Implications of the 2020 Global Economic Crisis for Sustainable Development and Financial Mechanisms for Their Management

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Abstract. Purpose: The purpose of this research is to determine the implications of the global economic crisis of 2020 for sustainable development, as well as to justify preference and develop recommendations for the application of financial mechanisms for their management.

Design/Methodology/Approach: The objects for study are the top 12 countries affected (with the highest incidence) by COVID-19. The author predicts the change in indicators of sustainable development under the influence of the economic crisis of 2020. Using the regression analysis method, the dependence of indicators of sustainable development of the economy on financial mechanisms of crisis management is revealed, which are annual inflation of consumer prices, the Gini index (income inequality), R&D expenses and the total amount of investment in the economy.

Findings: It is justified that thanks to the use of financial mechanisms of economic crisis management, the damage from the 2020 crisis, expressed in a reduction in indicators of sustainable development, can be reduced by an average of 14.94%.

Originality/Value: The example of the top 12 countries affected by COVID-19 shows that the impact of the global economic crisis of 2020 on sustainable development can be substantially mitigated through financial mechanisms of their management. To do this, annual inflation of consumer prices in 2020 should be reduced by 2.15% compared to 2019, the Gini index (income inequality) - by 41.69%, R&D spending should be increased by 11.58%, and the total investment in the economy - by 2.32%.

Keywords: Consequences · The global economic crisis of 2020 · Sustainable development · Financial governance mechanisms · Crisis management

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1 Introduction

The economic crisis that began in 2020 created high risks for the sustainable development of the world economy and, under the worst-case scenario, can return it to the level of 2015, zeroing the results of the five-year implementation of global sustainable development goals. Any economic upheaval was contrary to the idea of sustainable development. Considering the four manifestations of sustainability justified in chapter 2 of this book and based on the new (“broad”) approach to the interpretation of sustainable development developed and applied in it, it can be seen that the decline in economic activity tends to increase social tensions as a manifestation of sustainability, destabilizing the labor market, reducing living standards and increasing income inequality in society.

Environmental protection, which is also a manifestation of sustainability, is also difficult during the recession. The lack of financial resources in the state and business hinders the development and implementation of green innovations, as well as the marketing of more eco-efficient products produced using them, due to its increased cost compared to available less environmentally friendly alternatives. The economic downturn is completely opposite to stability as another criterion for the sustainability of economic systems - it increases uncertainty and risk in economic systems, reducing the efficiency of economic activities.

Finally, considering the growth and progress of economic systems as the last manifestation of their sustainability in this book, it is also necessary to note the unfavorable conditions for it in the context of economic depression. Market flexibility and innovation in business and social adaptation are hampered by resource constraints and are associated with increased costs. The 2020 crisis, based on the high speed and global scale of its spread, the great depth achieved in the first months and the expected long duration, could be the most serious shock to the economy in the last decade.

The above determines the high relevance of forecasting the effects of the current crisis and identifying the prospects for their mitigation for sustainable development. The working hypothesis of this study is that the financial mechanisms of crisis management should play a key role in this process. The aim of the study is to determine the implications of the global economic crisis of 2020 for sustainable development, as well as to justify preference and develop recommendations for the application of financial mechanisms for their management.

2 Materials and Method

The contradiction between the economic crisis and the sustainable development of science is justified and emphasized in the works of Andronova et al. (2019), Frolov et al. (2017), Inshakov et al. (2019), Morozova et al. (2019), Petrenko et al. (2018), Popkova et al. (2014), Popkova et al. (2017), Popkova et al. (2016), Saveleva (2017), Ragulina (2019), Ragulina et al. (2019), Zavyalova et al. (2018). The financial mechanisms of economic crisis management are investigated in sufficient detail and covered in the works of Haabazoka (2019), Sergi et al. (2019a, 2019b, 2019c), Orazov (2020), Perminov (2020), Cherevatenko (2020).
A review of the available literature on the selected topic showed that despite the rather detailed reflection of certain issues of the problem posed, the consequences of the global economic crisis of 2020 are not directly determined for sustainable development, and the financial mechanisms for crisis management are not sufficiently studied from the perspective of sustainable development. To fill the identified gaps in the existing scientific and economic knowledge, this work predicts the change in the indicators of sustainable development highlighted in chapter 2 of this book, under the influence of the economic crisis of 2020.

The objects for research are the top 12 countries affected (with the highest incidence) by COVID-19 (Fig. 1).

