THE IMPACT OF THE COVID-19 PANDEMIC ON THE HOUSEHOLD DEPOSITS VOLUME: THE CASE OF SLOVENIA

Malči Grivec[1] and Srečko Devjak[2*]

[1]*University of Novo mesto, Faculty of Economics and Informatics, Novo mesto, Slovenia*
[2]*MLC Management and Law College, Ljubljana, Slovenia*

In this paper, the impact of the COVID-19 pandemic on the savings of Slovenian households in banks is explored. For this purpose, an econometric model is developed and the macroeconomic variables exerting a statistically significant impact on household deposits in banks are identified. Among all the macroeconomic variables considered in the paper, the research study has shown that there are only two macroeconomic variables with a statistically significant impact. These two macroeconomic variables are the Euro Overnight Index Average (EONIA) reference interest rate used as a proxy variable for the rate of return, and the price of one Bitcoin as a yield on an alternative investment opportunity. The results of this research study are important for both the Central Government in Slovenia and for Slovenia's banks as household deposits are a source of funding for banks in the time of a crisis as well, and because of the fact that the volume of the loans granted accelerates the GDP growth, which shows the successful implementation of the economic policy.

Keywords: banking, household deposits, EONIA, Bitcoin, Slovenian Stock Exchange Index, COVID-19

INTRODUCTION

In March 2020, there was the outbreak of the COVID-19 pandemic in Slovenia and the Government restricted public life in the country accordingly. N. Donthu and A. Gustafsson (2020) explain that the business environment changed overnight after the appearance of the COVID-19 pandemic. Significant changes happened in the business operations of companies and in customer behavior. The restrictions introduced in public life reduced demand and people's consumption, the economic activity at the country level consequently also declining. The decline in the economic activity in Slovenia in the first quarter of 2020 was strong according to the Statistical Office of the Republic of Slovenia (SORS) (2023), having amounted to 11%. In the third quarter of 2020, the epidemiological picture in the country improved, which had a positive impact on the

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* *Correspondence to*: S. Devjak, MLC Management and Law College, Tržaška 207, 1000 Ljubljana, Slovenia;
e-mail: devjaks@dnb.com

economic activity in the country. The epidemiological situation deteriorated again in the third quarter of 2020, so the Government reintroduced restrictions on movement and public life, which however were not as severe as those in the first quarter but were more protracted as the restrictions on public life lasted for a longer time. The restrictions on movement and public life affected the consumption habits of individuals. The way of shopping changed, as people were less likely to visit physical stores, hence being forced to buy goods online. As a result, the consumption structure changed as well, at least in the short run, as it increased in favor of the products available for purchase online.

Because the appearance of the COVID-19 pandemic in Slovenia has changed the way individuals purchase goods, an answer is sought in this paper to the question whether the appearance of COVID-19 has also changed the volume of people's savings and the ways people save in Slovenia. Saving is an important activity, since bigger savings at a given disposable income reduce current consumption. According to C. Denizer and H. C. Wolf (2000), the household sector is the main sector of any national economy that saves. Bigger household savings increase the volume of savings in the national economy, which are then available to investors to finance their investments. Companies in Slovenia obtain the majority of all needed financial resources to finance investments from banks. If banks want to grant loans to companies for investments, it is essential how much savings households in Slovenia have in banks in the form of deposits. The more deposits households hold with banks, the more loans banks can grant to companies to finance their respective investments. Consequently, a greater volume of household deposits in banks accelerates the GDP growth in the country.

This paper aims to analyze how the volume of household deposits in banks in Slovenia has changed due to the appearance and presence of the COVID-19 pandemic and which macroeconomic variables affect the volume of household deposits in banks in Slovenia. This research question allows us to derive the following two hypotheses:

H1: The volume of household savings in banks in Slovenia increased during the COVID-19 pandemic.

H2: The volume of household savings in banks in Slovenia is influenced by the economic activity in the country, return on bank deposits and return on the alternative forms of investment.

The hypothesis H1 is based on the experience of the time with the COVID-19 pandemic, when the population was forced to reduce current consumption due to restrictions on movement. On the other hand, the hypothesis H2 takes into account the fact that the economic activity in the country determines the volume of household income, and that return on bank deposits and return on the alternative forms of investment determine the attractiveness of bank deposits. It is important for banks and the Central Government in Slovenia to understand the exact key determinants of household deposits in banks in Slovenia in the time of the COVID-19 pandemic and what it is that drives these key determinants. It is in Slovenia's banks' interest to grant more loans to companies, because a greater volume of loans at a given risk level increases the profitability of banks in Slovenia. More loans granted to companies accelerate the GDP growth, which is in the Slovenian Central Government's interest, because it shows the successful implementation of the economic policy.

