Impact of Risk Supply Chain Management and International Debt Market Indicators on GDP

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Abstract— **Financial and economic globalization has significantly increased the total amount of external debt of the different countries of the world. An aggravation of the problem of globalization of the external debt prevents the restoration of stability and achieving sustainable growth in the current global economy. In this regard, at present various countries and groups of countries strengthen management of external borrowings at the national and regional levels. The author has made an attempt to evaluate an impact of the major international debt market indicators and risk supply chain management on GDP. The paper is focusing on an econometric analysis of the hypothetical linkage between the major international debt market indicators and risk supply chain management on GDP growth. A correlation and regression analysis was applied as the basic method of econometric study. The paper has a conclusion that in the world the most effective external debt instruments stimulating the growth of GDP are international syndicated loans and gross issues of international debt securities.**

Keywords— *General Commission for Taxes (GCT), judicial audit, Supply Chain Management, Iraqi Stock Exchange (IXA), Tax Evasion Methods*

1. Introduction

Financial and economic globalization has significantly increased the total amount of external debt of the different countries of the world. On the one hand, there are lending countries, including, for example, China, Japan, South Korea, Russia, Hong Kong, Israel, Norway, Singapore, South Africa, and on the other hand, there are borrowing countries: USA, Australia, Brazil, India, Mexico, the Philippines, Turkey, Kazakhstan, Ukraine, and others. There is a split between countries benefiting from debt assumption and those that must bear its

costs [1]. As a result, external funding imbalance as one of the major imbalances of the current global financial architecture has been formed (Reforming global financial architecture and Russian financial market).

In the past few years, supply chain risk management studies have grown significantly both in the industry and the academic sector. At the outset, only one article was devoted to risk management in the supply chain in 1995, which was 23 in 2002 and 60 papers and more than 130 articles arrived in 2012. The topic of risk management in the pharmaceutical industry was first introduced by the organization in 2002, entitled "Risk Management in Food and Drug Management", in which the Risk Management Program was developed as a strategic safety plan to reduce product risk by working Winning one or a combination of several tools. In 2011, Saeedi and Kazemipur investigated the relationship between environmental risk and strategy and structure, and evaluated the performance of existing pharmaceutical companies in the securities and stock market. The results showed that understanding of environmental risks in terms of structure and strategy of the market of companies will have a great impact on their performance.

In the structure of gross external debt of the various countries the ratio between government and corporate borrowings is significantly different. In addition, in a globalized world economy a division of the public debt into the external and internal is rather conditional, since in the government's debt structure of various countries of the world the share of market debt instruments is increasing in the form of a variety of debt securities that are publicly traded [2]. In this regard, the sovereign debt securities repeatedly change the holders, and the holders may be both non-residents and residents.

There is no single "best" indicator for analyzing general government debt [3]. According to [4], for

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the period from 1800 to 2009, 250 cases of sovereign external debt default were recorded in the world. Of these, 170 cases occured after the World War II. It means that sovereign external debt defaults occur more frequently. If in XIX century and in the first half of the XX century one sovereign default on average occurred once every 2 years, then the last 50 years it on average occurs every 4 months. At the same time, one should note that not all crises are equal: they differ depending on whether the government faces insolvency, illiquidity, or various macroeconomic risks [5].

Until the early 80-ies of the last century external debt problems periodically appeared in some countries due to the economic crisis and military actions. However, in the early 80-ies of the last century, when the difficulties with external debt service began to be experienced by not separate countries but groups of countries in specific regions of the world (especially in Africa and Latin America), the problem of the growing external debt and its impact on the economic development of separate countries and international economic relations in general, has become the focus of attention of economists and politicians. Debt has come to be the central issue of international politics [6]. The problem of the rapid growth of external debt is in the center of the most urgent global financial and economic problems, requiring an efficient solution [7].

In the 80-90-s of XX century, sovereign debt crises were initially associated with the developing countries only, but at present an urgent problem is the developed countries' debts. Sovereign debt restructurings have returned as a key concern to governments and market participants [8]. In recent years, the volume of external debt of the most major countries around the world has been steadily increasing. Massive increase in public borrowing in many advanced economies raises questions about the sustainability of public debt [9].

