

# Theoretical-methodological and practical value aspects resulting from the economic impact of Covid-19

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**Abstract:** *In the current period, marked by the pandemic, in parallel with the unprecedented actions required for the health system, it is necessary to prepare the economy for a crisis. In this regard, the elaboration of a set of measures is seriously affected by the fact that at present it is not known till when the epidemic will last. Firstly, the extraordinarily abrupt dynamics of the infections spread from a day to another, doubled by the authorities' actions for the population isolation at home and, implicit, the severe restriction of the economic activities, make the proposed set of measures frequently changed.*

*The present paper presents an analysis of the economic effects of the coronavirus pandemic on the Romanian economy from the point of view of monetary, fiscal, as well as entrepreneurial policy, tries a macroeconomic estimate on medium term and proposes a series of measures aimed at recovering the national economy.*

**Keywords:** *Coronavirus Crisis, Economic Crises, Romania, Recovery*

**JEL Classification:** *G01, L26*

## 1. Introduction

The COVID-19 pandemic, unprecedented from the point of view of causes and remedies knowledge, is more than a global emergency for health, due to its character, a

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systemic crisis in the human development process. The two sides of the COVID-19 crisis - medical emergency and economic impact - are closely related. First and foremost the majority of economies are hit by the economic impact. Many governments have effectively frozen the social and economic activity in all or some parts of their countries to eliminate contamination with the new coronavirus shut down non-essential businesses and ordered residents to stay home for weeks or months. Income reduction, job losses, closure of some companies, reducing remittances from citizens' abroad and rapid capital outflows are severely affecting the economies. In these circumstances, economic devastation will undermine the ability to respond to the virus and threaten social and political stability in the short and medium term. The hope that economies will operate in a crisis mode, without causing extreme disruption, then quickly resuming the process of growth and recovery it is very low.

As the world enters into the deepest global recession since the Great Depression, it is necessary to link health needs to social, economic and environmental well-being, linking the present to the future. The long-term social and economic impact of this crisis will be profound, and economists and international organizations already anticipate the potential socio-economic effects of this pandemic: The World Bank has warned that in 2020 between 40 and 60 million people could end up in extreme poverty, while the International Labour Organization expects some 195 million jobs to be lost. For these reasons, the policies to reduce vulnerabilities and to strengthen capabilities to combat crises, both in the short and long term, are vital.

## 2. Literature review

Pandemics are not new and we can find them in various stages of human history<sup>1</sup>. This idea is also supported by the historical timeline of major pandemics around the world, presented by the World Economic Forum.

Name of the pandemic	Period	Number of cases
Antonian Plague	165-180	5 million
Japanese smallpox epidemic	735-737	1 milion
Justinian's plague	541-542	30 -50 million
Bubonic plague	1347-1351	200 million
The new global smallpox epidemic	1520-onwards	56 million

<sup>1</sup> Ferguson, N., Laydon, D., Nedjati Gilani, G., Imai, N., Ainslie, K., Baguelin, M., Bhatia, S., Boonyasiri, A., Cucunuba Perez, Z., Cuomo-Dannenburg, G., Dighe, A., Dorigatti, I., Fu, H., Gaythorpe, K., Green, W., Hamlet, A., Hinsley, W., Okell, L., Van Elsland, S., Ghani, A. (2020). Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand. Imperial College London. <https://doi.org/10.25561/77482>

Name of the pandemic	Period	Number of cases
The Great Plague of London	1665	100,000
The Italian plague	1629-1631	1 million
The third plague	1885	12 million (China & India)
Yellow fever	1800s	100,000-150,000 (US)
Russian flu	1889-1890	1 million
Spanish flu	1918-1919	40- 50 million
Asiatic flu	1957-1958	1.1 million
Hong Kong flu	1968-1970	1 million
HIV/AIDS	1981- present	25- 50 million
Swine flu	2009-2010	200,000
SARS	2002-2003	770
Ebola	2014-2016	11,000
MERS	2015-present	850

Source: <https://weforum.org/agenda/2020/03/a-viUSAI-history-of-pandemics>

Given the increased frequency of pandemics, in the 20 and 21 centuries, many researchers, including Garrett (2007), Keogh-Brown et al. (2008) and the latest Madhav et al. (2017) and Fan et al. (2018) support the idea that the emergence of a global pandemic was inevitable, COVID-19 pandemic being the worst episode since the Spanish flu pandemic in 1918.

As an impact and particularities, the new coronavirus has spread across the majority of the world countries, affecting in almost every country on the planet over 13 million people and causing the deaths of more than 570,000 people<sup>1</sup>. At present, countries are trying to combat the spread of the virus through the application of different treatment options, massive population testing and the adoption of public health measures, including social distancing<sup>2</sup>. In the opinion of Mandavilli's (2020), the social distancing strategy had saved thousands of lives during other pandemics, such as the Spanish flu from 1918 and more recently in Mexico City, during the 2009 flu. As part of social distancing policies, companies, schools, restaurants, sports clubs were forced to close, mass gatherings were banned and border closure measures have been imposed in many countries, allowing only certain types of travel. The objective of these social distancing measures has been and is the attempt to "flatten the curve" of the COVID-19 cases daily evolution, in order to decrease its exponential growth and, consequently, to

<sup>1</sup> <https://www.unicef.org/romania/ro/comunicate-de-pres%C4%83planul-global-privind-r%C4%83spunsul-umanitar-%C3%AEn-contextul-covid-19>

<sup>2</sup> Fong, M. W., Gao, H., Wong, J. Y., Xiao, J., Shiu, E. Y. C., Ryu, S., & Cowling, B. J. (2020). Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings— Social Distancing Measures. 26(5), 976–984. <https://doi.org/10.3201/eid2605.190995>

reduce the pressure on health systems<sup>1</sup>. The adoption of social distancing measures has an influence on the current and long-term decision-making processes of the population and companies, relating to resource management, consumption, saving and investment. Ferguson et al. (2020) and Trilla et al. (2008) consider that, at this time, economic decision-making is difficult because, in recent decades, the world has not faced with pandemics of such magnitude. In these circumstances, governments must decide to what extent and for how long they will impose travel restrictions, social distancing, closure of companies, schools and other institutions<sup>2</sup>.

As a result of the COVID-19 crisis, there will be a considerable slowdown of the economic activities. According to an International Monetary Fund (2020) forecast, realized in June 2020, the global economy could contract by around 4,9 % in 2020 and the contraction will be much larger than the global financial crisis from 2008-2009. Carlsson-Szlezak et al. (2020) considers that the evolution forecasts are uncertain because there are quite a lot of unknown issues, such as<sup>3</sup>:

- the virus properties are not fully understood and mutations can occur;
- the situation of asymptomatic patients is not fully clear;
- the infection and immunity rates are uncertain, especially where testing is limited or uncertain as results;
- the reactions of firms and households are difficult to predict.

The quarantine measures, much more extensive in scope and scale compared to previous pandemics, have caused the disruption of the global value chains and also of the demand and consumption patterns. As a consequence of this, there has been an increase in the turbulence of the financial markets and the economic shock has been amplified. Moreover, compared to previous pandemics, we can observe the rapid pace increase of the firms and households loans and debt, on the short term.

To investigate the potential negative impact of the coronavirus pandemic, it is useful to understand the economic mechanisms by which shocks will adversely affect the

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1 John Hopkins University. (2020b, May). Mortality Analyses. Johns Hopkins Coronavirus Resource Center. <https://coronavirus.jhu.edu/data/>

2 Asioli, D., Varela, P., Hersleth, M., Almli, V. L., Olsen, N. V., & Naes, T. (2017). A discussion of recent methodologies for combining sensory and extrinsic product properties in consumer studies. *Food Quality and Preference*, 56

3 Carlsson-Szlezak, P., Reeves, M., & Swartz, P. (2020, March). What Coronavirus Could Mean for the Global Economy. <https://hbr.org/2020/03/what-coronavirus-couldmean-for-the-global-economy>

economy. According to Carlsson-Szlezak et al. (2020), there are three main shock transmission channels<sup>1</sup>. The first channel is the direct impact of the reducing consumption. The prolonged duration of the pandemic, the adoption of public measures of social distancing, negative forecasts of long-term economic prospects may change consumer behaviour. In normal circumstances, the decision to choose a product is linked to its characteristics. In the context of the coronavirus pandemic, there is a change in the assessment of the usefulness of some products, with the emphasis being placed on the supply of food and less on the luxury goods and services sector. The second channel is linked to the indirect impact caused by financial market shocks and their effects on the real economy. The third impact generated by the supply change; whereas during the quarantine period the production of some companies has been stopped, this has negatively affected supply chains, demand and employment, leading to prolonged periods of redundancies and rising unemployment.

