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The Impact of the COVID-19 Pandemic on the Consumer Credit Market in Eurozone Countries

Keywords: consumer credit market; household; COVID-19; pandemic; Eurozone countries

JEL: D11; D12; G21; I15; I19

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Abstract

Theoretical background: The problem of the impact of the pandemic on the consumer credit market in Eurozone countries is important both from a cognitive point of view and from the perspective of economic practice. The current state of knowledge on the consumer credit market situation in Eurozone countries is incomplete. It is more common to find works concentrating on the effect of the pandemic on the consumer credit regulations, on the banking sector, or on evaluation of the consumer credit market situation in selected Eurozone countries, selected European countries or Europe as a whole. As a result, many accounts of the impact of the pandemic on consumer credit can be found, but there are no studies presenting the situation

of the consumer credit market in Eurozone countries during COVID-19 in a comprehensive and integrated manner, simultaneously combining theoretical aspects and research results.
Purpose of the article: This study has two objectives. The main objective was to examine the impact of the COVID-19 pandemic on the value of consumer credit in Eurozone countries. The specific objective was to examine the dynamics and directions of changes in the value of consumer credit during the pandemic in the Eurozone. The study hypothesis is that COVID-19 has determined the amount of household consumer credit debt in Eurozone countries, but that the determinants of this debt and the direction and strength of their impact are diverse.
Research methods: The achievement of the objectives and hypothesis verification was based on a critical analysis of source texts and on quantitative research, in which time series analysis and multiple linear regression analysis were used.
Main findings: It has been proven that the pandemic has influenced the tendency of households to take out credit, as well as the propensity of banks to grant credit, and that it therefore has affected the behaviour of both borrowers and lenders. We also showed that in periods of increased COVID-19 transmission, there was a low propensity for using credit, while in periods of relative suppression of COVID-19 symptoms, this tendency increased. It also has been proven that COVID-19 has unevenly affected the value of loans across countries. A significant difference was observed in the strength of the impact of individual independent variables on the value of consumer credit in the Eurozone, as well as a different direction of correlation between the variables. Moreover, significant differences were found in the number of variables influencing the value of consumer loans in individual Eurozone countries.

Introduction

Under EU regulations, a consumer is a natural person who acts for purposes unrelated to his trade, business or professional activity (Directive 2008/48/EC…, Art. 3). The use of credit or loans is common in financial consumption in Eurozone countries. Household indebtedness is widespread and natural in countries with a modern financial system, including Eurozone countries, and one form of indebtedness is consumer credit.

This credit is understood as a contractual obligation to use such credit to purchase a specific product or service. It is most often used by consumers to purchase goods or services at a given moment of sale (Guardia, 2002). The EU Directive states that a

> credit agreement means an agreement whereby a creditor grants or promises to grant credit to a consumer in the form of a deferred payment, loan or other similar financial accommodation, except for agreements for the provision on a continuing basis of services or for the supply of goods of the same kind, where the consumer pays for such services or goods for the duration of their provision by means of instalments. (Regulation EU, 2021, Art. 3)

Consumer credit comprises credit and loans granted primarily for personal use in the consumption of goods and services. This category also includes loans granted to small business owners if the reporting agent has information that such loans are primarily used for the person's own personal consumption purposes (Proposal for a Directive…, 2021).

It is widely recognised that the liberalisation of financial markets has contributed to growth in the importance of consumer credit, as it has facilitated access to

credit for people in the middle- and upper-income brackets, i.e. those with good creditworthiness. Such access facilitates an increase in the consumption of goods and services in order to maintain or improve lifestyle, especially in cases of reduced income. Consumer credit is seen as one financial tool "among a wider set that enables consumers to maintain, promote and enhance their own welfare" (Henry & Morris, 2017; Marron, 2012).

Two segments can be distinguished in the consumer loan market: the mainstream and the alternative markets. In the mainstream market, so-called "high-street" banks (monetary financial institutions, MFIs) target low-risk consumers for whom financial data is available. In most cases, these creditors refuse to grant consumer credit to customers with a high-risk profile and/or for various reasons an incomplete credit history. Consumers who cannot be offered credit in the mainstream credit market due to their high-risk profiles and/or insufficient credit history may be offered credit by alternative lenders, which mostly operate as non-bank financial institutions (NBFIs). Consequently, subprime consumer credit has emerged primarily in areas where there is demand that banks cannot or do not want to meet (Bouyon & Oliinyk, 2019).

The research aim of this paper is to investigate and evaluate the changes in the value of consumer loans as a result of exogenous factors (COVID-19) in Eurozone countries. In these countries, the pandemic has influenced the propensity of households to take out loans and the propensity of institutions to lend to them, thus, affecting both borrowers' and lenders' behaviour. There are both theoretical and practical reasons for undertaking such a subject of research. The current state of knowledge on the consumer credit market situation in Eurozone countries is incomplete. The impact of COVID-19 on the consumer credit market is not widely discussed in the literature. It is more common to find works concentrating on the effect of the pandemic on the consumer credit regulations (Gębski, 2021; Norwood & Molinarii, 2021), on the banking sector (Beck, 2021; Aiyar et al., 2021), or on evaluation of the consumer credit market situation in selected Eurozone countries, selected European countries or Europe as a whole (Demertzis, Domínguez-Jiménez, & Lusardi, 2020; Norwood & Molinarii, 2021). As a result, many accounts of the impact of the pandemic on consumer credit can be found, but there are no studies presenting the situation of the consumer credit market in Eurozone countries during the COVID-19 pandemic in a comprehensive and integrated manner, simultaneously combining theoretical aspects and research results. The problem of the impact of the pandemic on the consumer credit market in Eurozone countries is important both from a cognitive point of view and from the perspective of economic practice. The results of the study show that COVID-19 has determined the level of household debt in the Eurozone, and has affected the decision of households in taking out consumer loans. This state of affairs prompted an investigation into the relationship between the status of household consumer credit debt and the development of the pandemic reflected in the number of COVID-19 cases, the number of COVID-19 deaths, the number of COVID-19 tests, the number of vaccinations against COVID-19 and the change in the level of the stringency index.

