2020

Emerging bond markets: shedding light on trends and patterns

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Routledge Studies in the Modern World Economy

EMERGING BOND MARKETS

SHEDDING LIGHT ON TRENDS AND PATTERNS

Tamara Teplova, Tatiana V. Sokolova
and Qaiser Munir

Emerging Bond Markets

The bond market is a key securities market and emerging economies present exciting, new investment opportunities. This timely book provides insights into these emerging bond markets through empirical models and analytical databases, i.e. Bloomberg, Eikon Refinitiv and the Russian Cbonds.

The book looks at the dynamics of the development of emerging bond markets, their competitiveness, features and patterns using macro and micro level data. It also takes into consideration various securities type i.e. government, corporate, sub-federal and municipal bonds, to identify respective challenges and risks. The book also analyses factors that may inhibit or stimulate a well-balanced financial market. It includes case studies of Asian, Latin American and Russian bond markets, as well as cross-country comparisons.

It will be a useful reference for anyone who is interested to learn more of the bond market and the modelling techniques for critical data analysis.

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Routledge
Taylor & Francis Group

LONDON AND NEW YORK

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Preface

The global economy is growing at a slower pace, the population is ageing, the stratification of the population by wealth and access to resources is growing, which leads to a drop in consumer demand. There are fewer breakthrough technologies and products on the market that could fundamentally spur consumer activity.

The analysis of situation during the global financial crisis of 2007–2008 (the subprime problem led to $3 tn of debt write-offs), the euro-debt crisis of 2010, and the subsequent recession of 2010–2011 in the global economy, shows that the initial problems were associated with the accumulation of imbalanced debt (by maturity, currency, income structure, etc.) in many developed and developing economies, especially at the household level and in the financial sector. The governments of the United States and a number of large countries had to take unprecedented measures in order to maintain financial and political stability. It would seem that the post-crisis period should be characterized by a significant easing of the debt burden, a revision of the borrowing policy, both at the level of governments and at the level of firms and households. However, statistics show the opposite. In this monograph we consider trends in the debt market through the prism of bonds.

We note three characteristic features of the global financial system by the beginning of 2020: 1) an ultra-soft monetary policy or a 'money helicopter' by the central banks and governments of most countries and a high level of liquidity in the financial system; 2) the ongoing process of increasing debt, especially in emerging capital markets; 3) the risk of behaviour of major market agents.

In December 2019, the global debt reached the record levels of $256 tn ($182 tn in 2018), or 230% of the global GDP (IIF, according to the Institute of International Finance), the growth over 20 years was more than 3.2 times (in nominal dollar terms from $81 tn in 1999). China's total debt at the end of 2019 exceeded $40 tn (303% of domestic GDP). At near-zero rates, there is no catastrophe with debt growth. But the share of high-risk debts is high. In the monograph, we consider the features of the formation of the recovery rate in emerging markets, the determinants of defaults and the ability to reduce risks through portfolio building (ETFs).

In the total debt about $70 tn is the government debt, $50 tn is the debt of households ($15.3 tn in 1999), $80 tn is the debt of non-financial companies ($22 tn in 1999)[1]. The global bond market exceeded $118 tn in 2019 ($115 tn in 2018). The largest weight in bond debt is held by the US ($41.9 tn), followed by China ($13.6 tn), Japan ($12.4 tn), France ($4.6 tn) and Germany ($3.5 tn). In the structure of the global bond market, the share of government, corporate and municipal bonds is 61%, 36% and 3%, respectively. In Russia, Brazil, and S. Korea, corporate non-financial debt significantly exceeds government debt. Therefore, our monograph focuses on the corporate debt of emerging markets, and special attention is paid to the growing countries of Asia.

Potentially problematic corporate debt of the global market can be estimated at the beginning of 2020 at $5 tn as the sum of $1.2 tn of leveraged loans, $1.2 tn in sub-investment corporate bonds and $2.5 tn of 'frontier bonds' with a BBB rating (70% IG bond matured in the next 5 years falls on this group). In case of rising inflation and interest rates in the market, this debt can create big problems in the financial market. In the event of recession and the downgrade of credit ratings even by one notch, 'frontier bonds' will be thrown into the market by pension and insurance companies that are forbidden to hold sub-investment securities.

Excessive liquidity and ignoring risk led to paradoxical distortions of the 'risk–return rate' ratios, to a deformation of risk perception. The spread between corporate bonds with a minimum investment (BBB) and speculative (BB) ratings has fallen in the global market to 38 basis points (bp), which is the minimum value since 1994 (i.e. the beginning of the collection of these statistics by Bloomberg). Yield spreads of RUSSIA'29[2] and RUSSIA'47 at the end of 2019 were at the minimum levels against UST10: 110 bp and 170 bp, respectively. RUSSIA'47 shows a 20 bp yield less than the higher-rated Indian bonds INDON'47 (YTM 3.9%), while the RUSSIA'29 yield is equal to INDON'29 of the same maturity (YTM 2.9%) and is 30 bp lower than yield of Mexican sovereign bonds MEX'29 (YTM 3.2%).

On average, corporate bonds of emerging markets (estimated by ICE Bofa EM Corporate Bonds indices) provided investors with a total return rate of 12.4% per annum in 2019 against a negative total return on investment in 2018 (minus 1.3%). EM corporate bonds of the BB rating provided 15% of the total yield for the year, and high-yield bonds (with CCC ratings and lower) even higher (24.9%). EM highly reliable bonds (AAA – A ratings) showed the yield of 9.5%.

Economic problems amid the coronavirus epidemic and government promises to help businesses and the public (in the US, the promised aid exceeds $2 tn in 2020, the Fed's balance increased by $1 tn over several weeks of March due to the purchase of government bonds and mortgage securities, which led to even greater decrease in yields on US government bonds) forced companies to attract additional loans. Issuing bonds in March, 2020 turned out to be a record: investment-rated non-financial companies around the world issued bonds totalling $244 bn, wrote the Financial Times (FT), citing estimates from the

research company Dealogic. Taking into account bank bonds, the total amount of bond issuance in March, 2020 alone exceeded $400 bn.

It is important for investors and regulators to understand the logic of the functioning of bond markets, the principles of pricing and specific factors of influence that are formed in emerging markets for both sovereign and municipal bonds and corporate bonds. In recent years, a number of trends have appeared in emerging bond markets: the role of foreign capital has grown, especially in the local sovereign bond market, including local currency bonds; public participation in the securities market has increased.

Our monograph reveals trends and interdependencies, observed anomalies in pricing, which will allow investors to correctly make decisions in the bond market.

Notes

1 Bank for International Settlements. www.bis.org/statistics/totcredit.htm?m= 6%7C380%7C669
2 Russia's sovereign rating at 2019 from т S&P was BBB-. National rating agency ACRA evaluated it as AAA.

Acknowledgements

Part 1

Trends and determinants of bond market development

1 Change in tendencies in the global debt market

Specifics of development of emerging markets

Introduction

By the end of the first quarter in 2019, the world's total debt had reached $184 tn. (238% of the world GDP), out of which sovereign debt makes $65 tn, $47 tn comes from households and $72 tn comes from non-financial sector companies.[1] A catastrophically huge amount of debt had been observed in Netherlands (325% of GDP), Japan (378% of GDP), Portugal (303% of GDP), Belgium (339% of GDP), Spain (263% of GDP), China (259% of GDP), and Italy (254% of GDP) at the beginning of 2019.[2] A number of countries have abnormal amounts of total debt (Luxembourg, Ireland and the UK lead in terms of debt-to-GDP ratio).

The year 2018 was one of the most unsuccessful for investors around the world. According to Deutsche Bank, from the beginning of the year till mid-November of 2018, 90% of 70 asset classes showed a synchronous decline in returns in dollar terms. The previous anti-record was in 1920 – 84% out of 37 asset classes which existed in the past dropped in value. For comparison, in 2017, only 1% of asset classes were unprofitable. Low results were also present in the bond market (indices and index funds). According to *The Economist*, global corporate debt grew from 84% of global GDP in 2009 to 92% in 2019 (IIF data), and 39% of bonds of non-financial companies have a rating below the investment level.