Gourinchas (2020) summarizes the effect of the crisis on the economy by saying: "A modern economy is a complex network of interconnected parties: employees, firms, suppliers, consumers and financial intermediaries. Each is the employee, customer, creditor of someone else etc." <sup>2</sup> Due to the high degree of interconnectivity and specialization of productive activities, any change in supply chains and economic flows will have cascade effects. Baldwin (2020) describes the impact of COVID-19 on income flows in the economy, thus<sup>3</sup>:

- Firstly, wages non-payment leads to a reduction in consumption and savings. In turn, the decrease in savings leads to a reduction in investment and therefore ultimately to a reduction in the capital stock;
- Secondly, households reduce their demand for imports, which in turn leads to reduced export revenues;
- Thirdly, demand/supply shocks cause disturbances in domestic and international supply chains;

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<sup>1</sup> Carlsson-Szlezak, P., Reeves, M., & Swartz, P. (2020, March 27). Understanding the Economic Shock of Coronavirus. Harvard Business Review. <https://hbr.org/2020/03/understanding-the-economic-shock-of-coronavirus>

<sup>2</sup> Gourinchas, P.-O. (2020). Flattening the pandemic and recession curves. Mitigating the COVID Economic Crisis: Act Fast and Do Whatever. <http://vietstudies.net/kinhte/COVIDEconomicCrisis.pdf#p.=38>

<sup>3</sup> Baldwin, R. (2020, March 13). Keeping the lights on: Economic medicine for a medical shock. VoxEU.Org. <https://voxeu.org/article/how-should-we-think-about-containing-COVID19-economic-crisis>

- Fourthly, all previous shocks and breaks lead to a decrease in production - which leads to reductions in the use of production factors. In this case, by reducing working hours or redundancies the workforce is more affected than capital and, therefore, will gain lower earnings.

According to the opinion of most professionals, many aspects, phenomena and post-crisis COVID-19 will no longer be similar.

### **3. Methodology**

We have built our research on the data and information from the national and international literature, including data from the Johns Hopkins University site (<https://coronavirus.jhu.edu>), as well as other national and international institutions (World Health Organization, European Commission, Ministry of Health, etc.).

Among the used statistical methods of research we mention, as the most relevant, the regression and the simple and multiple correlation analysis devoted to the analysis of the interdependence between the daily number of deaths, recovered and active cases in the period January-October 2020.

### **4. Simple and multiple regression and correlation analysis results**

In the case of the regression and correlation analysis, it was considered 14 countries, most of which are members of the European Union, to which are added other countries, such as Norway, Russia, the USA and China. Our analysis took into account the total number of cases of coronavirus cases, the number of deaths and the number of active cases in each country.

#### **Simple regression - the intensity of the relationship $R^2$ (Annex 1)**

##### **A. Relationship between "total deaths" as dependent variable (y) and "total cases" as independent variable (x)**

The calculations using regression and correlation analysis have tried to establish causalities between "total deaths" as a dependent variable (y) of "total number of cases" (x), for the period 22.01.2020 to 18.10.2020, considering that the number of deaths is the result of total number of cases variation which sequentially involves a certain relationship between the two variables.

Taking into account the size of  $R^2$ , we can affirm that the dependence between the total number of cases and the total number of deaths is verified, the value of the  $R^2$  coefficient being higher than 0.5 (0.52 being the lowest value for Hungary).

For seven countries, the value of  $R^2$  is between 0.98 and 0.89, a very high value, which shows that the functional dependence of variables is correctly chosen and that the variable 'total cases', depending on its evolution, has a quasi-determining impact on the total number of deaths, with specific inter-country differences, not particularly large for the first seven (approximately 0,1) and with a greater differentiation for the remaining seven countries, where  $R^2$  takes values between 0.89 and 0.52. Romania belongs to the first category of the group countries, with  $R^2$  equal to 0.97.

### **B. Relationship between "recovered cases", as dependent variable (y) and "active cases", as independent variable (x)**

In contrast to the "total number of cases"<sup>1</sup>, the number of total active cases is a category of symptomatic infections, which come directly under medical care.

The recovered cases are part of the total number of cases, with the distinction that the final result of the medical assistance is a happy one in terms of saving human life and, hence, healing those infected with the coronavirus.

If the number of deaths is correlated with "total cases" in our analysis reflects the fatal outcome intensity of COVID-19, which involves a number of specific measures, in the case of the recovered we can consider that they are a combination of healthcare efficiency, but also the resilience and immunity of patients.

Conventionally, the variation interval is divided into two groups:

- Relatively high correlation ( $R^2$  has values between 1 and 0.5);
- Weaker correlation ( $R^2$  has values between 0.49 and 0).

In the first group of countries, with  $R^2$  values above 0.5, we have six countries, of which three developed (Sweden, France and the USA) and three emerging economy countries (Bulgaria, Hungary and China). In our opinion, these countries have a relatively favourable situation in fighting and preventing the coronavirus either as a result of relatively effective health capabilities to combat the virus (in the case of developed countries) or the immune resistance to which we may also add prompt treatment and prevention policies, such as in the case of China in particular.

In the second group, of which Romania is a member,  $R^2$  has lower values, which means a weaker intensity of the relation between the two variables and, ipso facto, a weaker relation between 'recovered' and 'active cases', due to a multitude of factors and

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<sup>1</sup> "Total cases" include contaminated and asymptomatic persons.

causes, including not only the weaker level of healthcare preparedness (Romania, Russia), but also interference of some factors related to external immigration that had a contingency with the pandemic (Germany, Finland, Italy, Spain, Denmark).

### **C. Relationship between “recovered” as a dependent variable (y) and “total cases” as an independent variable (x)**

The regression and correlation analysis of the dependent variable "recovered" (y) and the independent variable "total cases" (x) indirectly reveals, in a first approach, the involvement of the category of asymptomatic contaminants, in addition to the aspect of the effectiveness of the medical act. At the same time, we want to show that the statistical rigor of records (both of the recovered and total number of cases) has suffered some deforming influences from one country to another, namely:

- in "total cases" it is possible that only a part of them was registered due to the relatively low number of tests compared to the total number of infected cases, some of them entering into the untested population segment;
- the 'recovered' indicator may also include persons cured without medical care.

The third analysis, devoted to the “recovered” (y) - 'total cases' (x) relationship, shows a strong bond intensity between variables, starting with  $R^2$  values from 1 to 0,51, which leaves room for interpretation for the existence of infected in mild forms segments and asymptomatic infected. For example, the size of  $R^2$  for Romania, has a value of 0.91, and other countries have even 1 (Sweden) or 0.98 (USA).

### **Analysis by the size of the regression coefficient or elasticity (Annex 2)**

Using the same database, we present below the analysis of the regression or elasticity coefficient (b), associated with the independent variable (x), relative to the dependent variable (y), according to the equation  $y=a+bx$ . For the two categories of variables (y and x) statistical quantities of the same indicators were used as in the previous analysis.

### **D. Relationship between “deaths” as a dependent variable (y) and “total cases” as an independent variable (x)**

The higher the positive values of the regression coefficient are, the more one unit increase of the independent variable x will influence more the dependent variable y.



Conventionally, the following two groups of regression factors were established according to their descending size:

- size range from 0,12 to 0,03;
- size range from 0,02 to 0,01.

As a general remark, from the analysis results a very high approximation between countries as regards the size of the regression coefficient.

The first interval includes ten countries that are characterized by a relatively high regression coefficient, among which is Romania. This means that the change by one unit of the independent variable "total cases" (x) induces a higher increase of the dependent variable "deaths" (y), Italy being in the first place in this respect, followed by Sweden, France, Spain, etc., Romania being on the penultimate place with a size of 0.03.

The second size range highlights the regression coefficient varying between 0.02 and 0.01, which means a weaker link between the two variables.

#### **E. Relationship between "recovered" as a dependent variable (y) and "active cases" as an independent variable (x)**

Conventionally, we have established two intervals of variation of the regression coefficient for this case of functional dependence, namely:

- variation interval from 2.55 to 1.26;
- variation interval from 0.68 to 0.

