

CONSUMER CONFIDENCE AND REAL ECONOMIC GROWTH IN THE EUROZONE

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Abstract. Over the past 15 years, the world economic system has experienced two global crises: the financial and economic crisis of 2008 and the pandemic crisis of 2020. The financial crisis of 2008 had a significant impact on the development of the world economy, including the eurozone. Although some sectors of the economy are not recovering and have not reached pre-crisis levels of efficiency, overall economies are characterized by predictable and positive economic trends. The pandemic crisis poses new challenges to the economy in terms of business closures, disrupted supply chains, and high and accelerating inflation. All this brought to the fore the need to analyze the correlations between various indicators and the dynamics of economic growth, so that when unforeseen crises occur, decisions can be made quickly. The aim of the study is to analyze the degree of correlation between the indicator of consumer confidence and real GDP growth by quarter in the euro area. The tested hypothesis is that for the last three years there has been a strong correlation between quarterly data on real economic growth and consumers' direct assessments, as expressed by the consumer confidence indicator. The regression analysis and hypothesis testing are performed using seasonally adjusted monthly data on consumer confidence indicator and seasonally adjusted annual data by quarters on real annual GDP growth in Q2 2019 – Q1 2022. The in-depth regression analysis shows that there is a statistically significant linear relationship between the indicator of consumer confidence and real annual GDP growth by quarters for the period under study. The results of the Granger causality test confirm the conclusions drawn from the dynamic, correlation, and regression analyses. The results of the test prove not only the presence of causality, but also the ability of the consumer confidence indicator to predict real annual growth by quarter during periods of crisis. All this allows to conclude that in periods of import crises, the indicator of consumer confidence can also be used as an early signal of the presence of systemic problems and to determine the dynamics of GDP, as well as to implement specific economic measures and policies.

Key word: early warning systems, casual relationship, COVID-19, economic and inflationary crisis.

JEL Classification: C13, E32, E37, O47

1. Introduction

Over the past 15 years, the world economic system has experienced two global crises. The financial and economic crisis of 2008 left long-lasting traces on the development of the world economy, including the eurozone. Before the COVID-19 crisis, there were still sectors that had not fully recovered or had not reached pre-crisis levels of efficiency. Nevertheless, economic activity in the eurozone, as in the rest of the world, is characterized by predictability and positive economic trends. The challenges facing economies in this period are mainly related to the acceleration of digitalization processes and the non-compliance of some countries, mainly outside Europe, with the rules of international trade of the World Trade Organization. This leads to trade wars, which are reflected in the international

prices of certain raw materials. In this relatively positive period of economic development, the emergence of COVID-19 also led to a new economic crisis with global repercussions. The first negative effects were felt in Europe due to supply disruptions from China, and a number of industries began to experience difficulties. After the transmission of the virus to Europe, a number of administrative and restrictive measures were imposed on various businesses, borders were closed, etc. This led to a breakdown of many systemic ties in the economies of the eurozone member states and the virtual shutdown of many businesses. The recovery of economies from the damage caused by the COVID-19 pandemic and the cautious policies of central banks, including the ECB, led to the emergence and acceleration of inflation around the

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world, including in the euro area. In the current situation, the risk of a deflationary spiral, as feared after the European debt crisis (Mihaylova-Borisova, 2016), is no longer raised, but the question of entering an inflationary spiral and stagflation is raised. The European Central Bank has been much more cautious in taking measures in fighting inflation compared to the Federal Reserve System (Borisova, 2021). When the pandemic crisis erupted, it was the Federal Reserve that was the first bank to take unconventional measures to deal with the crisis, while the European Central Bank waited before intervening more aggressively in the markets. In the current environment of accelerating inflation, the European Central Bank has again refrained from raising interest rates because of concerns about the large accumulated debts of some eurozone countries, causing inflation to continue rising. This has a corresponding effect on countries' economic growth. Record levels of inflation have been achieved in the eurozone, as well as in the US and the UK (Borisov, 2022), but the actions of central banks in Europe and the US are different. Rising energy and food prices are also at record levels. All this has brought to the fore the need to analyze the relationships between various indicators and the dynamics of economic growth, so that quick decisions can be made in the event of unforeseen crises. Moreover, some short-term indicators can also serve as information for early warning of crises and, on this basis, for specific economic policies.