At the same time, the emerging bond markets during 2018–2019 demonstrated positive levels of real returns. For example, in the Russian market, the OFZ total return index in RUB grew by 8.01% from January to September 2019, and the indices of corporate and sub-federal bonds also showed a strong growth (8.4% and 9.97% accordingly). For the nine months of 2019, RUB appreciated by 6.49%, which is one of the best results among the countries of CIS.

The tasks of a statistical analysis of the global debt market and an identification of current trends forming in the market after the global financial crisis of 2007–2009, understanding the role of the bond markets, the risks faced by the sovereign and corporate debt holders and the realities faced by the issuers remain relevant.

Comments on the global debt market statistical data

Until a certain moment, the debt paradigm did not indicate its risks. But investors' and financial intermediaries' desire to earn increased returns, backed by the connivance of regulators (especially in the US), led to an almost rampant growth of securitizing various assets, including real estate. Banks issued securities with the next level of reliability on unlimited loans and mortgage bonds by composing assets according to their risk levels, which allowed them to further reduce the requirements for the credit quality of borrowers. The scale of the pyramid scheme that was forming in the US can be assessed by the CDO market (collateralized debt obligations, which combined various assets, primarily mortgage bonds). From 2004, the CDO market in the US had increased more than sevenfold, and by the end of August 2007, it had exceeded $180 bn. Such a situation could not continue indefinitely, and defaults were increasing on highly risky mortgage loans (for example, the share of default loans in May 2005 was 5.37% in the US, and by August 2007 it reached 20%). In 2006, when residential property prices stopped growing (in fact, both high-quality and low-quality mortgage borrowers had already ended), the refusal of loan payments and putting up houses for sale created an excess of supply over demand in the housing market. Since the second half of 2007, housing prices in the US began to decline. As a result, demand for mortgage securities declined, and financial analysts recognized their inability to fairly price assets as a collateral (on August 9, 2007, French bank BNP Paribas closed three funds because of this). This was a signal for the reversal of the stock market, which before then had grown rapidly. A number of analysts on August 9, 2007 recorded the beginning of the financial crisis, although more dramatic events took place at the end of 2007 (the largest financial companies were forced to write off at least $500 billion as a result of the collapse of the CDO pyramid) and in early 2008.

A feature of the global financial market development in the post-crisis period from 2010 to 2019 is the high level of liquidity in the financial system: the total balance of the three leading central banks in the world (Fed, ECB and Bank of Japan) amounted to $14.2 tn in September 2019 (by the end of 2015 – $10.7 tn).[3] The process of increasing debt were ongoing, especially in emerging capital markets (source: IMF), both for sovereign borrowings and for the corporate sector. In 2019, the total debt-to-GDP ratios of emerging and developed markets are about 120% and 165%, respectively (source: IMF).

In connection with the decision of the ECB to launch an asset purchase programme in March 2015 (in 2018 the programme was reduced, but assets were bought up by €15 bn each month), investors' increased demand for bonds in the European market, as in the US market, intensified, which gave rise to a situation where the yields of an increasing number of government and corporate bonds in the European developed countries decreased to negative values. This trend continues till today: for example, the US Federal Reserve lowered the rate twice in 2019.

As a response to the high liquidity generated by the quantitative easing (QE) programme pursued by the US Fed and the largest central banks since 2009 (the ECB and the Bank of Japan), the market for assets, primarily stocks and bonds, of developed countries had been actively growing till 2015–2016. In 2015, the US primary market amounted to $7.1 tn, but in 2018, it fell to $6.86 tn.[4]

Country statistics allows us to compare stock and corporate bond markets. In the US in mid-2018, the stock market was $32 tn, and the bond market was $4.8 tn. In Western Europe, the stock market was $14 tn, and the bond market was $2.6 tn. In Russia, the stock market was $0.6 tn, and the secondary corporate bond (CB) market was $0.198 tn. For comparison, according to JP Morgan at the beginning of 2018, the total value of corporate and sovereign bonds of emerging markets exceeded $2 tn. The volume of CB primary issues in the US market amounted to more than $1.1 tn. in 2018, and $542.3 bn for the nine months of 2019 (IPOs on the stock market reached $42.5 bn. for the nine months of 2019). Initial offerings for the nine months of 2019 in the US bond market exceeded $5.9 tn.

Inside the structure of the global bond market as of September 2019 ($120.9 tn – the bond market), the share of government bonds was 62%, corporate bonds 35%, municipal bonds 3% (Figure 1.1). We note that 92–97% of government bonds in developed and emerging markets are issued in local currency. In emerging markets, the share of corporate bonds in local currency was 72%. The structure of the global bond market is shown in Figure 1.1.

Analysis of the situation during the global financial crisis of 2007–2008, the euro debt crisis of 2010, and the subsequent recession of 2010–2011, shows that in the global economy, the initial problems were associated with the accumulation of misbalanced debt (by timing, currency, income structure, etc.) in many developed and developing countries, especially at the household level and in the financial sector of the economy. The governments of the US and a number of major countries had to take unprecedented support measures in order to maintain the financial and political stability of the system. It would seem that the post-crisis period should be characterized by a significant easing of the debt burden, a revision of the borrowing policy both at the level of governments and at the level of firms and households. However, statistics show the opposite.

By the beginning of 2019, global debt reached $184 tn., or 238% of global GDP. From pre-crisis 2007 to 2018, global debt grew by $68 tn., and half of this growth was provided by emerging markets. Since 2007, China's total debt has grown six times ($5.3 tn), reaching $33 tn. In 2018, out of $68 tn in global debt increment, China's contribution amounted to $27.8 tn. In the global debt structure (238% of global GDP), non-financial corporate sector debt is 94% of GDP, that of the government is 84% of GDP, and that of households is 60% of GDP (Table 1.1).

In developed economies (USA, Australia, Germany, France, Great Britain, Canada, Japan, South Korea, and the Netherlands) during the post-crisis period,

Figure 1.1 The global bond market (bonds outstanding as of September 30, 2019).
Source: Authors' calculations based on the Bloomberg database.

we observe a decrease in bank loans, securitized forms of attracting capital and strengthening of the role of bond loans for the non-financial companies. For households, the situation is reversed: the share of bank loans has been growing since 2007 and the weights of other forms of borrowing have been decreasing. The proportions in the stock and bond markets at the end of the 1990s are shown in Table 1.2.

Global debt market trends in the post-crisis period

We reveal the following interesting trends in the global debt market during the post-crisis period.

Table 1.1 Total debt of Asian countries in % of GDP (government, non-financial companies and households), Q1 2019

Country	Total debt, % of GDP	Structure of debt in % of GDP (the share in total debt, %), Q1 2019		
		Government	Corporate (financial and non-financial sectors)	Households
Japan	378	203 (55.7)	103 (28.3)	58 (16)
S. Korea	228	39 (17)	97 (42.6)	92 (40.4)
Malaysia	190	53 (28)	68 (36.1)	68 (35.9)
China	259	51 (19.7)	155 (59.6)	54 (20.6)
Thailand	150	34 (22.4)	48 (31.8)	69 (45.8)
Indonesia	70	30 (43.2)	23 (32.6)	17 (24.2)

Source: Bank for International Settlement.

Table 1.2 Volume of stock markets, government and corporate bonds (% of GDP) in a number of developed and developing countries by the end of the 1990s

Country	Stock market	Bank credit to the private sector	Government and corporate bond market	Share of corporate bonds, %	
				in the total volume of the stock market, bank credit to the private sector and the bond market	in the total volume of the bond market
USA	158.0	63.6	164.2	18.20	42.75
Japan	65.9	133.3	137.7	11.87	29.05
Germany	51.5	125.9	94.5	19.75	56.83
United Kingdom	169.7	120.8	61.0	7.91	45.57
S. Korea	35.7	82.5	86.5	15.10	35.72
India	28.3	26.6	29.3	5.23	15.02
Thailand	30.9	127.8	18.6	1.75	16.67
Hungary	29.2	17.2	25.1	0.70	1.99
Poland	13.0	19.5	8.0	8.00	0.00

Source: Endo, 2000, World Bank Database.