A number of five countries belong to the first interval, these being characterized by a high regression coefficient, among which is Romania (1.26), at a considerable distance from the first ranked. This means a relatively high share of the recovered cases, compared to the total number of infected cases.

The second range comprises a number of nine countries, two of which (Norway and China) have insignificant regression coefficients. The regression coefficients in the second interval are less elastic than those in the first interval.

#### **F. Relationship between "recovered" as a dependent variable (y) and "total cases" as an independent variable (x)**

The following intervals were established for regression coefficient:

- variation interval from 1.15 to 0.68 (high coefficients);
- variation interval from 0.38 to 0 (low coefficients).

The first interval highlights nine cases of countries with a relatively high elasticity of the recovered people number to the total number of cases. Nine countries belong to this interval, including Romania with 0.68, which means that, at an increase of one unit of the total number cases, the number of recovered people will increase by 0.68, while the countries in the second interval will have much lower values of the regression coefficients.

Regression and correlation analysis over the entire interval can be detailed depending on variations over different time periods. In this context, we emphasize the need to highlight, practically in most countries, the existence of a second wave of the pandemic in the general framework of the total time interval, with different configurations. (See Annex 3)

The pandemic started gradually and will probably end gradually or may lead to the situation of prolonged coexistence between man and coronavirus, similar to HIV, SARS, MERS, Ebola. The vaccine that will be discovered will have an efficiency of no more than 95%, which means that a margin of about 5% will still be at risk of infection.

## **5. Comparative aspects of COVID-19 in Romania and EU27 member countries**

As of March 13, 2020, the World Health Organization (WHO) has considered Europe to be the active centre of the 2019-2020 coronavirus pandemic. Cases in European countries have doubled over the 3 to 4 days, and some countries have doubled contamination cases every 2 days. As of March 17, all European countries had a case confirmed by COVID-19, with Montenegro being the last European country to report at least one case. At least one death has been reported in all European countries except the Vatican City.

The restrictions imposed in most European countries are generating great losses from an economic point of view. Notable differences in the evolution of the pandemic in the European Union countries were due to testing policies (different capacity of states to perform as many tests as possible). The number of deaths reported to the population can provide a better reflection on how European countries are managing the crisis. Analysing the specific COVID-19 indicators, results that the Eastern Europe countries, less developed, compared to those from the western continent had a lower number of COVID-19 victims. One explanation would be that the coronavirus pandemic reached later in Eastern Europe compared to Western states and that Eastern governments had

time to learn from the experiences and good practices of Western countries. In addition, the low number of global air and ground connections, especially with China, has played an important role. On the other hand, if we relate the number of people who were cured of COVID-19 to the number of contaminations, we can see that it is higher in developed countries, which explains why the health systems of developed countries, as endowment and performance, are clearly superior to those of Eastern Europe.

Vaccination is the main tool for primary disease prevention and one of the most cost-effective measures in terms of public health. Immunization by vaccination is the best defensive way available to mankind to fight serious, preventable and contagious diseases, which can sometimes be fatal. With widespread vaccination, smallpox has been eradicated, poliomyelitis has disappeared from Europe and many other diseases have been almost eliminated. On 17 June 2020, the Commission presented a European strategy to accelerate the development, production and delivery of vaccines against COVID-19. An effective and safe vaccine against the virus is the main asset to find a definitive solution to the pandemic crisis. But the development and use of a vaccine requires a complex and lasting process. Optimistic estimates foresee the development and availability of safe and effective vaccines at the earliest in early 2021.

This is not only a European challenge, but also a global one. The European Union will not be safe until the entire world will have access to a vaccine and, as such, the EU and its Member States have both responsibility and the interest in making this vaccine universally available.

The COVID-19 pandemic has radically transformed the lives of people around the world. Apart from the negative health consequences for people directly affected by the virus, the COVID-19 pandemic has had major implications for how people live and work, affecting their physical and mental well-being in a profound manner.

The immediate economic and social effects of this crisis have been analysed by Eurofound on the basis of an online survey realized at EU level, titled Living, Working and COVID-19. The aim of the survey was to investigate the impact of the COVID -19 crises on welfare, work, teleworking and on the financial situation of the population, with a number of relevant questions to people from different age groups and living conditions.

Based on the data from the aforementioned survey, we analysed the case of Romania compared to other countries and the EU. Many respondents highlighted high levels of loneliness, coupled with low optimism about their future, a decline in well-being and confidence in the EU. The survey confirms an increase in work at home and, for an increasing number of respondents, a feeling of insecurity in terms of jobs, with a

dramatic decrease in working time. It is clear to the people of the 27 EU Member States that their economic situation is deteriorating and their financial future is worrying.

**Tabelul 1 – Satisfaction with the quality of life and the mental well-being index in Romania and some EU member states**

-points-

Country	Respondents quality of life	Differences Romania – other states	Country	Mental well-being index	Differences Romania – other states
UE-27	6,3	-0,2	UE-27	5,9	-0,2
Romania	6,1	0,0	Romania	5,7	0,0
Greece	5,1	1,0	Greece	5,6	0,1
Denmark	7,4	-1,3	Malta	6,5	-0,8

Source: data processed by the authors based on [www.eurofound.europa.eu/publications/report/2020](http://www.eurofound.europa.eu/publications/report/2020)

According to the Eurofound survey, in terms of European life satisfaction, Denmark and Finland are expected to have the highest scores, 7.4 and 7.3, respectively, but surprisingly, France is among the countries with the lowest life satisfaction. (5.9 points) - a position it generally does not have in other surveys conducted before the COVID-19 crisis. Romania has 6.1 points in terms of life satisfaction, with 0.2 points below the EU-27 average and 1.3 points behind Denmark. The country with the lowest life satisfaction in the European Union is Greece (5.1 points). Greece is the last country in the EU in terms of mental well-being (5.6 points). Romania is 0.2 points below the EU average, and the least affected country in the European Union, in terms of mental well-being, is Malta (6.5 points)...

**Table 2 – Confidence in the EU and the health system in Romania towards the EU-27 states and the maximum and minimum values of the countries**

-points-

Country	Confidence in the EU	Differences Romania – other states	Country	Confidence in the EU	Differences Romania – other states
EU-27	4,6	-0,1	EU-27	6,3	-2,0
Romania	4,5	0,0	Romania	4,3	0,0
Greece	3,3	1,2	Hungary	3,9	0,4
Finland	6,5	-2,0	Malta	8,1	-3,8

Source: data processed by the authors based on [www.eurofound.europa.eu/publications/report/2020](http://www.eurofound.europa.eu/publications/report/2020)

Confidence in the European Union had an average value of 4.6 points. Respondents in Finland have the highest confidence in the EU and the respondents from Greece have lowest confidence (Table 2). Romania is very close to the average in the European Union in terms of citizens' trust in the EU.

The data of Table 2 shows that Malta had the highest confidence in the national health system (8,1 points) and that Hungary had the lowest confidence (3,9 points). In the countries most affected by COVID-19 (in particular Spain, Belgium, Italy and France), confidence in the health system was higher than the EU average. Romania is 2 points below the European Union average, with only 0.4 points above Hungary. In our country, confidence in the health system it was not high before the current pandemic. As revealed by the study realized by the Local American Working Group, in collaboration with GfK, in June 2016, 45% of Romanians pointed out three main problems facing the national health system in Romania, namely: insufficient medical personnel; lack of access to last generation medicinal products, allocated budget inefficient management<sup>1</sup>.

Romania's Medical College appreciates that the shortage of doctors in our country is 40% of what is needed, and half a million Romanians live in localities without a doctor<sup>2</sup>. The exodus of doctors in Romania has the effect of collapsing the Romanian health system through the lack of qualified personnel. In addition to the impact of the exodus of doctors, under-financing of the health system, poor infrastructure, lack of prevention and screening programs financing are problems that have a direct impact on the health status of patients. In the EU Health Status Report (2018)<sup>3</sup>, the Romanian health system is characterized by low funding and inefficient use of public resources, with the lowest per capita spending as a proportion of GDP. With a historic minimum of health spending compared to the rest of the European Union, Romania records unwanted mortality rates from treatable or preventable causes, but also as regards the sustainability of the health system, it is shown in another report by the European Commission published in November 2019<sup>4</sup>.

The situation is critical both because of low budget allocations and the chronic lack of health education among the population. Romania has allocated 2020 5.6% of the Gross Domestic Product to the health sector, in conditions in which in the EU the average share of the funds allocated to health is 9%.