The main objective of the article is to examine the impact of COVID-19 on the value of consumer loans incurred in MFIs in Eurozone countries. The specific goal is to examine the situation on the consumer credit market in Eurozone countries during the pandemic.

Achievement of the main objective is comprised of theoretical-cognitive and application objectives. The achievement of the theoretical-cognitive goal in terms of presenting the level of existing knowledge required identification of aspects of the situation on the consumer credit market (especially during the pandemic) and determining household indebtedness. In turn, the realisation of the theoretical-cognitive objective required: study of the size and dynamics of the value of consumer credit in the Eurozone and Eurozone countries, and the development of a model defining the relationship between the determinants of household consumer credit indebtedness during the pandemic.

Regarding the research subject and the adopted objectives, the following research hypothesis was formulated: COVID-19 determines the amount of household consumer credit debt in Eurozone countries, but the determinants of this debt and the direction and strength of their impact are diverse.

Considerations undertaken in the paper fall within the framework of economic sciences in the discipline of finance, with particular emphasis on sub-disciplines such as banking, international finance and credit markets. The problems discussed in the article relate to the current problems of contemporary finance, also from the aspect of dilemmas related to the development of a scientific financial methodology.

It should be emphasized that this paper is a further part of the authors' research project using a series of studies on the impact of the pandemic on the value of consumer credit.

The determinants of household indebtedness

Regarding research on the determinants of household indebtedness, it is necessary to start from a study conducted by Fisher (1930), in which it was shown that consumption increases as household indebtedness increases. According to this research, inadequate earnings in relation to consumption induce the household to borrow. In another study, Modigliani and Brumberg (1955) developed the life cycle hypothesis (LCH), which assumes that households (in the case of young people) may have a desired or required level of consumption in excess of their current income. In contrast, Ando and Modigliani (1963) found that the LCH proposes the idea that individuals save at a young age, accumulate wealth in middle age and save in retirement. The household accumulates wealth, in particular by having funds for investment, and, thus, debt also becomes important for financing needs on a limited budget. Friedman (1957) proposed the concept of the permanent income hypothesis (PIH), which indicates that households tend to make consumption decisions based on anticipated

income prospects rather than earnings. The gap mentioned in the LCH when individuals are younger can be financed by consumer credit, which will be repaid from future income. The LCH and PIH concepts view debt as an instrument that ensures stable consumption and subsistence over a person's life cycle, and emphasise that a household resorts to loans when earnings are lower than expected. Based on the LCH and PIH, it can be concluded that debt is a useful tool for increasing consumption (Abd Samad, Daud, & Dali, 2020).

The determinants that may influence household indebtedness can be divided into two main groups: demand factors (including socio-demographic and economic factors) and supply factors. One group of demand factors are socio-demographic variables, and one of these is the impact of life expectancy on indebtedness. Longer life expectancy may be associated with more debt, but on the other hand, may mean an older population and therefore less debt, as older people are less likely to take out credit (Coletta, De Bonis, & Piermattei, 2014). The level of education is a factor that positively influences consumer use of credit. Higher levels of education and better qualifications are a solid basis for higher household creditworthiness, and this provides the possibility of lower margins on consumer credit (Borowski, Jaworski, & Olipra, 2017). On the other hand, the probability of possessing unsecured debt increases with education (Del Rio & Young, 2005). Household consumer credit indebtedness is also affected by household size. It is pointed out that family size is a good indicator of needs, and debt is likely to increase with such needs. Besides, increasingly indebted households continue to borrow more to sustain their consumption (Borowski, Jaworski, & Olipra, 2017). Research also shows that rising income inequality is linked to increased household indebtedness, and the global financial crisis has shown that this situation has ultimately led to macroeconomic instability. People with a lower standard of living have been induced to borrow in order to increase consumption and keep up with those in a higher income bracket. Income inequality may therefore encourage unsustainable household debt (Jestl, 2019). Marital status and gender are also factors that influence household indebtedness. As emphasized by Fasianos, Godin, Kinsella and Wu, married couples and families are more likely to take on debt, and families and couples with children and single mothers have the highest indebtedness. However, the amount borrowed is much smaller for women than for men. A household's attitude to risk plays an important role in the decision to borrow. It is rational for a household that the lower the aversion to risk, the lower the debt burden (Fasianos et al., 2014).

The second group of determinants are economic factors. GDP and household debt are closely linked, both in the short and long term. Positive economic growth has been found to reflect higher GDP in which households earn higher incomes and banks issue additional debt (Mohamed et al., 2020). The unemployment rate is one of the common indicators that affect household indebtedness. Research by Catherine, Jamaliah, Aminah, and Arshad shows that the unemployment rate is significantly related to household indebtedness, as temporary unemployment induces households

to increase their debt in order to maintain their current standard of living (Catherine et al., 2016). Inflation, in turn, has different effects on borrowing and lending. Inflation devalues debt, providing a strong incentive for households to borrow. On the supply side, however, inflation will erode capital and discourage lending. In the light of high inflation, less money is borrowed and household debt declines. Low inflation may be a reason for an increase in household indebtedness, as it can reduce households' financial constraints (lower inflation leads to a lower interest rate, and thus less income is needed for repayment) and encourage lending (lower inflation causes slower erosion of capital) (Meng, Hoang, & Siriwardana, 2013).

In addition to demand-side determinants, household indebtedness may be influenced by supply-side factors, i.e. by influencing the behaviour of financial intermediaries. The first is investor and creditor protection, which varies by type of legal system and helps determine the propensity for private indebtedness. The next are collateral and bankruptcy laws that protect borrowers and lenders, which can facilitate lending. Traditionally, bankruptcy law aims to manage the insolvency of non-financial businesses, while consumer bankruptcy law aims to manage the insolvency of households. The quality of credit information available through public or private credit registers is another supply-side factor. Financial intermediaries share information on the creditworthiness of their borrowers and find that the inclusion of borrowers in both private and public registers has a positive impact on household indebtedness. In contrast, inefficient collection procedures in case of debtor insolvency may make banks less willing to lend (Coletta, De Bonis, & Piermattei, 2014).