1. US government bonds had demonstrated low interest rates until the end of 2015. The yield on the bonds with the longest duration did not exceed 2.6% per annum in mid-2015. The increase in rates at the end of 2015 was associated with an increase in the Fed base rate (the first increase in the last 9 years took place on December 18, 2015 from 0–0.25% to 0.25–0.5% and marked the beginning of the cycle of rate hikes).

From 2011 to 2015, most central banks in emerging markets (EM) also lowered their key rates. The period from 2013 to 2014 can be described as a period of conditional tightening monetary policy in EM, but from the end of 2015 to the beginning of 2018, we can talk about the return to monetary easing. In the spring of 2018, problems began not only in Russia, but also in a number of EMs. Outflow of capital, devaluation of currencies, and increase in expected inflation again resulted in tightening monetary policy for most EMs.

The policy of the US Fed is a key factor in determining the dynamics of the global market yield levels in the long run. By September 2019, the 10-year US Treasury bonds rates reached a maximum for the last 8 years (1.75–2%). At the same time, the US negatively impacts EMs in two ways by decreasing its dollar liquidity: 1) by increasing the yields and volume of borrowing (in 2018 and 2019, the volume of new issues of US Treasuries will exceed $1 tn), 2) by reducing the balance. According to the Bloomberg forecast, until the end of 2019, the Fed key rate will remain at 2%. The yield on sovereign bonds of emerging countries in Euro-Cbonds Sovereign EM YTM eff is 3.67% as of October 2019 (Cbonds estimate). The strengthening of the dollar leads to the depreciation of national currencies: for example, the Turkish lira fell by 11% from January to October 2019 (the spread of sovereign bonds amounted to 494.7 bp in October 2019), the Brazilian real fell by 5%.

The policy of quantitative easing in European countries has led to a situation of low, often negative, interest rates on GBs. In March 2019, Germany issued 10-year GBs worth EUR 2.4 billion with a yield of –0.05%. In October 2019, Greece issued 13-week bonds worth € 487.5 million with a –0.02% yield. Note that in a deflationary situation, negative nominal rates turn into positive real ones.

2. The post-crisis debt market of developed countries has become the corporate bond market (CB). By 2013, total demand for the US corporate debt was higher than for Treasuries (valued by research firm Lipper).

    In the US, the largest bond issues are placed by banks. The average size for corporate sector borrowing is $17.35 bn. Among non-financial borrowers, we highlight General Electric, Verizon Communications and CVS Health. General Electric is actively borrowing both in national currency (USD) and in EUR. The average coupon rate on 70 negotiable bonds of Apple is 2.661% per annum. For Microsoft, the average rate is higher: 3.328% per annum (39 issues in circulation as of October 2019). Among municipalities, Texas and California are leading by volume. The average coupon for US municipal bonds is 4.21% per annum (source: Bloomberg database). US government bonds have an average issue size of approximately $300 bn. For corporate borrowing in foreign currencies (euros, pounds sterling), the average volume of issues is $5.3 bn (typical securities: Federal Home Loan Mortgage CorpFHLMC, Fannie Mae Discount Notes).

3. The correlation between the stock and bond markets is of research interest, and this relationship is conditional. There was a positive correlation between the movements of stocks and bonds from the 1970s till the end of the 1990s.

After the collapse of the dotcoms (since the beginning of the 2000s), investor attitudes toward bonds (fixed income assets) have changed: bonds began to be regarded as a hedging instrument. Investors began to include GBs in their portfolios as an insurance against the risk of falling stocks. Models with a sto-chastic discount factor explain well the low risk premium for bonds and the high risk premium for stocks through the covariance of the risk premium and turbulent periods of development of the financial market. However, in recent years, the connection between the segments of the financial market has again changed its direction.

A study of the factors influencing the relationship between the stock market and the bond market showed that the key drivers were uncertainty about the expected interest rate, real interest rates, covariance between interest rates, dividends and real interest rates, as well as uncertainty about the stock market risk premium. Inflation affects the correlation sign between stocks and bonds depending on the phase of the business cycle. Macroeconomic dynamics tend to fluctuate from periods of anticyclic expected inflation – stagnation – to periods of procyclical expected inflation. During stagnation, good (bad) news of future cash flows is usually accompanied by news of a lower (higher) expected return. Thus, we returned to the situation of the 1970s–1990s that when stock prices rise (fall), bond prices also rise (fall). The procyclical shocks of expected inflation as a result create a negative correlation, for example, during the period of the Great Recession. This is the conclusion of Pericoli (2018). An interesting conclusion is made by Campbell et al. (2018) that the covariance between inflation and the prod-uctivity gap is unstable over time, and its conditional nature may explain the change in the direction of correlation between the bond and stock markets. Such a conclusion becomes a good explanation of the observed dependen-cies: a positive correlation between 1979 and 2001 and a negative correl-ation between 2001 and 2011.

4. The agiotage around the CB market of developed countries attracted issuers with low credit ratings and changed the financial policies of many companies. Even companies that traditionally focused on growth at the expense of equity capital (IT companies and Internet search engines) entered the debt market. So, in 2013, Apple and Microsoft issued debt securities with a maturity of 2023 (yield 3.488% and 3.366%, respectively). In early 2014, for the first time in three years, Google entered the bond market (Aa2 rating at Moody's, AA at S&P) to refinance previously issued bonds and implement share repurchase plans (Google issued ten-year bonds worth $1 bn. with a yield of 3.377%). The prospectus indicates[5], that these funds will be used for 'general corporate expenses, including the possible payment of the $1 bn main debt of bonds with a yield of 1.25% and maturity in 2014'.

The paradox of the post-crisis debt market is a violation of the relationship between the level of debt burden on the US non-financial companies and the share (percentage) of defaults of high-risk bond issuers. Figure 1.2 shows the dynamics of the level of defaults (in %) from the end of 1986 to the third
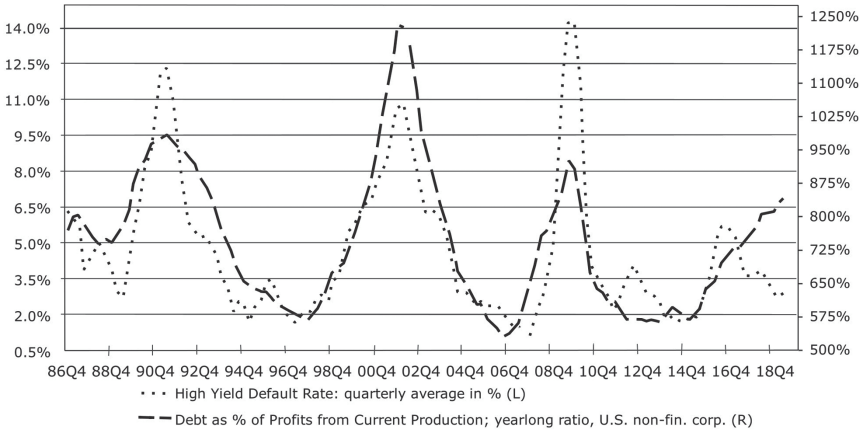
Figure 1.2 The debt burden of US companies in explaining the dynamics high-yield bond defaults.

quarter of 2019 and the dynamics of the US corporate debt (as a percentage of GDP, Moody's data). Until 2011, there was a fairly clear synchronicity, which clearly disappears since 2016 (Figure 1.2[6]).

