Drivers and Barriers
to the Development of Corporate Bond Markets
of Developed and Developing Countries
in the 11 Years of the 21st Century

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'Bondization' – Development of the Bond Market

Банк России
Центральный банк Российской Федерации

Analytical Survey №12

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Bank of Russia is constantly working to remove restrictions that inhibit growth of the bond market: these are measures to reduce administrative, cash and time costs of bond issuing, development of exchange and accounting infrastructure, institutions for external risk assessment, in particular, in the framework of the reset of the rating industry, and mechanisms for providing price information on low-liquid instruments (price centers).
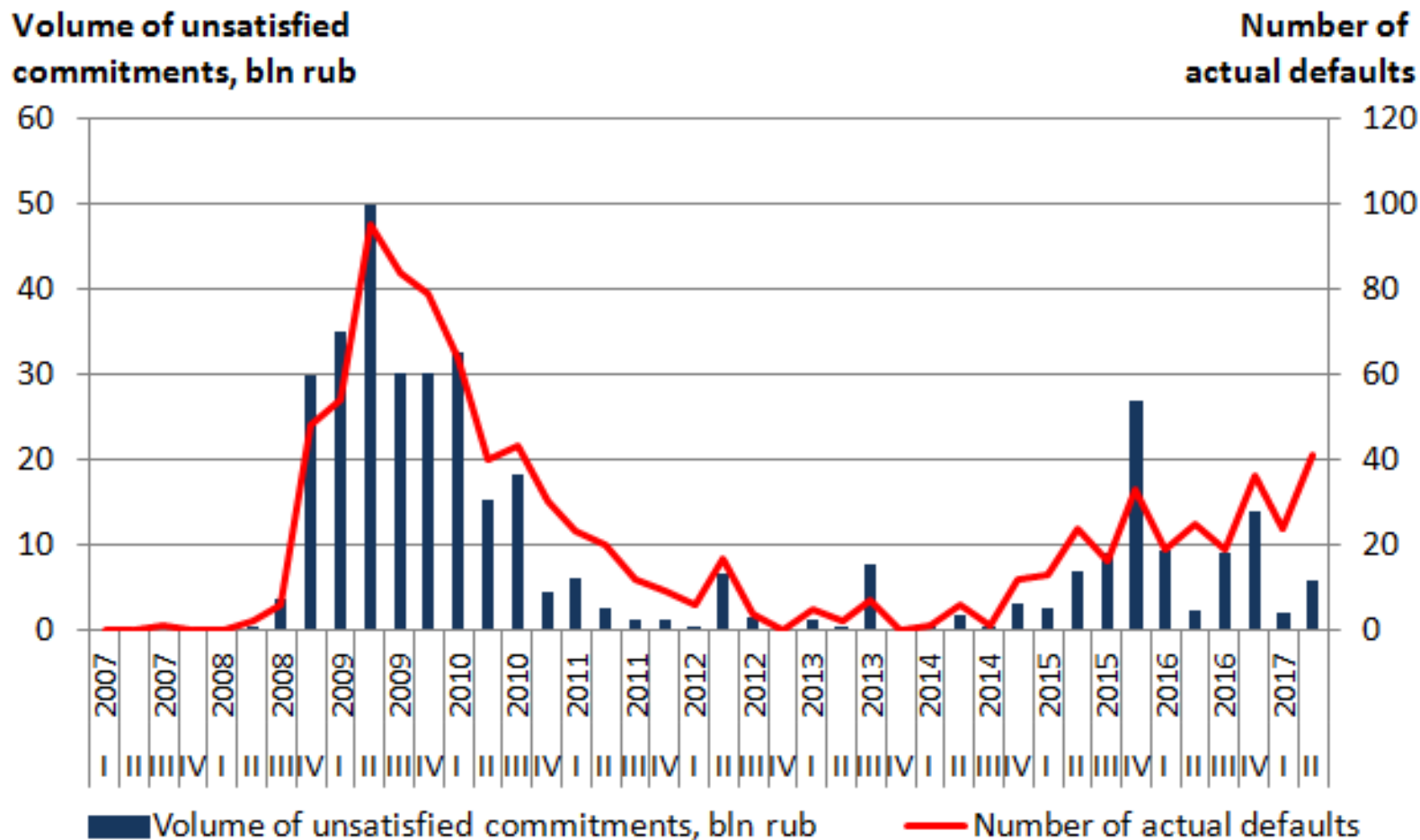
Bank of Russia identifies barriers to institutional and retail investors. The effectiveness of this work depends on the dialogue with the professional community, the satisfaction of market participants with changes. That is why Bank of Russia prepares for publication a consulting report on further steps to develop the bond market.

