

## Romania's economy on the threshold of recession

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**Abstract.** *The evolution of the Romanian economy in the current situation is particularly difficult. The effects of the health and financial-economic crisis are reflected in the normal activity in the national economic branches. The measures taken by the authorities to control and control the effects of infection of the population have, in turn, some negative effects on the concrete results that are achieved in the economy. Thus, tourism and HoReCa have been virtually inactivated, which has an immediate effect on economic growth. In industry, construction and other branches of the national economy, some restrictions have also been imposed which have had the effect of reducing the production of goods and services. All together it creates a difficulty in maintaining macrostability. Romania's national economy has declined in the last quarter. If this decrease is maintained in the first quarter of 2022, according to the economic criteria for assessing the economic cycle, it turns out that the country is entering a recession. March inflation is already forecast to reach 10%.*

*In these conditions, in this article we set out to analyse the evolution of the Gross Domestic Product, with the main objective of highlighting the fact that in the current price crisis, the international crisis (Ukraine-Russia armed conflict) and the effects of the crisis economic and financial issues may cause the countries, but we are referring to Romania, to continue to decrease in the next quarter. In this article we used the data published by the National Institute of Statistics, Eurostat, we applied some data processing using statistical-econometric methods, we performed comparability studies in time and space, precisely in order to accurately highlight the economic situation and the trend of the evolution of the economy in the next period.*

*A series of graphs, a series of data and tables were used that convincingly highlight the evolution of the Gross Domestic Product, i.e. the evolution of economic growth.*

**Keywords:** GDP, unemployment, inflation, crises, developments, macroeconomic indicators, variables, patterns, perspectives.

**JEL Classification:** C13, E20.

## Introduction

In this article we have started from the perspective that the current pandemic and economic-financial crisis, correlated lately with the armed conflict between Russia and Ukraine, as well as the energy crisis, the food crisis and all the others that have accumulated can cause a declining economic growth.

In another view, if we consider the price explosion (inflation will soon reach 10%), we can even appreciate that the depreciation of the Gross Domestic Product is not so high in current prices, because the gross value added increases through this explosion of prices. Thus, we analysed the evolution of the Gross Domestic Product in 2021, with some opinions based on the data regarding the increase of the Gross Domestic Product to date, which suggests precisely this aspect of the perspective of entering the economic recession.

The current state of the national economy shows that the process of declining up-to-date results is difficult the inflation rate also contributes to the reduction of economic results in real terms, which means that there are less chances to feed the national budget for consumption and investment.

Next, we made a comprehensive presentation of the evolution of the Gross Domestic Product in raw data and data that take into account the seasonal aspect and we highlighted the perspective of the evolution. We also analysed from a structural point of view the way in which these results were obtained through the management of resources and uses as factors of economic growth.

To highlight the trend we used statistical-econometric methods, such as multiple linear regression resulting in a possibility to establish the probabilistic trend of evolution in the next period. The article is logically structured so that, through the analysis, processing and comparison of data, it is possible to draw the necessary conclusions regarding the growth forecast of the Romanian economy in the next period. From the data processed and used it results that in the current period we are very close to entering the recession.

## 1. Literature review

A number of researchers have focused on the evolution of national economies and the factors influencing them. Thus, Agrawala and Matsab (2013) studied the relationship between unemployment risk and business financing decisions. Anghelache et al. (2013) conducted a study on the general aspects related to the evolution of GDP in Romania. Anghelache et al. (2016) published an article on the correlation between the growth rate of GDP, the inflation rate and unemployment. Armantier et al. (2015) addressed a number of issues regarding inflation forecasts. Bardson et al. (2005) address these issues in a paper dealing with the use of econometric models in the study of macroeconomic phenomena. Heiberger and Holland (2004) publish a study on statistical analysis using databases. Censolo and Colomco (2008) publish a study on consumption and growth. Couch et al. (2013) analysed the consequences of long-term unemployment. Davidson and Mackinnon (2004) publish a study on econometric models used in the study of economic growth. Kim and Henderson (2005) addressed issues related to inflation and the influence on nominal