What is the reason behind this desynchronization? Firstly, due to globalization and increasing international trade, it is more relevant to correlate corporate debt with global GDP; this significantly changes the ratio and narrows the spread. Secondly, due to the fact that until recently, the cost of debt was at a very low level, large corporate debt did not create a high risk of default. With an increase in the cost of funding, which directly depends on the Fed monetary policy, the default rate on high-yield bonds will increase, which will cause sales in all markets, and will most probably affect developing markets.

5. Low rates of return were demonstrated not only by GBs, but also by CBs. In the US bond market, borrowers with high credit ratings raised debt at record low rates (1–1.5% per annum). For example, the yield on three-year Nissan Motor Acceptance bonds maturing in 2018 was 1.5%. In the European market, even low-quality issuers with a CCC rating made attempts to issue Eurobonds. The year 2018 also demonstrated high growth rates of the market for corporate bonds of developed countries.

In 2019, there was an IPO boom in the US bond market. From January to September 2019, more than 120 companies went IPO with a volume of $42.5 bn.

6. Strengthening regulation in the banking system has led to a change in the traditional proportion of market and bank financing in the US and EU markets. Traditionally, American companies were leaders in attracting market (bond) financing: about 70% of the necessary financing was attracted through bonds

and 30% from bank loans. For European companies, the opposite proportion existed until 2013: 30% – bonds and 70% – bank loans. In 2013, statistics for the first time showed a breakdown of the traditional proportion, and 2014 estimates confirmed this trend. Through the issue of bonds, US companies attracted about 30% of financing, in Europe – about 40%.

This change in proportions can be explained by several reasons. Apparently, the main reason is associated with low economic growth in the EU and the difficult financial situation of European banks, which have not recovered from the global crisis of 2008–2009 and the 2010 European debt crisis. As a result, the EU's regulated banking sector continues to experience major problems in performing its traditional lending functions to companies. They were followed by an increase in the US lending and a slowdown in the EU. If in 2013 in the US banks had a record level of lending (exceeding the 2007 volume by 10%), then European banks, even considering some surge in activity in 2013, reached only 50% of the lending period of 2005–2007. In the Eurozone 2012–2013 banks reduced lending by two trillion euros.

7. Another emerging trend is that non-banking institutions (asset managers, insurance companies, private equity funds, hedge funds and professional associations, industry cooperatives) began to actively lend money to borrowers. To a large extent, this trend is emerging due to the tightening of banking regulation after a series of crisis years 2008–2010. In the USA, assets of industrial cooperatives reached $1.4 trillion by 2014, an increase of 60% since 2008.

According to *The Economist*, in March, 2020 about 7% of corporate bonds (CBs) in the global market belong to travel companies, airlines and hotels and about 8% of CBs to oil companies. These sectors are seriously affected by the coronavirus and drop of oil prices below $30 / barrel, so 15% of global corporate debt is at risk.

8. Since 2011, we have observed a growing interest in debt instruments of developing countries, not only in sovereign debts, but also in the corporate sector. In 2012, the yield spread between corporate and government bonds decreased to 223 basis points (bp) compared to 351 bp at the end of 2011. Such a low return on developed countries means that in fact institutional investors, primarily insurance and pension companies, invested in 'depreciating assets'. The average return fell to 3.34% in 2011 and dropped to 3% by 2014. Investors were forced to look for higher returns in emerging markets, which until mid-2014 (before the fall in oil prices and the devaluation processes in a number of markets) showed quite acceptable levels in the ratio 'risk–profitability'.

Since 2012, the interest of global investors in emerging bond markets is evidenced by the dynamics of the index EMBI plus Composite, which showed an increase of 17.4% in 2012. The highest growth rate over the past 15 years was recorded twice in 1999 and in 2009, and these estimates are overstated due to the low comparative base of the previous year, when there was a catastrophic drop in the index of the previous crisis year. By 2014, nine of the
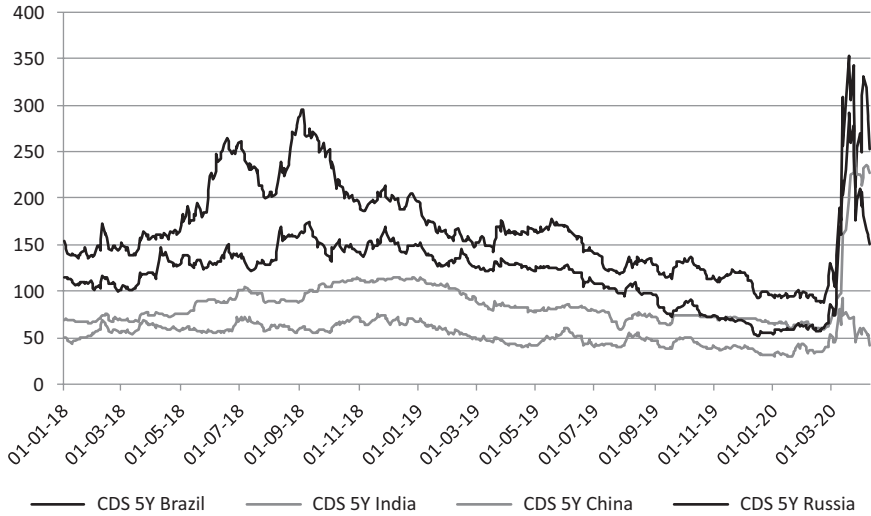
Figure 1.3 Growth of five-year sovereign spreads (CDS) of developing countries in 2018–Q1 2020.

Source: Cbonds.

16 largest US pension funds made strategic investments in the national bond market of developing countries (Arslanalp & Tsuda, 2014).

The peculiarity of mid-2018 and the first quarter of 2020 is the growth of country risks in emerging capital markets, which is shown in Figure 1.3 on sovereign spreads for five-year US bonds.

Since 2012, global investors began to pay attention to bonds in the national currency of countries that demonstrated the stability of their currency, a strong surplus budget and high nominal rates in the domestic market. The ratios of the levels of country credit risk, nominal and real returns are shown in Table 1.3. The liberalization of access of foreign capital to domestic markets (for example, to the markets of Russia and China) also played a positive role. The bond markets of developing countries showed significant growth due to the 'demand for real positive returns', while investors had been faced with extremely low rates in developed capital markets.

The average volume of new issues of corporate bonds in national currency (for comparison, the volumes were converted into USD) in January–September 2019 amounted to $85.65 m for Brazil, $142.76 m for Singapore, $78.98 m for Russia, and mainland China $232.84 m. Smaller volumes on average attract companies in India ($56.83 m), Poland ($55.35 m), Hong Kong ($43.08 m).

The numbers of bond issues and their nominal volume for emerging markets and for individual geographical regions are shown in Tables 1.4 and 1.5. Bonds of the financial and non-financial sectors of the economy are highlighted.

Table 1.3 Yield levels in emerging capital markets (10-year GBs). October 2019

	Rating S&P / Moody's / Fitch	Yields of 10-year GBs, %	Inflation rate, %	Real return rate, %	Key rate of the central bank, %
Russia	BBB-/Baa3/BBB	6.66	3.46	3.20	7.0
S. Africa	BB/Baa3/BB+	8.92	5.46	3.46	10.0
Turkey	B+/B1/BB-	14.1	3.58	10.52	16.5
Brazil	BB-/Ba2/BB-	6.66	2.83	3.83	5.5
Mexico	BBB+/A3/BBB	6.74	3.24	3.50	7.75
India	BBB-/Baa2/BBB-	6.51	3.1	3.41	5.15
Indonesia	BBB/Baa2/BBB	7.2	3.1	4.10	5.25
Columbia	BBB-/Baa2/BBB	6.0	1.46	4.54	4.25
Philippines	BBB+/Baa2/BBB	4.71	3.0	1.71	4.0
Chile	A+/A1/A	2.14	0.29	1.85	2.0
Peru	BBB+/A3/BBB+	4.4	2.5	1.90	2.5

Source: Bloomberg Database, World Bank.