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<sup>1</sup> [www.lawg.ro](http://www.lawg.ro), accesat octombrie 2020

<sup>2</sup> [www.medichub.ro/stiri/harta-deficitului-de-medici-de-familie-jumatate-de-milion-de-romani-traiesc-in-localitati-fara-niciun-medic-id-2830-cmsid-2](http://www.medichub.ro/stiri/harta-deficitului-de-medici-de-familie-jumatate-de-milion-de-romani-traiesc-in-localitati-fara-niciun-medic-id-2830-cmsid-2)

<sup>3</sup> [www.ec.europa.eu/romania/news/20181123\\_raport\\_2018\\_stare\\_de\\_sanatate\\_ue\\_romania\\_ro](http://www.ec.europa.eu/romania/news/20181123_raport_2018_stare_de_sanatate_ue_romania_ro)

<sup>4</sup> [www.ec.europa.eu/health/sites/health/files/state/docs/2019\\_chp\\_romania\\_romanian.pdf](http://www.ec.europa.eu/health/sites/health/files/state/docs/2019_chp_romania_romanian.pdf)

The crisis caused by the COVID-19 pandemic has had an overwhelming effect on people's optimism about their future, with 45% saying they were optimistic about their own future in 2020, compared to 64% in the 2016 European Quality of Life Survey. The respondents from the most severely affected EU countries (Belgium, France, Italy and Spain) were among the least optimistic about their future, their evaluations being below the EU average; Belgium and Spain were previously more optimistic than the EU average.

**Table 3 – The optimism regarding the personal future in Romania, towards the EU average and the maximum and minimum levels of the respondents**

-pp-

Country	Respondents' optimism about their future	Differences Romania – other states
EU-27	45,0	5,0
Romania	50,0	0,0
Greece	32,0	18,0
Finland	75,0	-25,0

Source: data processed by the authors based on [www.eurofound.europa.eu/publications/report/2020](http://www.eurofound.europa.eu/publications/report/2020)

Analysing the European Union countries, the highest percentage of optimism is found in Finland (75%), and the lowest percentage of optimism is found in Greece (32%). Romania is 5 percentage points above the European Union average.

**Table 4 – The share of responses regarding the changes in working time and people who started teleworking due to COVID-19, in Romania and EU member states with maximum and minimum shares**

-pp-

Country	Changes in working time during the pandemic	Differences Romania – other states	Country	Workers who started teleworking as a result of the pandemic	Differences Romania – other states
EU-27	48,0	9,0	UE-27	37,0	-19,0
Romania	57,0	0,0	Romania	18,0	0,0
Sweden	21,0	36,0	Greece	26,0	-8,0
Greece	66,0	-9,0	Finland	58,0	-40,0

Source: data processed by the authors based on [www.eurofound.europa.eu/publications/report/2020](http://www.eurofound.europa.eu/publications/report/2020)

Measures to restrict physical contact, in an attempt to stop the pandemic, have led to the unprecedented closure of offices around the world. The continuation of economic activity, in these conditions, has tested many states regarding changes in working time, but also in the implementation of the home work system.

A proportion of 48% of the active population in the European Union has recorded a reduction of their working time (table no. 4). More than a third (34%) of the employed persons said that their working time had decreased "a lot" and 16% that it had decreased "a little". Greece, Cyprus, France, Italy and Romania are countries where more than half of workers said that their working time has decreased "a lot". Reducing the working time can sometimes involve reducing income. On the other hand, the highest proportion of workers whose working hours did not change was reported in Sweden, Finland and Denmark<sup>1</sup>.

As a result of the pandemic, more than a third (37%) of the employees working in the EU has started to work from home. The countries with most workers who have started work at home are in the Nordic and Benelux countries (almost 60% in Finland, over 50% in Luxembourg, the Netherlands, Belgium and Denmark, and 40% or more in Ireland, Sweden, Austria and Italy). Romania takes the last place in the EU in terms of the number of people who have started working at home, as a result of the COVID-19 pandemic, respectively 18% of the total employed persons. The small percentage can be explained by the lack of previous experience in making work more flexible. However, some sectors of activity have adapted on the go, with the understanding that on such times, the main goal is to continue the activity,

At European Union level, people who started working at home during the pandemic mainly had previous experience in this area, which is reflected in the differences between countries. Some jobs and a number of essential services cannot be done remotely, while others could benefit from the technology modernization and reorganization. So far, those who have never worked at home before the pandemic have a lower proportion of teleworking, compared to those who have worked previously, at least sequentially.

A high proportion of respondents (38%) said that their financial situation is now (June 2020) worse than before the COVID-19 pandemic, when the European Union still had strong economic growth. Moreover, many people express their concern about the immediate future, with 38% of respondents stating that their financial situation will be worse in three months.

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<sup>1</sup> [www.eurofound.europa.eu/publications/report/2020](http://www.eurofound.europa.eu/publications/report/2020), accesat octombrie 2020

**Table 5 – Financial situation (worse or better) of people three months ago and expected in the next three months**

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Country	The financial situation 3 months ago	Differences Romania – other states	Country	Expected financial situation in the next 3 months	Differences Romania – other states
EU-27	38,0	8,0	EU-27	38,0	5,0
Romania	46,0	0,0	Romania	43,0	0,0
Denmak	12,0	34,0	Denmak	10,0	33,0
Bulgaria	60,0	-14,0	Bulgaria	62,0	-19,0

Source: data processed by the authors based on [www.eurofound.europa.eu/publications/report/2020](http://www.eurofound.europa.eu/publications/report/2020)

Strong differences are observed across countries, with a gap of 48 percentage points between the Member State with the lowest (Denmark at 12%) and highest (Bulgaria at 60%) proportion of respondents who reported that their financial situation is now weaker than three months ago. There is a slightly larger gap is between the countries with the lowest and highest percentages of the expectations regarding the deterioration of their financial situation in the next three months (difference of 52 percentage points between Denmark at 10% and Bulgaria at 62%).

In Romania, 46% of respondents consider that their current financial situation is worse than the one they had before the pandemic, and 43% expect their financial situation to deteriorate in the next 3 months, in both cases our country being over EU average.

## 6. Coronavirus pandemic in Romania

The first case of COVID-19 infection in Romania appeared at the end of February 2020. We believe that the aggravating factors that have led to the current situation in which our country is in the health and economic terms are: the lack of the decision makers preparedness to react quickly, non-compliant behaviour with the taken decisions, but also the reception of the diaspora in the country after the pandemic has started, they were

COVID-19 manifested itself with territorial and sectorial ups and downs, which would have presupposed the application of a differentiated system of measures. If at the beginning of the pandemic in Romania the first severely affected county was Suceava, and the measures were drastic in that area at that time, in the first half of November, in our country, the most affected counties were Sibiu, with an incidence of infections per thousand inhabitants of 9.00, Cluj with an incidence of infections per thousand



inhabitants of 7.42 and Timiș with an incidence of infections per thousand inhabitants of 6.85.

With the reopening of economic activities (especially restaurants, cafes and tourism) during the summer holidays, as a result of the interaction between people and the relaxation of restrictions imposed by the authorities, we are witnessing in the autumn months an increase in the number of infections cases with the new coronavirus, but also of the number of deaths cases caused by COVID-19, both in Romania and worldwide. This situation imposed, at the end of September - beginning of October, the reintroduction of the anti-epidemic restrictions in certain areas of the world, where cases of SARS-CoV-2 infection exploded, but also locally in our country. Limiting interpersonal interaction has led to a decrease in the average daily rate of infections with the new coronavirus and the rate of increase in deaths caused by it. (See annex 4)

For 2020, experts estimate a contraction of the economy of -4.7%, and the budget deficit could rise to -9.3% of GDP. The economic forecast is uncertain during this period, because it is directly correlated with the duration and proportions of coronavirus outbreaks, which are difficult to predict and with changes in consumer behaviour depending on the time variations of COVID-19<sup>1</sup>.

The National Bank of Romania intends to use "whatever is necessary" to support the rapid recovery from the crisis, and interest rates should fall amid broad liquidity conditions and further interest rate cuts, in tandem with regional central banks. It is difficult for the NBR to maintain the stability of the national currency while injecting more liquidity into the market through quantitative easing.

The IMF estimates for Romania show a 5% economic contraction for this year, followed by an increase of 3.9% in 2021. The economic impact depends on factors which interact in a manner difficult to estimate, which include the pandemic trajectory, the intensity and effectiveness of protection measures, the disturbances on supply chains, the repercussions of tightening conditions on global financial markets, changes in consumer behaviour, effects on confidence and the evolution of commodity prices<sup>2</sup>.