The aim of the study is to analyze the degree of correlation between the indicator of consumer confidence and real GDP growth by quarter in the euro area.

The thesis is that for the past three years there has been a strong correlation between quarterly data on real economic growth and consumers' direct assessments as expressed by the consumer confidence indicator. There are statistically significant causal relationships between quarterly real annual GDP growth and the indicator of consumer confidence, and they can serve to determine the direction of GDP dynamics and identify the presence of systemic problems. Based on this information and during the crisis, specific economic measures and policies can be adopted and implemented.

2. Literature review

There are various studies in the economic literature analyzing such relationships. In particular, in 2018, one of the first attempts was made in the European Union to identify the impact of consumer confidence on GDP growth (Sorić, 2018). The empirical analysis in the study is based on data from 11 new EU member states. The analysis shows that consumer confidence rose sharply during the global financial crisis of

2008, indicating that the crisis was to some extent psychologically manageable. The study also shows that the impact of consumer confidence on GDP has largely stabilized at previous pre-crisis levels. The conclusions drawn for the countries in question are fairly robust and remain unchanged when additional control variables are included in the model. The author concludes that a possible solution to contain the psychological factors of the crisis is a quick, consistent and clearly communicated management policy, which, in turn, can help prevent a significant decline in consumer confidence. Using quarterly data for the United States from 1980 to 2005, the relationship between measures of consumer, investor and business confidence and economic fluctuations is explored (Afshar, et al, 2007). The paper implements vector autoregression and uses error correction methodology. The results show that consumer confidence, stock returns and purchasing managers' index are responsible for large fluctuations in GDP and can predict it. An empirical analysis of the effect of the consumer confidence index on GDP was also conducted for Japan (Utaka, 2003). The paper uses a vector autoregression, which includes variables representing consumer confidence. It is shown that consumer confidence has a significant impact on the dynamics of GDP in quarterly and monthly data, while in semiannual data it has no effect. The conclusion is that consumer confidence affects only short-term economic fluctuations. The usefulness of the short-term business surveillance indicators maintained by the European Commission for forecasting GDP growth rates in Belgium, Spain, Germany, France, Italy and the Netherlands has been investigated (Mourougane & Roma, 2003). A linear relationship between real GDP and confidence indicators is estimated. The case study also showed that confidence indicators can be useful for predicting the rate of economic growth of real GDP in the short run in most of the observed countries. In 2021, predictive value was demonstrated for GDP dynamics based on consumer and business perceptions, and a correlation was found based on economic shocks caused by the COVID-19 pandemic (Kitrar, 2021). The same study also points out that consumer and business assessments are reliable and available long before quantitative GDP growth statistics and can be used as an early warning system of economic growth dynamics and taken into account in policy making. The theory has been further developed in a study of other "balance of opinion" indicators that can serve as an early warning of a crisis (Kitrar & Lipkind, 2021). For Canada, a model has been developed for forecasting real GDP growth for the current quarter, using zero to three months of indicators for that quarter (Zheng & Rossiter 2006). The equation relates Canada's quarterly GDP growth to monthly data on

retail sales, housing starts and consumer confidence. The authors' model predicts GDP growth in the first month of the quarter and its accuracy usually increases with the release of additional monthly data. Another study based on data on the U.S. economy shows that a linear regression model can overcome some limitations and provide an effective coefficient to explain the variation between the consumer confidence index and the business climate index with real GDP growth (Michis, 2011). The predictive power of confidence indicators and their ability to predict discrete events, namely economic recessions, is examined for four European economies (Taylor & McNabb, 2007). The results show that both consumer and business confidence indicators are pro-cyclical and generally play a significant role in predicting recessions. A study of the relationship between the consumer confidence indicator, the overall business climate indicator, and real GDP growth by quarter was also conducted for Bulgaria by analyzing data for the period 2019–2021 (Borisov, 2021). The study separately proves a statistically significant causal relationship between the overall index of business climate and the consumer confidence index with real annual GDP growth by quarter. The individual functional relationships are derived using a linear regression model. Other relationships between qualitative valuations and GDP in terms of the influence of external and internal factors on value creation are also the subject of analysis.