income growth. Koulakiotis et al. (2012) undertake an analysis of the correlation that exists between inflation, Gross Domestic Product and the effect on economic growth in the member countries of the European Union. Kroft and Notowidigdo (2016), as well as Krueger and Mueller (2010), presented significant elements related to unemployment insurance. Moscarini and Postei-Vinay (2012) studied how employers, depending on their size, contribute to job creation during periods of unemployment. Nekoei and Weber (2017) sought to identify how job quality is improved by extending unemployment benefits. Usher (1980) lays the groundwork for real measurement of economic growth.

## 2. Methodology

In order to facilitate the understanding of the analysis made in this article, we will present the main methodological aspects used by the National Institute of Statistics and Eurostat. Thus, the signal estimates of the quarterly Gross Domestic Product are produced to provide the fastest picture of the evolution of the economy and have the following characteristics: they are in accordance with the methodological standards of the System of National Accounts (SEC) 2010; are produced and published no later than 45 days after the end of the reference quarter; they are based on an incomplete set of information compared to the provisional estimates of the quarterly national accounts, including the Gross Domestic Product, which is why they are subject to quarterly revisions.

The differences between the signal estimates and the provisional estimates of the Gross Domestic Product are determined by the following aspects: operability – the signal estimates are available earlier than the provisional ones (40-45 days compared to 70-75 days); accuracy – a compromise is made between operability and accuracy, as signal estimates are generally less accurate than provisional estimates, but the aim is to reduce the loss of accuracy to a minimum; scope – the number of variables covered by the signal estimates is limited; available information – signal estimates are based on a limited set of data, and some information provided by statistical surveys or administrative sources is not available; estimation method – depending on the available data sources the direct method can be used (using existing data and estimates for those not available) or the indirect method (using regression techniques).

The signal estimates of the quarterly Gross Domestic Product in the Romanian national accounts are made by applying the direct method considering the existence of infra-annual data sources, especially the statistical surveys that provide information and allow the estimation of the quarterly Gross Domestic Product (GDP) at market price by production method, according to the relation:

$$PIBT = VAB + IP - SP,$$

where:

GVA – gross value added at basic price;

IP – taxes on the product;

SP – subsidies per product.

In addition to the gross quarterly Gross Domestic Product estimates by which the current year's GDP is compared to the same period of the previous year, seasonally adjusted estimates are also calculated using the regressive method, a method recommended by European regulations, by which GDP can be compared two consecutive quarters, from which the position in the economic cycle can be deduced, the eventual entry into recession.

Seasonal adjustment aims to eliminate seasonal effects from the data series in order to highlight the real economic evolution in consecutive periods.

The JDEMETRA software package version 2.2.0 (TRAMO/SEATS and X-13ARIMA-SEATS method) is used to adjust the series of main aggregates on the basis of which GDP is estimated by production method and expenditure method. It estimates the seasonal effect (events that occur at the same time, with the same magnitude and direction each year, such as: seasons, holidays, etc.), the number of working days differing from month to month and the effect of the calendar, such as Orthodox Easter, leap year and other national holidays) as well as the identification and correction of extreme values (occasional, transient or permanent level changes) and the interpolation of missing values.

The quarterly national accounts in Romania generally have a strong seasonality, being adjusted according to the number of working days and calendar even if the effect of the latter is insignificant.

The seasonally adjusted series was obtained by removing the seasonal effect from the raw series, with the help of correction coefficients, established according to the regression model used (additive or multiplicative). The additive or multiplicative pattern used for regression is automatically identified by the JDemetra program depending on the nature of the series being adjusted.

Seasonally adjusted series for the last 5 years and available quarters in the reference year are recalculated quarterly as a result of the revision of the quarterly and annual gross data series, as statistical and administrative data sources with a higher degree of coverage and coverage become available accuracy, the introduction of the last available observation in the data series, the modification of the adopted models and the regression parameters.