As the economic recovery will depend on a number of factors above-mentioned as well as on the possibility that the epidemic will produce structural changes, two scenarios of the evolution of the COVID-19 crisis were initially considered, namely "V" and "L" shape. The "V" -shaped return scenario described the classic impact of a shock, with a pronounced decrease, followed by an almost complete recovery. This scenario was

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1 [www.bcr.ro/ro/estimari-2020-contractie-economica-de-minus-4-virgula-7-procente](http://www.bcr.ro/ro/estimari-2020-contractie-economica-de-minus-4-virgula-7-procente)

2 [www.economica.net/impact-grav-al-crizei-COVID-asupra-economiei-romaniei-exista-scenariu-pentru-o-evolu-ie-in-forma-de-l-raport-oficial\\_182974.html](http://www.economica.net/impact-grav-al-crizei-COVID-asupra-economiei-romaniei-exista-scenariu-pentru-o-evolu-ie-in-forma-de-l-raport-oficial_182974.html)

considered to be the most plausible based on the specialized literature in assessing similar shocks (SARS, H3N2, H2N2, Spanish flu), with subsequent economic development leading to a "V" return. Therefore, in the presented forecast version, they opted for an economy recovery in an intermediate form, between variants "V" (closer) and "L", with a proper recovery in the fourth quarter of the year. Unfortunately, the initial forecasts for the recovery of the economic downturn in the last quarter of 2020 have proved unrealistic because starting June 2020 the second wave of the COVID crisis has continued till November 2020, which will lead to more the time trajectories of the economic recovery in Romania.

Based on the World Bank's analyses, in the first months of the COVID-19 crisis, it was estimated that, in terms of the challenges facing Romania, in the short term, the main challenge would have been to keep the COVID-19 crisis under control and limit its sanitary and economic consequences<sup>1</sup>. Such a presumptive situation was totally modified by the intensification of the pandemic in the summer and autumn months both in Romania and in other countries, when it was returned to the partial relaxation of the restrictions imposed in the first months of the crisis.

The economic measures to combat the economic and social effects caused by the coronavirus, of around 2 % of GDP in 2019, were aimed at:

- additional fund granting for the health system;
- partial coverage of the parents salaries who stay at home for the period when the schools are closed (the parent will be paid for this entire period with 75% of the salary. The law applies to private and public employees, and days off are granted upon request one of the parents);
- taking measures to support businesses, including partial coverage of the salaries of the self-employed and workers at risk of being laid off for an initial period of one month, postponing payments for SME utilities.

At the same time, in order to support the SMEs significantly affected by the COVID-19 crisis, the INVEST ROMANIA SME Program was launched. Through this program, companies can receive liquidity for current activities or investments, accessing one or more loans for investments and / or one or more loans / working capital credit lines, guaranteed by FNGCIMM in the name and account of the Romanian state, through the Ministry of Public Finance. The maximum ceiling allocated by the guarantee is 15 billion lei LEI. Through this program, the state can guarantee up to 90% of the value of the

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<sup>1</sup> [www.un.org/sustainabledevelopment/blog/2020/04/COVID-19-likely-to-shrink-global-gdp-by-almost-one-per-cent-in-2020/](http://www.un.org/sustainabledevelopment/blog/2020/04/COVID-19-likely-to-shrink-global-gdp-by-almost-one-per-cent-in-2020/)

loans accessed, without paying interest, guarantee fees or other award costs. The financing costs are 100% subsidized from the state budget until 31.12.2020, with the possibility of extension. The maximum loan amount can be up to RON 10,000,000 for investments and up to RON 5,000,000 for working capital.

Other economic measures referred to<sup>1</sup>:

- faster refund of the VAT;
- suspension of tax executions for the remaining debtors;
- suspension of the tax authorities control;
- reductions in the payment of profit taxes and postponement of the property tax by three months;
- capping the prices of car fuels during the state of emergency;
- granting an unemployment benefit in amount of 75% from the salary to employees sent into technical unemployment by companies. The state will grant a subsidy equal to 75% of the employee's salary, capped at 75% of the average salary in the country;
- granting a technical unemployment fixed benefit, borne by the state equal to 75% from the average gross salary in the country to self-employees, individual enterprises, cooperative workers and freelancers;
- postponement of the instalments payment for all bank customers affected by the crisis caused by the spread of COVID-19, for the approval of the facility, in the case of the population being sufficient a statement on their own responsibility that revenues were affected compared to the situation before the emergency state;
- interest on state-guaranteed loans to SMEs and micro-enterprises will have, after the expiration period of the interest and commission hedging grants, very small margins of 2% for investment financing and 2.5% for loans and credit lines for working capital.

The National Bank of Romania has adopted a series of measures aimed at macro-financial stability, namely<sup>2</sup>:

- Monetary policy measures:

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<sup>1</sup> [www.mfinante.gov.ro/acasa.html?method=detalii&id=999647168](http://www.mfinante.gov.ro/acasa.html?method=detalii&id=999647168)

<sup>2</sup> [www.bnr.ro/Masurile-BNR-in-contextul-situa%c8%9biei-generate-de-epidemia-COVID-19-21312.aspx](http://www.bnr.ro/Masurile-BNR-in-contextul-situa%c8%9biei-generate-de-epidemia-COVID-19-21312.aspx)

- reduction of the monetary policy interest rate by 0.5 percentage points, from 2.5% to 2%;
- narrowing the corridor consisting of permanent facilities interest rates around the monetary policy interest rate to  $\pm 0.5$  percentage points from  $\pm 1$  percentage point. Thus, the interest rate for the deposit facility is maintained at 1.5% and the Lombard interest rate is reduced to 2.5% from 3.5%. The expected effect will be to lower the interest rates on loans for both population and companies;
- providing liquidity to banks;
- purchasing of government securities in lei on the secondary market for the financing in good conditions of the real economy and public sector.
- Measures to make the regulatory framework more flexible so that credit institutions and NFIs can help individuals and companies with loans: lenders will be able to defer payments to any natural and legal person affected by the COVID 19 epidemic, without applying the conditions for the indebtedness degree, credit limitation according to the value of the guarantee and the maximum duration of the consumer credit.
- Bank resolution measures:
  - postponement of the term for collecting the annual contributions to the bank resolution fund for 2020 by 3 months, with the possibility of extension up to 6 months,;
  - postponement of the deadlines for reporting information related to the resolution planning.

Among the operational measures we mention the ensuring of a good functioning of the payment and settlement systems in national currency, in order to carry out, under normal conditions, the commercial and financial transactions. The NBR will provide banks with uninterrupted cash flows for all operations, including ATM liquidity.

## 7. Conclusions

### 7.1. Theoretical-methodological conclusions

The current pandemic, unprecedented in terms of impact, knowledge of the causes and remedies, is of a systemic nature and affects the economic and social structures of the development model based on the freely competitive market and the exclusivity of profit as a corporate aim. Although it is assigned to the natural hazard category and vulnerability, COVID-19 generates a number of negative externalities (external marginal costs), which cannot be attributed to a polluter because it is difficult if not impossible to identify for the purpose of complying with the polluter pays principle.

The COVID-19 pandemic will accelerate the Romanian economy and society digitization<sup>1</sup>, rather forcibly, to the mode of sine-qua-non constraint, in line with the requirement for sustainable and inclusive development of national economies.

The paradigm shift of sustainable development as a result of digitalisation and its effects have highlighted the importance of health, which could become a major goal of sustainable development alongside the environment. Environmental issues continue to grow in importance as a pillar of sustainable development (decarbonisation and the Green Deal).

The social pillar is stronger present with inclusive sustainable development and the principles of cohesion and solidarity, and the economic pillar, efficiency and profitability, focuses on replacing corporate scope in the sense of making profit for corporate shareholders with the principle of creating lato-sensu value, which involves combining stricto-sensu profitability for stakeholders with corporate social responsibility and business ethics.

The evolution of the COVID-19 pandemic in waves proves vulnerabilities in practical terms and the need for interpretations in theoretical-methodological terms for which new methods of analysis and forecasting are needed, management in terms of risks and uncertainty based on complex, nonlinear models

After the crisis, the economy and society will no longer be as they were before the crisis. There will be important changes from the point of view of the sustainable development paradigm which, if in present sets as a primary goal of the 2030 Agenda the reduction of inequities and extreme poverty, in the future it will certainly be complemented by sub-objectives such as: priority given to health, education, environmental protection (Green Deal).