After the global financial and economic crisis of 2008-2009 among the top five countries the volume of gross external debt has reduced in all countries except the United States. In the USA there was an increase by almost 30%. However, the external debt in 2016 increased in 9 out of 10 countries (excluding the UK). Active issuance by governments and non-financial corporations has lifted the share of domestically issued bonds, whereas more restrained activity by financial institutions has held back international issuance [10].

An aggravation of the problem of globalization of the external debt prevents the restoration of stability and achieving sustainable growth in the current global economy. Until significant pockets of private, external and public debt overhang further abate, the potential role of other headwinds to economic growth will be difficult to quantify [11]. In this regard, at present various countries and groups of countries strengthen management of external borrowings at the national and regional levels. Successful debt management requires close collaboration between different elements of government concerned with external finance in order to have key information necessary to make informed decisions on the access to and uses of external finance [12]. The critical point appears to be the institutions set up to handle potential problems, and these institutions are really part of the question of distinguishing between what is a good sovereign and what is not [13]. One can say that a wrong diagnosis of a problem is a bad starting point for remedies [14].

A rapid growth of the external debt burden of many countries (primarily developed countries) raises serious concerns regarding the possibility of a new wave of global financial and economic crisis that can be triggered by a "chain reaction" of debt crises in separate countries. The aggregate debt service burden is an important link between financial and real developments, it has sizable negative effects on credit and expenditure growth [15].

As a part of the national regulation of sovereign debt, one of the main activities of the state authorities is to determine the limits of the new external borrowings. A more restrictive, practical, solvency criterion suggests that the debt to GDP ratio (or the ratio of debt to some other measure of the capacity to pay such as exports or government revenue) should not increase forever [16, 17].

Taking into account the above mentioned, the author has made an attempt to evaluate an impact of the major international debt market indicators on GDP. The paper is focusing on an econometric analysis of the hypothetical linkage between the major international debt market indicators and GDP growth.

2. Methodology

Chain risk management involves identifying, analyzing and controlling the economic risks or risks that can threaten the profitability and efficiency of the supply chain management. In other words, risk management is the same system that is designed to regulate the operation to deal with uncertainty or the probability of diversion. Any approach to supply chain risk management requires understanding and reducing the vulnerability of the entire supply chain, in other words, the goal is to achieve a general optimum rather than an optimal location.

A correlation and regression analysis was applied as the main method of econometric study. To interpret the results of calculations performed using Excel facilities, a statistics scale of R.E. Chaddock was used. To find the patterns, at the

first stage of the study the author has analyzed the correlation between the size of GDP and key indicators of the international debt market for separate countries of the world [18, 19].

Modern international debt market, in the author's opinion, is a set of conditions ensuring buy and sell operations regarding various debt obligations using issuing and non-issuing instruments at the international level. In other words, international debt market is a set of conditions ensuring the borrower to raise funds through issuing debt securities outside the country of registration and through loans granted by the non-residents. In accordance with the author's concept, the international debt market participants apply traditional instruments of the stock and credit segments of the international financial market.

The size of external debt and the amount of outstanding international debt securities were selected as key indicators, because, firstly, these figures are basic in terms of characterizing the position of the country in the international debt market, and, secondly, these indicators have reliable statistics for a relatively long period (about 15 years), which makes a correlation analysis rather apodictic.

3.   Results

An analysis of the calculated figures contained in the Appendix (see Tables 1-11 in the Appendix) shows that all countries studied, with the exception of Japan, are characterized by a strong or very strong relationship between changes of GDP and external debt. The studied relationship is direct. It means that an increase of external debt contributes to the growth of GDP. Such relationship is easy to understand − raising funds abroad increases the economy's dependence on external factors, but it contributes to economic growth, so it is widely

used by many countries to stimulate their national economies. Despite the fact that Japan's financial policy has traditionally focused on domestic resource mobilization, however, the impact of its external debt on GDP, according to Chaddock scale, can be assessed as significant.

With regard to the analysis of the relationship between the dynamics of changes of GDP and the size of outstanding international debt securities, it is worth noting that the high or very high positive correlation is specific for Russia and European countries (Germany, UK, Spain, Luxembourg, Italy, the Netherlands, France, Ireland), while for the US relationship can be defined as significant, and in Japan the connection between these indicators practically is not available. Together with the analysis of dynamics of external debt, this may mean that in Russia and Europe international debt securities are the basic instrument for raising foreign funds, while the United States and especially Japan focus on other financial instruments (syndicated loans).