Russian Corporate Bond Market.
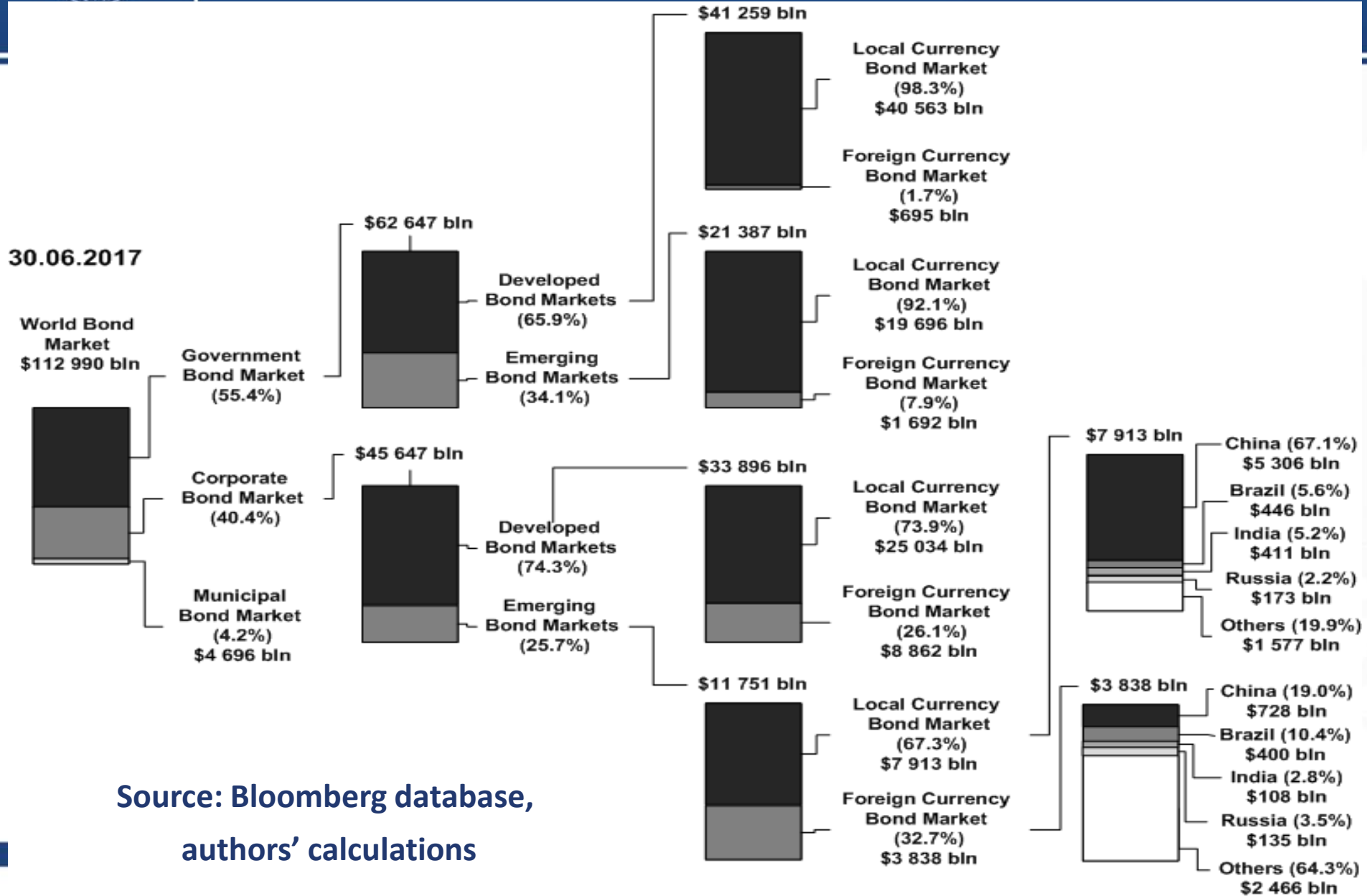# Share of Corporate Bonds in Total Debt Volume, %

