-187.262	24,497	197
muni.rate - BET-C/Plus returns (%)	-204.224	-96.187	978.787	-7,779.792	4,944.837	-220.732	14,575	197
muni.rate - BET-FI returns (%)	723.739	-94.786	14,423.187	-32,588.947	199,231.035	-171.808	4,378	197
muni.rate - yield <1 year	30.117	0.000	356.667	-763.723	4,484.365	-15.804	18,574	197
muni.rate - yield 3 years	60.508	-4.539	824.386	-1,929.348	10,295.775	-54.875	32,922	197
muni.rate - yield 5 years	-41.832	-6.322	341.167	-3,124.638	1,433.333	-48.462	24,912	197
muni.rate - yield 10 years	72.027	-1.940	883.510	-2,019.713	11,882.870	-25.588	23,339	197
muni.rate - ROTX returns (%)	69.243	-103.271	3,294.028	-18,906.910	34,770.145	-216.215	-4,082	197
muni.rate - BET-XT returns (%)	-47.564	-104.074	1,627.927	-7,779.792	13,805.050	-217.668	4,396	197
muni.rate - BET-NG returns (%)	-81.598	-92.095	556.397	-2,919.745	3,263.395	-193.366	5,636	197

Source: authors' calculations using JASP

**Annex 1d**

**Descriptive statistics for the premiums of various rates/returns over monthly inflation rate for Nov.2001-Dec.2023**

	Mean	Median	St.dev.	Minim	Maxim	Q1	Q3	Obs.
Robid overnight - monthly inflation (%)	-0.693	-0.200	7.809	-54.763	30.866	-3.922	3.287	266
Robid 3M - monthly inflation (%)	0.227	0.336	7.821	-53.663	31.416	-3.112	4.270	266
Robid 6M - monthly inflation (%)	0.208	0.284	7.778	-53.593	31.506	-2.896	3.846	266
Robid 12M - monthly inflation (%)	0.176	0.270	7.759	-53.523	31.556	-2.796	3.876	266
Robor overnight - monthly inflation (%)	0.469	1.031	8.274	-54.463	31.276	-3.448	4.880	266
Robor 3M - monthly inflation (%)	1.439	1.425	8.293	-53.363	31.876	-2.463	5.791	266
Robor 6M - monthly inflation (%)	1.572	1.756	8.246	-53.243	32.146	-2.219	6.025	266
Robor 12M - monthly inflation (%)	1.573	1.599	8.209	-53.173	32.206	-2.148	5.872	266
avg.Robid-Robor 3M - monthly inflation (%)	0.833	1.053	8.026	-53.513	31.646	-2.715	4.753	266
avg.Robid-Robor 6M - monthly inflation (%)	0.890	1.121	7.978	-53.418	31.826	-2.557	4.823	266
credit rate - monthly inflation (%)	6.140	5.882	8.702	-51.273	36.286	1.900	10.636	266
savings rate - monthly inflation (%)	-0.620	-0.154	7.731	-54.668	31.906	-3.878	3.557	266
T-bill yield - monthly inflation (%)	0.647	0.829	7.962	-53.833	31.926	-2.618	4.245	266
T-bond rate - monthly inflation (%)	0.222	0.891	8.106	-51.553	33.096	-2.493	4.702	266
BET return - monthly inflation (%)	54.592	3.957	256.939	-113.452	3.286.894	-24.795	58.628	266
BET-C/Plus return - monthly inflation (%)	43.736	3.504	190.035	-113.447	2.071.590	-25.886	60.244	266
BET-Fi return - monthly inflation (%)	1,144.907	6.783	14,426.829	-128.352	230,172.225	-37.548	72.270	266

  

	Mean	Median	St.dev.	Minim	Maxim	Q1	Q3	Obs.
Robid overnight - monthly inflation (%)	-1.505	-0.919	7.589	-54.763	30.866	-4.053	2.275	198
Robid 3M - monthly inflation (%)	-0.684	-0.499	7.543	-53.663	31.416	-3.410	2.898	198
Robid 6M - monthly inflation (%)	-0.579	-0.394	7.531	-53.593	31.506	-3.187	3.081	198
Robid 12M - monthly inflation (%)	-0.491	-0.259	7.523	-53.523	31.556	-3.407	3.269	198
Robor overnight - monthly inflation (%)	-1.031	-0.585	7.661	-54.463	31.276	-3.694	2.703	198
Robor 3M - monthly inflation (%)	-0.173	-0.104	7.629	-53.363	31.876	-2.985	3.573	198
Robor 6M - monthly inflation (%)	0.070	0.148	7.648	-53.243	32.146	-2.796	3.861	198
Robor 12M - monthly inflation (%)	0.163	0.264	7.636	-53.173	32.206	-2.602	3.962	198
avg.Robid-Robor 3M - monthly inflation (%)	-0.434	-0.301	7.579	-53.513	31.646	-3.171	3.323	198
avg.Robid-Robor 6M - monthly inflation (%)	-0.254	-0.134	7.583	-53.418	31.826	-2.977	3.461	198