A more detailed correlation and regression analysis was carried out by the author in relation to Russia as a participant of the international debt market. Initially, the correlations between GDP and the following variables were studied: external debt, international debt securities outstanding, gross issuance of international debt securities, net issuance of international debt securities and international syndicated loans. Since the statistical data connected with all selected indicators, with the exception of international syndicated loans, are available for 1993-2015, and connected with syndicated loans are available for 1996-2012, to increase the reliability of the results, the author has made calculations for two periods. As a result, two correlation matrices were obtained.

Table 1 . Correlation matrix of GDP and basic external debt indicators of Russia (1993-2015)

Indicators	GDP	External debt at the year end	Outstanding international debt securities	Gross issues of international debt securities	Net issues of international debt securities
GDP	1	---	---	---	---
External debt at the year end	0.974489688	1	---	---	---
Outstanding international debt securities	0.946081749	0.977477392	1	---	---
Gross issues of international debt securities	0.761025022	0.770708056	0.738258567	1	---
Net issues of international debt securities	0.385021301	0.374246582	0.317312284	0.865213838	1

Table 2 . Correlation matrix of GDP and basic external debt indicators of Russia (1996-2012)

Indicators	GDP	External debt at the year end	Outstanding international debt securities	Gross issues of international debt securities	Net issues of international debt securities	International syndicated loans
GDP	1	---	---	---	---	---
External debt at the year end	0.978977089	1	---	---	---	---
Outstanding international debt securities	0.964383469	0.972877668	1	---	---	---
Gross issues of international debt securities	0.774374446	0.802347709	0.849307495	1	---	---
Net issues of international debt securities	0.599397397	0.618084635	0.683414731	0.959772637	1	---
International syndicated loans	0.826117511	0.81247458	0.765644849	0.623497019	0.496328069	1

As can be seen from Tables 1 and 2, regardless of the calculation period, the strongest correlation is between GDP and the following variables: external debt and outstanding international debt securities (a very strong relationship, according to Chaddock scale). Rather strong relationship is also between international syndicated loans and gross issues of international debt securities. Relationship between GDP and net issues of international debt securities can be defined as moderate or significant (depending on the period of calculation). To compare the situation in Russia with the world, the same two-step analysis of the correlation of similar international debt market indicators (with the exception of external debt) was made. The resulting correlation matrix are presented below.

Table 3 . Correlation matrix of GDP and basic external debt indicators, globally (1990-2015)

Indicators	GDP	Outstanding international debt securities	Gross issues of international debt securities	Net issues of international debt securities
GDP	1	---	---	---
Outstanding international debt securities	0.981137718	1	---	---
Gross issues of international debt securities	0.889350379	0.94288703	1	---
Net issues of international debt securities	0.294004914	0.415323371	0.681716434	1

Table 4. Correlation matrix of GDP and basic external debt indicators, globally (1993-2012)

Indicators	GDP	Outstanding international debt securities	Gross issues of international debt securities	Net issues of international debt securities	International syndicated loans
GDP	1	---	---	---	---
Outstanding international debt securities	0.978795298	1	---	---	---
Gross issues of international debt	0.897395246	0.948782186	1	---	---

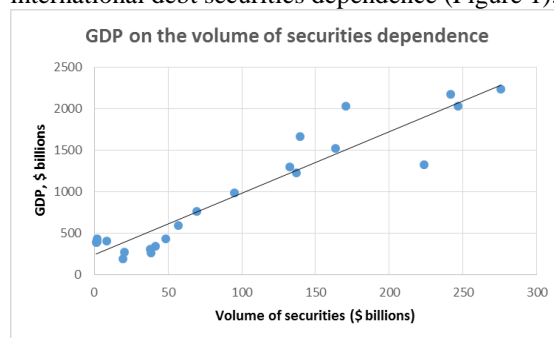| securities					
Net issues of international debt securities	0.382359873	0.499771599	0.733767218	1	---
International syndicated loans	0.712630298	0.717848412	0.771926536	0.610007253	1

Analysis of Tables 3 and 4 shows that the situation in Russia is similar to global: globally regardless of the calculation period the strongest correlation is between GDP and outstanding international debt securities (very strong relationship, according to Chaddock scale). Relationship between GDP and gross issues of international debt securities is slightly stronger than in Russia. Rather strong relationship is also between GDP and international syndicated loans. Relationship between GDP and net issues of international debt securities can be defined as moderate or weak (depending on the calculation period).