One of the important determinants in recent years have been global financial shocks, which reduce external demand and cause a reduction in production in export-dependent countries. Global financial shocks worsen domestic financing conditions, create negative effects on wealth and consequently reduce real economic activity. Domestic credit conditions also become more restrictive as household balance sheets deteriorate (T'ng, 2013). One of the global shocks that has taken place in recent times is the COVID-19 pandemic.

Literature review

The COVID-19 crisis and the resulting restrictions on movement disrupted the economies of Eurozone countries and had a severe impact on the credit market and consumers, especially those who were financially exposed, leaving many Eurozone households in an unstable financial situation. During the COVID-19 crisis, member states introduced a number of support measures to ease the financial burden on households, such as moratoria for consumer credit repayments. In addition, the banking sector was supported by credit moratoria and guarantees. These measures helped spare households, businesses, and banks from bearing the burden of the crisis, but

they also suspended the normal functioning of market mechanisms. As a result, the full consequences of the crisis are not yet visible.

According to Angeloni (2021), the pandemic has affected banks through multiple channels. The first is an increase in demand for consumer credit, as households experiencing cash shortages use credit, often with the support of public guarantees. This increase in the guaranteed credit amount is a positive source of income for banks, but this effect is weakened, and can be reversed, by a reduction in credit spreads resulting from a more accommodative monetary policy. However, over time, both of these effects are likely to be overshadowed by the deterioration in credit quality resulting from the recession. This effect will become apparent after a significant time lag following the removal of public support measures (Angeloni, 2021).

Beck (2021) believes that unlike the global financial crisis and the Great Recession, the financial sector was not at the centre of the current crisis. The financial sector has been affected in the same way as other sectors by the public health crisis and the restrictive measures imposed by governments. Borrowers affected by the pandemic are less willing to pay back loans, and the reduction in interest rates worldwide has put pressure on banks' interest spread. This also highlights the fact that the financial sector plays a key role in providing much of the support for governments and central banks in containing and mitigating the impact of the pandemic. Monetary authorities expanded asset purchase programmes and stepped in as market makers when financial markets showed clear disruptions. These aggressive monetary policy actions were aimed at maintaining liquidity and credit in the real economy (Beck, 2021).

In contrast, Aiyar et al. (2021) find that borrower defaults may occur during the pandemic and could start to increase as the moratoria put in place expire. Furthermore, the expiration of other borrower support measures may also increase credit risk and result in tighter credit conditions. The authors emphasize that the trade-offs introduced by banks relating to the scale and duration of borrower support measures should relate to debt service relief and loan guarantees. Debt service relief should be a fundamental tool employed by banks to get ahead of missed loan repayments or, failing that, to restore loans to servicing condition. The pandemic has shown that widely available assistance measures, such as general debt moratoria, can effectively prevent widespread bankruptcy of (temporarily illiquid) borrowers. However, moratoria are unsustainable in the long term because they defer banks' accrued interest income, putting pressure on the net operating income, and distorting asset valuation by misclassifying loans. In contrast, the design of loan guarantees should ensure that banks' incentives to select and provide services to borrowers were consistent with the public sector's interest in limiting losses beyond what is required to address any market failure (Aiyar et al., 2021).

The Consumer Financial Protection Bureau's Consumer Credit Panel (CCP) (2020) report examined the early effects of COVID-19 regarding consumer credit on: late loan repayments, payment assistance, access to credit and account balances. The report emphasizes that reduced income can cause households to struggle to pay bills

and can increase their debt. Households that are struggling to make payments may ask for deferment or forbearance to repay their debt. Such assistance is most often provided at the discretion of the financial institution. Access to loans may be difficult for households looking for additional credit. In order to address pandemic-related household financial shocks, it was noted that lenders should report to credit reference bureaus whether consumers are paying their debts or have obtained relief. The CCP notes that assistance to borrowers should vary by loan type, such as suspending capital and interest payments on loans until September 30, 2020 (CFPB, 2020).

Research by Fieldhouse and Partridge (2020) suggests that consumer credit losses as a result of the pandemic will be high and will vary significantly by region, credit rating and asset class, just as the impact of COVID-19 may vary significantly by location and other demographics. The author considers that the increase in bank losses should be less severe than the downturn during the pandemic, and that the recovery will be more gradual. This is because households have entered the recession with a strong credit position, but, at the same time, aid is targeted at their solvency. The most likely path for consumer credit is one in which losses will be less severe than the unemployment rate would suggest, that is, characterised by slower growth and a more gradual decline. This is due to both the strength of household finances entering the recession and the help that will be offered in many forms from both governments and lenders. Lenders will probably offer their own form of relief, such as deferred payments, so as to minimise losses during the pandemic (Fieldhouse & Partridge, 2020).

Demertzis et al. (2020) find that one in three EU households cannot cope with an unexpected shock in normal times, let alone during a pandemic. Support measures introduced across the EU aim to provide economic assistance to those households in which people have lost their jobs or faced a significant reduction in income. However, in many countries – typically the economically weaker countries – every second household has been vulnerable and state assistance is likely to be smaller and shorter. Policies that increase financial resilience in a structural way among consumers will become necessary in the future. Such policies include financial education programmes in the workplace or initiatives to directly promote financial resilience among households. The survey also shows that there are significant differences between EU countries in terms of financial instability. This indicates different degrees of urgency, and the need for different policies to promote financial resilience (Demertzis et al., 2020).