Source: Bank of Russia
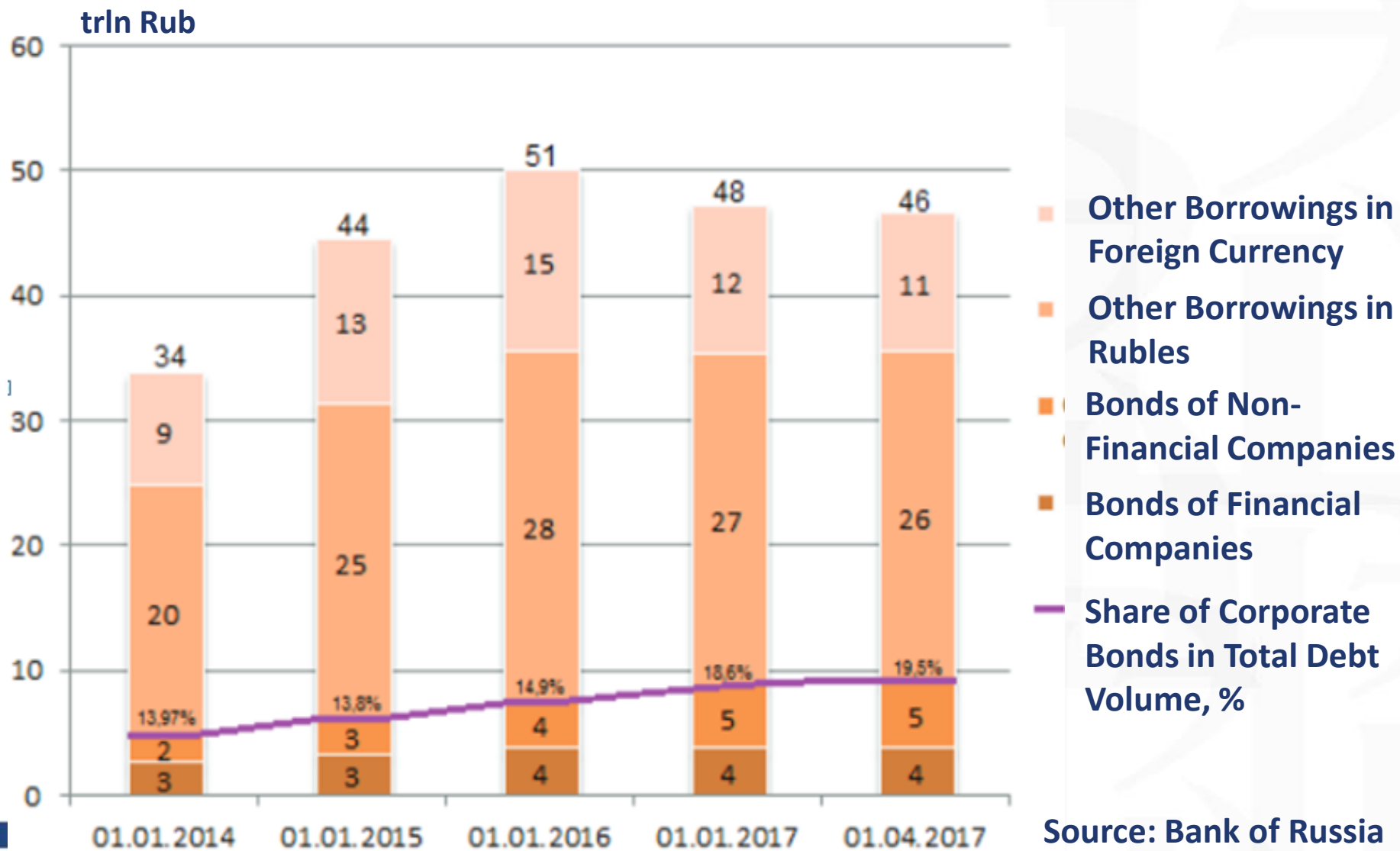
Actual Defaults in Russian Corporate Bond Market