Based on the analysis of the Russian statistics, we can construct a multiple regression model where the dependent variable Y is GDP. To construct the model, let us select from the correlation matrix indicators that have the strongest relationship with GDP: external debt, outstanding international debt securities, international syndicated loans, gross issues of international debt securities. To avoid multicollinearity, we can exclude external debt indicator from the model, since, in our opinion, there is a close correlation between external debt and outstanding international debt securities.

Since the strongest relationship is between GDP and outstanding international debt securities, then we use the pair to determine the type of regression. On the basis of available data we can make a graph showing GDP on the volume of outstanding international debt securities dependence (Figure 1).

Figure 1. Russia's GDP on the volume of outstanding debt securities dependence

As can be seen from the graph, the studied relationship can be either linear or logarithmic. Let us test our hypotheses (see Tables 5-10 and Figures 2-3).

Table 5 . Linear regression relationship GDP/outstanding debt securities (Russia)

Regression statistics	
Multiple R	0.94608
R-squared	0.89507
Normalized R-squared	0.89007
Standard error	232.839
Observations	23

Table 6 . Variance analysis of linear regression relationship GDP/outstanding debt securities (Russia)

Indicators	df	SS	MS	F	F-Value
Regression	1	9,711,591.112	9,711,591.112	179.1347109	9,48336E-12
Balance	21	1,138,491.878	54213.89893	---	---
Total	22	10,850,082.99	---	---	---

Table 7 . Results of linear regression relationship GDP/outstanding debt securities (Russia)

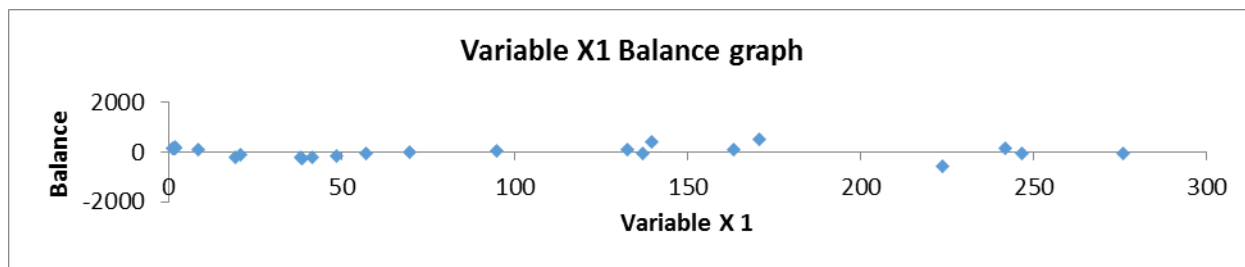| Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	241.708	71.39442175	3.385524929	0.002791279	93.23476674	390.1804226	93.23477	390.1804
Variable X1	7.41816	0.554250729	13.3841216	9,48336E-12	6.265531668	8.570786648	6.265532	8.570787

Figure 2 . Balance graph of linear regression relationship GDP/outstanding debt securities (Russia)

Table 8 .Logarithmic regression relationship GDP/outstanding debt securities (Russia)

Regression statistics	
Multiple R	0.72879
R-squared	0.53113
Normalized R-squared	0.50881
Standard error	492.189
Observations	23

Table 9 . Variance analysis of logarithmic regression relationship GDP/outstanding debt securities (Russia)

Indicators	df	SS	MS	F	F-Value
Regression	1	5,762,829.422	5,762,829.422	23.78875286	8,01081E-05
Balance	21	5,087,253.568	242250.1699	---	---
Total	22	10,850,082.99	---	---	---

Table 10 . Results of logarithmic regression relationship GDP/outstanding debt securities (Russia)