This paper is organized into a few sections. The section that follows is a review of the existing literature dealing with household savings during the COVID-19 pandemic. The literature dealing with household savings in Slovenia during the COVID-19 pandemic is prioritized in this paper. In the section discussing the research model, the model to be used to measure the impact of the COVID-19 pandemic on household savings in bank deposits in Slovenia is explained. The section dedicated to the research data accounts for the possible macroeconomic variables that determine the size of household savings in Slovenia in bank deposits during the COVID-19 pandemic. The discussion of the research model results presents the statistically significant macroeconomic variables affecting the volume of household savings in Slovenia in bank deposits during the COVID-19 pandemic.

The conclusion summarizes the key findings of the research study and explains the guidelines for further research in this area.

LITERATURE REVIEW

The personal savings function has been the subject matter of studies carried out by numerous authors. J. M. Keynes (1936/2007) explains that household savings are a linear function of disposable income, where household savings are positively correlated with disposable income. Classical economic theory, described in the works of A. Smith (1789/1994) and D. Ricardo (1817/2015), neoclassical economic theory, described in the works of R. Solow (1956) and T. Swan (1956), as well as financial repression theory, described in the works of R. McKinnon (1973) and E. Shaw (1973), agree that the motivation of households to save is positively correlated with the interest rate.

J. J. Heim (2017) explained the personal savings functions in the US economy. He found personal savings to be the functions of disposable income, tax cut-induced crowding out, the prime interest rate, stock market levels, consumer confidence levels, and inflation. T. Callen and C. Thimann (1997) did research in the empirical determinants of household savings in the OECD countries. The empirical results of their research study show that public and corporate savings, growth, and demographic trends are the important determinants of household savings, the other variables with a statistically significant impact on household savings being inflation, unemployment, the real interest rate, and financial deregulation. S. Rocher and M. H. Stierle (2015) reviewed previous studies on household savings and compiled a list of the variables that determine the volume of household savings. They showed that, among the other variables that determine household savings, there were also the rates of return on alternative investment opportunities. In addition, they found out that proxies, the unemployment rate and inflation positively affected household savings.

The impact of savings and the efficiency of financial intermediation on economic growth was studied

by M. Grbic (2016). The results of her research show that the improvement of the efficiency of financial intermediaries accelerates economic growth at the country level. A greater economic activity simultaneously increases financial intermediaries' business volume. Since the economies of scale reduce transaction and information costs, the efficiency of financial intermediations grows. Savings in the economy were also studied by N. Jankovic (2015). He carried out a study of the twin deficit, which relates to the budget deficit and the current account deficit in the Republic of Serbia. If there is a twin deficit, then the country spends more than it produces, and investments are greater than savings. The results obtained in his research study show that the financial position of countries whit a chronic budget deficit and without a sufficient amount of domestic savings to finance excessive government spending will further deteriorate in crisis situations. Austerity during the COVID-19 pandemic has already been researched by many authors. G. Torkar (2022) finds that there was an almost 20% growth of household deposits in banks in Slovenia in 2020, which he attributes to the unpredictable emergencies caused by the emergence of COVID-19. He also notes that banks underestimated the growth of household deposits during the COVID-19 pandemic, since the growth of household deposits was projected at only 4.4% in 2020. His research study also sums up the fact that, in years to come, banks will insist on attachments to households and nonfinancial corporations, amounting to a total of 72%. P. Dolenc, M. Ahtik, M. Lavrič, B. Poljšak, M. Požlep, F. Remšak, I. Sokolovska and R. Volčjak (2021) find that, in the second half of 2021, the deposits of households and nonfinancial corporations accounted for about 60% of all the liabilities of the Slovenian banking system, which is equivalent to about 64% of the GDP in Slovenia. They also note that the share of household deposits in the structure of the liabilities of the banking system is amongst the highest in the euro area.

The Bank of Slovenia (2020) also finds that 78% of household deposits are sight deposits, which allows their holders to use them immediately so as to overcome potential liquidity problems. The future development of the volume of household deposits is

therefore uncertain itself. The Bank of Slovenia does not expect households to reduce their holdings in the form of deposits with banks, which would be due to a decrease in savers' confidence in the stability of banks' operations and the entire banking system. At the same time, the Bank of Slovenia estimates that households will remain cautious and not convert their savings into time deposits, which on its part will increase the share of sight deposits in the future.

D. Di Virgilio (2022) studied the stability of sight deposits in banks in Slovenia under the assumption of different interest rate regimes. The study showed that sight deposits from households and nonfinancial corporations were highly stable even in the conditions of low interest rates. In the same study, the Bank of Slovenia simulated the impact of a gradual increase in the reference interest rate on the volume of bank deposits and found that the volume of deposits would decrease due to the increase in the reference interest rate, but the expected rate of decline was low.