Table 1.4 Dynamics of EM bond market segments in 2017–2019. Asian region

	Emerging debt markets, total				Incl. Asian region			
	2019 January–September	2018	2017	Change	2019 January-September	2018	2017	Change
Volume in m USD	567 105	652 865	806 967	-19%	297 459	322 888	379 329	-15%
Number of issues Volume in m USD	1 571	1 767	1 827	-3,3%	922	1 124	1 060	6%
Government	124 721	159 654	208 474	-23%	12 841	22 469	24 779	-9%
Municipal	11 000	1 432	15 155	-91%	-	-	-	
Corporate Volume in m USD	431 384	491 779	583 338	-16%	284 618	300 419	354 550	-15%
financial sector	180 949	202 979	250 123	-19%	117 942	127 790	164 477	-22%
non-financial sector	250 434	288 800	333 215	-13%	166 676	172 629	190 073	-9%

Source: Bloomberg, authors' calculations.

The growth of yields in the bond markets gave rise to discussions about pos-sible problems with economic growth (previously, the credit market often acted as an indicator of future problems in the economy). Economists have

Table 1.5 Dynamics of EM bond markets by region in 2017–2019. Eastern Europe and the Middle East

	Eastern Europe				Middle East			
	2019 January–September	2018	2017	Change	2019 January–September	2018	2017	Change
Volume in m USD	35 933	40 769	57 049	-29%	86 876	100 509	98 620	2%
Number of issues	53	75	113	-34%	234	227	187	21%
Volume in m USD								
Government	24 178	23 998	30 591	-22%	30 341	42 191	50 671	-17%
Municipal	-	-	-		11 000	1 317	10 000	-87%
Corporate	11 756	16 772	26 457	-37%	45 534	57 001	37 950	50%
Volume in m USD								
Financial sector	5 610	9 927	18 274	-46%	26 659	28 686	25 299	13%
Non-financial sector	6 146	6 844	8 183	-16%	18 875	28 315	12 651	124%

Source: Bloomberg, authors' calculations.

Table 1.6 The share of borrowings in various currencies in the global market (%)

Currency	2008	2009	2010	2013	2014	2019
Dollar	47.5	44	52	50	46.7	34.78
Euro	21.6	25	15	17	18.8	17.23
Yuan	5.1	9	9	15	18.7	19.33

Source: Bloomberg, authors' calculations.

traditionally tracked the spreads between speculative-rated corporate bonds and government bonds (in the run-up to crises, as well as during periods of market downturns, spreads increase dramatically). In 2018, the yields of high-risk CBs (without an investment credit rating) increase with increasing yields on government bonds, but spreads are in an acceptable range and do not signal a pre-crisis state.

9. The role of the US dollar as a bond issue currency returned to its pre-crisis level in 2014 (Table 1.6). In the 1990s the share of USD-denominated bonds increased and reached 49.5% in 2000. By 2008, the weight of dollar borrowings dropped to 47.5% with a slight surge in 2010–2011. By 2015, it returned to the level of 46%. The Japanese government's policy of reducing

external debt has led to a decrease in the share of yen-denominated financial instruments to 2.5%. The share of bond issues in the currencies of other developed countries (Swiss francs, Canadian and Australian dollars) are also at a low level. The emerging trend in the global debt market is the growth of borrowings in the Chinese yuan.

There is a trend for an increase in the share of euro-denominated bonds with a floating interest rate in the total debt. The share of bonds with floating rates in the total bond market volume increased from 23.8% in 2000 to 28% in 2005 and 29% in 2011. At the same time, the share of convertible bonds decreased (at the level of 1–2% of the total volume of bonds market).

10. With the growing volume of debt in EMs, the share of foreign investors in this segment of the financial market increased. According to Arslanalp and Tsuda (2014), in 2013 global investors owned 13% of the debt of 21 emerging market (EM) countries. The highest share of investments – 51% – is in Peru, while the relative share of foreign investors in China and India is lower than 2%, which is associated with strict government regulation of foreign capital inflows (Table 1.7). At the beginning of 2012, the nominal volume of Russian OFZs owned by foreign investors amounted to no more than 3.7% (about 107 bn RUB) of the total volume of the OFZ market (total amount of about 2903 bn RUB). For comparison, at the beginning of 2012, foreign investors held about 11% of Brazilian GBs. Until 2018, the share of foreign investors in the Russian bond market grew precisely in the national currency. The share of non-residents in the OFZ market increased from 3% until 2012 to 33% in March 2018 (local maximums were observed in December 2014 at 32% and in April 2013 at 28.1%). Since April 2018 (introducing of the US sanctions), the share of foreign investors in the OFZ market began to decrease and in November 2018 it was at no more than 24%. But in 2019 it increased and consisted 32% in March, 2020 (source: Moscow Exchange).

11. The Chinese market creates a 'new reality' for market participants. An analysis of bond issues by developing countries in 2019 shows that the Asian market is the leader. China and Hong Kong account for almost a third of the total volume of new issues in developing debt markets (24.6% and 11%, respectively). Latin American countries (Brazil, Mexico, Argentina) have a significant proportion in the developing countries debt structure.

After the 'big landslides' in the Chinese stock market in 2015, 2016 was marked for the Chinese regulator by the need to introduce new rules of the game. In the summer of 2015, the Securities Market Regulatory Commission suspended the rule to stop trading when the index fell by 7%. A six-month moratorium on the sale of minority shareholders with a package of more than 5% ended, which significantly affected China's stock indices, since minority shareholders entered the market. The regulator was forced to introduce a new rule: sales for large shareholders are limited to 1% of their package, and large shareholders are required to publish plans for the sale of shares 15 days before entering the market. This created a situation of declining market participants' confidence in the regulator and

Table 1.7 The share of foreign investors in sovereign debt in national currency

Country	The volume of sovereign debt in national currency ($bn)			Share of foreign investors (% of sovereign debt in national currency)	
	December 2006	December 2013	December 2013, % GDP	December 2006	December 2013 (December 2019)
China	448.09	1340.27	14.50	0.02	1.68 (8.0)
Brazil	511.84	859.48	38.27	2.88	16.10 (11.0)
India	337.46	680.49	36.26	0.26	1.23 (3.0)
Mexico	157.08	379.80	30.12	7.57	36.87
Poland	120.55	191.17	36.94	21.25	34.92
Turkey	153.15	189.78	23.14	13.84	21.53
Malaysia	56.20	146.27	46.82	8.40	29.40
Russia	39.05	120.57	5.75	2.55	24.75 (32.0)
S. Africa	63.89	114.34	32.61	8.59	37.85
Thailand	48.78	104.04	26.87	2.73	17.41
Philippines	43.48	84.08	30.91	0.00	14.44
Columbia	37.87	82.35	21.78	0.00	6.43
Indonesia	46.55	77.22	8.89	13.12	30.01
Egypt	18.62	65.43	24.06	18.57	0.21
Hungary	53.52	57.61	44.32	28.81	40.36
Argentina	32.74	37.20	6.10	16.80	3.20
Ukraine	-	30.06	16.94	0.00	4.83
Romania	-	27.12	14.30	0.00	22.30
Peru	3.70	12.81	6.33	27.21	51.08
Lithuania	1.42	3.30	7.19	1.26	16.09
Bulgaria	1.44	3.16	5.95	0.00	0.98

Source: International Monetary Fund.

increased volatility in different segments of China's financial market. In April–May 2018, China announced a reform in the field of regulation of the debt market. The problem for the global market is that the Chinese market is so large that professionals say: 'when China sneezes, the whole world gets sick'.

12. The increase in US Fed rates has led to an outflow of capital from both the equity markets of developing countries and the bond market. Prices of the major emerging market indices plummeted. Since 2014, there has been a slowdown in the inflow of capital from foreign investors into the bond markets of the BRICS countries.