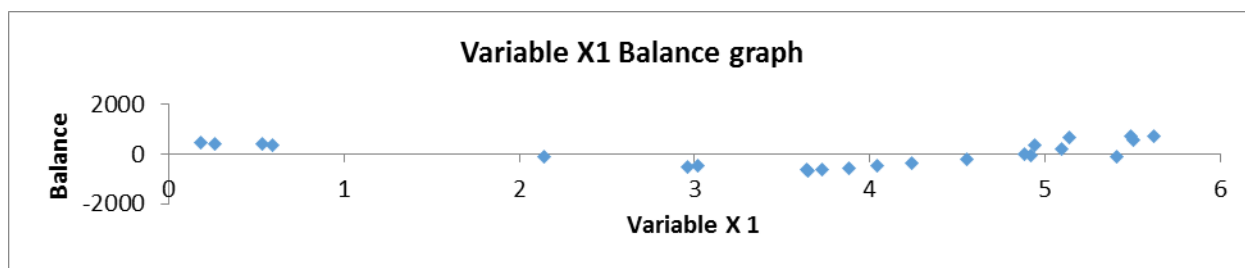| Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	-110.55	239.0193683	0.462509891	0.648472185	-607.6168093	386.5191655	-607.617	386.5192
Vvariable X1	286.859	58.81420325	4.877371511	8,01081E-05	164.547888	409.1695508	164.5479	409.1696

Figure 3 . Balance graph of logarithmic regression relationship GDP/outstanding debt securities (Russia)

As can be seen from the above analysis, for this type of relationship a linear regression equation is more correct (1).

Let us define the coefficients of the regression equation:

$$Y = b_0 + b_1 \cdot X_1 + b_2 \cdot X_2 + b_3 \cdot X_3 \qquad (1)$$

The results of the multiple regression are presented in numerical form in the tables below (see Tables 11-13).

Table 11 . Linear regression relationship GDP/outstanding debt securities, international syndicated loans, gross issues of international debt securities (Russia)

Regression statistics	
Multiple R	.9768
R-squared	0.95413
Normalized R-squared	0.94355
Standard error	156.289
Observations	17

Table 12 . Variance analysis of linear regression relationship GDP/ outstanding debt securities, international syndicated loans, gross issues of international debt securities (Russia)

Indicators	df	SS	MS	F	F-Value
Regression	3	6,605,822.711	2,201,940.904	90.14674575	5,93711E-09
Balance	13	317540.3783	24426.18295	---	---
Total	16	6,923,363.089	---	---	---

Table 13 . Results of linear regression relationship GDP/outstanding debt securities, international syndicated loans, gross issues of international debt securities (Russia)

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	80.996	61.3723929	1.319747262	0.209688912	51.59094652	213.5830415	-51.5909	213.583
Variable X1	8.86798	1.310012461	6.769388825	1,32267E-05	6.037873853	11.69809357	6.037874	11.69809
Variable X2	-4.2398	3.397578126	-1.24789082	0.234081002	11.57982784	3.100214737	-11.5798	3.100215
Variable X3	6.26606	2.860052801	2.190891013	0.047281537	0.08729555	12.4448324	0.087296	12.44483

Thus, an obtained multivariable model of linear regression relationship GDP/outstanding debt securities, international syndicated loans, gross issues of international debt securities (Russia) has the following form (2):

$$Y = 80{,}96 + 8{,}86798 \cdot X1 - 4{,}238 \cdot X2 + 6{,}26606 \cdot X3 \quad (2)$$

The equation is a multivariable model that expresses relationship between GDP (Y), outstanding debt securities (X1), gross issues of international debt securities (X2) and international syndicated loans (X3). The coefficients of the equation show the quantitative impact of each factor when the others do not change. In our case, GDP increases by 8.87 units if outstanding debt securities increase and the volume of international syndicated loans does not change, or GDP increases by 6.27 units as a result of the international syndicated loans' growth by 1 unit at a constant volume of outstanding debt securities. Random deviation of the coefficient for variable

X1 is 1.31; for variable X2 - 3.40; for variable X3 - 2.86; for free term of equation - 61.37.

In our opinion, negative coefficient for variable X2 (gross issues of international debt securities) reflects the fact that gross issues of international debt securities within the period in question are part of the total volume of outstanding debt securities within the same period. Hence, this multivariable equation can not be properly used to assess the impact on GDP of each indicator of the international debt market.