The closure or downsizing of economic activities since the second half of March as a result of the outbreak of the Corona virus has been different from other economic crises. The establishment of the state of emergency and the emergency ordinances issued by the government in order to protect the population against infection and reduce the risk of spreading the virus had an important impact on the Romanian economy.

The national statistical institutes have had to face new challenges related to the collection of statistical data through infra-annual surveys and to ensuring the best possible quality of the calculated indicators.

Faced with this situation, Eurostat and the national statistical authorities of the European Statistical System worked together to develop methodological guidelines and notes on how to address the methodological issues triggered by these changes in statistical production. This ensures that European statistics continue to be well-founded.

A methodological section has been opened on the Eurostat website to support European statisticians, but not only, in which have new methodological guidelines and notes been presented.

### 3. Data, results and discussions

The economic growth of a country is achieved by calculating the quarterly and annual Gross Domestic Product, which highlights how economic activities at the macro level have contributed to the growth of Gross Domestic Product, so economic growth.

The economic theory and the statistical analysis of the economy at the macro level show that if in two periods of time the quarterly GDP compared to the result of the previous quarter is declining, we can talk about the country's economy that it has entered a recession.

Simultaneously with this recession, according to the economic definition, a process of stagflation is developing. Stage inflation is the change in the rate of inflation in a period of time when the country's economy is stagnant or entering a process of recession.

The period 2019-December 2021 is quite complicated in terms of this assessment. In 2020, we registered a process of decreasing the quarterly Gross Domestic Product in only one quarter, which is oscillating. Thus, in the first quarter of 2020 we had a GDP growth rate of 2.3%, which decreased in the second quarter to -10.1% but then increased to -5.6% and in the fourth quarter increased again at -1.5%.

In this context, the alternation of increase and decrease had an effect only on the increase of monthly and quarterly inflation, as well as the average annual inflation, but the alternation of decrease/increase determined recovery in the quarters that registered slight increases.

From the point of view of 2021, we find that in the series of data in which we reported the quarterly Gross Domestic Product from one quarter to another, the previous quarter, we approached an easily interpretable inflation threshold.

Thus, in the first quarter of 2021 we had an increase of 2% compared to the fourth quarter of 2020. The second quarter registered a decrease compared to the previous quarter, being an increase of only 1.1%. The same situation happened in the third quarter compared to the second quarter, when we had a decrease of 1%, the quarterly rate being 101%. In the fourth quarter of 2021, compared to the third quarter of the same year, we recorded a decrease of 0.5%.

We could consider the three quarters with slight decreases from one to the other, but it is not edifying because the decrease was relative and did not pass on the actual loss.

The fourth quarter of 2021 was affected by the onset of the energy crisis in oil, gas and electricity, which changed the level of economic growth which, although at current prices, shows a downward trend.

The inflation rate has sharpened sharply, given that the November-December 2021 bills for the consumption of natural gas and electricity by businesses and individuals have risen

alarmingly. At the same time, the other groups of products and services have undergone changes in price increases under the influence of natural gas and electricity consumption.

In these conditions, we can see that the level of economic growth in 2021 compared to 2020 must be interpreted in two ways.

On the one hand, comparing the changes for comparable periods in the two years, we record in the gross series a certain perspective with the possibility of growth, but in the context in which in the previous year we closed in December with a loss of 3.7%.

From the point of view of the seasonally adjusted series, compared to the previous quarter and the corresponding quarter of 2020, we see a slight increase in the total year but this will wither in the context in which in the first quarter of 2022 anticipates an increase, even without precedent, inflation.

Thus, in January 2022, the National Institute of Statistics already reported a loss of 1.5%. There will be two more months, February and March of the first quarter of 2022, in which, despite some measures taken to reduce the level of invoices in terms of prices, there will probably be increases in the inflation rate.