Since 2015, there has been a tendency to reduce Russian investments in the US public debt. If in 2010, Russian investments in US bonds were $175 bn,

then in September 2019 they were only $8.5 bn. For comparison: China's investments were $1110 bn, Japan $1131 bn, Brazil $310 bn.

Problems and recommendations on development of emerging government bond markets

Since 1988, analysts have distinguished emerging markets. We focus on the largest emerging bond markets in Asia, Latin America and Eastern Europe: China (also the third largest in the world by volume after the US and Japan), India, Brazil and Russia. The volume of outstanding government bonds (GBs) of Russia in relation to GDP is relatively low (10.6% in 2019), but the Russian market has specifics: first, unlike China and India, where the share of over-the-counter trading is high (about 80–90%), 97% of transactions in the Russian bond market are performed in the Moscow stock exchange. Secondly, under the conditions of sanctions from the US and the EU and low oil prices, the Russian government strictly controlled the level of public debt, so by the beginning of 2020 there was a situation that reserves exceed the volume of public debt. Therefore in Russia there is a significant potential for increasing public debt without loss of financial stability. Third, the share of non-residents in Russian GBs is high: 32% on March 19, 2020. This forces the regulator (Bank of Russia) to take into account the interests of non-residents and the problem of possible capital outflows when setting the key rate which affects the rouble exchange rate.

In this chapter, we consider the relatively favourable period of development of bond markets until 2020. Starting in January 2020, there has been an outflow of capital from emerging bond markets due to the coronavirus epidemic and low oil prices. According to Bloomberg estimates, from the beginning of January 2020 to March 20, 2020, the capitalization of the bond markets of developing countries decreased by $5 tn[7] In Brazil, the regulator faced a difficult situation: from March 1, 2020 to March 16, 2020, trading in the stock exchange was automatically stopped six times. The Brazilian real fell by 9% from March 1, 2020 to March 16, 2020. Overcoming the problem of hyperinflation in recent years facilitated the entry of retail investors into the stock market, and for them the 2020 crisis is the first. Brazil is forced to strictly control the state budget balance, and decreasing the interest rate to stimulate the economy will contribute to further devaluation of the national currency. The situation in Russia is more favourable, but the Russian rouble took second place in terms of the exchange rate volatility against the US dollar since the beginning of 2020 (after the Mexican peso), which became an additional motivation for the inclusion of Brazil and Russia in our consideration.[8]

The government bond (GB) markets of a number of large developing countries (China, India, Russia, Brazil) have investment attractiveness for global investors: on the one hand, they are characterized by positive real interest rates, on the other hand, they offer opportunities for risk diversification. For example, in China, Policy Bank bonds have historically low correlation with the key global debt market indices (about 0.2), which allows an external investor to take

Table 1.8 Average annual nominal and real interest rates (in brackets) on 10-year government bonds

	China	India	Russia	Brazil
2017	3.63	6.75	7.77	10.26
	(2.01)	(4.15)	(3.94)	(6.59)
2018	3.62	7.72	7.89	10.48
	(1.51)	(2.73)	(4.87)	(6.57)
2019	3.20	6.92	7.42	7.80
	(0.30)	(−0.69)	(2.82)	(3.93)

Source: Investing.com, authors' calculations.

Table 1.9 The volumes of the secondary GB markets (in % GDP)

	China	India	Russia	Brazil
Volume of the secondary GB market				
2012	32.6	84.6	7.22	55.09
2018	53.7	89.3	9.94	85.14
2019	54.9	88.9	10.57	80.20
Share of internal GB market, %	99.3	100	77.6	93.7
Average annual growth rate in 2012–2019, %	7.7	0.8	5.6	5.5

Source: Bloomberg, Asian Bonds Online, authors' calculations.

advantage of the diversification.[9] In 2019, we note a trend towards a decrease in real interest rates on 10-year GB denominated in local currency compared to 2017–2018 (Table 1.8).

Among the BRIC countries, in 2012–2018, the GB markets of China grew at the fastest pace (in % of GDP): on average, by 7.7% per year, respectively (Table 1.9). The factors of rapid growth of the Chinese GB market were high GDP growth and investment in long-term infrastructure projects, as well as the process of market liberalization for global investors. The volume of the secondary GB market of India has not practically changed: its average annual growth rate was only 0.9%. The Russian GB market is the least developed (by the volume in GDP) among the BRIC countries: the volume of outstanding GB at the end of 2018 was only 9.9% of GDP (Table 1.9), which is due to the control of debt level under conditions of low oil prices and anti-Russia sanctions. In all the markets under consideration, the internal government debt prevails (Table 1.9).

We highlight the following problems that impede the development of emerging GB markets:

1. Relatively short terms for attracting loans, which is caused by the instability of the macroeconomic environment in many emerging economies. The latter is especially pronounced in the case of Russia, which was characterized in

2013–2019 by low economic growth, high volatility of the exchange rate, as well as the negative effects of anti-Russian sanctions by the US and the EU. For China, the relatively short terms for attracting loans (3–4 years) are associated with a slowdown in the growth rate of long-term capital investments. On average, in emerging markets, the average maturity of GBs was 7.3 years in 2018[10].

2. In a number of developing countries, the vast majority of outstanding bonds are directly or indirectly related to the public sector. The direct share of GBs and regional bonds in China, India and Russia is 38.7%, 52.4% and 65.7% of the total volume of outstanding bonds (source: Bloomberg). But according to the ACRA-Ratings estimates, in China and Russia, about 80% of bonds are issued either by government or by large companies with state participation in the ownership structure. This raises the problem of implicit state guarantees in the event of a potential default on bonds of state-owned companies. This problem is especially relevant for China, due to an increase in the number of defaults on corporate bonds in 2018–2019.

3. Most GB markets in developing countries are characterized by low liquidity; the reasons are a narrow investor base, low confidence of retail investors in the financial market, and investors' choice of buy-and-hold strategies. Since the GB market performs a benchmarking function, the absence of a liquid bond market at different maturities leads to the use of indicative yields instead of market indicators.

4. The volume of GB markets in China, Russia, Brazil and India (Table 1.9) is much smaller than in a number of developed countries (US, Japan). Typical problems of emerging bond markets are insufficient investor confidence, market infrastructure problems, and also the narrow spectrum of debt instruments (often the only differences in conditions of bond issues are the coupon size and maturity). As shown in Table 1.9, Russia has the lowest level of public debt in relation to GDP, because low oil prices and anti-Russian sanctions forced the government to increase reserves and strictly control the debt level. A negative consequence is the lack of fiscal incentives for economic development. The positive trends include the development in Russia of the GB segment with a variable coupon, depending on inflation. A unique feature of the Russian bond market is a high share of exchange trading (about 97%).

5. A not so high (compared with developed countries) sovereign credit rating, which is typical for some developing countries. As of March, 2020, Moody's long-term foreign currency ratings of India is Baa2, China is A1, Brazil is Ba2, Russia is Baa3. In India, the planned deficit of the state budget for the fiscal year 2020 is 3.5%, and according to the forecasts of the Fitch rating agency, the forecast of the ratio of government debt to GDP should not exceed 70% by 2022. Against the background of slowing economic growth, a budget deficit does not allow India's credit rating to exceed Baa2, despite the weakening of barriers to foreign capital inflows, as well as lowering corporate taxes. In Brazil, starting in 2015, there has been a downward trend in the ratings of Moody's, S&P and Fitch. Since 2016, Brazil's long-term sovereign credit

rating has been Ba2 according to Moody's and BB according to S&P and Fitch (i.e., sub-investment rating; source: Eikon). The creation of incentives for domestic investment in financing the budget deficit increased the yields of GBs. In 2018, over 1.8 m brokerage accounts were registered in the Brazilian debt market, while in the stock market only 0.6 m accounts were registered.