M. Dossche, G. Krustev and S. Zlatanos (2021) analyzed household savings in the euro area having been deposited since the beginning of the COVID-19 pandemic only to find that the propensity of the euro area households to save had sharply risen in early 2020. The higher propensity of households to save was due to lower consumption, which was involuntary. Households had invested much of their savings in the aftermath of the COVID-19 pandemic in the most liquid assets. The authors also found that older households and households with higher income had saved more during the COVID-19 pandemic.

In their study, M. Dossche and S. Zlatanos (2020) explain that the greater savings of the euro area households in early 2020 were such due to the two reasons. The first reason was the restriction of movement that led to an involuntary reduction in household consumption. The second reason was the uncertainty of households with respect to their employment and the level of their future income, this uncertainty having been caused by the sudden outbreak of the COVID-19 pandemic. Due to said uncertainty, households in the euro area started to accumulate precautionary savings.

RESEARCH MODEL

In this research study, a linear econometric model is used because J. M. Keynes (1936/2007) explains that household savings are the linear function of disposable income. The dependent variable in this model will be the volume of household deposits in Slovenia at all banks, which will contain deposits of all maturities, both sight deposits and time deposits, and deposits in all currencies, both in the domestic currency EUR and in other currencies. In this way, the dependent variable will include total household savings at all banks in Slovenia, but not savings in vaults.

This research initially considers a broad range of the independent variables in the study. The attractiveness of deposits as an investment form is determined by interest rates. Deposit interest rates are different for different maturities and currencies, but all interest rates are of the same origin, which is the short-term reference interest rate, i.e. the Euro Overnight Index Average (EONIA). The attractiveness of deposits is also determined by the yields of alternative investments. Gold as the basic precious metal, the Bitcoin as the basic cryptocurrency, the Slovenian Stock Exchange Index (SBITOP), and savings in mutual funds are considered to be the alternative investments. Only gold is considered of all precious metals, because the prices of the other precious metals, namely of silver, platinum and palladium, are strongly positively correlated with each other and the multi-collinearity between the independent variables in the final linear econometric model is unwanted.

The multivariate linear econometric model is defined by the multivariate linear regression model. If y is the dependent variable, if x_i are the independent variables, where $i = 1, 2, \ldots, n$, if β_i are the regression coefficients of the multiple regression, if α is the regression constant, and if ε are the residuals, then the multivariate linear regression model is defined by the following equation (Košmelj, 1983):

$$y = \alpha + \sum_{i=1}^{n} \beta_i \cdot x_i + \varepsilon \tag{1}$$

The Pearson correlation coefficients between the prices for each pair of precious metals and the corresponding exact significance levels are shown in Table 1.

Employment has a significant impact on the volume of savings, since it is only the employed income-generating population who can save. Among the macroeconomic variables that measure employment in the economy, this research study considers the number of employed individuals and the unemployment rate. Among the independent variables, this research study also considers the economic activity, which measures the amount of created added value and the ability of companies to pay income to employees. The economic activity is measured using different macroeconomic variables. In this research study, the GDP and the industrial production index are taken into consideration. The added value created at the economy level is a necessary condition for companies to pay income to their employees. The amount of the income paid to employees depends on capital owners' preferences, i.e. on how much added value they want to keep

for themselves and how much added value they want to pay to their employees in the form of their personal income, which affects both consumption and savings. The income earned by employees in the Slovenian economy is measured by means of the two macroeconomic variables, namely the average gross salary and the average net salary in euros.

DATA

The observation period was from June 2018 to December 2021, which is 21 months before the start of the COVID-19 pandemic and 21 months after the start of the COVID-19 pandemic. In this way, the length of the period of time prior to the outbreak of the COVID-19 pandemic is equal to the length of the time period after the outbreak of the COVID-19 pandemic. Since the values of the macroeconomic variables: the GDP, employment and the unemployment rate are only available at the quarterly level, this research study first considers the values of all the listed independent variables at the quarterly level when

Table 1 The Pearson correlation coefficients between the precious metal prices

		Gold	Silver	Platinum	Palladium
Gold	Pearson Correlation	1	0.800**	0.467	0.744**
	Sig. (2-tailed)		<0.001	0.080	0.001
	N	15	15	15	15
Silver	Pearson Correlation	0.800**	1	0.722**	0.726**
	Sig. (2-tailed)	<0.001		0.002	0.002
	N	15	15	15	15
Platinum	Pearson Correlation	0.467	0.722**	1	0.738**
	Sig. (2-tailed)	0.080	0.002		0.002
	N	15	15	15	15
Palladium	Pearson Correlation	0.744**	0.726**	0.738**	1
	Sig. (2-tailed)	0.001	0.002	0.002	
	N	15	15	15	15

Note: ** - The correlation is significant at the 0.01 level (2-tailed).