In this context, only a few examples are edifying to see the trend in the first quarter of 2022. In February, already, the cost of fuel pumps reached almost 8 lei per liter, with an increase of about 30%. The consumption of some foods, agri-food products, especially those made in solariums by consuming electricity, have a fairly high price. This will also happen in other areas of the extractive and manufacturing industries, where prices will rise from industrial, agricultural products, construction targets, transport and, last but not least, services.

Against this background, we can anticipate that at this moment the Romanian economy is in the situation of registering in the second consecutive quarter a decrease, which coincides with the entry into recession.

The entry into recession is a stage in the economic cycle in which production will continue to decline, prices will rise, unemployment may worsen, the number of unemployed may increase and even if the level of production in all areas of activity is maintained, it would still not be too happy a situation.

However, we can consider that the restrictions imposed by the COVID 19 pandemic, which also triggered the economic and financial crisis, correlated with the money supply in circulation, with the alarming level of inflation, can cause an escalation by increasing inflation and actually reducing the volume of industrial production expressed in physical units.

Of course, in the calculation of the Gross Domestic Product, quarterly and annually, we take into account the value index of this indicator, which is recorded and we know that the value is given by the product between quantity and price. Under these conditions, the value level increases by price, i.e. inflation, and not by increasing the volume in most areas of activity.

There are some branches of the national economy, such as agriculture, which is currently at rest, but due to the drought that has manifested itself this winter, by the impossibility of applying fertilization related to irrigation and other advanced agro-technical methods, we anticipate the increase in the price of agricultural production which may be of value will express an increase, but from the point of view of the physical units in which the production of each branch can be expressed, we record some decreases.

In this field we can even specify that in 2022 the cost of agricultural activities per hectare will be much higher. Here, for example, the cost per unit of product of chemical fertilizers (ton), increased from 1,100 lei to about 3,000 lei. The same goes for other fertilizers, pesticides, herbicides and other substances, not to mention the high value of irrigation per hectare. All this will lead to an increase in the price of agricultural production, which will feed in the months when the seasonal agricultural activity is relaunched, from March-April to October.

From the presented results the danger that the Romanian economy will enter recession and it would be desirable for the national level to be concerned with increasing subsidies for certain branches, including tourism and HoReCa, to stop the process of macroeconomic structural disintegration.

In the field of tourism, the most important service in Romania as in other countries, a number of owners of specialized companies have reached the situation of closing or changing the object of activity. Many of the existing restaurants, bodegas, cafes have been transformed into food or textile stores or other, clearly showing the potential of the tourism industry in our country. In this context, we presented the state of the Romanian economy in terms of entering the recession.

From the point of view of the result obtained in 2021 compared to 2020 in terms of the growth of the Gross Domestic Product, so the economic growth, we can specify on the basis of provisional data, that compared to the previous year it would be an increase of 5.6% recovery of 3.7%, collapse below the level of 100 in 2020.

However, if we turn this data into real data, we will find that the growth rate of Gross Domestic Product, of 5.6%, is clearly lower than the growth rate of inflation which is 8.4% at the end of 2021.