Cooper, Getter, Gnanarajah, Perkins, and Scott (2020) emphasize that even before the pandemic, many consumers had problems in repaying their loan obligations, but due to increasing difficulties during COVID-19, loan repayment tolerance became a common form of relief for consumers. Loan repayment plans are agreements that allow borrowers to reduce or suspend payments for a short period of time, providing consumers with more time to repay their debt. These plans do not cover outstanding loans and appear to be suitable for borrowers experiencing temporary difficul-

ties. During the COVID-19 pandemic, financial regulators took significant steps to encourage lenders to provide credit relief and other types of relief to financially disadvantaged consumers. In addition, many market regulators have updated their guidelines to help financial institutions support consumer needs during the pandemic. Regulatory guidelines do not force financial institutions to take specific actions in favour of consumers (such as deferring loan repayments), but may encourage them to offer various forms of support. Many banks and cooperative savings and credit unions have announced measures to offer various forms of assistance to affected consumers. The economic impact of the COVID-19 pandemic could significantly affect the financial system. The large number of outstanding consumer credit instalments could have serious negative consequences for financial institutions. Many consumers with credit repayment problems may not be aware that during the pandemic banks have introduced the possibility of obtaining a loan default under certain circumstances, and that their financial institutions can provide loan waivers or other assistance. If consumers are not aware of these existing assistance options, it is possible that assistance may not reach those most in need (Cooper et al., 2020, p. 1).

As underlined by Cooper et al. (2020, p. 2), promoting loan amortisation as a solution for consumers who have problems meeting their loan obligations would make sense if COVID-19 was short-lived. However, if the economic impact of the pandemic continues for a longer period, loan defaults may only delay consumers' loan repayments. If this occurs, consumers may not be able to avoid the serious consequences of non-payment of credit, such as debt collection, seizure of goods or garnishment of wages. While regulatory protection allows consumers with credit redemption agreements to protect their credit history during the pandemic, this provision can also lead to unintended consequences. One of the most significant is making it more difficult for consumers to access new credit, especially for those who are currently meeting their credit obligations. So far, most of the response to COVID-19 in consumer debt markets has focused on helping consumers make existing debt repayments rather than providing access to credit as the pandemic continues. Evidence suggests that credit markets have already tightened, and consumers may now find it harder to access new credit than before the pandemic (Cooper et al., 2020, p. 2).

Research methods and data

The study is based on a critical analysis of the literature and quantitative research. Analysis of the scientific literature focused on studying the impact of the pandemic on situation of the consumer credit market and determining the factors affecting household consumer credit indebtedness. The empirical research, meanwhile, focused on determining the dynamics and direction of changes in the total value of consumer credit before and during the COVID-19 pandemic (time series analysis), as well as

identifying the determinants directly related to COVID-19 that affect the amount of consumer credit in the Eurozone (multiple linear regression analysis).

Multiple linear regression analysis was used to determine the impact of multiple variables that characterise COVID-19 (independent variables) on the amount of consumer credit in Eurozone countries (dependent variable). The principal focus in the research was to quantify the relationship between multiple independent variables and the dependent variable.

This study focuses only on extracting factors directly derived from COVID-19 and affecting the value of consumer credit in the Eurozone. For this purpose, a separate multiple linear regression model was built for each Eurozone country (19 models in total), in which the dependent variable (Y) was the amount of household consumer credit, while the independent variables were the following:

1. Total COVID-19 cases,
2. New COVID-19 cases,
3. Total COVID-19 deaths,
4. New COVID-19 deaths,
5. Total COVID-19 tests,
6. New COVID-19 tests,
7. Patients hospitalized with COVID-19,
8. ICU COVID-19 patients (per million),
9. Total COVID-19 vaccinations,
10. People vaccinated with at least one dose against COVID-19,
11. People fully vaccinated against COVID-19,
12. Reproduction rate (R number), which measures the ability of COVID-19 to spread, e.g. the number R-15 means that on average one person transmits COVID-19 to 15 other people,
13. Stringency index, which is calculated as the average of the following indicators: face covering; closure of schools and workplaces; restrictions on movement, international travel, public assembly, cancellation of public events, stay-at-home requirements and public information campaigns.

The estimated multiple linear regression models are described by the following formula:

$$\hat{Y} = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + \ldots + b_{13}x_{13} \pm \zeta$$

where: b_i – partial regression factors – are model parameters representing independent variables that influence the level of household consumer credit in the Eurozone.

The parameters of the regression equation were estimated using the least squares method (LSM), for which the sum of squares of the residuals (deviations $y - \hat{y}$) for all observation results is the smallest. In order to verify the individual models and

answer the question whether there is a relationship between the dependent variable (Y) and any of the explanatory variables (X), two hypotheses were formulated for each model:

H_0: $b_1 = b_2 = \ldots = b_{13} = 0$
H_1: at least one of the b_i ($i = 1, 2, \ldots, 13$) $\neq 0$

Hypothesis H_0 assumes that there is no linear correlation relationship between the amount of consumer credit in Eurozone countries and any of the independent variables X_i present in the regression model. If hypothesis H_0 is confirmed, the analysis is not continued. In contrast, hypothesis H_1 assumes that there is a linear correlation relationship between the dependent variable and at least one independent variable X_i. Acceptance of hypothesis H_1 requires further action to resolve which b_i parameters are different from zero. After verifying the factors (independent variables) that influence the dependent variable (amount of consumer credit in the Eurozone), the significance of the parameters of the multivariate linear regression model was assessed using the multivariate coefficient of determination R^2 and the standard error of estimation.

The progressive stepwise regression method was chosen as the method for selecting independent variables in the multiple linear regression analysis. In the construction of the model, all the above-mentioned independent variables (X_i) were considered, but only those that were statistically significant were entered into the model. Statistical significance was assessed using the t-test, assuming a maximum 5% probability of error in inference ($p < 0.05$). Thus, those variables whose value was higher than the critical value resulting from the Student's t-distribution at the alpha level < 0.05 were considered statistically significant. Then, after including all statistically significant variables in the model, the linear significance for the entire constructed model was tested using the F-test statistic.