3. Methodology

In order to analyze a causal relationship between the indicator of consumer confidence and real GDP growth, the official, publicly available statistical data published by Eurostat for the euro area are used. In particular, seasonally adjusted monthly data on consumer confidence indicator and seasonally adjusted annual quarterly data on real GDP growth are used. The period from Q2 2019 to Q1 2022 is analyzed based on available statistical information and taking into account the fact that this period covers the beginning of the COVID-19 pandemic, the economic recovery after it and the inflationary processes that followed it. The analyzed period also includes the pre-crisis period and the introduction of restrictive measures against business. The statistical information used corresponds to the methodology of the European Commission (EC, 2022). The analysis compares reported quantitative data on real GDP growth with an indicator of consumer confidence. It is obtained as the average value of the balance of consumer expectations about developments over the next 12 months. The survey includes expectations about the financial situation of households, the general economic situation in the country, households'

savings, etc. The consumer confidence indicator collects information about the direction of change in variables and consumer confidence regarding basic economic processes. Thus, the study will actually analyze the relationship between a purely quantitative indicator and an indicator that is calculated on the basis of qualitative assessments.

As for the analysis of correlations between the indicator of consumer confidence, which is published monthly, and real GDP growth, the correlation is tested with data for each of the months falling in the quarter for which GDP growth is calculated. Tests to examine correlations with months at the beginning and end of the GDP reporting period also provide information on the predictive power of the consumer confidence indicator. The correlation is examined with the help of Pearson coefficient. After identifying the strongest correlations between the indicator of consumer confidence and real GDP growth, a regression analysis is carried out to prove causal relationships and find functional dependencies. In addition, the study rejects the so-called null hypothesis that there is no causal relationship between the indicator of consumer confidence and real GDP growth by quarters. The statistical significance of the causal relationships between the indicators for the analyzed period is investigated. In addition to the results of the dynamic analysis, correlation analysis and regression analysis, the data on the causal relationship between the indicator of consumer confidence and real annual GDP growth are also investigated using Granger causality test. This approach seeks, on the one hand, to confirm the results and, on the other hand, to determine whether the consumer confidence indicator is useful for predicting real annual growth by quarter or vice versa. In addition to proving causality, this approach also searches for the predictive power of the consumer confidence indicator.

4. Results and discussion

4.1 Correlation relationships

To analyze the relationship between the consumer confidence indicator and real annual economic growth for the period Q2 2019 – Q1 2022, correlation coefficients are tested starting from the month that coincides with the data release for both indicators. A 1-month and 2-month time series lag was then created for the consumer confidence index, as shown in Table 1. This was done in order to find the highest correlation coefficient and hence the lag for regression analysis of the functional relationship between the two indices.

The results show that there is a strong correlation between the indicator of consumer confidence and real

Table 1

Coefficient of linear correlation (Pearson)

Real GDP growth (y/y), (month - t ¹)	Linear correlation coefficient
Consumer Confidence Indicator (month - t)	0.713
Consumer Confidence Indicator (month - t-1)	0.779
Consumer Confidence Indicator (month - t-2)	0.476

Source: Eurostat, own calculation

annual GDP growth in seasonally adjusted quarterly data. The strongest correlation is observed with the data on consumer confidence indicator for the month that coincides with the second month of the quarter for which GDP is reported, which means a lag of minus 1 month. The correlation in this interval is strong, and the Pearson coefficient, respectively, has a value of 0.779. With this in mind, the study will use data from the consumer confidence indicator for the second month of the quarter in which GDP is reported.

The high linear correlation between the indicator of consumer confidence and real annual growth by quarter in the euro area is confirmed by a dynamic analysis of the indicators.

The seasonally adjusted data of consumer confidence indicator and real annualized GDP growth by quarters remained relatively constant until the beginning of COVID-19, until the direct effects of the introduced administrative restrictive measures on business became apparent. Both indicators began to decline in the first quarter of 2020, and the second quarter of 2020 saw the lowest value in the period under review. The consumer confidence indicator and real annual growth declined by more than 10 points each during the quarter. The highest values over the period under review are observed for both indicators in the second quarter of 2021. High levels of inflation are not yet

present at that time. After the second quarter of 2021, inflation begins to accelerate, which has a negative impact on both consumer confidence and real GDP growth by the end of the period under review.

Although these two indicators have different characteristics and one is based on quantitative results and the other on qualitative evaluations of consumers, they have similar dynamics.