Source: Cbonds, authors' calculations

30.06.2017

World Bond Market $112 990 bln

Government Bond Market (55.4%) — $62 647 bln
- **Developed Bond Markets (65.9%)** — $41 259 bln
  - Local Currency Bond Market (98.3%) $40 563 bln
  - Foreign Currency Bond Market (1.7%) $695 bln
- **Emerging Bond Markets (34.1%)** — $21 387 bln
  - Local Currency Bond Market (92.1%) $19 696 bln
  - Foreign Currency Bond Market (7.9%) $1 692 bln

Corporate Bond Market (40.4%) — $45 647 bln
- **Developed Bond Markets (74.3%)** — $33 896 bln
  - Local Currency Bond Market (73.9%) $25 034 bln
  - Foreign Currency Bond Market (26.1%) $8 862 bln
- **Emerging Bond Markets (25.7%)** — $11 751 bln
  - Local Currency Bond Market (67.3%) $7 913 bln
  - Foreign Currency Bond Market (32.7%) $3 838 bln

Municipal Bond Market (4.2%) $4 696 bln

$7 913 bln
- China (67.1%) $5 306 bln
- Brazil (5.6%) $446 bln
- India (5.2%) $411 bln
- Russia (2.2%) $173 bln
- Others (19.9%) $1 577 bln

$3 838 bln
- China (19.0%) $728 bln
- Brazil (10.4%) $400 bln
- India (2.8%) $108 bln
- Russia (3.5%) $135 bln
- Others (64.3%) $2 466 bln

Source: Bloomberg database, authors' calculations

Bond Markets of Developed and Developing Countries

Comparison of 31.12.2006 and 30.06.2017

World Bond Market, $bln	Share of Government Bonds, %	Share of Corporate Bonds, %	Share of Municipal Bonds, %
62 376 / 112 990	57.0 / 55.4	40.3 / 40.4	2.7 / 4.2

| Emerging Corporate Bond Markets, $bln	Share of Local Currency (LCY) Bonds, %	Share of Foreign Currency (FCY) Bonds, %
2 823 / 11 751	52.4 / 67.3	47.6 / 32.7

2006 / 2017		

Corporate Bond Market, $bln	Share of Developed Corporate Bond Markets, %	Share of Emerging Corporate Bond Markets, %
25 116 / 45 647	88.8 / 74.3	11.2 / 25.7

LCY Corporate Bond Markets of Emerging Countries ($ bln)	China, $bln	Brazil, $bln	India, $bln	Russia, $bln
1 479 / 7 913	118 / 5306	491 / 446	98 / 411	33 / 173