The application of the multivariate linear regression model allowed us to answer the question of whether the COVID-19 pandemic affects changes in the amount of consumer credit in Eurozone countries. During the research process, the method of economic statistics was mainly used. This is a subject method used to collect materials and data and then to conduct analysis. The following secondary data used in the empirical research was:

– monthly consumer credit amounts in Eurozone countries, obtained from the European Central Bank (ECB) database,

– daily COVID-19 data in Eurozone countries, obtained from the Our World in Data database, which collects government data from around the world. For the regression analysis, daily data was averaged (arithmetic average) and presented monthly.

The study was conducted between January 1, 2019, and July 31, 2021 (time series analysis) and during the pandemic: March 1, 2020 – August 31, 2021 (regression analysis). The study periods adopted are determined by the duration of the pandemic in Eurozone countries and the availability of statistical data. On March 11, 2020,

the World Health Organization (WHO) characterized the COVID-19 disease as a pandemic, which is ongoing as of the date of this study. Due to this, and because of the disparity in the frequency of publication of individual statistics, difficulties arose in defining the study period. For this reason, it was decided to adopt two different research periods for separate analyses. In the time series analysis, in order to compare the dynamics of changes before and during the pandemic, January 1, 2019 was taken as the beginning of the research. During the research period, the most complete current statistical data ended in August 2021, therefore, the research period closed on August 31, 2021. However, in the correlation analysis, the study period is determined by the timing of the outbreak of the pandemic in each country. Although the onset of COVID-19 was dated November 2019, the timing of its spread to individual countries varied. Therefore, March 1, 2020 was taken as the start of the study period, as from this date all Eurozone countries recorded cases of COVID-19 and started publishing statistics on the spread of the pandemic. Due to the availability of up-to-date statistical data, the latest extent of the study was set – as in the dynamics analysis – as 31 August 2021.

Results

Dynamics analysis results

Consumer credit is a growing segment in most Eurozone countries. Thanks to an increase in both demand and supply, this segment saw a significant increase in loans granted in many countries in the years before the pandemic. The supply increased due to low interest rates and higher margins being sought by banks. The increase in the total amount of loans granted was mainly due to increased demand from borrowers and the better macroeconomic conditions observed during the year before the pandemic in the Eurozone, as well as falling unemployment. These factors boosted household incomes and private consumption was enhanced by growing consumer confidence. Supply was driven by low interest rates and banks' search for higher margins (EBA, 2020).

The COVID-19 pandemic and the resulting pressure to observe social distancing, limit interpersonal contacts and move many spheres of life to the Internet contributed to rapid adaptation to new operating conditions both on the part of financial institutions and consumers themselves. The amount of consumer credit in the Eurozone is shown in Figure 1.

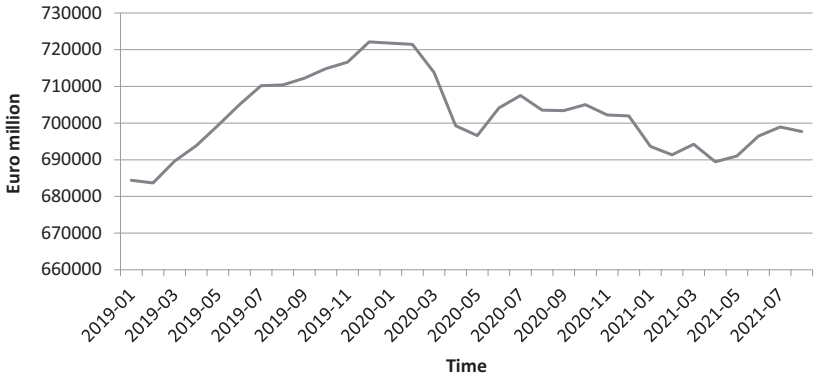

Figure 1. Total amount of consumer loans in the Eurozone between January 2019 and August 2021 (EUR million)

Source: Authors' own study based on (ECB, 2021).

The data presented in Figure 1 shows that the total amount of consumer loans granted by banks in the Eurozone varied over the period studied. Up until the outbreak of the pandemic, the value of these loans increased on average by 0.75% every month (Figures 2 and 3).

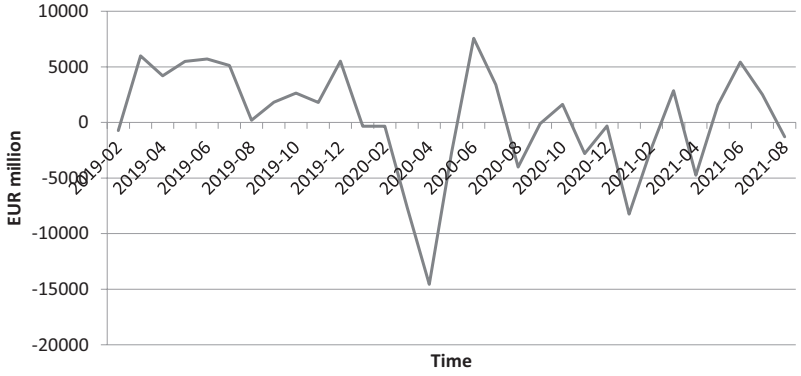

Figure 2. Consumer credit growth in the Eurozone (month-to-month, EUR million)

Source: Authors' own study based on (ECB, 2021).

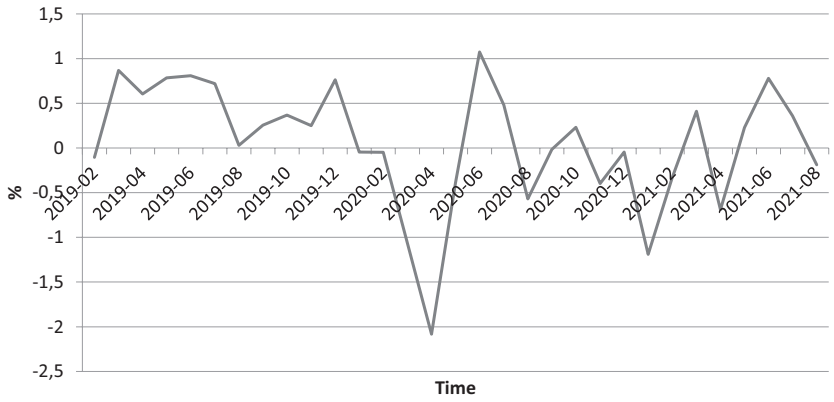

Figure 3. Consumer credit growth in the Eurozone (month-to-month, %)

Source: Authors' own study based on (ECB, 2021).