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credit rate - monthly inflation (%)	4.082	4.333	8.025	-51.273	36.286	1.291	8.156	198
savings rate - monthly inflation (%)	-0.559	-0.319	7.840	-54.668	31.906	-3.383	3.282	198
T-bill yield - monthly inflation (%)	-0.228	-0.101	7.573	-53.833	31.926	-3.030	3.602	198
T-bond rate - monthly inflation (%)	0.576	0.945	7.390	-51.553	33.096	-1.908	4.504	198
BET return - monthly inflation (%)	30.666	2.376	150.790	-113.452	1,457,099	-26.866	51.161	198
BET-C/Plus return - monthly inflation (%)	24.115	0.741	132.380	-113.447	1,272,565	-27.653	46.974	198
BET-Fi return - monthly inflation (%)	299.292	1.902	3,551.115	-114.161	49,870,765	-33.855	55.795	198
Yield <1 year - monthly inflation (%)	-0.591	-0.288	7.567	-54.113	31.836	-3.339	3.259	198
Yield 3 years - monthly inflation (%)	0.215	0.505	7.446	-53.323	33.376	-2.334	4.275	198
Yield 5 years - monthly inflation (%)	0.450	0.856	7.357	-51.713	33.396	-2.003	4.460	198
Yield 10 years - monthly inflation (%)	0.690	1.183	7.275	-51.593	32.476	-1.565	4.575	198
ROTX return - monthly inflation (%)	43.577	3.698	273.237	-115.227	3,452,069	-24.972	50.589	198
BET-XT return - monthly inflation (%)	48.561	2.003	351.830	-113.990	4,479,571	-25.979	54.761	198
BET-NG return - monthly inflation (%)	22.679	1.593	100.378	-114.033	754,040	-33.747	48.782	198
<b>Descriptive statistics for the monthly variations of the premiums over monthly inflation rate for Nov.2001-Dec.2023</b>								
Robid overnight - monthly inflation (%)	-14.790	-49.540	708.309	-3,455,454	6,974,216	-124.836	37.814	265
Robid 3M - monthly inflation (%)	-503.217	-50.531	6,567,053	-89,920,571	9,085,284	-120.051	32,257	265
Robid 6M - monthly inflation (%)	-125.866	-54.904	857.538	-9,621,838	2,472,905	-125.654	30,827	265
Robid 12M - monthly inflation (%)	-88.473	-55.187	617.540	-5,996,672	2,452,505	-126.964	26,478	265
Robor overnight - monthly inflation (%)	-182.388	-36.939	2,695.843	-37,654,107	15,682,477	-111.289	41,648	265
Robor 3M - monthly inflation (%)	-109.215	-36.762	915.887	-8,739,086	3,125,527	-111.712	34,788	265
Robor 6M - monthly inflation (%)	321.169	-39.260	5,351,492	-7,488,957	85,331,941	-109.321	33,766	265
Robor 12M - monthly inflation (%)	-201.387	-44.811	3,083,914	-44,878,040	16,232,835	-112.606	29,549	265
avg.Robid-Robor 3M - monthly inflation (%)	-18.300	-39.124	728.436	-7,028,239	4,228,088	-112.428	37,392	265
avg.Robid-Robor 6M - monthly inflation (%)	42.981	-40.421	1,166.604	-7,441,601	8,408,184	-112.269	36,058	265
credit rate - monthly inflation (%)	76.171	-14.641	2,972.537	-20,891,334	43,351,797	-71.433	45,147	265
savings rate - monthly inflation (%)	10.094	-47.206	946.197	-4,594,446	7,934,324	-121.163	45,658	265
T-bill yield - monthly inflation (%)	267.024	-51.041	4,166.822	-2,781,090	66,482,854	-117.743	34,428	265
T-bond rate - monthly inflation (%)	-116.985	-59.076	1,643.684	-22,281,793	10,322,932	-137.382	19,739	265
BET return - monthly inflation (%)	-53.197	-96.032	3,338.043	-11,292,359	46,963,739	-189.362	15,776	265
BET-C/Plus return - monthly inflation (%)	-303.222	-97.014	2,104.273	-27,730,747	7,379,771	-199.988	14,634	265