Source: Bloomberg database, authors' calculations

Different Sources of Financing: LCY Corporate Bond Markets and Bank Credits
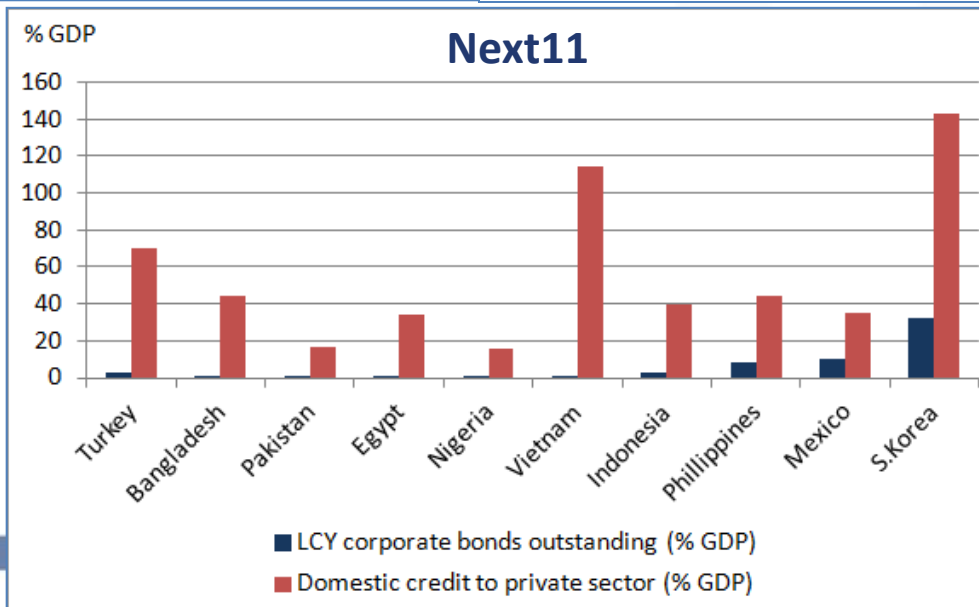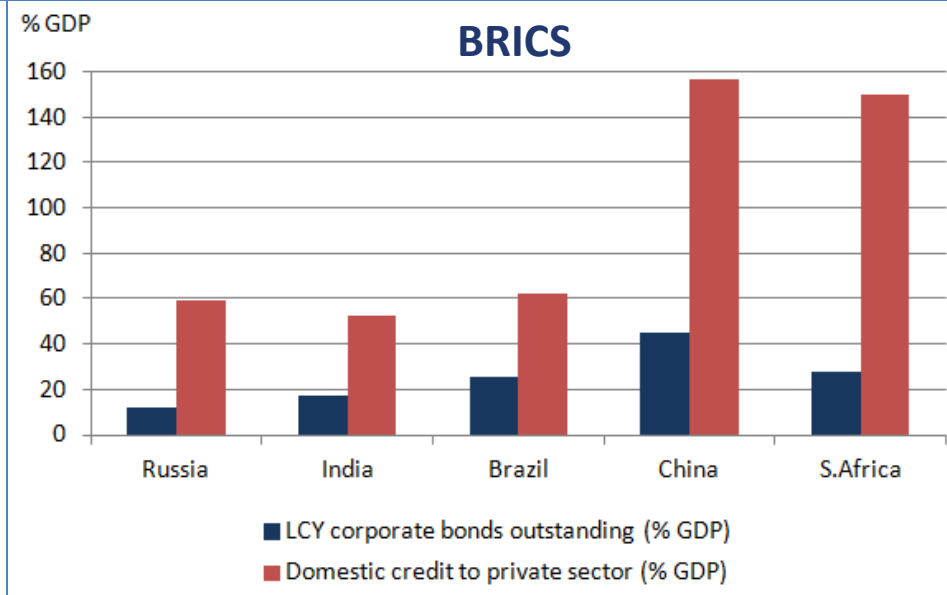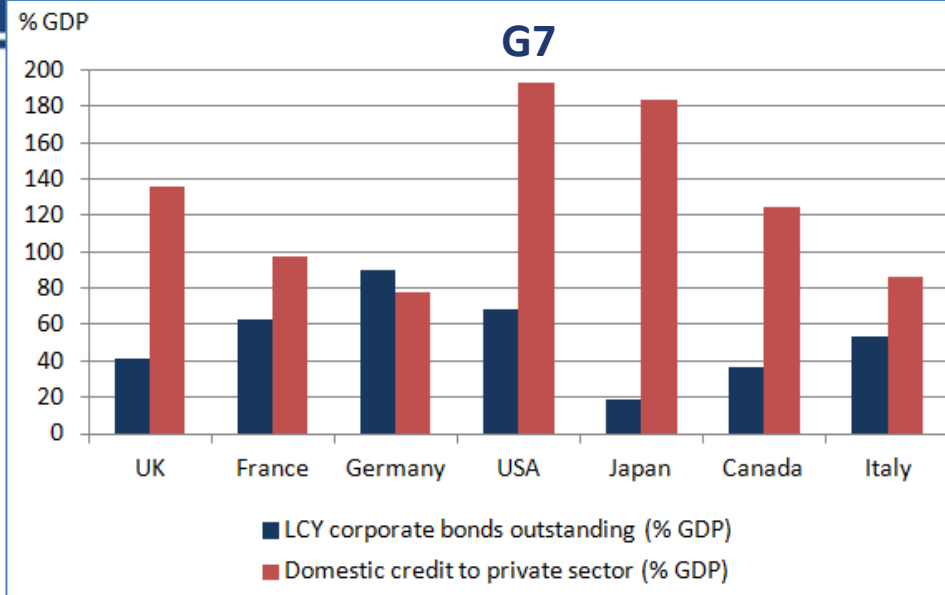
Source: Bloomberg database, World Bank database, authors' calculations

What factors are drivers and barriers to the development of corporate bond markets?