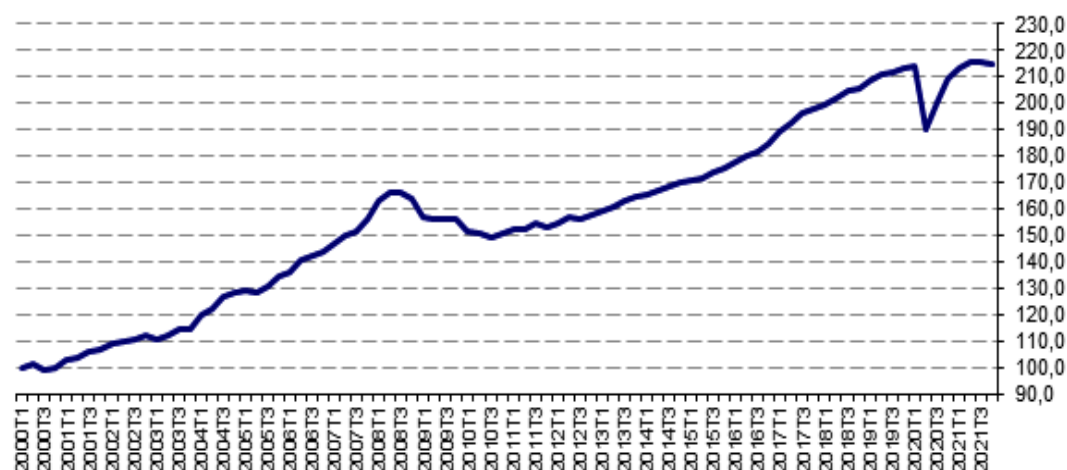
We will further interpret the data based on the communiqués of the National Institute of Statistics and Eurostat, regarding the results recorded in 2021 compared to 2020 or an analysis of the quarterly increase in Gross Domestic Product in Romania, in the period 2000-2021, data seasonally adjusted. Thus, the Gross Domestic Product in the fourth quarter of 2021 was, in real terms, lower by 0.5% compared to the third quarter of 2021. Compared to the same quarter in 2020 the Gross Domestic Product increased by 2.2% per gross series and by 2.7% on seasonally adjusted series. The data regarding the evolution of the quarterly Gross Domestic Product in the period 2019-2021 are structured in Table 1.

**Table 1.** Quarterly gross domestic product evolution in 2019-2021

		Q I	Q II	Q III	Q IV	Year
<b>- in % compared to the corresponding period of the previous year -</b>						
<b>Gross series</b>	<b>2019</b>	105.1	104.4	103.0	104.4	104.2
	<b>2020</b>	102.3	89.9	94.4	98.5	96.3
	<b>2021</b>	99.8	113.9	107.4	102.2	105.6
<b>Seasonally adjusted series</b>	<b>2019</b>	104.9	104.6	103.4	103.8	-
	<b>2020</b>	102.5	90.2	94.8	98.0	-
	<b>2021</b>	99.6	113.4	107.6	102.7	-
<b>- in % compared to the previous quarter -</b>						
<b>Seasonally adjusted series</b>	<b>2019</b>	101.6	101.0	100.2	100.9	-
	<b>2020</b>	100.3	88.8	105.4	104.3	-
	<b>2021</b>	102.0	101.1	100.1	99.5	-

Source: INS release no. 39, February 15, 2022.

Below is the evolution of the quarterly Gross Domestic Product between January 2000 and December 2021.

**Chart 1.** Quarterly gross domestic product evolution between January 2000 and December 2021 (2000 average = 100%)

Compared to the same quarter of 2020 the Gross Domestic Product in the fourth quarter of 2021 increased by 2.2%. We find that this increase is somewhat insignificant given the decreases recorded in 2020. In 2021, compared to 2020, the Gross Domestic Product increased by 5.6%. This means that the loss has recovered from 2020 (-3.7%) and deflation shows that this increase is reduced by the alarming level of inflation (8.4%).

By revising the quarterly gross GDP series by including the estimate of Gross Domestic Product for the fourth quarter of 2021 in the quarterly series, the seasonally adjusted series was recalculated, the volume indices being revised against the second provisional version of Gross Domestic Product for the third quarter of 2021. Thus, the results in each quarter of 2021, compared to the level recorded in the previous quarter, decreased as follows: the results of the first quarter of 2021, compared to the fourth quarter of 2020, were revised from 102.2% to 102.0%; the results of the second quarter of 2021, compared to the first quarter of 2021, were revised from 101.5% to 101.1%; the results of the third quarter of 2021, compared to the second quarter of 2021, were revised from 100.4% to 100.1%.