Source: Authors

developing the linear econometric model. Given the fact that the data on a quarterly basis were included in the study, the length of the time series of the data in the study was 15 quarters.

The time series of the nominal data were drawn from various data sources. The data on household bank deposits, the EONIA interest rate, the savings paid into mutual funds, average gross salaries and average net salaries for the observed period were obtained from the Monthly Bulletins of the Bank of Slovenia. The EONIA interest rate is the reference interest rate for overnight loans in the EUR currency. It is calculated as a weighted average of all interest rates on unsecured overnight loans carried out by participating banks on the interbank market in the euro area (Bank of Slovenia, 2022a). The data on the GDP, employment, unemployment rates and the industrial production index were obtained on the SiStat online data platform, which is managed by the Statistical Office of the Republic of Slovenia (hereinafter referred to as SORS). In this research study, the value at the end of the quarter for each variable in the time interval, which was defined as the observation period at the beginning of the research, is considered.

The data about the stock exchange index of the Ljubljana Stock Exchange, SBITOP, were retrieved from the annual trading reports of the Ljubljana Stock Exchange. This research study takes into account the value of the SBITOP index on the last day of each respective quarter. The prices of precious metals, namely gold, silver, palladium, and platinum were extracted from the online data platform operated by the Elementum company in Slovenia. There were two prices of precious metals available, the one in EUR per kilogram or the other in EUR per ounce. Between both options, the data in EUR per kilogram were opted for. The price of the Bitcoin cryptocurrency in EUR was also considered as a macroeconomic variable in the research. Its values were retrieved from the Yahoo Finance online data platform. Since quarterly data are used in this research, the last market price of each precious metal and Bitcoin reached on the last trading day of the quarter were used.

In the next step, the time series of the nominal data were deflated and so converted into the time series of the real data, in which way the effect of inflation was removed from the time series of the nominal data. The consumer price index was used as the deflator. The values of this index were taken from the SiStat online data platform, which is managed by SORS. SORS publishes the values of the consumer price index on a monthly basis. This research study used the consumer price index calculated as the base index, where the base was the average price level in 2015, which means that deflation delivered real data for each observed macroeconomic variable in the average prices since 2015. This research study considered the monthly consumer price indices at the end of each quarter in the time interval defined at the beginning of this research as the observation period.

The nominal data deflation was achieved by dividing the nominal data at the end of each quarter by the value of the consumer price index at the end of the same quarter, which was followed by multiplying the obtained result by one hundred. In order to calculate the EONIA real reference interest rate, the Fischer formula was used in the study (Fisher, 1907). Out of all the observed macroeconomic variables, the macroeconomic variables: employment and the unemployment rate were not deflated.

RESULTS AND DISCUSSION

Figure 1 shows the development of the nominal value of household deposits in banks in Slovenia in the selected time interval. The nominal value of household deposits in banks in Slovenia increased in the entire time interval, which was defined at the beginning of this research as the observation period. This means that the nominal value of household deposits increased even after the outbreak of the COVID-19 pandemic. Since the COVID-19 pandemic in Slovenia started in March 2020 and if the observed time series of the data is split into two parts, the first part ending with February 2020 and the second part starting with March 2020, then the hypothesis H1 can be tested using the independent simple *t*-test. The alternative

hypothesis in this case is that the average nominal value of household deposits in banks in Slovenia after the outbreak of the COVID-19 pandemic was greater than the average nominal value of household deposits in banks in Slovenia before the outbreak of the COVID-19 pandemic. The results of this test are and the corresponding one-sided significance level . The independent sample *t*-test hence shows that the nominal value of household deposits increased after the outbreak of the COVID-19 pandemic. Both the graphical method and the independent sample *t*-test consequently confirm the hypothesis H1 that the volume of household savings in banks in Slovenia increased during the COVID-19 pandemic.

The linear econometric model is developed using the IBM SPSS Statistics software, version 27. The stepwise method is used to include the independent variables in the model. The method first includes in the model the independent variable that explains the largest share of the variability of the dependent variable in the model. At each step, the stepwise method also excludes insignificant independent variables from the model and finally ends with those independent variables in the model, which all together explains the largest share of the variability of the dependent variable in the model, whereby all the independent variables in the model are statistically significant.