Is an improvement of the quality of institutions always an advantage to attract debt in LCY corporate bond markets?

What should be the state policy to stimulate the development of LCY corporate bond markets?

Goal of the study: to identify macroeconomic and institutional determinants and barriers to the development of LCY corporate bond markets across a wide cross-country sample

**Analysis of the impact
of macroeconomic factors
on the development
of LCY corporate bond markets**

**Eichengreen et al., 2006;
Burger and Warnock, 2006;
Fidora et al., 2007;
Forslund et al., 2011;
Batten et al., 2012;
Bhattacharyay, 2013**

**Identifying institutional determinants
of the development
of LCY corporate bond markets**

**Eichengreen and Luengnaruemitchai,
2004;
Burger and Warnock, 2006;
Claessens et al., 2007;
Guscina, 2008;
Berensmann et al., 2015;
Park, 2016**

- ✓ **Focus on the fast-growing segment of LCY corporate bonds**

- ✓ **Consideration of a wide range of macroeconomic and institutional factors and investigation of their influence on the development of LCY corporate bond markets**

- ✓ **Applying multifactor regressions and the Generalized Method of Moments (GMM) to deal with the problem of potential endogeneity of variables**

- ✓ **Applying logit and probit models to reveal the impact of macroeconomic and institutional factors on the level of development of LCY corporate bond markets (outstanding volume in GDP)**

- ✓ **Consideration of non-linear factors**

Hypothesis 1. Macroeconomic and institutional factors have a significant impact on the share of LCY corporate bonds in the total volume of new corporate bond issues

Hypothesis 2. Macroeconomic and institutional factors have a significant impact on the level of development of LCY corporate bond market (outstanding volume in GDP)

The dependent dummy is equal to 1, if the volume of LCY corporate bonds outstanding (% GDP) is greater than the median value for this year for all countries

Description of Variables

Dependent Variables	
lcy_new_bonds	Share of LCY corporate bonds in the total volume of new issues (%)
bondmarket	Dummy =1 if the volume of LCY corporate bonds outstanding (% GDP) is greater than the median value for this year for all countries; =0 otherwise
Explaining Variables	
ln_mc	Logarithm of market capitalization (mln USD)
cur_usd	Change in local currency rate (USD / units of LCY) for a given quarter, %
gdp_growth	Annual rate of real GDP growth for a given quarter (in comparison with the same quarter of the previous year)
inflation	Inflation rate (CPI), the average value for the three months of a given quarter (%)
inflation_stab	Difference between the values of *inflation* for the current and previous quarters
dyear	Dummy of the global financial crisis of 2008-2009
next11	Dummy of the country's belonging to the Next 11 group (1 – yes, 0 – no)

Description of Variables

ief	Index of Economic Freedom by Heritage Foundation
ipr	Index of Property Rights Heritage Foundation
ichr	Human Development Index (United Nations Development Program)
polit	Indicator of Political Stability and Absence of Violence by World Bank
gover	Indicator of Government Effectiveness by World Bank
regul	Indicator of Regulatory Quality by World Bank
rule	Indicator of Rule of Law by World Bank
corrup	Indicator of Control of Corruption by World Bank
rating_SP	Change in sovereign credit rating by S&P (0 – no change, +1 – an increase, -1 – a decrease)
rating_Fitch	Change in sovereign credit rating by Fitch (0 – no change, +1 – an increase, -1 – a decrease)
rating_ Moodys	Change in sovereign credit rating by Moody's (0 – no change, +1 – an increase, -1 – a decrease)

For testing the Hypothesis 1:
- Models with Random Effects

$$lcy\_new\_bonds = \alpha + \sum \beta_{1,k} \cdot Macrofactor_k + \sum \beta_{2,l} \cdot Institution_l + u + \varepsilon$$