BET-Fi return - monthly inflation (%)	1,228.306	-92.624	22,373.180	-22,249.428	362,282.633	-171.248	13.300	265
<b>Descriptive statistics for the monthly variations of the premiums of various rates/returns over monthly inflation rate for Jul.2007-Dec.2023</b>								
Robid overnight - monthly inflation (%)	6.302	-46.083	530.941	-2,923.938	3,904.872	-116.075	44.372	197
Robid 3M - monthly inflation (%)	-232.262	-44.318	4,075.085	-55,581.507	9,085.284	-119.107	39.815	197
Robid 6M - monthly inflation (%)	-142.910	-54.306	964.206	-9,621.838	1,510.041	-122.912	34.574	197
Robid 12M - monthly inflation (%)	-88.947	-54.188	689.722	-5,996.672	2,452.505	-121.433	33.851	197
Robor overnight - monthly inflation (%)	-270.457	-43.870	3,117.589	-37,654.107	15,682.477	-118.455	39.263	197
Robor 3M - monthly inflation (%)	-113.939	-50.401	925.137	-8,739.086	3,125.527	-114.902	34.788	197
Robor 6M - monthly inflation (%)	414.206	-51.588	6,161.601	-7,488.957	85,331.941	-114.416	37.616	197
Robor 12M - monthly inflation (%)	-200.593	-50.671	3,518.119	-44,878.040	16,232.835	-114.593	33.962	197
avg.Robid-Robor 3M - monthly inflation (%)	-36.555	-41.469	715.419	-7,028.239	3,879.615	-118.776	41.914	197
avg.Robid-Robor 6M - monthly inflation (%)	-24.250	-42.217	1,026.786	-4,003.862	8,408.184	-112.790	40.412	197
credit rate - monthly inflation (%)	113.039	-16.064	3,447.125	-20,891.334	43,351.797	-75.194	46.081	197
savings rate - monthly inflation (%)	37.713	-41.122	1,089.472	-4,594.446	7,934.324	-111.143	58.692	197
T-bill yield - monthly inflation (%)	400.471	-51.041	4,821.110	-2,781.090	66,482.854	-116.933	38.540	197
T-bond rate - monthly inflation (%)	-139.733	-55.804	1,702.531	-22,281.793	3,983.238	-129.241	37.161	197
BET return - monthly inflation (%)	-251.925	-89.762	1,337.190	-7,781.096	7,898.606	-210.939	0.556	197
BET-C/Plus return - monthly inflation (%)	-379.788	-92.978	2,178.179	-27,730.747	2,270.900	-215.384	13.106	197
BET-Fi return - monthly inflation (%)	-70.392	-94.345	2,298.241	-22,249.428	18,860.278	-181.235	-12.620	197
Yield <1 year - monthly inflation (%)	-128.632	-54.578	2,090.149	-20,997.660	14,475.969	-119.891	35.752	197
Yield 3 years - monthly inflation (%)	11.332	-52.326	954.981	-7,261.934	6,361.082	-119.857	55.212	197
Yield 5 years - monthly inflation (%)	-86.388	-56.791	710.430	-3,918.666	4,275.865	-131.547	38.900	197
Yield 10 years - monthly inflation (%)	534.576	-58.875	5,734.076	-8,212.001	60,198.415	-128.872	35.996	197
ROTX return - monthly inflation (%)	-160.455	-105.533	1,530.372	-12,569.616	8,812.711	-222.491	-16.312	197
BETXT return - monthly inflation (%)	39.659	-101.315	2,094.256	-15,376.953	20,317.556	-190.099	13.335	197
BET-NG return - monthly inflation (%)	-23.833	-97.125	1,916.825	-5,716.021	24,857.330	-192.075	8.830	197

Source: authors' calculations using JASP

MUNICIPAL BONDS AT BUCHAREST STOCK EXCHANGE: WHAT THE CORRELATIONS ARE REVEALING?