![Fig. 1. Morbidity and mortality in the top 12 countries affected by COVID-19 as of (Data last updated), 2020/5/30 9: 37am CEST (Source: compiled and calculated by the author based on materials World Health Organization (2020).)](image)

The regression analysis method identifies the dependence of indicators of sustainable economic development on financial mechanisms of crisis management, which are annual inflation of consumer prices, the Gini index (income inequality), R&D expenditures and total investment in the economy (Table 1).
| Country | Manifestations of sustainable development | Financial mechanisms |
|---------|------------------------------------------|---------------------|
|         | Global Competitiveness Index 4.0, points 1–100 |                       |
|         | Economic growth rate, % | GDP per capita, US $ | Sustainable Development Index, points 1–100 | Annual consumer price inflation in 2019, % | Gini index (income inequality) on average in 2010–2017гг., % | R&D expenditure, % of GDP** | Investment in the economy, % of GDP*** |
| USA     | 83.7 | 2.121 | 64212.535 | 74.5 | 1.812 | 41.5 | 2.79 | 21.002 |
| Brazil  | 60.9 | 1.954 | 11110.946 | 70.6 | 3.733 | 53.3 | 1.26 | 19.554 |
| Russia  | 66.7 | 1.500 | 11558.835 | 70.9 | 4.470 | 37.7 | 1.11 | 21.189 |
| UK      | 81.2 | 1.606 | 38965.146 | 79.4 | 1.738 | 33.2 | 1.66 | 16.965 |
| Spain   | 75.3 | 2.045 | 28619.088 | 77.8 | 0.700 | 36.2 | 1.20 | 20.734 |
| Italy   | 71.5 | 0.800 | 30941.744 | 75.8 | 0.611 | 35.4 | 1.35 | 18.094 |
| Germany | 81.8 | 1.415 | 43372.885 | 81.1 | 1.446 | 31.7 | 3.02 | 19.348 |
| India   | 61.4 | 7.791 | 2173.500 | 61.1 | 7.660 | 35.7 | 0.60 | 32.093 |
| Turkey  | 62.1 | 3.428 | 10645.480 | 68.5 | 15.177 | 41.9 | 0.96 | 29.229 |
| France  | 78.8 | 1.749 | 39121.158 | 81.5 | 1.108 | 32.7 | 2.19 | 21.813 |
| Iran    | 53.0 | 4.454 | 4927.273 | 70.5 | n/a* | 40.0 | 0.83 | 32.886 |
| Peru    | 61.7 | 3.838 | 7141.429 | 71.2 | 2.137 | 43.3 | 0.13 | 23.391 |
| Average | 69.84 | 2.73 | 24399.17 | 73.58 | 3.38 | 38.55 | 1.43 | 23.02 |
| Standard deviation | 10.22 | 1.93 | 19391.20 | 5.95 | 4.27 | 6.00 | 0.86 | 5.38 |

* n/a - no data in source.

**Research and development expenditure (% of GDP)

***Total investment, percent of GDP

Source: compiled and calculated by the author based on materials Institute of Scientific Communications (2020a), Institute of Scientific Communications (2020b), International Monetary Fund (2020), World Bank (2020).
3 Results

Based on the data from Table 1, projections of indicators of sustainable development are made - 100 random numbers are generated for each indicator in normal distribution based on the calculated arithmetic mean and standard deviations, on the basis of which histograms in Fig. 2 are based, reflecting the forecast values of indicators and their probability.

Fig. 2. Forecast values of indicators of sustainable development in the top 12 countries affected by COVID-19 for 2020. (Source: calculated and built by the author.)

Table 2. Forecast of indicators of sustainable development in the top 12 countries affected by COVID-19 for 2020

| Indicator of sustainable development | Forecast value for 2020 | Average in 2019 | Crisis recession (ratio)** | Crisis recession (percentage)* |
|--------------------------------------|------------------------|----------------|---------------------------|-------------------------------|
| Global Competitiveness Index 4.0, scores 1–100 | y1 51.03 | 69.84 | 0.73065 | −26.93 |
| Economic growth rate, % | y2 0.54 | 2.73 | 0.19816 | −80.22 |
| GDP per capita, US $ | y3 19493.7 | 24399.17 | 0.79895 | −20.11 |
| Sustainable Development Index, points 1–100 | y4 58.41 | 73.58 | 0.79388 | −20.62 |

* 2020 value * 100%/2019 value −100;
** 2020 value/2019 value
From the histograms in Fig. 2, the worst values of indicators of sustainable development were selected. Their probability is minimal, since histograms reflect the probability of “all other things being equal,” and the crisis changes conditions and increases the probability of the worst forecasts. Selected values of indicators of sustainable development are given in Table 2.