The results of the correlation analysis indicate a strong correlation between the indicator of consumer confidence and real annual GDP growth by quarters according to seasonally adjusted data. Despite the fact that the components of the consumer confidence indicator are based on unmeasured statistical signs, there is a strong linear correlation at the level of 0.779 for the Pearson coefficient. All of this requires a causal relationship study using a detailed regression model to analyze the causal relationship between the consumer confidence indicator and GDP. The analysis will also answer the question of whether consumer confidence can serve as an early warning indicator of the direction of real growth by quarter. This also requires rejecting the hypothesis that there is no causal relationship between the consumer confidence indicator and real growth.

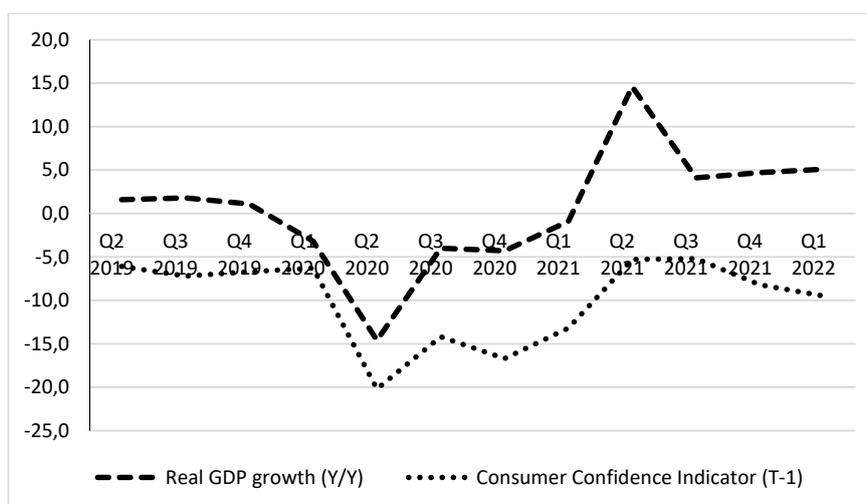


Figure 1. Consumer Confidence Indicator (t-1) and Real GDP Growth by quarter (y/y)

Source: Eurostat, own calculation

¹ "t" is the last month of the reference quarter for real GDP growth

Table 2

Regression function results from the data analysis package

SUMMARY	OUTPUT							
Regression	Statistics							
Multiple R	0.779							
R Square	0.606							
Adjusted R Square	0.567							
Standard Error	4.613							
Observations	12							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	327.965	327.965	15.411	0.0028			
Residual	10	212.815	21.282					
Total	11	540.78						
	Coefficients	Standard Error	tStat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	11.352	3.068	3.7	0.004	4.515	18.189	4.515	18.189
X Variable 1	1.096	0.279	3.926	0.003	0.474	1.718	0.474	1.718

Source: Eurostat, own calculation

4.2 Regression analysis

The Regression function was used for regression analysis, and the corresponding indicators were interpreted accordingly. The result of the study between the indicator of consumer confidence as a factor (X-variable) and real annual GDP growth by quarters as a dependent variable according to the methodology is presented in Table 2.

– According to the results of the regression analysis, the Pearson correlation coefficient (Multiple R) is 0.779, indicating a strong correlation between the indicator of consumer confidence as a factor (X variable) and real annual GDP growth by quarter as the dependent variable.

– 60.6% of the variance of real annual GDP growth by quarter can be explained by the variance of the consumer confidence indicator. The result is due to the fact that R² (R Square) is 0.606.

– Adjusted R² (R Square) is 0.567.

– The Standard Error is 4.61. This means that for the variable-factor relationship in the model, the observed values deviate on average by 4.61 units from the regression line for the 12 observations made.

– The Significance F = 0.00284 < 0.05, indicating that the functional relationship is statistically significant for the chosen significance level of 0.05. The value of the indicator is extremely low and this means that the regression model is statistically significant.

– The coefficients of the regression equation indicate that the relationship between real annual GDP growth by quarter and Consumer Confidence Indicator has the following form:

- $Y_t = 11.352 + 1.096 \cdot X_{t-1}$, in which:

- Y real annual GDP growth by quarter (seasonally adjusted data);

- X is the Consumer Confidence Indicator (seasonally adjusted data);

- t is the last month of the reference quarter for real GDP growth.

– According to the regression model, the Intercept in the function is (11.352) and the corresponding value of the Student's t-criterion is (t=3.699) and since P-value=0.0041 < 0.05, it follows that the Intercept is statistically significant.