Next, we will address the issue of the influence of unemployment and inflation on the national economy, using a multifactorial linear regression model. Thus, the data on the evolution of the three macroeconomic indicators in the period 2002-2020 are structured in Table 2.

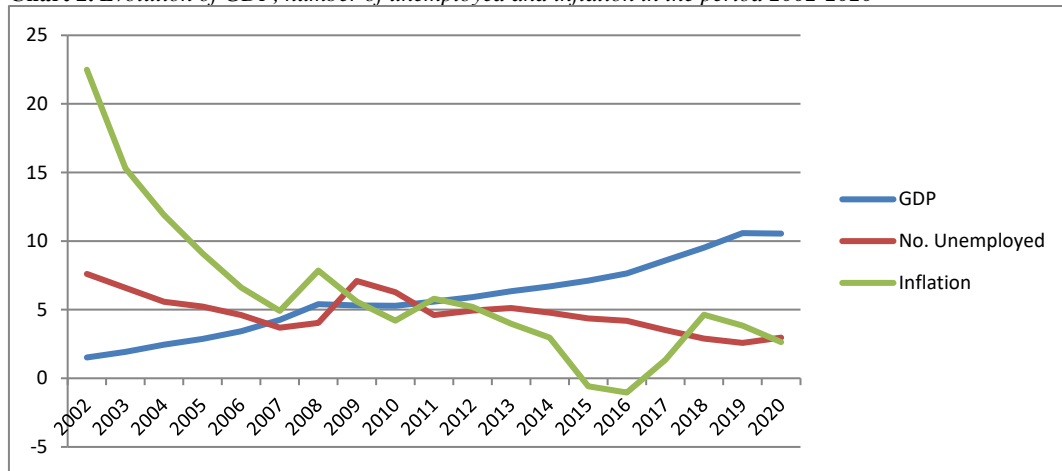
**Table 2.** Evolution of GDP, number of unemployed and inflation in the period 2002-2020

Year	GDP	No. Unemployed	Inflation
2002	152,272	760,620	22.5
2003	191,918	658,890	15.3
2004	244,688	557,890	11.9
2005	286,862	522,970	9.10
2006	342,763	460,500	6.61
2007	425,691	367,840	4.91
2008	539,835	403,440	7.85
2009	530,894	709,380	5.59
2010	528,515	626,960	4.20
2011	558,890	461,010	5.79
2012	591,799	493,780	5.20
2013	634,968	512,330	3.98
2014	669,704	478,340	2.96
2015	711,930	436,240	-0.59
2016	763,653	418,240	-1.04
2017	857,896	351,110	1.34
2018	951,729	288,900	4.63
2019	1,058,190	257,870	3.83
2020	1,053,881	296,050	2.63

**Source:** <http://statistici.insse.ro:8077/tempo-online>. Data processed by the authors.

For a better visualization of the evolution of the macroeconomic indicators under analysis, graph number 2 was drawn up.

**Chart 2.** Evolution of GDP, number of unemployed and inflation in the period 2002-2020



Interpreting the data on the evolution of GDP, the number of unemployed and inflation in the period 2002-2020, we find that the trend of GDP evolution was an upward one, marked only by the economic and financial crises that manifested in this period, the from 2008-2010 and the current one generated by the pandemic crisis. At the same time, the evolution of the number of unemployed was inversely proportional to the evolution of

GDP, and that of inflation is somewhat more chaotic with much stronger oscillations in the period under analysis.

In order to establish the intensity of the connection between the variables, the correlation matrix between the variables was presented in Table 3.