In this way, this research study has developed an econometric model, in which only two statistically significant independent variables appear, namely the EONIA and the price of one Bitcoin. The coefficients of the linear econometric model are shown in Table 2.

Whether the considered macroeconomic variables as lagged variables are statistically significant in the econometric model or not is not tested in this research study. Asset prices are market variables, which typically change intraday and very quickly. Therefore, asset prices quickly lose relevance as time passes and have increasingly smaller impact on the investor's investment decision. Within the framework of this research study, the time series of the quarterly data were used. Hence, there are also the quarterly time series of market prices. As a result, there is one quarter of time between the two consecutive data points in the time series, which makes the earlier data point out of the two consecutive data points too old to have a significant impact on the investor's investment decision. Consequently, it makes no sense to test quarterly asset prices as lagged variables for statistical significance in the econometric model.

According to the Bank of Slovenia (2020), 78% of household deposits are sight deposits. Therefore, both independent variables in the econometric
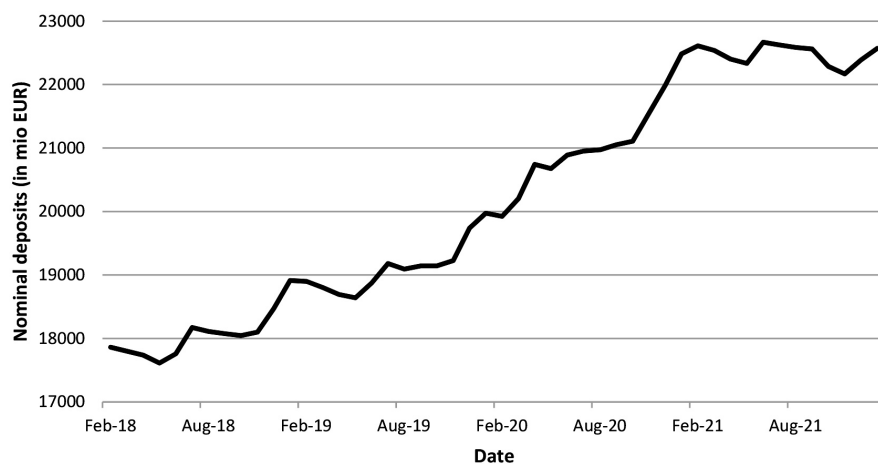

Figure 1 The development of the nominal value of household deposits in banks in Slovenia

Source: Authors

Table 2 The coefficients of the linear econometric model

Model B	Non-standardized coefficients		Standardized coefficients	T	Sig.
	Std. error	Beta			
1 (Constant)	12022.053	1140.419		10.542	<0.001
EONIA	-18251.323	2458.926	-0.899	-7.422	<0.001
2 (Constant)	13787.513	763.987		18.047	<0.001
EONIA	-12489.238	1861.592	-0.616	-6.709	<0.001
Bitcoin	0.056	0.11	0.458	4.988	<0.001

Source: Authors

model only explain the variability of household sight deposits in banks in Slovenia. If this research wanted to find out the macroeconomic variables that determine the amount of household time deposits in banks in Slovenia, then it would have to develop another econometric model. Consequently, it is also understandable that EONIA is a statistically significant independent variable in the model, since it is the reference interest rate for the shortest maturity and thus determines the return on investment with the shortest maturity, which is overnight. EONIA is not an interest rate in use for retail deposits in banks in Slovenia and hence is included in this model only as a proxy variable. However, EONIA drives deposit rates for retail deposits. According to J. Eisenschmidt and F. Smets (2019), money market rates have tracked the key central bank's interest rate closely as the later decreased below zero. They also explain that retail deposit rates, especially those of households, appear to have a zero-lower bound. Deutsche Bundesbank (2019) also explains that, due to the exceptional interest rate environment in 2018, some institutions charged negative interest rates on large corporate deposits, as well as the large deposits made by wealthy retail depositors.

W. Boungou (2022) studied the effects of a negative interest rate policy on retail deposit rates in banks. His research showed that banks had reduced their retail deposit rate in response to the introduction of the negative interest rate policy. This effect varies from country to country, especially among the countries with the euro as the domestic currency. Moreover,

this research study also shows that reduction in the retail deposit rate is not prompt. However, it becomes stronger if the negative interest rate policy persists over time. Overall, the findings of this research study confirm the fact that banks are reluctant to reduce retail deposit interest rates, this reluctance decreasing when negative interest rates have been in place for a longer period of time. This finding additionally supports the research result of J. Eisenschmidt and F. Smets (2019), where they concluded that retail deposit rates appeared to have a zero-lower bound.