To assess the impact on GDP of the most significant indicators of the the international debt market, the author has made the pair correlation and regression analysis for the relationship GDP/external debt, GDP/outstanding debt securities, GDP/gross issues of international debt securities, GDP/international syndicated loans. The results of the analysis are presented below (see Tables 14-16).

Table 14. Linear regression relationship GDP/external debt (Russia)

Regression statistics	
Multiple R	0.97449
R-squared	0.94963
Normalized R-squared	0.94723
Standard error	161.321
Observations	23

Table 15 . Variance analysis of linear regression relationship GDP/external debt (Russia)

Indicators	Df	SS	MS	F	F-Value
Regression	1	10,303,565.95	10,303,565.95	395.9160855	4,15605E-15
Balance	21	546517.0348	26024.6207	---	---
Total	22	10,850,082.99	---	---	---

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Table 16 - Results of linear regression relationship GDP/external debt (Russia)

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	-187.13	65.98086556	-2.83617596	0.009892217	-324.3480663	-49.91862325	-324.348	-49.9186
Variable X1	3.49836	0.175817798	19.8976402	4,15605E-15	3.132726165	3.863992421	3.132726	3.863992

Thus, the equation of linear regression relationship GDP/external debt (Russia) has the following form (3):

$$Y=-187,13+3,49836*X1 \qquad (3)$$

This equation is a model which shows the dependence of GDP (Y) on the size of external debt (X1). The equation means that GDP increases by 3.50 units with the growth of external debt by 1 unit. Random deviation of the coefficient for variable X1 is 0.18; for free term of equation - 65.98.

The results of the analysis GDP/outstanding debt securities (Russia) are presented below (see Tables 17-19).

Table 17 . Linear regression relationship GDP/outstanding debt securities (Russia)

Regression statistics	
Multiple R	0.94608
R-squared	0.89507
Normalized R-squared	0.89007
Standard error	232.839
Observations	23

Table 18. Variance analysis of linear regression relationship GDP/outstanding debt securities (Russia)

Indicators	Df	SS	MS	F	F-Value
Regression	1	9,711,591.112	9,711,591.112	179.1347109	9,48336E-12
Balance	21	1,138,491.878	54213.89893	---	---
Total	22	10,850,082.99	---	---	---

Table 19 . Results of linear regression relationship GDP/outstanding debt securities (Russia)

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	241.708	71.39442175	3.385524929	0.002791279	93.23476674	390.1804226	93.23477	390.1804
Variable X1	7.41816	0.554250729	13.3841216	9,48336E-12	6.265531668	8.570786648	6.265532	8.570787

Thus, the equation of linear regression relationship GDP/outstanding debt securities (Russia) is the following (4):

$$Y=241,708+7,41816*X1 \qquad (4)$$

This equation is a model which shows the dependence of GDP (Y) on the volume of outstanding debt securities (X1). The equation means that GDP increases by 7.42 units with an increase of the volume of outstanding debt securities by 1 unit. Random deviation of the coefficient for variable X1 is 0.55; for free term of equation - 71.39.

The results of the analysis GDP/gross issues of international debt securities (Russia) are presented below (see Tables 20-22).

Table 20 . Linear regression relationship GDP/gross issues of international debt securities (Russia)

Regression statistics	
Multiple R	0.76103
R-squared	0.57916
Normalized R-squared	0.55912
Standard error	466.3
Observations	23

Table 21 . Variance analysis of linear regression relationship GDP/gross issues of international debt securities (Russia)

Indicators	Df	SS	MS	F	F-Value
Regression	1	6,283,924.128	6,283,924.128	28.90009102	2,48114E-05
Balance	21	4,566,158.861	217436.1362	---	---
Total	22	10,850,082.99	---	---	---

Table 22 - Results of linear regression relationship GDP/gross issues of international debt securities (Russia)

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	474.977	130.4248036	3.64177063	0.001524917	203.7439919	746.2104464	203.744	746.2104
Variable X1	24.2576	4.512294884	5.375880488	2,48114E-05	14.87372711	33.64138893	14.87373	33.64139

Thus, the equation of linear regression relationship GDP/gross issues of international debt securities (Russia) has the following form (5):

Y=474,977+24,2576*X1   (5)

This equation is a model which shows the dependence of GDP (Y) on gross issues of international debt securities (X1). The equation means that GDP increases by 24.26 units if the volume of gross issues of international debt securities increases by 1 unit. Random deviation of the coefficient for variable X1 is 4.51; for free term of equation - 130.42.