Economic models involve a number of strategic management paradigm shifts and it will be completely different in terms of managerial functions (CEO, etc.) at the corporate level. It will move from the profit-making objective to value creation objective, which includes, in addition to profit, the principle of inclusion and social responsibility, solidarity and cohesion, the principle of business ethics and sustainability (Green Deal). The second aspect of the paradigm shift is rapid and timely action ("just in time, just in place") both to combat or alleviate the damage caused by the COVID-19 crisis and beyond. The third aspect aims to step up efforts to more effectively manage allocated

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<sup>1</sup> ca cea de-a 4-a fază a Revoluției Industriale, digitalizarea reprezintă un proces tehnologic complex format din robotizare, automatizare, internetul lucrurilor, inteligență artificială, Big Data, Cloud Computing, Analytics etc.

funds and promoted investment in scientific research and technological development (eg the use of cellular and gene methods in combating COVID-19).

## 7.2. Practical-applicative conclusions

The nation-state, as a sui generis economic factor, as a manager, responsible and coordinator at local, regional, national and international level has the mission of achieving the goal of sustainable development and welfare for all and ensuring a minimum income, in opposition with the theories that support the abolition states, borders and the creation of a unipolar world<sup>1</sup>.

The recovery of the subsequent economic decline generated by the COVID-19 crisis will be a long term process, with specific evolutions to the particularities of economic and social development of each country, so that the desideratum of minimizing the recovery time of the decline is closely related to at least the following factors:

- the vulnerability degree of the COVID-19 crisis;
- the resilience of each economy to external and internal shocks;
- increasing the role and the impact of the "digitization" factor.

Recovery and resilience after the COVID-19 crisis involve the intensification of the control monitoring between different economic sectors and institutions, in territorial profile, international cooperation and the need to streamline public-private, private-private and public-public partnerships, and ensuring the key role of national effort to which the influence of favourable external factors must be connected, hence the importance of nation-states, as a coordinating and responsible element, mandated in normative acts both at national, internal and at international, external level.

COVID-19 determined the partial waiver (changing) of a number of agreements at European Union level (free movement of workers, persons, certain goods and products, waiver of certain State aid requirements, temporary closure of borders for certain citizens in the contaminated countries) which in the future requires more attention to the

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<sup>1</sup> The mention of the topicality of the intervention of the nation-state and its continuation in the future is based on the following arguments:

- the number of nation-states increased from 53 in 1945 in the League of Nations to 193 nation-states today;
- the life of empires throughout history has decreased from millennia to decades (see Roman Empire and Soviet Union).

categorization of phenomena and processes, including integrationist ones, as irreversible.

The COVID-19 pandemic has widened the gaps between countries and, in general the transitions from globalization to localization, in the conditions in which corporations' international value chains unfold.

Mainly the economic effects of COVID-19 in Romania consisted in the reducing of the labour market size and the degree of employment and the relative increase of the certain sectors vulnerability (trade, tourism, cultural-artistic services, SMEs).

Given the experience of other states in managing the economic crisis due to COVID-19, a number of possible solutions can be proposed for Romania, such as:

- implementation of an extended scheme of government guarantees for financing or refinancing of enterprises or persons affected by banks, in more favourable cost conditions;
- funds related to other funding programs that have not been spent use for funding;
- timely payment of state debts - timely repayment of VAT, payment of arrears in the refund of VAT, timely payment of allowances and other forms of support, payment of sick leave, etc.;
- taking into account the huge budgetary pressure, the reduction of privileges enjoyed by certain people (such as special pensions) could also be taken into account;
- granting facilities for the payment of taxes and fees to companies from various affected economic sectors;
- encouraging through various incentives the timely payment of taxes and fees by individuals or legal entities that have not been affected by the crisis;
- reconsideration of non-compulsory budget expenditures, so that urgent expenditures related to ensuring the health of the population can be supported;
- reducing of the state apparatus expenses must become a priority in order to get through the crisis well;
- financing and supporting large infrastructure projects, in this way the capital infusion would be felt both horizontally and vertically in the Romanian economy;
- unblocking large strategic private investment projects, by adopting the necessary legislation and regulations;

- in the medium term, the reorientation of the Romanian economy towards a production economy and not a consumption one;
- supporting and promoting local producers, local businesses;
- VAT exemption for companies producing medical supplies, used in connection with COVID-19;
- establishing a longer period of deferral of tax losses (from five to eight years) for severely affected companies;
- additional allocation for capital investments or nationalization of companies in difficulty;
- the exemption from the payment of the profit and dividend tax corresponding to 2019 and the consideration as zero profit and dividend tax for 2020, if the tax is reinvested in the main activity.

Despite the multitude of adverse negative effects that culminate with the loss of human lives, the COVID-19 crisis contributes to accelerating the digitization process in Romania through its interdependent components (automation, robotics, big data, internet of things, cloud computing, analytics, collaborative platforms block-chain).

Manifestation of the requirement to move from globalization processes, materialized by international value chains destroyed by the COVID-19 crisis, to the so-called location in a new structure on smaller areas under the monitoring of the nation-state and its participation in various types of international coordination .Within the multiannual budget of the European Union, Romania will have an allocation of 46.3 billion euros for the period 2021-2027, of which 27 billion euros are structural and cohesion funds and approximately 18 billion euros for agriculture<sup>1</sup>..

It is a first advantage to the previous programming period, 2014-2020, when Romania benefited from 42.5 billion euros, through "classic" European funds - those for which projects must be written - and direct payments for agriculture. Break down, direct payments (subsidies) for agriculture amounted to 11.2 billion euros, and the rest of the funds, over 31 billion euros. Of that 31 billion, the majority came from the Structural and Cohesion Funds and the Common Agricultural Policy, other than subsidies (around 8 billion).

However, it must be said that, overall, the EU budget for the next seven years has been reduced by 21 billion euros, from the February 2020 proposal of 1095 billion to the

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<sup>1</sup> [www.fonduri-structurale.ro/2021-2027](http://www.fonduri-structurale.ro/2021-2027), accessed October 2020



summer agreement of 1074 billion. Being one of the states that receive the most from the multiannual budget, it was natural for Romania to have a large share from the general decrease of the Union budget.

Another important aspect is that Romania has a higher allocation, although the second largest contributor to the Union budget, the United Kingdom, has left the EU. UK's financial contribution was about 11% of the total European budget, being surpassed only by that of Germany. However, the European budget 2021-2027 has increased compared to 2014-2020, from 959.5 million euros to 1074, at this time.

To all this is added the post-pandemic economic recovery fund, called the Next Generation EU (NGEU). This is a single fund, worth 750 billion euros, of which 390 are grants and 360 are loans. From this fund, Romania will receive 16.8 billion, non-refundable money, and 16.7 billion euros, loans. In order to obtain this money, the European Commission will borrow from the market, at minimum interest rates, given its excellent credit rating. The money must be returned by 2058. In order to benefit from the NGEU allocations, each state must submit a national recovery plan, which must be approved by the Commission, with payments being made in stages, after verifying compliance with the Commission's plan.

The question is whether Romania is able to effectively absorb all these available funds. The answer is nuanced. Thus, if we look at the current financial year, Romania has spent only 34% of the allocated amount (without taking into account subsidies in agriculture), and we are in the last year. But the European rule "N + 3" provides for another three years in which the allocated money can be used, after contracting. Therefore, in the next three years, the remaining 66% of the allocated money must be spent, and this is very likely, because at this moment the degree of contracting of the funds is 97%.