Since household deposits in banks are a function of the interest rate, this research study leaves EONIA in the model despite its negative pre-sign. Economically speaking, of course, it makes little sense to invest in an asset with a negative rate of return. However, the negative regression coefficient for this independent variable in the model shows that households increase their deposits in banks in the times of uncertainty due to the corona crisis because they see in bank deposits the safety provided by the deposit insurance scheme. In this light, the interest rate is the variable that brings the portfolio of both positive and negative benefits to the investor. On the one hand, a positive interest rate brings to the investor a reward for the invested capital in the form of a profit with a positive pre-sign. A negative interest rate, on the other hand, discourages the investor from investing in an asset with a negative interest rate. However, a bank deposit also provides safety to the investor through a deposit insurance scheme. Consequently, the interest rate on a bank deposit reflects all the benefits together, and

no investor can only take the positive benefits of the investment in a bank deposit, namely the deposit insurance scheme. An investor must also accept the negative benefits if investing in a bank deposit with a negative interest rate. In this light, the deposit insurance scheme reduces the actual credit risk of banks in the eyes of households who own deposits in banks and expect banks to pay the deposits back to them at maturity. The deposit insurance scheme reduces the actual credit risk of banks with the deposit insurance fund, which is behind the deposit insurance scheme and is available to cover deposit payments in the event of a bank failure. This is an attractive characteristic of a bank deposit in comparison to other investment alternatives since no other investment provides the investor with similar capital protection. The deposit insurance scheme is a part of bank regulation, and the importance of bank regulation has been studied by many authors. V. Todorović, M. Jakšić and N. Tomić (2017) studied the role of bank regulation in the modern financial environment and concluded that bank regulation significantly contributed to safer banking operations and financial stability in the country.

The main contribution of the Central Government to the volume of household deposits in banks in Slovenia is therefore the definition of the deposit insurance scheme. Reduction in the deposit insurance level or even the abolition of the deposit insurance scheme may have a significant impact on the volume of household deposits in banks. The safety of a deposit insurance scheme composes the level of deposit insurance and the hedge fund behind the deposit insurance scheme. In Slovenia, this hedge fund behind the deposit insurance scheme is managed by the Bank of Slovenia, which is the central bank in Slovenia. As can be seen from the data, the current deposit insurance scheme in Slovenia has been accepted well by households as household deposits in Slovenian banks have been growing since the outbreak of the COVID-19 pandemic. An open question is whether a further increase in the deposit insurance level can increase the attractiveness of bank deposits for investors or not. A higher deposit insurance level would also include deposits with greater values, but the number of such deposits is smaller. According to

the Bank of Slovenia (2021), 88% of individuals have deposits in one bank in Slovenia, those deposits being below EUR 20,000 and an average deposit in this interval amounting to only EUR 2,800.

The Bank of Slovenia (2021) also explains that there are but a few banks in Slovenia that introduced negative interest rates on household deposits during the COVID-19 pandemic, but these rates only apply to the deposits exceeding the predetermined threshold. This threshold varied from bank to bank, the same not being below EUR 100,000 in any bank in September 2021. This threshold corresponds to the deposit insurance level. At the end of 2020, 1.1% of individuals had deposits amounting to more than EUR 100,000 in one bank and the total value of these deposits was EUR 4.9 billion. Further reduction in this threshold for the application of negative interest rates on household deposits might lead to a partial withdrawal of deposits from banks or the transfer of deposits to the other forms of investment (mutual funds, pension savings, investments in real estate) in the future, which some banks have already become aware of and have already introduced negative interest rates. The same banks also notice that individuals are already redirecting their savings within the same bank to other investments, mainly mutual funds.

Negative interest rates have been further explored and discussed by L. Brandao-Marques, M. Casiraghi, G. Gelos, G. Kamber and R. Meeks (2021), who explain that retail depositors value the safety and convenience of bank deposits, and that they consider switching accounts so as to take advantage of better rates as troublesome. The deposit insurance scheme provides this safety to retail depositors. The negative interest rate policy does not seem to have reduced retail deposits in banks. After the negative interest rate had been adopted, the share of household or nonfinancial corporate deposits in the balance sheet did not decline in any relevant economy. J. Eisenschmidt and F. Smets (2019) and Deutsche Bundesbank (2019) explain that, in the euro area, banks' reliance on retail deposits has even risen since the policy rate stepped onto the negative territory, which itself means that retail deposits have even increased after the policy interest rate became negative.

Since the regression coefficient for the price of Bitcoin is positive in the econometric model developed within the framework of this research study, it shows that average household income in Slovenia is so big that it allows households to save in two different asset classes, namely in bank deposits (as a safer form of savings) and in Bitcoin (as a riskier property form). The positive regression coefficient for the price of Bitcoin additionally shows that households are steadily increasing their savings in both asset classes, which is why this regression coefficient is also statistically significant.