The results of the analysis GDP/ international syndicated loans (Russia) are presented below (see Tables 23-25).

Table 23. Linear regression relationship GDP/international syndicated loans (Russia)

Regression statistics	
Multiple R	0.82612
R-squared	0.68247
Normalized R-squared	.6613
Standard error	382.829
Observations	17

Table 24. Variance analysis of linear regression relationship GDP/international syndicated loans (Russia)

Indicators	df	SS	MS	F	F-Value
Regression	1	4,724,988.592	4,724,988.592	32.23965205	4,3829E-05
Balance	15	2,198,374.497	146558.2998	---	---
Total	16	6,923,363.089	---	---	---

Table 25 . Results of linear regression relationship GDP/international syndicated loans (Russia)

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	306.621	136.4184475	2.247649939	0.040068455	15.85187722	597.3899532	15.85188	597.39
Variable X1	25.5083	4.492484478	5.677997187	4,3829E-05	15.93281023	35.08381823	15.93281	35.08382

Thus, the equation of linear regression relationship GDP/international syndicated loans (Russia) has the following form (6):

Y = 306,621 + 25,5083 * X1   (6)

This equation is a model which shows the dependence of GDP (Y) on the volume of international syndicated loans (X1). The equation means that GDP increases by 25.51 units if the volume of international syndicated loans grows by 1 unit. Random deviation of the coefficient for variable X1 is 4.49; for free term of equation - 136.42.

The author's pair correlation and regression analysis of the relationship GDP/external debt, GDP/outstanding debt securities, GDP/gross issues of international debt securities, GDP/volume of international syndicated loans allows to rank the main indicators of the international debt market regarding the degree of impact on the Russian GDP as follows:

Volume of international syndicated loans
Gross issues of international debt securities
Volume of outstanding debt securities
External debt

It means that the most effective instruments stimulating the growth of GDP are international syndicated loans and gross issues of international debt securities.

To compare the patterns identified during the research with the current global trends, the author has made a pair correlation and regression analysis of the relationships global GDP/global volume of outstanding debt securities, global GDP/global gross issues of international debt securities, global GDP/global volume of international syndicated loans. The results of the analysis are presented below (see Tables 26-28).

Table 26 . Linear regression relationship GDP/outstanding debt securities, globally

Regression statistics	
Multiple R	0.981
R-squared	0.963
Normalized R-squared	0.961
Standard error	3758
Observations	26

Table 27 . Variance analysis of linear regression relationship GDP/outstanding debt securities, globally

Indicators	df	SS	MS	F	F-Value
Regression	1	8730786069	8730786069	618.2473946	1,2163E-18
Balance	24	338923976.9	14,121,832.37	---	---
Total	25	9069710046	---	---	---

Table 28 - Results of linear regression relationship GDP/outstanding debt securities, globally

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	20680	1242.89439	16.63893142	1,11222E-14	18115.22656	23245.64	18115.23	23245.64
Variable X1	2,291	0.092142236	24.86458113	1,2163E-18	2.10090587	2.48125	2.100906	2.48125

Thus, the equation of linear regression relationship GDP/ outstanding debt securities is as follows (7):

$$Y = 20680 + 2{,}291 * X1 \qquad (7)$$

This equation is a model which shows the dependence of the world's GDP (Y) on the global volume of outstanding debt securities (X1). The equation means that GDP increased by 2.29 units with an increase of the volume of outstanding debt securities by 1 unit. Random deviation of the coefficient for variable X1 is 0.09; for free term of equation - 1242.89.

The results of the analysis GDP/gross issues of international debt securities are presented below (see Tables 29-31).