- GMM-models (Arellano and Bond (1991), Arellano and Bover (1995), Blundell and Bond (1998))

$$lcy\_new\_bonds_{i,t} = \alpha \cdot lcy\_new\_bonds_{i,t-1} + \beta_0 \cdot X_{i,t} + \mu_i + \varepsilon_{i,t}$$

$$lcy\_new\_bonds_{i,t} - lcy\_new\_bonds_{i,t-1} =$$
$$= \alpha \cdot (lcy\_new\_bonds_{i,t-1} - lcy\_new\_bonds_{i,t-2}) +$$
$$+ \beta_0 \cdot (X_{i,t} - X_{i,t-1}) + \varepsilon_{i,t} - \varepsilon_{i,t-1}$$

$$E[(dom\_cur\_bonds_{i,t-s} - dom\_cur\_bonds_{i,t-s-1})(\mu_i + \varepsilon_{i,t})] = 0, \quad s = 1$$
$$E[(X_{i,t-s} - X_{i,t-s-1})(\mu_i + \varepsilon_{i,t})] = 0, \text{ для } s = 1$$

For testing the Hypothesis 2:
- Logit-models

$$p = F(Z) = \frac{1}{1 + e^{-Z}}$$

$$Z = \beta_1 + \sum \beta_{2,k} \cdot Macrofactor_k + \sum \beta_{3,l} \cdot Institution_l$$

- Probit-models

$$f(Z) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}Z^2}$$

$$Z = \beta_1 + \sum \beta_{2,k} \cdot Macrofactor_k + \sum \beta_{3,l} \cdot Institution_l$$

We consider a balanced panel for 28 countries and 44 quarterly periods (from 2006 to 2016), with the focus on the Next 11 group of countries.

Variable	Mean	Median	Stand. Deviation
lcy_new_bonds	0,64	0,74	0,32
ichr	0,76	0,76	0,13
polit	-0,21	0,02	1,00
gover	0,55	0,37	0,90
regul	0,51	0,40	0,89
rule	0,37	0,10	0,96
corrup	0,29	-0,01	1,04
cur_usd	-0,01	0,00	0,05
ln_credit	4,27	4,49	0,72
gdp_growth	0,03	0,03	0,04
inflation	0,05	0,04	0,04
inflation_stab	0,00	0,00	0,01
ln_mc	4,15	4,10	0,92
rating_SP	-0,02	0,00	0,18
rating_Fitch	-0,01	0,00	0,21
rating_Moodys	0,01	0,00	0,23
ief	64,59	62,75	11,00
ipr	55,00	50,00	24,95

Variable	Number of Calculation										
	1	2	3	4	5	6	7	8	9	10	11
ief	-0.018**										-0.019**
ief2	0.0001**										0.0001**
ief_crisis	0.065***										
ief2_crisis	-0.0005***										
ipr		-0.0008*									
ipr2_crisis			-0.0001**								
ipr_crisis			0.011**								
ipr_next11		0.002**									
ichr				1.717**	1.872***						
ichr2				-1.215**	-1.311***						
ichr_next11				0.044*							
polit						-0.032***					
polit2						-0.017**					
gover							-0.106***				
gover2							0.042***				
gover_next11							0.115***				
regul								-0.072***			
regul2								0.025*			
regul_next11								0.091***			

Variable	Number of Calculation										
	1	2	3	4	5	6	7	8	9	10	11
rule									-0.068***		
rule2									0.023*		
rule_next11									0.070**		
corrup										-0.038***	
corrup2										0.012	
corrup_crisis										0.075**	
corrup2_crisis										-0.042*	
inflation_stab	-1.009*	-0.979*	-0.998*	-0.972*	-0.973*	-0.956*	-0.984*	-0.932*	-0.962*	-0.965*	-0.959*
ln_mc	0.033***	0.032***	0.025***	0.029***	0.029***	0.03***	0.039***	0.031***	0.036***	0.035***	0.134**
ln_mc2											-0.012*
ln_mc_next11											0.012***
rating_sp	0.084**	0.086*	0.084**	0.086**	0.086**	0.091**	0.084**	0.086**	0.089**	0.091**	0.078*
next11	0.033*	-0.053	0.04**		0.031*						
dyear	-2.164***	0.013	-0.311***	0.013	0.012	0.012	0.017	0.016	0.014	0.038	0.013
constant	1.112***	0.54***	0.518***	-0.079	-0.142	0.523***	0.492***	0.522***	0.496***	0.489***	0.910***
Observations	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126
Wald chi2	30.54***	25.03***	27.28***	27.23***	26.79***	23.74***	37.70***	29.14***	30.54***	25.38***	26.12***