In the first phase of the pandemic (March 2020), banks in the Eurozone granted fewer consumer loans, with the decline in the value of these loans amounting to 2%. The image of the consumer credit market was "distorted" by the existence of completely opposite periods: "pre-pandemic" and "pandemic" (Kata, Nowak, Leszczyńska, Kowal, & Sebastianka, 2021). The situation was similar in the subsequent phases of the pandemic, although the decline in the value of loans was not as large as in the initial phase. Up until the outbreak of the pandemic, the value of these loans increased slightly in most Eurozone countries (Figures 4 and 5).

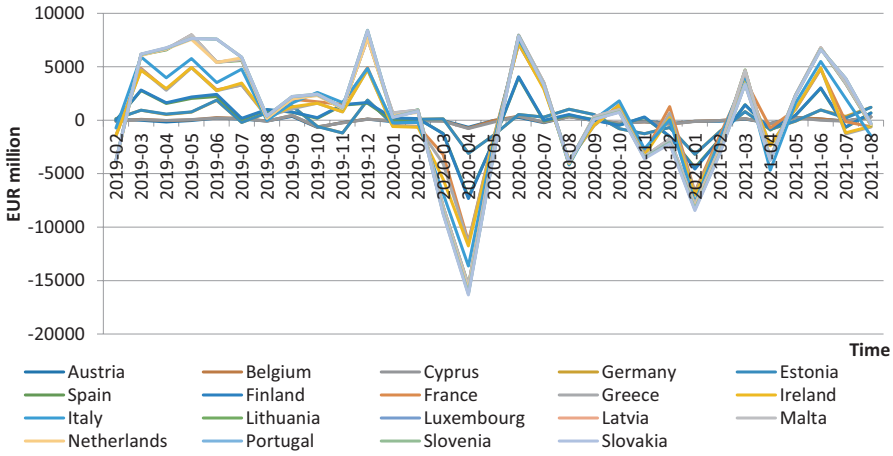

Figure 4. Consumer credit growth dynamics in Eurozone countries (month-to-month, EUR million)

Source: Authors' own study based on (ECB, 2021).

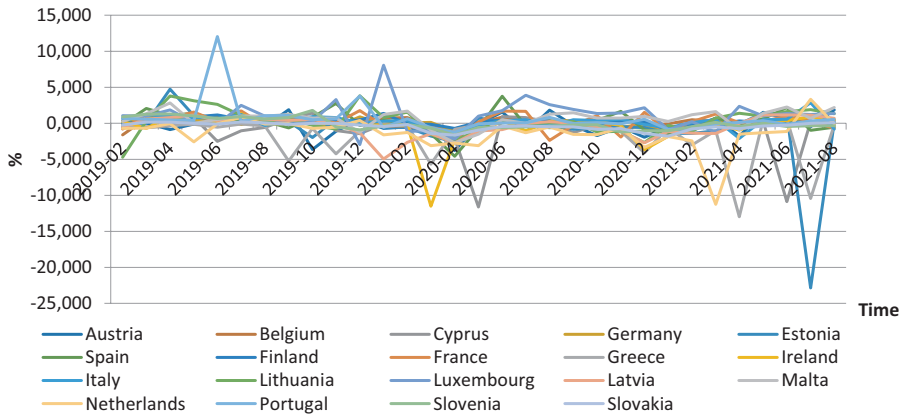

Figure 5. Consumer credit growth dynamics in Eurozone countries (month-to-month, in %)

Source: Authors' own study based on (ECB, 2021).

In the first phase of the pandemic (March 2020), banks in Eurozone countries extended less consumer credit, with the largest decreases in the value of these loans recorded by Ireland (11.7%), Cyprus (11.6%) and Greece (5.7%), while in the rest of the Eurozone the decrease was between 0.5% and 2%. In the subsequent phases of the pandemic the situation was similar but the declines were significantly smaller, the exceptions being the Netherlands (down 11.3% in April 2021), Greece (down 12.98% in April 2021), Cyprus (down 10.9% in June 2021) and Estonia (down 22.9% in July 2021).

Linear regression analysis results

In the analysis of the impact of the COVID-19 pandemic on consumer credit values in the Eurozone, 19 multiple linear regression models were estimated and verified – one for each Eurozone country. The H_0 hypothesis was accepted in three models for the following Eurozone countries: Austria, Luxembourg and Slovakia, while for the remaining countries, the hypothesis was rejected. A positive verification of H_0 is equivalent to the lack of a linear correlation between the value of consumer credit in Austria, Luxembourg and Slovakia and any of the independent variables X_i present in the regression model. As there was no linear relationship between the variables tested, the multiple regression analysis was terminated at this stage. In the remaining 16 Eurozone countries, hypothesis H_1 was verified positively and, thus, confirmed that in these countries there is a linear relationship between the value of consumer loans and at least one independent variable X_i. At the same time, the results indicate that the independent variables vary across countries (Table 1).