**Annex 1e**

**Descriptive statistics for the premiums of various rates/returns over T-bill avg. yield for Nov.2001-Dec.2023**

	Mean	Median	St.dev.	Minim	Maxim	Q1	Q3	Obs.
Robid overnight - T-bill yield (%)	-1.340	-0.995	2.004	-11.080	2.780	-1.792	-0.440	266
Robid 3M - T-bill yield (%)	-0.420	-0.385	1.085	-6.240	2.860	-0.780	-0.070	266
Robid 6M - T-bill yield (%)	-0.439	-0.380	1.043	-6.410	2.770	-0.728	-0.110	266
Robid 12M - T-bill yield (%)	-0.471	-0.360	1.122	-7.210	2.510	-0.710	-0.020	266
Robor overnight - T-bill yield (%)	-0.178	-0.440	1.841	-5.450	10.260	-1.010	0.282	266
Robor 3M - T-bill yield (%)	0.793	0.185	1.580	-2.320	9.150	-0.178	1.325	266
Robor 6M - T-bill yield (%)	0.925	0.395	1.392	-2.670	9.330	0.100	1.590	266
Robor 12M - T-bill yield (%)	0.926	0.480	1.306	-3.130	9.110	0.190	1.498	266
avg.Robid-Robor 3M - T-bill yield (%)	0.186	-0.100	1.133	-4.280	5.210	-0.480	0.493	266
avg.Robid-Robor 6M - monthly inflation (%)	0.243	0.055	0.962	-4.540	5.175	-0.264	0.446	266
credit rate - T-bill yield (%)	5.493	4.830	2.525	-0.375	15.710	3.910	6.459	266
savings rate - T-bill yield (%)	-1.267	-0.465	2.632	-12.300	5.245	-1.195	-0.016	266
T-bond rate - T-bill yield (%)	-0.425	0.710	5.422	-35.700	3.410	0.010	1.200	266
BET return - T-bill yield (%)	53.945	6.371	256.227	-112.288	3.282.719	-24.578	55.269	266
BET-C/Plus return - T-bill yield (%)	43.089	5.046	189.236	-112.283	2.067.414	-26.339	59.547	266
BET-Fi return - T-bill yield (%)	1,144.261	3.859	14,426.490	-127.328	230,168.050	-35.944	71.772	266

  

	Mean	Median	St.dev.	Minim	Maxim	Q1	Q3	Obs.
Robid overnight - T-bill yield (%)	-1.216	-1.020	1.034	-4.310	1.900	-1.477	-0.610	198
Robid 3M - T-bill yield (%)	-0.406	-0.405	0.671	-3.110	2.350	-0.740	-0.180	198
Robid 6M - T-bill yield (%)	-0.290	-0.310	0.565	-1.930	2.190	-0.610	-0.088	198
Robid 12M - T-bill yield (%)	-0.203	-0.260	0.561	-1.810	2.120	-0.538	0.017	198
Robor overnight - T-bill yield (%)	-0.742	-0.645	1.281	-3.940	10.260	-1.130	-0.230	198
Robor 3M - T-bill yield (%)	0.116	0.050	0.987	-1.740	9.150	-0.297	0.280	198
Robor 6M - T-bill yield (%)	0.359	0.240	0.929	-1.580	9.330	0.020	0.510	198
Robor 12M - T-bill yield (%)	0.452	0.360	0.901	-1.460	9.110	0.105	0.590	198
avg.Robid-Robor 3M - T-bill yield (%)	-0.145	-0.175	0.785	-1.890	5.210	-0.519	0.057	198
avg.Robid-Robor 6M - monthly inflation (%)	0.034	-0.028	0.704	-1.755	5.175	-0.304	0.180	198
credit rate - T-bill yield (%)	4.371	4.457	1.290	-0.375	8.240	3.569	5.033	198