– The coefficient in front of the factor (X) has a value of 1.1096. It is statistically significant at 0.05 level of significance (t= 3.926; P-value = 0.0028 < 0.05).

The combined results of the regression analysis show that there is a statistically significant causal relationship between the indicator of consumer confidence and real annual growth by quarter. This relationship can be expressed by a linear equation using consumer confidence indicator data for the month falling in the middle of the base quarter of GDP. The model also shows that 60.6% of the variance of real annual GDP growth by quarters can be explained by the variance of the consumer confidence index. The regression model also shows that the coefficients in the linear equation are statistically significant.

4.3 Granger causality test

Specific results of the Granger causality test in examining the causality and usefulness of the consumer confidence indicator for predicting real annual GDP growth are presented in Table 3.

The Granger causality test was carried out and it was found out that the null hypothesis that the consumer confidence indicator does not cause the

Table 3

Granger causality test

	F-Statistic	Prob.
Consumer Confidence Indicator (month – t-1) does not Granger Cause Real GDP growth (y/y), (month – t)	10.599	0.014
Real GDP growth (y/y), (month – t) does not Granger Cause Consumer Confidence Indicator (month – t-1)	0.254	0.630
Consumer Confidence Indicator (month – t-2) does not Granger Cause Real GDP growth (y/y), (month – t)	5.942	0.045
Real GDP growth (y/y), (month – t) does not Granger Cause Consumer Confidence Indicator (month – t-2)	0.389	0.552

Source: Eurostat, own calculation

growth of real annual GDP by quarters is rejected. This means that the consumer confidence indicator can serve to predict the dynamics of real annual GDP growth and there is a causal relationship. These conclusions are also true when using consumer confidence indicator data with a lag of 1 and 2 months. The results are better if one uses the consumer confidence indicator for the month falling in the middle of the GDP reference quarter (t-1).

The results of the dynamic analysis, correlation analysis and regression analysis and the proven causal relationship between the consumer confidence indicator and real annual GDP growth by quarters are confirmed by Granger causality test. Specifically, the test proves that the consumer confidence indicator is useful in predicting real annual GDP growth by quarter and there is a causal relationship. Moreover, greater predictive power and correlation are present when using data from the consumer confidence indicator for the month that falls in the middle of the GDP reference quarter. This, in turn, confirms the results of the correlation analysis.

5. Conclusions

The study provides a brief overview of the periods of economic crises over the past 15 years, as well as the general economic situation resulting from the COVID-19 pandemic and subsequent inflationary problems in the euro area. In crises of this kind, the need for indicators serving as an early warning for appropriate economic policies and measures is presented. For the period in question, from Q2 2019 to Q1 2021, for which publicly available data on the consumer confidence indicator and real annual GDP growth by quarter (seasonally adjusted data) are available, there is a strong correlation between the indicators. This is also the period that covers the crisis caused by the COVID-19 pandemic,

the recovery period, and the time when serious problems arise due to the acceleration of inflation that has emerged in the euro area. The dynamic and correlation analysis show the relationship between these two indicators, despite their fluctuations, which are due to the crisis, the consequences caused by disruptions in the supply to the economy, the forced administrative contraction of some enterprises and inflation. In-depth regression analysis shows that there is a statistically significant linear relationship between the indicator of consumer confidence and real annual GDP growth by quarter over the period under study. The correlation between the indicators is also the strongest when using the data of the consumer confidence indicator for the month, which falls in the middle of the reporting quarter of GDP. The regression analysis also shows that most of the variance of real GDP growth by quarter can be explained by the variance of the consumer confidence indicator used in the model. On the basis of statistically significant linear regression model the functional dependence of real annual GDP growth by quarters is derived. The results of the Granger causality test confirm the conclusions drawn from the dynamic, correlation, and regression analyses. The results of the test prove not only the presence of causality, but also the ability of the consumer confidence indicator to predict real annual growth by quarter during periods of crisis. All this allows to conclude that in periods of import crises the consumer confidence indicator can also be used as an early warning signal of crises. The consumer confidence indicator, based on a proven statistically significant model, can also serve as an indicator for predicting the dynamics of economic growth during crises. Thus, signals from consumer surveillance in the eurozone can also be used to take appropriate action by governments as well as by the European Central Bank.

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