6. Problems of regulation of bond markets and liberalization of international capital flows. The share of LCY GB held by non-residents in China and Russia in 2019 was about 8% and 30–33%, respectively[11], and in India and Brazil in 2019 was about 3% and 11%, respectively[12]. In OFZs with debt amortization and OFZs with the float coupon rate, there are practically no non-residents holdings. In inflation-linked OFZs 52001 and 52002 the share of non-residents was 2.95% and 9.30% on March 18, 2020. The maximum share of non-residents in the OFZ bond issue is 81%, one of the minimums is 7–8%. In the total volume of OFZs at the beginning of March 2020 the share of non-residents was 32% (source: Moscow Exchange).

   The high share of foreign investors can greatly affect the exchange rate, especially during periods of turmoil in financial markets. The regulator is forced to consider the possible outflow of capital when pursuing a policy of changing the key rate and foreign exchange interventions (Bank of Russia, mid-March 2020).

   In China, the process of bond issuance is regulated by different agencies: China Banking and Insurance Regulatory Commission, People's Bank of China, National Development and Reform Commission, and China Securities Regulatory Commission.[13] China's bond market is highly segmented, and each segment has its own legal regulations.

7. Insufficient financial literacy of the retail investors that impedes the development of GB markets, as well as the underdevelopment of the segment of institutional investors (mutual funds, private pension funds, and insurance companies). For example, in Russia, the population prefers to save money on bank deposits (about $460 bn at January, 2020). Both the Moscow Exchange and the regulator (Bank of Russia) are interested in that the savings of retail investors are redirected to the stock or bond market. In Russia, there is implemented a project to create a single market place, and in 2017–2019 the largest banks organized placement of OFZs for the population (OFZ-N).

Dominant holders of bonds in the internal bond markets of many emerging countries are commercial banks. For example, in China and Russia their share in bond holdings is 56% and 67%, respectively[14]. The exception is Brazil where the share of funds, pension funds and insurance companies in GBs is 55.8% in 2019 (Source: Brazil National Treasury).

   In connection with the identified problems, the following recommendations can be made on the development policy of GB markets in developing countries:

1. Since one of the important factors determining the development of the GB market is the stability of the macroeconomic environment, it is necessary to

pursue appropriate policies aimed at stimulating economic growth and redu-cing inflation, as well as monitoring and optimizing the ratio of public debt to GDP in order to reduce risks. A stable macroeconomic environment will also increase the term for raising funds in the bond market, as investor confidence will increase.

2. In order to increase the investment attractiveness of the GB markets of developing countries in the eyes of global investors, an institutional environ-ment should be developed that focuses on protecting the rights of investors, including equalizing the rights of internal and external investors. The latter is especially relevant for China, where it can be recommended to allow external investors to participate in repo transactions in order to diversify their portfolios[15].

   Optimization of complicated legislation in the field of regulation of capital markets can attract a larger number of external investors. For China, unifica-tion of the rules for bond issuing and trading, as well as the choice of a single regulator are recommended. Since a large number of individual investors par-ticipate in the debt market, their interests should be protected. According to IMF recommendations, the legal framework should protect investors from insolvency and inappropriate behaviour of custodians.

   Another aspect important for the development of the GB market is the liberalization of international capital flows in order to attract foreign investors. According to the IMF survey[16], foreign investors pay attention to the ease of access to the public sector, foreign exchange and tax regimes, the liquidity of the bond market, and the organization of market infrastructure.

3. Due to the high share of the public sector among bond issuers, hedging instruments should be developed, including the market of derivative finan-cial instruments. It is also necessary to increase the diversity of fixed income instruments issued, especially regarding inflation-linked bonds. It is necessary to take measures aimed at limiting risks taken by municipalities or major state-owned companies.

4. We recommend the development of technical systems and the stock exchange infrastructure in order to ensure financial stability and prevent the risks of sharp price changes as a result of manipulations or negative practices of high-frequency trading. It is important to introduce and develop electronic trading platforms, which will increase the transparency of pricing in the bond market. IT platforms used by stock exchanges should provide the necessary capacity to handle trade transactions with large volumes and be cyber-secure.

5. One of the instruments for increasing liquidity in the bond market is bench-mark building programmes, including setting reliable yields curve, planning of public offerings in the primary GB market, and revisions of primary dealer agreements. According to IMF recommendations[17], one important aspect is the development of the money market, including REPO transactions with GBs as collateral and derivatives market. For the market for outstanding bonds, market makers (financial intermediaries) providing GBs trade play the key role.

6. It is necessary to increase the financial literacy of the population, to clarify the principles of working with various financial instruments, and also to stimulate the development of banking products, which, in addition to traditional deposits, can be used to redirect part of the savings of investors to investment accounts. In parallel, an impetus will be given to the development of a new financial intermediation market.

To ensure the possibility of raising funds in the bond market for the long term, it is important to develop pension funds and insurance companies. One bad practice, used in Russia, is a continuous change of the scheme of a pension system, because this decreases public confidence in institutional investors. We recommend establishing a long-term moratorium on the change of the rules of a pension system.

Another promising area is the development of the bond ETF segment, which allows investors to pay lower fees compared to mutual funds. ETFs can improve the liquidity situation and expand the investor base.

The object of further research is the crisis in emerging bond markets which began in 2020 due to the epidemic of coronavirus and a sharp drop of oil prices.

The Fourth Industrial Revolution in financial markets

The Fourth Industrial Revolution in financial markets means innovative products and technological advances including robots and artificial intelligence. Pieterse-Bloem (2019)[18] highlights the important role of exchange-traded products (ETPs) which allow investors access to a broad segment of the market in 'one transaction' and at a low cost. In 2018, the volume of the global ETP market was about $5 tn. Bond ETPs constituted only 18% of the total volume, but this segment is the most rapidly growing. ETPs contribute to increasing liquidity in different market segments.

In recent years, there has been an expansion and strengthening of the influence of algorithmic trading (AT) on the financial markets of developed and developing economies. Based on a review of research papers, we consider the positive and negative aspects of the impact of AT on the volatility of return rates of securities, liquidity indicators, and market efficiency. Our focus is on high-frequency trading (HFT), which means the submission of a significant number of trade orders per second using robots. This type of trade poses risks to market stability. Currently, the share of HFT in the US stock market is about 50% (Breckenfelder, 2019). In 2017, the global market of AT was $9.3 bn, and it is forecasted that its volume in 2026 will be about $21.7 bn, i.e. the average annual growth rate will be about 10.1% (source: Bloomberg[19]).

HFT allows investors to achieve high return rates, but O'Connell (2019) notes a decrease in HFT profitability since 2015. The first reason is increased competition: the number of investment companies using HFT, modern information technologies and hardware has rapidly grown. The second reason is

increased market regulation and surveillance aimed at preventing manipulations and fraud via HFT.

The influence of HFT on volatility in financial markets. One of the classic cases is the Flash Crash which occurred on May 6, 2010 in the US market. Due to price manipulations based on HFT, the decline of the market index was 10% in 36 minutes (O'Connell, 2019). At the end of the day, the situation had stabilized.

The results of previous studies are ambiguous. On the one hand, Hasbrouck and Saar (2013) reveal that low-latency trading (i.e., the execution of trade orders with a faster speed) contributes to a decrease in short-term volatility, even if the financial market is under pressure. Hagstromer and Norden (2013) divide HF traders into market makers (their share at NASDAQ-OMX Stockholm in the total HFT volume is from 63% to 72%) and 'opportunistic' HF traders. The authors reveal that market-making HFTs decrease intraday volatility while Breckenfelder (2019), based on the analysis of trades at the Stockholm Stock Exchange, shows that competition among HFT traders leads to increased speculative trading, and as a result, intraday volatility grows. HFT does not significantly change interday volatility, since most HFT trading positions close at the end of the day.

Gianluca (2016) performs two simulations showing different results. If there is no stress in the financial market and the price movement can be described by a random walk model, then HFT traders do not affect volatility. But if there is a clear upward or downward trend in the financial market, then HFT significantly increases volatility. Trade orders of 'slow' market participants are executed with a time delay in comparison with HFT traders, and this leads to greater market uncertainty.