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savings rate - T-bill yield (%)	-0.271	-0.300	0.966	-2.820	5.245	-0.867	0.105	198
T-bond rate - T-bill yield (%)	0.865	0.855	0.846	-1.800	3.410	0.385	1.440	198
BET return - T-bill yield (%)	30.954	4.090	150.040	-112.288	1,449.022	-24.346	49.941	198
BET-C/Plus return - T-bill yield (%)	24.403	1.634	131.836	-112.283	1,267.380	-28.637	47.805	198
BET-Fi return - T-bill yield (%)	299.580	1.342	3,550.475	-112.997	49,862.687	-32.092	55.787	198
Yield <1 year - T-bill yield (%)	-0.303	-0.150	0.708	-4.880	1.880	-0.420	0.000	198
Yield 3 years - T-bill yield (%)	0.503	0.560	0.830	-2.470	2.800	0.193	0.945	198
Yield 5 years - T-bill yield (%)	0.738	0.770	1.068	-3.580	3.350	0.210	1.468	198
Yield 10 years - T-bill yield (%)	0.978	1.125	1.561	-5.020	3.880	0.253	2.095	198
ROTX return - T-bill yield (%)	43.865	4.195	272.627	-112.463	3,446.884	-25.004	49.532	198
BET-XT return - T-bill yield (%)	48.849	4.303	351.133	-112.826	4,471.493	-24.446	52.280	198
BET-NG return - T-bill yield (%)	22.967	-1.312	100.238	-112.869	745.962	-32.133	48.372	198
<b>Descriptive statistics for the monthly variations of the premiums of various rates/returns over T-bill avg. yield for Nov.2001-Dec.2023</b>								
Robid overnight - T-bill yield (%)	-15.777	-8.955	379.754	-3,672.727	2,055.556	-49.624	23.944	265
Robid 3M - T-bill yield (%)	-15.190	-7.143	552.407	-3,100.000	7,300.000	-50.649	29.293	265
Robid 6M - T-bill yield (%)	-13.384	-4.000	221.563	-2,000.000	1,100.000	-45.790	26.190	265
Robid 12M - T-bill yield (%)	-53.002	-5.993	586.982	-9,000.000	1,600.000	-47.692	30.769	265
Robor overnight - T-bill yield (%)	24.667	-14.599	453.137	-1,643.750	4,614.286	-64.198	35.409	265
Robor 3M - T-bill yield (%)	6.590	-6.667	264.663	-2,209.091	1,600.000	-58.436	36.842	265
Robor 6M - T-bill yield (%)	-26.238	-4.217	573.595	-7,400.000	3,250.000	-47.126	21.094	265
Robor 12M - T-bill yield (%)	17.315	-3.982	198.598	-866.667	1,362.500	-37.255	28.571	265
avg.Robid-Robor 3M - T-bill yield (%)	-20.153	-11.940	315.879	-1,733.333	2,700.000	-78.261	27.273	265
avg.Robid-Robor 6M - monthly inflation (%)	-19.401	-13.043	269.161	-1,320.000	1,650.000	-76.667	25.000	265
credit rate - T-bill yield (%)	-1.188	-0.446	39.051	-520.000	175.439	-6.022	5.275	265
savings rate - T-bill yield (%)	49.580	-3.922	916.989	-2,000.000	14,000.000	-37.201	15.534	265
T-bond rate - T-bill yield (%)	-28.694	0.000	550.470	-6,800.000	5,500.000	-22.222	15.972	265
BET return - T-bill yield (%)	24.259	-94.062	2,679.936	-10,682.151	36,638.961	-174.877	23.085	265
BET-C/Plus return - T-bill yield (%)	996.649	-99.131	16,199.760	-22,504.648	252,582.914	-198.527	9.967	265
BET-Fi return - T-bill yield (%)	11,861.628	-94.326	158,401.022	-30,109.349	2,495,000.000	-164.763	14.961	265