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[www.mfinante.gov.ro/acasa.html?method=detalii&id=999647168](http://www.mfinante.gov.ro/acasa.html?method=detalii&id=999647168)  
[www.nytimes.com/2020/07/04/health/239-experts-with-one-big-claim-the-coronavirus-is-airborne.html](http://www.nytimes.com/2020/07/04/health/239-experts-with-one-big-claim-the-coronavirus-is-airborne.html)  
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[www.who.int/emergencies/diseases/novel-coronavirus-2019](http://www.who.int/emergencies/diseases/novel-coronavirus-2019)

## Annex 1

**Deaths- total cases**  
**22.01-18.10.2020**

y=decedati	x= total cazuri
<b>BULGARIA</b>	
R Square	0,988
Intercept	12,551
X Variable 1	0,037
<b>RUSSIA</b>	
R Square	0,987
Intercept	-689,854
X Variable 1	0,017
<b>ROMANIA</b>	
R Square	0,972
Intercept	293,365
X Variable 1	0,036
<b>ITALY</b>	
R Square	0,943
Intercept	1051,620
X Variable 1	0,126
<b>USA</b>	
R Square	0,917
Intercept	22459,653
X Variable 1	0,028
<b>FINLAND</b>	
R Square	0,908
Intercept	6,850
X Variable 1	0,039
<b>SWEDEN</b>	
R Square	0,899
Intercept	680,229
X Variable 1	0,064
<b>GERMANY</b>	
R Square	0,892
Intercept	223,488
X Variable 1	0,037
<b>NORWAY</b>	
R Square	0,874
Intercept	8,557

**Recovered- Active cases**  
**22.01-18.10.2020**

y=vindecati	x=contaminati
<b>SWEDEN</b>	
R Square	1,000
Intercept	0,000
X Variable 1	0,000
<b>USA</b>	
R Square	0,959
Intercept	-216726,605
X Variable 1	0,655
<b>BULGARIA</b>	
R Square	0,823
Intercept	-702,680
X Variable 1	2,088
<b>HUNGARY</b>	
R Square	0,718
Intercept	1241,176
X Variable 1	0,330
<b>CHINA</b>	
R Square	0,541
Intercept	78089,348
X Variable 1	-1,353
<b>FRANCE</b>	
R Square	0,511
Intercept	32071,491
X Variable 1	0,166
<b>RUSSIA</b>	
R Square	0,456
Intercept	13571,734
X Variable 1	2,575
<b>ROMANIA</b>	
R Square	0,369
Intercept	7132,447
X Variable 1	1,262
<b>DENMARK</b>	
R Square	0,337
Intercept	5235,135

**Recovered- total cases**  
**Perioda 22.01-18.10.2020**

y=vindecati	X= total cazuri
<b>SWEDEN</b>	
R Square	1,000
Intercept	0,000
X Variable 1	0,000
<b>USA</b>	
R Square	0,983
Intercept	-149768,462
X Variable 1	0,388
<b>BULGARIA</b>	
R Square	0,984
Intercept	-433,127
X Variable 1	0,680
<b>DENMARK</b>	
R Square	0,976
Intercept	-205,713
X Variable 1	0,837
<b>RUSIA</b>	
R Square	0,974
Intercept	-47164,210
X Variable 1	0,813
<b>GERMANY</b>	
R Square	0,969
Intercept	-9976,586
X Variable 1	0,909
<b>FINLAND</b>	
R Square	0,944
Intercept	-316,528
X Variable 1	0,862
<b>ROMANIA</b>	
R Square	0,918
Intercept	-2827,436
X Variable 1	0,685
<b>ITALY</b>	
R Square	0,880
Intercept	-19162,017

X Variable 1	0,023
<b>CHINA</b>	
R Square	0,794
Intercept	-856,370
X Variable 1	0,060
<b>DENMARK</b>	
R Square	0,725
Intercept	130,970
X Variable 1	0,025
<b>SPAIN</b>	
R Square	0,596
Intercept	9691,060
X Variable 1	0,040
<b>FRANCE</b>	
R Square	0,533
Intercept	10605,680
X Variable 1	0,049
<b>HUNGARY</b>	
R Square	0,527
Intercept	260,611
X Variable 1	0,023

X Variable 1	2,501
<b>SPAIN</b>	
R Square	0,242
Intercept	76866,429
X Variable 1	0,167
<b>NORWAY</b>	
R Square	0,128
Intercept	6436,659
X Variable 1	-0,636
<b>GERMANY</b>	
R Square	0,106
Intercept	94452,779
X Variable 1	1,608
<b>FINLAND</b>	
R Square	0,034
Intercept	3754,807
X Variable 1	0,680
<b>ITALY</b>	
R Square	0,000
Intercept	122823,705
X Variable 1	0,027

X Variable 1	0,764
<b>HUNGARY</b>	
R Square	0,857
Intercept	749,840
X Variable 1	0,261
<b>CHINA</b>	
R Square	0,750
Intercept	-23017,227
X Variable 1	1,156
<b>NORWAY</b>	
R Square	0,699
Intercept	-1260,271
X Variable 1	0,855
<b>FRANCE</b>	
R Square	0,690
Intercept	21660,411
X Variable 1	0,156
<b>SPAIN</b>	
R Square	0,510
Intercept	49261,745
X Variable 1	0,194

## Annex 2

<b>deaths- total cases</b>	
<b>Perioda 22.01-18.10.2020</b>	
<b>y=decedati</b>	<b>x= total cazuri</b>
<b>ITALIA</b>	
R Square	0,943
Intercept	1051,620
X Variable 1	0,126
<b>SUEDIA</b>	
R Square	0,899
Intercept	680,229
X Variable 1	0,064
<b>CHINA</b>	
R Square	0,794
Intercept	-856,370
X Variable 1	0,060
<b>FRANCE</b>	
R Square	0,533
Intercept	10605,680
X Variable 1	0,049
<b>SPAIN</b>	
R Square	0,596
Intercept	9691,060
X Variable 1	0,040
<b>FINLAND</b>	
R Square	0,908
Intercept	6,850
X Variable 1	0,039
<b>BULGARIA</b>	
R Square	0,988
Intercept	12,551
X Variable 1	0,037
<b>GERMANY</b>	
R Square	0,892
Intercept	223,488
X Variable 1	0,037
<b>ROMANIA</b>	
R Square	0,972

<b>Recovered- active cases</b>	
<b>Perioda 22.01-18.10.2020</b>	
<b>y=vindecati</b>	<b>x=contaminati</b>
<b>RUSIA</b>	
R Square	0,456
Intercept	13571,734
X Variable 1	2,575
<b>DENMARK</b>	
R Square	0,337
Intercept	5235,135
X Variable 1	2,501
<b>BULGARIA</b>	
R Square	0,823
Intercept	-702,680
X Variable 1	2,088
<b>GERMANY</b>	
R Square	0,106
Intercept	94452,779
X Variable 1	1,608
<b>ROMANIA</b>	
R Square	0,369
Intercept	7132,447
X Variable 1	1,262
<b>FINLANDA</b>	
R Square	0,034
Intercept	3754,807
X Variable 1	0,680
<b>USA</b>	
R Square	0,959
Intercept	-216726,605
X Variable 1	0,655
<b>HUNGARY</b>	
R Square	0,718
Intercept	1241,176
X Variable 1	0,330
<b>SPAIN</b>	
R Square	0,242

<b>Recovered - total cases</b>	
<b>Perioda 22.01-18.10.2020</b>	
<b>y=vindecati</b>	<b>X= total cazuri</b>
<b>CHINA</b>	
R Square	0,750
Intercept	-23017,227
X Variable 1	1,156
<b>GERMANY</b>	
R Square	0,969
Intercept	-9976,586
X Variable 1	0,909
<b>FINLAND</b>	
R Square	0,944
Intercept	-316,528
X Variable 1	0,862
<b>NORWAY</b>	
R Square	0,699
Intercept	-1260,271
X Variable 1	0,855
<b>DENMARK</b>	
R Square	0,976
Intercept	-205,713
X Variable 1	0,837
<b>RUSSIA</b>	
R Square	0,974
Intercept	-47164,210
X Variable 1	0,813
<b>ITALY</b>	
R Square	0,880
Intercept	-19162,017
X Variable 1	0,764
<b>ROMANIA</b>	
R Square	0,918
Intercept	-2827,436
X Variable 1	0,685
<b>BULGARIA</b>	
R Square	0,984

Intercept	293,365
X Variable 1	0,036
<b>USA</b>	
R Square	0,917
Intercept	22459,653
X Variable 1	0,028
<b>DENMARK</b>	
R Square	0,725
Intercept	130,970
X Variable 1	0,025
<b>HUNGARY</b>	
R Square	0,527
Intercept	260,611
X Variable 1	0,023
<b>NORWAY</b>	
R Square	0,874
Intercept	8,557
X Variable 1	0,023
<b>RUSSIA</b>	
R Square	0,987
Intercept	-689,854
X Variable 1	0,017