**Table 3.** Correlation matrix between variables

	GDP	NSOM	INF
GDP	1.000000	-0.775474	-0.746810
NSOM	-0.775474	1.000000	0.648309
INF	-0.746810	0.648309	1.000000

Interpreting the structured data in table number 3, we find that the value of the linear correlation coefficients between the variables indicates quite strong links, with values between 0.64 and -0.74, values closer to the unit than to the zero, which indicates a fairly strong linear correlation and the possibility of continuing the study using the multiple linear regression model, of the form:

$$GDP = a + b \cdot NU + c \cdot INF + \varepsilon$$

where:

*GDP* (Gross Domestic Product) – the dependent variable;

*NU* (Unemployed number) – the independent variable;

*INF* (Inflation) – the independent variable;

*a*, *b* and *c* – the regression parameters;

$\varepsilon$  – the residual variable.

The testing of the significance of the model and the estimation of the parameters were done using the statistical-econometric analysis program EViews and the results of the analysis were structured in Table 4.

**Table 4.** Analysis results

Dependent Variable: GDP				
Method: Least Squares				
Sample: 2002 2020				
Included observations: 19				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	117846.8	142083.7	8.294183	0.0000
NU	-0.979668	0.348197	-2.813543	0.0125
INF	-20710.54	8785.962	-2.357231	0.0315
R-squared	0.704115	Mean dependent var		584004.1
Adjusted R-squared	0.667130	S.D. dependent var		273842.1
S.E. of regression	157993.0	Akaike info criterion		26.92243
Sum squared resid	3.99E+11	Schwarz criterion		27.07155
Log likelihood	-252.7631	F-statistic		19.03755
Durbin-Watson stat	0.553589	Prob(F-statistic)		0.000059

We find that the model is valid and can be used in estimating the evolution of GDP, a fact confirmed by the statistical tests *F-statistic* and *t-Statistic* whose values are higher than those tabulated ( $F_c = 19.03 > F_{0.05; 2; 19} = 3.13$ ). The strong influence of the factorial variables is also confirmed by the value of 0.70 of the *R-squared* correlation coefficient. We can also estimate the theoretical values of the dependent variable, according to the relation:

$$\widehat{GDP} = 1178468 - 0.97 \cdot \widehat{NU} - 20710.54 \cdot \widehat{INF} + \varepsilon$$

In the same vein, the minus sign of the unemployment rate and inflation is the expected one, in the sense that both factorial variables have a negative influence on the evolution of a country's economy.

## Conclusions

From the study undertaken by the authors and presented in this article, a series of important conclusions can be drawn in the perspective of establishing the macroeconomic strategy to be followed by Romania in the next period. Thus, it is very clear that the effects of the economic and financial crisis based on the COVID 19 pandemic, as well as the translation of some effects caused by the military conflict between Russia and Ukraine, have a negative impact on economic growth.

In this sense, inflation is stimulated, which reach unimaginable figures at the moment, unemployment will increase, the number of unemployed population will increase, and the real concrete results, obtained by deflation, show a rather large economic fall of the national economy of Romania.

In this context, given that in the fourth quarter of 2021 there was a reduction in economic growth, which will almost certainly be recorded at the end of March when the quarterly Gross Domestic Product will be calculated will be a new fall.

Starting from the logic of economists, when there is a decrease two consecutive quarters, the economy is in the recession phase of the economic cycle. This will mean taking steps to return to growth in the next quarter.

At the same time, it is easy to notice that in the current conditions of multiple and conjugate crisis (pandemic crisis, economic-financial crisis, price crisis, energy crisis, gas crisis, food crisis, etc.), it is difficult to maintain macrostability with a clear trend and deepening macroeconomic destabilization.

With our own resources, using community funds allocated to Romania, it will be difficult to re-establish the macroeconomic correlations and proportions so that we can return to balance, i.e. to macro-stability.

From the data we have analysed, it results that the number of unemployed will increase, as well as that of the unemployed population. It is not excluded that a part of the unemployed population, which is currently working abroad, will repatriate and contribute to the deepening of the phenomenon of macroeconomic destabilization.

Last but not least, this perspective of entering a recession is valid not only for Romania but also for other member states of the European Union, near or far from Romania, which on this background, associating their evolutions we can consider that we are entering a period in which the state of imbalance will be maintained.

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