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Descriptive statistics for the monthly variations of the premiums of various rates/returns over T-bill avg. yield for Jul.2007-Dec.2023									
Robid overnight - T-bill yield (%)	3.221	-4.348	269.261	-1,154.545	2,055.556	-33.784	22.892	197	
Robid 3M - T-bill yield (%)	-5.797	-7.143	618.011	-3,100.000	7,300.000	-43.243	25.714	197	
Robid 6M - T-bill yield (%)	-12.226	-4.412	245.366	-2,000.000	1,100.000	-50.000	26.923	197	
Robid 12M - T-bill yield (%)	-21.484	-9.677	211.902	-900.000	1,600.000	-61.538	29.730	197	
Robor overnight - T-bill yield (%)	10.684	-14.912	479.566	-1,643.750	4,614.286	-61.468	28.767	197	
Robor 3M - T-bill yield (%)	20.955	-15.385	260.823	-646.154	1,600.000	-81.250	48.387	197	
Robor 6M - T-bill yield (%)	-40.324	-10.377	688.736	-7,400.000	3,250.000	-57.692	33.333	197	
Robor 12M - T-bill yield (%)	10.696	-3.774	190.092	-866.667	1,183.333	-41.935	35.000	197	
avg.Robid-Robor 3M - T-bill yield (%)	-28.153	-14.545	336.177	-1,733.333	2,700.000	-85.714	34.783	197	
avg.Robid-Robor 6M - monthly inflation (%)	-14.163	-15.038	283.886	-1,320.000	1,650.000	-77.358	27.692	197	
credit rate - T-bill yield (%)	-2.284	0.000	42.915	-520.000	175.439	-5.775	5.411	197	
savings rate - T-bill yield (%)	73.392	-5.714	1,061.427	-2,000.000	14,000.000	-42.017	21.739	197	
T-bond rate - T-bill yield (%)	-2.6831	-2.439	625.878	-6,800.000	5,000.000	-20.455	18.571	197	
BET return - T-bill yield (%)	-71.610	-91.155	1,145.806	-4,860.959	11,661.887	-181.016	24.413	197	
BET-C/Plus return - T-bill yield (%)	1.511.749	-94.263	18,663.866	-4,317.575	252,582.914	-198.057	23.464	197	
BET-Fi return - T-bill yield (%)	12,803.154	-94.864	177,800.869	-24,694.868	2,495,000.000	-163.933	6.046	197	
Yield <1 year - T-bill yield (%)	-48.934	-8.696	363.493	-2,600.000	957.143	-97.297	15.464	197	
Yield 3 years - T-bill yield (%)	40.397	-2.500	339.591	-684.615	3,300.000	42.500	29.762	197	
Yield 5 years - T-bill yield (%)	38.724	0.000	380.163	-396.552	4,100.000	-25.676	26.131	197	
Yield 10 years - T-bill yield (%)	15.658	0.000	186.347	-900.000	1,600.000	-20.567	19.632	197	
ROTX return - T-bill yield (%)	-780.897	-103.203	9,005.248	-112,176.509	26,114.483	-211.650	-7.822	197	
BETXT return - T-bill yield (%)	90.449	-105.229	1,717.119	-5,679.811	13,418.170	-200.801	13.570	197	
BETNG return - T-bill yield (%)	-144.230	-96.195	1,112.717	-12,511.378	5,146.311	-194.819	3.818	197	

Source: authors' calculations using JASP

**Annex 1f**

**Descriptive statistics for the premiums of various rates/returns over Yield <1 year for Jul.2007-Dec.2023**

	Mean	Median	St.dev.	Minim	Maxim	Q1	Q3	Obs.
Robid overnight - Yield <1year (%)	-0.913	-0.890	1.049	-3.980	3.690	-1.415	-0.412	198
Robid 3M - Yield<1year (%)	-0.103	-0.255	0.846	-3.200	3.540	-0.580	-0.042	198
Robid 6M - Yield<1year (%)	0.012	-0.150	0.757	-1.200	3.290	-0.365	0.060	198
Robid 12M - Yield<1year (%)	0.100	-0.065	0.749	-1.180	3.270	-0.297	0.200	198
Robor overnight - Yield<1year (%)	-0.439	-0.495	1.381	-3.480	12.530	-1.027	-0.013	198
Robor 3M - Yield<1year (%)	0.418	0.170	1.207	-1.030	11.420	-0.158	0.385	198
Robor 6M - Yield<1year (%)	0.661	0.415	1.161	-0.850	11.600	0.170	0.688	198
Robor 12M - Yield<1year (%)	0.755	0.540	1.136	-0.780	11.380	0.283	0.847	198
avg.Robid-Robor 3M - Yield<1year (%)	0.158	-0.043	0.995	-1.550	7.480	-0.388	0.186	198
avg.Robid-Robor 6M - Yield<1year (%)	0.337	0.117	0.930	-1.025	7.448	-0.064	0.365	198
credit rate - Yield<1year (%)	4.674	4.820	1.293	0.975	9.005	3.779	5.241	198
savings rate - Yield<1year (%)	0.032	0.047	1.051	-2.415	6.05	-0.660	0.350	198
T-bill yield - Yield<1year (%)	0.303	0.150	0.708	-1.880	4.880	0.000	0.420	198
T-bond rate - Yield<1year (%)	1.168	1.095	0.884	-1.910	4.890	0.540	1.555	198
BET return - Yield<1 year (%)	31.257	4.350	149.945	-110.018	1,449.332	-24.001	50.109	198
BET-C/Plus return - Yield<1year (%)	24.706	1.927	131.704	-110.013	1,265.500	-28.598	47.871	198
BET-Fi return - Yield<1year (%)	299.883	1.427	3,550.469	-110.727	49,862.997	-31.450	56.562	198
Yield 3 years - Yield<1year (%)	0.806	0.750	0.754	-1.140	4.020	0.350	1.140	198
Yield 5 years - Yield<1year (%)	1.041	0.900	1.002	-2.680	5.260	0.490	1.600	198
Yield 10 years - Yield<1year (%)	1.281	1.325	1.415	-3.350	4.680	0.600	2.290	198
ROTX return - Yield<1year (%)	44.168	5.031	272.482	-111.319	3,445.004	-24.771	49.794	198
BETXT return - Yield<1year (%)	49.152	4.228	351.068	-110.556	4,471.803	-24.485	52.382	198
BET-NG return - Yield<1year (%)	23.270	-1.272	100.199	-110.599	746.272	-31.633	49.120	198
<b>Descriptive statistics for the monthly variations of the premiums of various rates/returns over Yield &lt;1 year for Jul.2007-Dec.2023</b>								
Robid overnight - Yield<1year (%)	-13.360	-2.308	217.201	-1.913.333	866.667	-38.158	18.182	197
Robid 3M - Yield<1year (%)	41.126	0.000	575.023	-1.600.000	7.300.000	-44.000	36.842	197
Robid 6M - Yield<1year (%)	-11.362	-2.542	387.050	-4.350.000	1.375.000	-54.054	48.241	197
Robid 12M - Yield<1year (%)	-29.084	-4.124	307.270	-2.550.000	1.375.000	-58.462	31.579	197