Table 29 . Linear regression relationship GDP/gross issues of international debt securities, globally

Regression statistics	
Multiple R	0.889
R-squared	0.791
Normalized R-squared	0.782
Standard error	8888
Observations	26

Table 30. Variance analysis of linear regression relationship GDP/gross issues of international debt securities, globally

Indicators	Df	SS	MS	F	F-Value
Regression	1	7173633625	7173633625	90.80182903	1,25047E-09
Balance	24	1896076421	79,003,184.21	---	---
Total	25	9069710046	---	---	---

Table 31 . Results of linear regression relationship GDP/gross issues of international debt securities, globally

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	20884	3122.050517	6.689298583	6,41947E-07	14440.73253	27327.92	14440.73	27327.92
Variable X1	6.867	0.720596861	9.528999372	1,25047E-09	5.379328213	8.353806	5.379328	8.353806

Thus, the equation of linear regression relationship GDP/gross issues of international debt securities has the following form (8):

Y = 20884 + 6,867 * X1   (8)

This equation is a model which shows the dependence of the world's GDP (Y) on the global gross issues of international debt securities (X1). The equation means that GDP increases by 6.87 units with an increase of gross issues of international debt securities by 1 unit. Random deviation of the coefficient for variable X1 is 0.72; for free term of equation - 3122.05.

The results of the analysis GDP/international syndicated loans are presented below (see Tables 32-34).

Table 32 . Linear regression relationship GDP/international syndicated loans, globally

Regression statistics	
Multiple R	0.713
R-squared	0,508
Normalized R-squared	0.48
Standard error	11504
Observations	20

Table 33. Variance analysis of linear regression relationship GDP/international syndicated loans, globally

Indicators	df	SS	MS	F	F-Value
Regression	1	2458025230	2458025230	18.5736163	0.000421915
Balance	18	2382113070	132339615	---	---
Total	19	4840138300	---	---	---

Table 34 . Results of linear regression relationship GDP/international syndicated loans, globally

Indicators	Coefficients	Standard error	t-statistics	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y-intersection	20772	6023.449505	3.448508466	0.002866208	8117.118787	33426.71	8117.119	33426.71
Variable X1	17.39	4.035098046	4.309711858	0.000421915	8.912683477	25.86754	8.912683	25.86754

Thus, the equation of linear regression relationship GDP/international syndicated loans is as follows (9):

Y = 20772 + 17,39 * X1   (9)

This equation is a model which shows the dependence of the world's GDP (Y) on the global international syndicated loans (X1). The equation means that GDP increases by 17.39 units with an increase of international syndicated loans by 1 unit. Random deviation of the coefficient for variable X1 is 4.04; for free term of equation - 6023.45.

4.   Summary

The author's pair correlation and regression analysis of the relationship global GDP/global volume of outstanding debt securities, global GDP/global gross issues of international debt securities, global GDP/global volume of international syndicated loans allows to rank the main indicators of the international debt market regarding the degree of impact on the global GDP as follows:

Volume of international syndicated loans
Gross issues of international debt securities
Volume of outstanding debt securities

Therefore, the patterns identified by the author correspond to the global trends: both in Russia and in the world the most effective instruments stimulating the growth of GDP are international syndicated loans and gross issues of international debt securities.

To find interrelationships between the two most important factors affecting the size of GDP, the author has also made a pair correlation analysis the results of which are presented below (see Tables 35 and 36).

Table 35 . Correlation matrix of international syndicated loans and gross issues of international debt securities, Russia (1996-2012)

Indicators	Gross issues of international debt securities	International syndicated loans
Gross issues of international debt securities	1	---
International syndicated loans	0.623497019	1

Table 36 . Correlation matrix of international syndicated loans and gross issues of international debt securities, globally (1993-2012)

Indicators	Gross issues of international debt securities	International syndicated loans
Gross issues of international debt securities	1	---
International syndicated loans	0.771926536	1

The increase in efficiency indicates a long-term approach, while stagnation shows a kind of balance between long-term and short-term approaches, while the reduction in efficiency does not represent the strategy's approach to risk management in that company.

As can be seen from the tables above, for Russia the relationship between the volume of international syndicated loans and the amount of gross issues of international debt securities can be defined as moderate, not very significant, and for the world - as significant, but not very strong. In our opinion, a direct relationship between these two indicators of the international debt market is not available, and identified interrelations are most likely indirect and connected with the influence of other factors (economic policy, political situation, etc.).

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