The influence of HFT on liquidity in financial markets. The results of previous studies are also ambiguous. On the one hand, Moriyasu et al. (2018) analyze data on 1302 stocks traded on the Tokyo Stock Exchange from 2007 to 2012 and show that AT increases liquidity: bid-ask spreads decrease, while market depth increases. The authors explain this effect by the reduction in monitoring costs. If volatility in the stock market grows, the positive effect of AT on liquidity weakens. Mestel et al. (2018) reveal that AT reduces the relative quoted and effective spreads in the Austrian stock market. The authors highlight the role of algorithmic traders as market makers.

On the other hand, Breckenfelder (2019) reveals that competition among HFT traders causes a decrease in liquidity: Amihud's illiquidity measure, bid-ask spreads and Kyle's price impact measure increase. Jiang et al. (2015) study the impact of HFT on the liquidity and pricing of US Treasuries at the time of publication of macroeconomic news. The sample includes 2223 publications of macroeconomic news in 2006–2011. The authors reveal that the activity of HFT traders worsens liquidity indicators, as it leads to a widening of the spread in the pre-announcement period and a decrease in depth at the best quotes and behind the best quotes.

The influence of HFT on the risks and returns of securities. Liu et al. (2013) test the hypothesis that government bonds more exposed to HFT are characterized by increased risks and, therefore, should demonstrate higher yields. The research

sample includes 416 US Treasuries; the analysis period is from 2003 to 2011. Based on the regression analysis, the authors find that the participation of HF traders in US Treasuries trades significantly increases their yields. A trading strategy based on opening long positions on Treasuries with a high share of HFT and short positions on Treasuries with low HFT activity is profitable.

The influence of HFT on the efficiency of financial markets. HFT allow investors to react instantly to stock prices changes, supply and demand changes, so they increase the efficiency of financial markets[20]. Chaboud et al. (2013) investigate the influence of AT on price efficiency in the foreign exchange market. The authors find a beneficial effect of AT due to a decrease in arbitrage opportunities. They also note that AT contributes to a faster reflection of new information in prices.

Nevertheless, there is a risk that some information, especially if not presented in a unique systematized form (company financial reports and news), is not taken into account by trading systems and, therefore, is not adequately reflected in prices. This could potentially increase information asymmetry. Gider et al. (2015) reveal that HFT negatively affected fundamental price efficiency in the US stock market from 1990 to 2014.

The influence of HFT on price manipulations and market anomalies. One common manipulation is spoofing, i.e. the practice of creating an order with a large volume and cancelling it microseconds before the execution. This practice distorts balance of supply and demand and is aimed at misleading traders (O'Connell, 2019). There is also a problem of the unpremeditated generation of a great number of trade orders which leads to an excessive burden on the IT infrastructure of stock exchanges. For example, during the IPO of Facebook, a lot of trade orders were not executed in time which caused losses for some investors (Jones, 2013).

HFT regulation issues. O'Connell (2019) states that regulation measures include minimum quoting requirements to market makers regarding benchmark securities which should be quoted, minimum secondary market volume, quotation size, maximum spread limits and minimum continuous quoting periods. These recommendations were basically developed by the US Securities and Exchange Commission (SEC) and US Commodity Futures Trading Commission (CFTC) as a response to the Flash Crash of May, 2010. Other measures are penalties for rapid cancellations of trade orders to prevent spoofing. There are also restrictions on co-location, i.e. the placement of computers of HF traders in the environment of the stock exchange servers, because this practice lets HF traders influence prices before other investors.

In some emerging markets, a lot of attention is paid to risk-management regarding HFT strategies. For example, in India and Thailand each strategy has to be audited and approved by the stock exchange before use[21].

Recommendations on HFT regulation. Based on the literature review, we conclude that HFT have positive effects which are opportunities for investors to obtain higher return rates, lowering bid-ask spreads and increasing the efficiency of the financial market. Negative effects of HFT (for example, price manipulations and increasing volatility) are primarily due to the activity of speculative HF traders.

It is necessary to distinguish between market-making and speculative HFT traders. Regulations should not be aimed at increasing competition among speculative traders (Breckenfelder, 2019), because this can cause a liquidity deterioration. It is recommended to provide lower commissions for market makers if they comply with minimum quoting requirements.

It can be recommended to implement and develop risk-management practices, including auditing and monitoring, to minimize the risks of applying HFT strategies. Possible measures are the certification of HFT strategies and limiting the number of trade orders from one account per time period. In emerging markets, it is advisable to stimulate the development of stock exchange IT infrastructure and to implement sophisticated technologies to monitor and audit trades at the same speed as HFTs.

It can also be recommended to provide a unique location point for traders to solve the potential problem of co-location giving preferences to HFTs. HFTs also take additional advantage from proprietary direct data feeds (Klaus and Elzweig, 2017), so it is reasonable to limit this channel.

An important issue is the worldwide coordination of regulators, because HFT provides opportunities for cross-exchange arbitrage strategies. Exchanges and regulators should collaborate in unifying existing rules and implementing best practices regarding HFT.

Finally, we note that the problems of HFT are less relevant for bond markets than for the stock markets, because bond markets are characterized by a high share of OTC trades.

Conclusion

A feature of the post-crisis period of development of the global financial market is the ongoing process of increasing debt. The crisis did not significantly cool the appetite of earning on borrowed cheap money. Low rates did not create a high risk of defaults, even for companies with low credit ratings. However, with the tightening of monetary policy and rising rates, and with the growth of geopolitical conflicts, in 2019 the situation is changing. We note the following trends in the global debt market in 2014–2019:

a) low interest rates on government and corporate bonds of developed countries associated with the implementation of quantitative easing until 2017. An increase in interest rates in the global debt market since 2018 due to the US Fed policy on increasing the key rate;

b) the interest of global investors in bonds of emerging markets, due to the low yields on bonds in developed markets and the liberalization of capital flows in a number of emerging markets, and, as a result, the high growth rate of the CB segment of developing countries. But in 2018, there has been a flow of capital from emerging markets to developed ones. This process is supported by a change in the US Federal Reserve's policy of raising interest rates (the Fed Rate grew from 2017 to mid-2019), as well as high instability

in the investment market due to crises in Argentina, Turkey and Venezuela, increased sanctions against Russia and Iran, ongoing pickets and trade wars of the US and China (termination agreement signed only at the G20 summit in early December 2018), the EU and NAFTA. From the third quarter of 2019, the Fed rate declined. In the first quarter of 2020 quantitative easing began due to the epidemic of the COVID-2019 and a sharp increase of volatility in the global financial market. Increased risks caused an outflow of funds from the emerging bond market;

c) the high growth rates of the CB segment with speculative ratings began to slow down in 2018. This is due to an increase in US Treasuries rates and an increase in the yields of high-rating borrowers. Yield of high-yield bonds in the Bloomberg Barclays index (EM) reached 8.32%; in the Bloomberg Barclays index (US high-yield bonds), the yield rose to 6.23% per annum;

d) an increase in the share of corporate bonds in the structure of debt financing for companies in the USA and EU countries, which arose in connection with the tightening of regulation in the banking sector;

e) an increase in the share of funds raised by companies of developed countries from non-banking organizations;

f) outstripping growth of GB and CB segments of developing countries denominated in national currency;

g) the struggle for the environment and the implementation of sustainable development policies have reached the bond market. Indonesia became the first sovereign borrower to place green sukuk bond (issue volume amounted to $3 billion) in the global capital market in the first quarter of 2018;

h) if in 2015–2017 Russia was interested in the rouble carry trade due to high real interest rates, it was one of the leaders in attracting investors to the rouble assets market (first of all, OFZ). In mid-2018, the real interest rate was greater than 2% in Turkey (6.7%), Mexico (4%), Russia (3%) and Brazil (2.3%) (Source: Cbonds Review, No. 3, 2018).

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