The developed linear econometric model is statistically significant, and the results of the analysis of the variance are shown in Table 3.

As the statistically significant independent variables in the model, EONIA and the price of Bitcoin account for 93.8% of the total variability of household deposits in all banks in Slovenia. The correlation metrics for the linear econometric model are shown in Table 4.

The graphic analysis of the residuals shows that the standardized residuals of the linear econometric model are approximately normally distributed, which confirms the fact that the correlation between the independent variables in the model, i.e. between EONIA and the price of one Bitcoin, is sufficiently low (Figure 2). Consequently, the key assumption behind the linear econometric model is fulfilled.

The Bank of Slovenia (2022) explains that even if the epidemiological situation deteriorates, the intensity of the household deposit accumulation in banks will most likely be smaller compared to the period after the outbreak of the COVID-19 pandemic, when consumption opportunities were limited and uncertainty about the development of the COVID-19 pandemic, as well as the control of the COVID-19 pandemic, was very high. Increased inflation could be an additional reason for the lower growth of household deposits in banks or even for a partial outflow of household deposits from banks in the future. Combined with low or even negative interest rates on household deposits, inflation reduces the real profitability of deposits and may motivate households

Table 3 The results of the variance analysis

	Model	Sum of squares	Df	Mean square	F	Sig.
1	Regression	36014739.25	1	36014739.25	55.093	<0.001[b]
	Residual	8498180.645	13	653706.203		
	Total	44512919.89	14			
2	Regression	41747947.77	2	20873973.88	90.593	<0.001[c]
	Residual	2764972.123	12	230414.344		
	Total	44512919.89	14			

Notes: "b" includes predictors: (Constant), EONIA; "c" includes predictors: (Constant), EONIA, Bitcoin

Source: Authors

Table 4 The correlation metrics

Model	R	R square	Adjusted R square	Std. error of the Estimate
1	0.899[a]	0.809	0.794	808.5209975
2	0.968[b]	0.938	0.928	480.0149410

Notes: "a" includes predictors: (Constant), EONIA; "b" includes predictors: (Constant), EONIA, Bitcoin
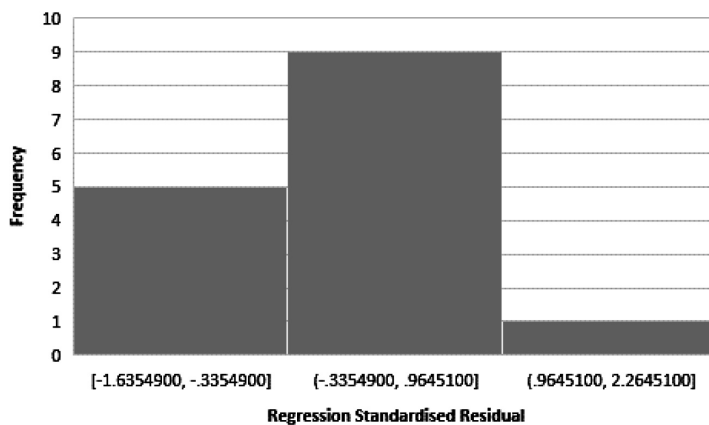
Source: Authors

Figure 2 The histogram of the standardized residuals with the adjusted normal distribution

Source: Authors

with bigger savings to redirect the savings to more profitable alternative investments. Nevertheless, the Bank of Slovenia believes that, given the traditionally prudent behavior of Slovenian savers, the likelihood of a sudden major withdrawal of household deposits due to inflationary pressures is currently low.

CONCLUSION

This paper investigates how the occurrence/outbreak and presence of COVID-19 has changed the volume of household savings in banks in Slovenia and which macroeconomic variables affect the volume of household deposits in banks in Slovenia. Two hypotheses are derived from the research question. The research results confirm the hypothesis H1, i.e. that the volume of household savings in banks in Slovenia increased during the COVID-19 pandemic. On the other hand, the econometric model developed within the framework of this research study shows that the volume of the deposits held by households in banks in Slovenia is statistically significantly influenced by only two macroeconomic variables, namely by EONIA and the price of one Bitcoin. Consequently, the research results only partly confirm the hypothesis H2. The volume of the deposits held by households in banks in Slovenia is

thus not affected by the economic activity, but it is rather affected by return on bank deposits, which determines the attractiveness of bank deposits as a form of investment, and the price of one Bitcoin as an alternative form of investment.