Based on the data from the table, a regression analysis of the multiple dependence of each of the indicators of sustainable development (y) on the set of financial mechanisms of crisis management (x1–x4) was carried out, the results of which are given in Table 3.

Table 3. Regression analysis results

| Indicator          | Multiple linear regression model |
|--------------------|---------------------------------|
|                    | y1  | y2  | y3   | y4   |
| Multiple correlation,% | 94.30 | 86.89 | 91.51 | 88.15 |
| Constant           | 102.66 | -2.27 | 29356.29 | 92.29 |
| Factor at x1       | 0.22  | 0.00  | -325.35 | -0.33 |
| Factor at x2       | -0.57 | -0.02 | -250.77 | -0.25 |
| Factor at x3       | 5.95  | -0.42 | 16431.63 | 2.09  |
| Factor at x4       | -0.88 | 0.28  | -764.59 | -0.48 |

Source: calculated and compiled by the author.

In order to determine the prospects for mitigating the effects of the global economic crisis of 2020, optimization was carried out on the basis of financial management mechanisms, aimed at determining the values that should be adopted by financial management indicators to prevent a projected decline in sustainable development indicators. After the isolated optimization, the arithmetic averages of financial management are calculated within selected indicators of sustainable development and the implications for sustainable development are determined (Table 4).

According to data from Table 4, due to the use of financial mechanisms of economic crisis management, the reduction of the value of the global competitiveness index 4.0 under the influence of the crisis will be reduced by 13.76% and amount to 13.17% instead of 26.93%. The economic growth rate will be reduced by 65.84%, that is, by 14.38% less than with the spontaneous impact of the crisis, thanks to the use of financial management mechanisms. GDP per capita will be increased by 5.94% instead of a decline of 20.11%. The sustainable development index will decline by 15.06% instead of the projected 20.62%.
**Table 4.** Prospects for mitigating the impact of the 2020 global economic crisis through financial governance mechanisms

| Indicator | Average in 2020 | Optimizable variable | $y_1$ | $y_2$ | $y_3$ | $y_4$ | $y_1, y_2, y_3, y_4$ |
|-----------|----------------|----------------------|------|------|------|------|---------------------|
| $x_1$     | 3.38           | 3.45                 | 3.37 | 3.36 | 3.06 | (3.45 + 3.37 + 3.36 + 3.06)/4 = 3.31 | -2.15 |
| $x_2$     | 38.55          | 15.88                | 30.83| 36.15| 7.07 | (15.88 + 30.83 + 36.15 + 7.07)/4 = 22.48 | -41.69 |
| $x_3$     | 1.43           | 1.75                 | 1.20 | 1.64 | 1.79 | (1.75 + 1.20 + 1.64 + 1.79)/4 = 1.59 | 11.58 |
| $x_4$     | 23.02          | 10.53                | 62.04| 20.41| 1.26 | (10.53 + 62.04 + 20.41 + 1.26)/4 = 23.56 | 2.32 |
| $y_1$     | 69.84          | 95.5901**            | −    | −    | −    | 79.45 | 26.93* − 13.76 = 13.17 | 13.76 |
| $y_2$     | 2.73           | −                    | 13.75**| −    | −    | 3.12  | 80.22* − 14.38 = 65.84 | 14.38 |
| $y_3$     | 24399.17       | −                    | −    | 30539.1**| −    | 30754.7 | 20.11* − 26.05 = +5.94  | 26.05 |
| $y_4$     | 73.58          | −                    | −    | −    | −    | 92.68**| 77.66  | 20.62* − 5.56 = 15.06 | 5.56 |

* The decline in the 2020 crisis as a percentage of the last column in Table 2.

** Obtained by means of the ratio of the average value of the indicator in 2020 to the decline in the conditions of the crisis of 2020 from the penultimate column from Table 2.

Source: calculated and compiled by the author.
4 Conclusion

The results of the research, based on the example of the top 12 countries affected by COVID-19, showed that the impact of the global economic crisis of 2020 on sustainable development can be significantly mitigated through financial mechanisms of their management. The damage from the crisis, expressed in terms of declining indicators of sustainable development, can on average be reduced by 14.94% (13.76 + 14.38 + 26.05 + 5.56)/4) due to financial crisis management. To do this, annual inflation of consumer prices in 2020 should be reduced by 2.15% compared to 2019, the Gini index (income inequality) - by 41.69%, R&D spending should be increased by 11.58%, and the total investment in the economy - by 2.32%.

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