Table 1. Linear regression analysis results

Dependent variables. Level of household debt resulting from consumer credit in the Eurozone	Parameters of the independent variables												
	Total COVID-19 cases	New COVID-19 cases	Total COVID-19 deaths	New COVID-19 deaths	Total COVID-19 tests	New COVID-19 tests	Patients hospitalized with COVID-19	ICU COVID-19 patients (per million)	Total COVID-19 vaccinations	People vaccinated with at least one dose against COVID-19	People fully vaccinated against COVID-19	Reproduction rate (R number)	Stringency index
	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}	x_{13}
Austria	No correlation												
Belgium			0.01										1.30
Cyprus						-0.002							
Germany			-0.1	-2.00					0.0001				-106.5
Estonia			-0.127		0.0001				-0.0001			-244.48	-3.09
Spain	-0.0001		0.1										-162.6
Finland			-1.76		0.0001							15.76	
France	0.1			0.15					-0.0001				
Greece	-0.04		0.31	0.0001								0.31	
Ireland		-0.04	-0.15								0.0001		
Italy	0.2							-89.4				3151.7	
Lithuania		0.009									0.0001		
Luxembourg	No correlation												
Latvia			-0.01		-0.0001	-0.001				0.0001	0.0001		
Malta			-0.1		0.0001								
Netherlands				30.27				-1.06					
Portugal		0.03					-0.01					-188.44	-9.89
Slovenia	-0.03		0.02		0.001						-0.0001		-0.003
Slovakia	No correlation												

Source: Authors' own study based on (Our World in Data, 2021).

Table 1 is quite revealing in several ways. First, there is a significant difference in the strength of the impact of individual independent variables on the amount of consumer credit in the Eurozone. Second, the direction of the impact of individual independent variables on the amount of consumer credit varies across Eurozone countries. Third, significant differences were found in the impact of the pandemic on the amount of consumer credit across Eurozone countries.

The results obtained revealed that the reproduction rate variable (x_{12}) has the greatest impact on the value of loans taken out in the Eurozone. It was shown that changes in this indicator caused the largest changes in the value of consumer loans. This applies to countries such as Italy, Estonia, Portugal, Finland and Greece. It should be emphasized that the direction of the demonstrated correlation shown in these countries varies. In the case of Italy, Finland and Greece, an increase in the reproduction rate variable by one unit results in an increase in the value of consumer loans by EUR 3151.70 million in Italy, EUR 15.76 million in Finland and EUR 0.31 million in Greece. In contrast, in countries such as Estonia and Portugal, an increase in the reproduction rate variable by one unit results in a decrease in the value of consumer credit in Estonia by more than EUR 244 million and in Portugal by more than EUR 188 million. The results indicate that the impact of this variable on the value of consumer loans is heterogeneous. The reproduction rate reflects the ability of transmitting COVID-19 to other people. As the R number increases, the risk of COVID-19 cases increases and, consequently, the threat of increased restrictions, including restrictions on mobility or imposition of quarantine. Such a situation leads to the need to stay at home and manage time with limited access to work and leisure activities. This, in turn, generates increased consumer spending on small domestic appliances, such as TVs, tablets, or computers. Satisfying small consumption needs is therefore achieved by means of financial credit. On the other hand, the negative impact of the Reproduction Rate on the value of consumer credit in Estonia and Portugal could be explained by the increasing risk of losing disposable income during the lockdown period. The higher the capacity of COVID-19 to spread, the higher the risk of temporary or even permanent job loss.

The second variable showing the strongest impact is the Stringency Index (x_{13}), which has been shown to be significant in Spain, Germany, Portugal, Estonia, Belgium and Slovenia. The research showed that in all these countries, with the exception of Belgium, there is a negative impact of this variable on the value of household consumer credit. According to the results, it is concluded that an increase in the Stringency Index by one unit resulted in a decrease in the value of consumer loans by EUR 162.60 million in Spain, over EUR 106 million in Germany and EUR 9.89 million in Portugal. In the other countries mentioned, the parameters of this variable indicate a much lower strength of interaction between the variables: -3.09 in Estonia, and -0.003 in Slovenia. Such a situation could be explained by the fact that the threat of temporary exclusion from professional and social activity caused by the increase in restrictions aimed at stopping the transmission of the COVID-19 disease

generated the risk of losing part or all of one's disposable income, and in extreme cases even the loss of jobs. As a consequence, the risk of loss of creditworthiness rises, difficulties in settling liabilities increase and the threat of discontinuation of loan repayments grows. The results of the study revealed that increasing restrictions have a negative impact on consumer borrowing in Eurozone countries. The opposite results were obtained only in Belgium, where, as Table 1 shows, an increase in the Stringency Index by one unit caused an increase in the value of household consumer loans by EUR 1.3 million.

In the analysis of the results, the following variables also deserve attention: ICU COVID-19 patients (per million) (x_8) and COVID-19 deaths (x_3 and x_4). The ICU COVID-19 patients (per million) variable shows a negative impact on the value of consumer credit in Italy and in the Netherlands. The strength of this variable is especially significant in Italy, where an increase of 1 patient per million in the number of patients in ICU results in a decrease of EUR 89.40 million in the value of consumer credit, while in the Netherlands it decreases by EUR -1.06 million. The cautiousness of Italian households in taking out consumer loans in the light of increased numbers of patients in intensive care is justified by the development of the pandemic in the country. The condition of ICU patients raises a risk of permanent damage to health, and consequently a significant reduction in income to repay loans. It has been proven that Italy, especially at the beginning of the pandemic, was severely affected by COVID-19. At the beginning of the pandemic, the mortality rate in Italy due to COVID-19 was 13%, while at the same time in China the mortality rate was 4% (Ceylan, 2020). The region that suffered the most from the COVID-19 disease was Lombardy, where high rates of infection (as high as 37% of cases and 53% of deaths across the whole country) and high rates of COVID-19 transmission were shown as of 15 April 2020 (Odone, Delmonte, Scognamiglio, & Signorelli, 2020). The analysis results are confirmed by the parameters of the Reproduction Rate variable.

The New COVID-19 deaths (x_4) variable was significant in the Netherlands. For the other countries, the strength of the impact of this variable is relatively weak. Noteworthy is the varying direction of the impact of this variable on the value of consumer credit across Eurozone countries. As presented in Table 1, New COVID-19 deaths show a higher strength, but a smaller range of impact compared to Total COVID-19 deaths.