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Robor overnight - Yield<1year (%)	-26.605	-4.839	355.907	-3.480.000	1.680.000	-62.500	34.615	197
Robor 3M - Yield<1year (%)	-4.774	-8.696	196.477	-800.000	1.150.000	-59.016	28.571	197
Robor 6M - Yield<1year (%)	19.674	-2.703	207.641	-650.000	1.900.000	-30.435	26.923	197
Robor 12M - Yield<1year (%)	-1.870	-1.170	203.073	-2.000.000	1.200.000	-24.638	21.622	197
avg.Robid-Robor 3M - Yield<1year (%)	-46.935	-9.055	649.473	-7.850.000	2.600.000	-80.000	36.986	197
avg.Robid-Robor 6M - Yield<1year (%)	24.533	-8.929	416.940	-1.144.444	4.000.000	-68.639	29.000	197
credit rate - Yield<1year (%)	1.177	-0.396	19.350	-73.918	191.282	-4.714	4.541	197
savings rate - Yield<1year (%)	34.440	-0.901	323.990	-1.525.000	2.866.667	-46.341	22.727	197
T-bill yield - Yield<1year (%)	-48.934	-8.696	363.493	-2.600.000	957.297	-97.297	15.464	197
T-bond rate - Yield<1year (%)	15.644	1.515	139.161	-790.909	1.075.000	-20.192	21.053	197
BET return - Yield<1year (%)	-144.712	-91.459	753.530	-4.883.502	4.217.169	-182.932	14.470	197
BET-C/Plus return - Yield<1year (%)	-74.661	-96.739	1.638.048	-4.317.575	20.724.655	-209.493	15.276	197
BET-Fi return - Yield<1year (%)	1.059.011	-94.069	11.566.575	-3.306.497	153.913.970	-161.007	13.889	197
Yield 3 years - Yield<1year (%)	-41.052	0.000	532.899	7.100.000	933.333	-32.000	24.051	197
Yield 5 years - Yield<1year (%)	-82.895	0.000	829.151	-9.033.333	1.950.000	-23.364	20.548	197
Yield 10 years - Yield<1year (%)	-30.840	0.000	444.125	-4.633.333	1.016.667	-19.008	17.391	197
ROTX return - Yield<1year (%)	737.697	-103.458	12.742.302	-31.062.165	173.957.154	-208.426	-5.617	197
BETXT return - Yield<1year (%)	15.159	-106.160	1.516.572	-5.679.811	12.456.914	-216.995	8.361	197
BET-NG return - Yield<1 year (%)	-4.139.006	-94.512	56.835.213	-797.753.601	5.096.936	-190.941	3.312	197

Source: authors' calculations using JASP