Variable	1	2	3	4	5
lcy_new_bonds L1.	-0.128***	-0.124***	-0.134***	-0.129***	-0.122***
ipr			0.101**	0.097**	
ipr2			-0.001**	-0.0008**	
ief	-0.311***	-0.271**			-0.270**
ief2	0.003***	0.002***			0.0022***
ief_crisis	0.12***				
ief2_crisis	-0.001***				
inflation_stab	-1.319**	-1.267*	-1.234***	-1.42**	-1.44**
ln_mc	0.071	0.057	0.056	-0.595*	-0.609*
ln_mc2				0.069*	0.072*
ln_mc_next11				0.298**	0.272*
rating_sp	0.085*	0.085*	0.089**	0.087**	0.084*
dyear	-3.749***	0.043	0.052	0.052	0.044
constant	9.769***	8.349**	-1.93	-0.774	9.456***
Observations	548	548	548	548	548
Wald chi2	37.89***	27.13***	25.14***	30.27***	31.94***

✓ **In case of a relatively undeveloped stock market, the demand for new issues of LCY corporate bonds is low, but as the stock market develops, the demand for new issues of LCY corporate bonds grows.**

✓ **An increase in sovereign credit ratings gives an incentive for companies to enter the national bond market.**

✓ **In case of increasing inflation, national companies tend to issue more LCY corporate bonds.**

✓ **Impact of most institutional factors is similar, non-linear and is described by U-dependence: in case of undeveloped institutions, initial improvements in their quality reduce the share of LCY corporate bonds in the total volume of new issues. After reaching a certain level of institutional development, their influence on the issuance of new LCY corporate bonds becomes positive.**

✓**For the Next 11 countries improvement of quality of institutions provides more significant incentives for growth of the share of new LCY corporate bonds.**

	logit	logit, dy/dx	probit	probit, dy/dx	logit	logit, dy/dx	logit	logit, dy/dx	logit	logit, dy/dx	logit
ief	-1.138***	-1.138***	-0.667***	-0.667***	-1.110***	-1.110***					-0.527***
ief2	0.008***	0.008***	0.005***	0.005***	0.008***	0.008***					0.004***
ief_crisis	2.074***	2.074***	1.123***	1.123***	2.049***	2.049***					
ief2_crisis	-0.015***	-0.015***	-0.008***	-0.008***	-0.015***	-0.015***					
ipr2_crisis							-0.004***	-0.004***			
ipr_crisis							0.401***	0.401***			
regul									-2.198***	-2.198***	
regul2									1.154***	1.154***	
regul_next11									2.929***	2.929***	
gdp_growth											7.864*
inflation									10.103*	10.103*	12.166**
inflation_stab	14.863	14.863	8.016	8.016	13.912	13.912	11.161	11.161			
ln_mc	-0.571*	-0.571*	-0.285	-0.285	-0.534*	-0.534*	-0.183	-0.183	-0.516**	-0.516**	-0.769***
rating_sp	-0.056	-0.056	-0.036	-0.036			0.223	0.223			0.173
rating_moodys					-0.228	-0.228					
next11	1.668***	1.668***	0.990***	0.990***	1.662***	1.662***	1.6***	1.6***			
dyear	-67.82***	-67.82***	-37.078***	-37.078***	-67.015***	-67.015***	-9.402**	-9.402**	-0.311	-0.311	-0.546
constant	36.02***		20.608***		33.683***		-4.921***		2.888**		
Observations	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126	220
log likelihood	-125.1		-124.1		-124.5		-135.4		-134.6		-89.92

✓ **In case of a relatively low level of institutional development, improvements in institutional quality slow down the development of LCY corporate bond market (outstanding volume to GDP). But starting from a certain level, the influence of institutional quality becomes positive: the outstanding volume of LCY corporate bonds (% GDP) grows at a faster rate.**

✓**During the crisis periods, the probability that the corporate bond market will be more developed decreases. At the same time, institutions give the national bond market incentives for growth and help to beat competitors.**

✓ **A developed stock market slows down the development of the bond market.**

✓ **An increase in sovereign credit ratings reduces the probability of outstripping development of LCY corporate bond market.**

✓**Belonging to the Next 11 group provides incentives for growth of the outstanding volume of LCY corporate bonds (% GDP).**

✓ **GDP growth positively affects the outstanding volume of LCY corporate bonds (% GDP).**