In addition to the varying strength and direction of the impact of independent variables on the value of consumer credit in the Eurozone, significant differences were found in the number of variables affecting the value of consumer credit in each Eurozone country. The results showed that the value of consumer credit in Estonia, Latvia and Slovenia is affected by five independent variables (38% of the examined indicators), while in Germany, Greece and Portugal it is affected by four variables (31% of the examined indicators). It should be noted that in each country, the value of consumer credit is affected by a different set of independent variables. In contrast, the smallest number of independent variables affecting the value of

consumer credit was observed in Cyprus (1 variable) and in Belgium, Lithuania, Malta and the Netherlands with 2 variables (15% of the examined indicators). The results of the analysis show that the COVID-19 pandemic in individual Eurozone countries has an uneven impact on the value of household consumer credit. Taking into account the strength, direction and level of the impact of independent variables on the value of consumer credit in individual Eurozone countries, it can be concluded that COVID-19 has affected the value of loans not only multidimensionally, but also heterogeneously. Indeed, according to the research results, the determinants of the impact on the value of consumer loans are diverse.

The results of the study confirm that all the estimated multivariate linear regression models are statistically significant. This is indicated by the results of significance assessment of the model parameters (Table 2).

Table 2. Results of the evaluation of multiple linear regression model parameter significance

	Model adjustment parameters				
	Determination coefficient R^2	Estimation error	F-test statistic value	Test probability level ($p < 0.05$)	T-test statistic value (intercept term)
Austria	No correlation				
Belgium	0.52	20.50	5.25	0.04	11090.06
Cyprus	0.36	72.36	10.37	0.00	1560.42
Germany	0.99	90.85	339.11	0.00	210246.90
Estonia	0.98	9.34	64.71	0.02	1016.91
Spain	0.91	318.87	23.32	0.00	102960.10
Finland	0.81	26.74	12.58	0.00	16162.55
France	0.98	257.44	150.03	0.00	186387.60
Greece	0.97	224.66	64.19	0.00	16918.17
Ireland	0.84	31.79	13.82	0.01	12015.44
Italy	0.97	236.11	85.62	0.00	107376.80
Lithuania	0.99	1.88	436.15	0.00	694.95
Luxembourg	No correlation				
Latvia	0.99	0.01	1617	0.00	452.89
Malta	0.95	2.72	70.63	0.00	392.54
Netherlands	0.93	186.77	53.65	0.00	10989.76
Portugal	0.97	13.62	58.08	0.00	19842.47
Slovenia	0.99	1.79	295.08	0.00	2687.86
Slovakia	No correlation				

Source: Authors' own study based on (Our World in Data, 2021).

Table 2 shows that all the estimated multiple linear regression models are statistically significant, with the exception of the models for Austria, Luxembourg and Slovakia, where the correlation was not demonstrated. This is confirmed by the F-test statistic values of individual models (in the range from 5.25 to 436.15) and $p < 0.05$. The significance of the model is also confirmed by the estimation errors and the value of the t-statistic (free expression) – these are significantly different from zero. The level of the determination coefficient (R^2) in the estimat-

ed models is between 0.36 and 0.99, which means that individual models explain between 36% and 99% of changes in the level of household consumer credit debt in the Eurozone.

Discussions and conclusions

The results have shown that changes in the number of cases, the number of deaths, the number of tests and the number of vaccinations against COVID-19, as well as the amount of introduced safeguards and the rate of spread of COVID-19 in individual Eurozone countries translate into a tendency or aversion among households to take out consumer loans.

It has been proven that the pandemic has influenced the tendency of households to take out credit, as well as the propensity of banks to grant credit, and that it therefore has affected the behaviour of both borrowers and lenders. We also showed that in periods of increased COVID-19 transmission, there was a low propensity for using credit, while in periods of relative suppression of COVID-19 symptoms, this tendency increased. Thus, the research results have confirmed the hypothesis that COVID-19 has determined the amount of household debt arising from consumer loans.

It has also been proven that the pandemic has unevenly affected the value of loans across countries. The research has shown that out of the 19 Eurozone countries, in 3 countries there is no linear correlation between the explanatory variables and the value of consumer loans. In the remaining 16 countries, a significant difference was observed in the strength of the impact of individual independent variables on the value of consumer credit in the Eurozone, as well as a different direction of correlation between the variables. Moreover, significant differences were found in the number of variables influencing the value of consumer loans in individual Eurozone countries.

The research has shown that not all COVID-19 predictors determine the value of the loans studied. It was shown that the Reproduction Rate was a direct factor that influenced changes in the value of consumer loans in Italy, Estonia and Portugal (where the strongest impact was demonstrated), and also for Finland and Greece (with much weaker strength). The second dominant factor in terms of the strength of impact on the value of consumer loans in the Eurozone was the Stringency Index. This is because it was shown that the introduction of further restrictions to prevent the spread of COVID-19 was associated with a reduction in the value of consumer credit taken out by households in Spain by over EUR 162 million, in Germany by over EUR 106 million, in Portugal by EUR -9.89 million, and in Estonia by EUR 3 million. The results of the research revealed that increasing restrictions negatively affected the value of consumer borrowing in the Eurozone. In only one country – Belgium – there was a positive impact between the Stringency Index variable and the value of consumer loans. It also was proven that the other factors significant for the value of consumer credit in the Eurozone were the ICU COVID-19 patients (per million), and the COVID-19 deaths.

The results of the study clearly indicate that COVID-19 has determined the value of consumer credit in Eurozone and has affected decision-making in households regarding debt. The main finding of this study is that the impact of the analysed variables on the value of household consumer credit varies across countries. The results vary both in terms of the strength, direction and extent of the impact of individual variables. This is also shown in other studies by the authors in a series of analyses on the impact of the pandemic on the value of consumer credit (e.g. in the V4 countries) (Czech & Puszer, 2021).

Given that the pandemic is still ongoing, the results of this study should be treated with some caution. In the near future, the continuing pandemic may affect the causes and effects of changes in the value of consumer credit in the Eurozone differently, but this cannot be predicted at the present. Undoubtedly, the research has contributed to some extent to a better understanding of consumer credit indebtedness in times of turbulence and instability due to health issues in Eurozone countries. In the future, this research will serve as a basis for further studies into the phenomenon of household indebtedness in other countries.

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