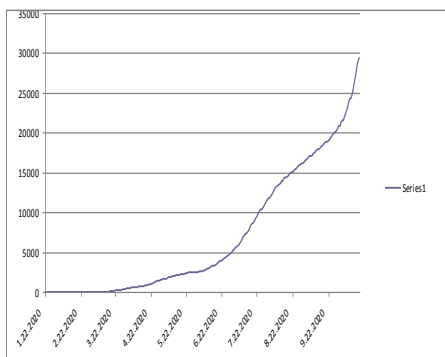
Intercept	76866,429
X Variable 1	0,167
<b>FRANCE</b>	
R Square	0,511
Intercept	32071,491
X Variable 1	0,166
<b>ITALY</b>	
R Square	0,000
Intercept	122823,705
X Variable 1	0,027
<b>SWEDEN</b>	
R Square	1,000
Intercept	0,000
X Variable 1	0,000
<b>NORWAY</b>	
R Square	0,128
Intercept	6436,659
X Variable 1	-0,636
<b>CHINA</b>	
R Square	0,541
Intercept	78089,348
X Variable 1	-1,353

Intercept	-433,127
X Variable 1	0,680
<b>USA</b>	
R Square	0,983
Intercept	-149768,462
X Variable 1	0,388
<b>HUNGARY</b>	
R Square	0,857
Intercept	749,840
X Variable 1	0,261
<b>SPAIN</b>	
R Square	0,510
Intercept	49261,745
X Variable 1	0,194
<b>FRANCE</b>	
R Square	0,690
Intercept	21660,411
X Variable 1	0,156
<b>SWEDEN</b>	
R Square	1,000
Intercept	0,000
X Variable 1	0,000

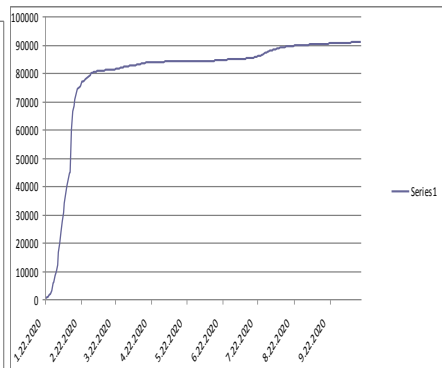
## Annex 3

## The evolution of infection cases with the new coronavirus (January - October 2020)

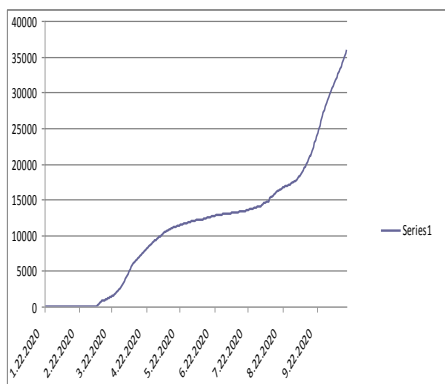
## BULGARY



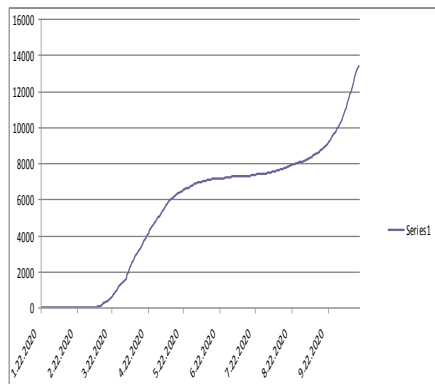
## CHINA



## DANEMARK

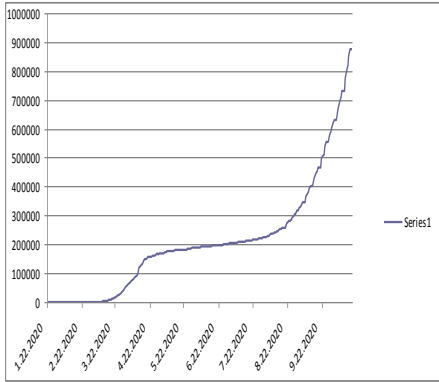


## FINLAND

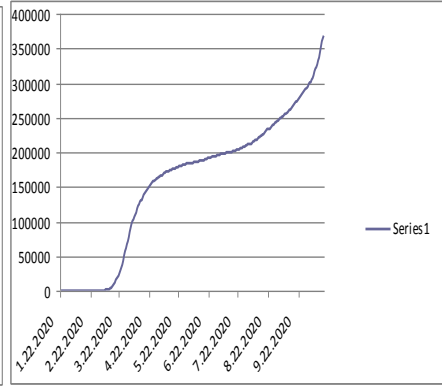




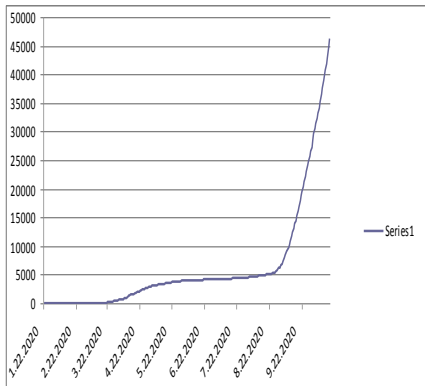
**FRANCE**



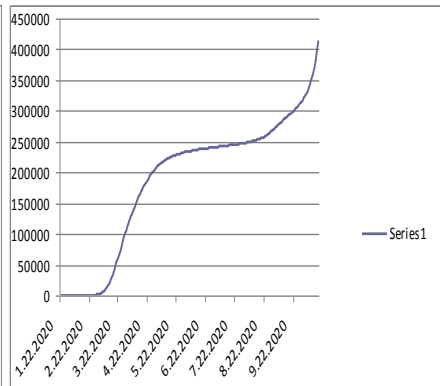
**GERMANY**



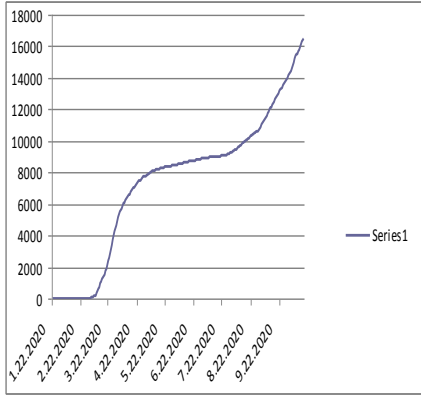
**HUNGARY**



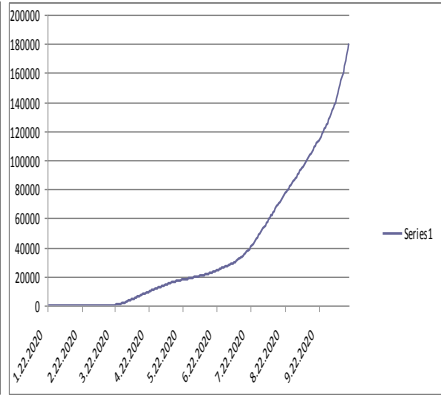
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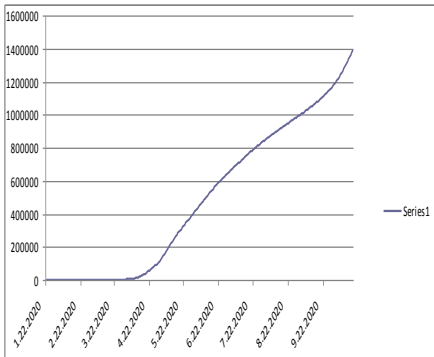
**NORWAY**



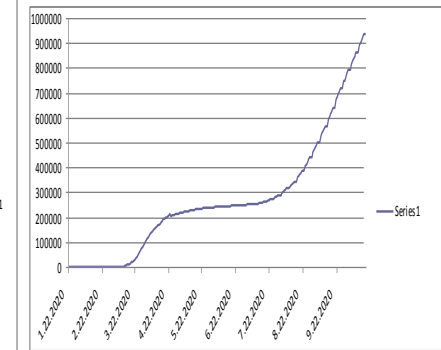
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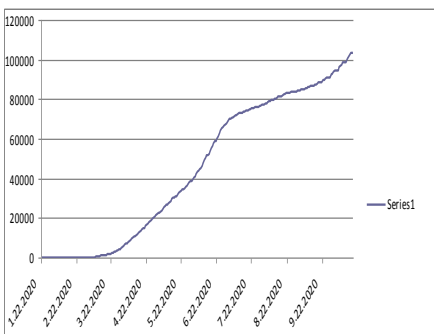
**RUSSIA**



**SPAIN**



**SWEDEN**



**USA**