The econometric model developed in this paper has some limitations as well. The first limitation arises from the fact that 78% of all household deposits in Slovenian banks are sight deposits. Therefore, this econometric model only shows those macroeconomic variables that affect the volume of household sight deposits, but not time deposits. If this research wanted to find out which macroeconomic variables determine the volume of household time deposits in banks in Slovenia, then this research study would have to develop yet another econometric model. The importance of this econometric model, which explains the movement of household time deposits in banks in Slovenia, will increase when interest rates on time deposits begin to rise, at which point time deposits will become a more attractive investment opportunity for households in Slovenia. This is also an opportunity to further explore how the COVID-19 pandemic has affected households saving in time deposits.

Of course, the length of the time interval defined at the beginning of the research study as the

observation period is another limitation of the econometric model. This observation period spans up to December 2021, the last month with the available data before this research started. Of course, the economic consequences of the COVID-19 pandemic by December 2021 have not yet been fully revealed. For a comprehensive analysis of the impact of the COVID-19 pandemic on household deposits in banks in Slovenia, this research should take into consideration the entire period since the outbreak of the COVID-19 pandemic, i.e. the period from March 2020 up to the time when the economic consequences of the COVID-19 pandemic fully emerge, which is also an opportunity for further research in the future.

REFERENCES

Bank of Slovenia (2021, October). *Report on financial stability*. Ljubljana, SI: Bank of Slovenia.

Bank of Slovenia (2022, May). *Report on financial stability*. Ljubljana, SI: Bank of Slovenia.

Bank of Slovenia (2022a, March). *Monthly Bulletin*. Ljubljana, SI: Bank of Slovenia.

Bank of Slovenia. (2020). *Assessment of systemic risks and resilience of the financial sector in the face of the COVID-19 epidemic*. Ljubljana, SI: Bank of Slovenia.

Boungou, W. (2022). "Negative-for-long" interest rates and customer deposit rate. *Finance Research Letters*, *46*, 102298. doi:10.1016/j.frl.2021.102298

Brandao-Marques, L., Casiraghi, M., Gelos, G., Kamber, G., & Meeks, R. (2021). Negative interest rates: Taking stock of the experience so far. *IMF Departmental Paper No. 2021*(3). Washington, DC: International Monetary Fund.

Callen, T., & Thimann, C. (1997). Empirical determinants of household saving: Evidence from OECD countries. *IMF Working Paper WP/97/181*. Washington, DC: International Monetary Fund.

Denizer, C., & Wolf, H. C. (2000). The saving collapse during the transition in Eastern Europe. *World Bank Economic Review*, *14*(3), 445-455. doi:10.1093/wber/14.3.445

Deutsche Bundesbank (2019). *The performance of German credit institutions in 2018*. Retrieved February 20, 2023, from: https://www.bundesbank.de/resource/blob/810788/f881d08c14b318f0af0f05fd9fa8f933/mL/2019-09-ertragslage-data.pdf

Di Virgilio, D. (2022). Stability of deposits in different interest rate regimes. *Working paper No. 2(2022)*. Ljubljana, SI: Bank of Slovenia.

Dolenc, P., Ahtik, M., Lavrič, M., Poljšak, B., Požlep, M., Remšak, F., Sokolovska, I., & Volčjak, R. (2021). Current challenges and the future development of the Slovenian banking system. *Bančni vestnik*, *70*(11), 41-49.

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research*, *117*, 284-289. doi:10.1016/j.jbusres.2020.06.008

Dossche, M., & Zlatanos, S. (2020). COVID-19 and the increase in household savings: precautionary or forced? *ECB Economic Bulletin*, *20*(6), 65-73.

Dossche, M., Krustev, G., Zlatanos, S. (2021). COVID-19 and the increase in household savings: an update. *ECB Economic Bulletin*, *21*(5), 48-54.

Eisenschmidt, J., & Smets, F. (2019). Negative interest rates: Lessons from the Euro Area. In: A. Aguirre, M. Brunnermeier, & D. Saravia (Eds.), *Monetary Policy and Financial Stability: Transmission Mechanisms and Policy Implications* (pp. 13-42). Santiago, CL: Central Bank of Chile.

Fisher, I. (1907). *The Rate of Interest*. New York, NY: The Macmillan Company.

Grbic, M. (2016). Interaction between financial intermediation efficiency and economic growth. *Economic Horizons*, *18*(3), 241-254. doi:10.5937/ekonhor1603247G

Heim, J. J. (2017). The savings functions. In: J. J. Heim (Ed.), *An Econometric Model of the US Economy*. New York, NY: Palgrave Macmillan. doi:10.1007/978-3-319-50681-4_13

Jankovic, N. (2015). A twin deficit - the issue of the Serbian economy. *Economic Horizons*, *17*(2), 107-122. doi:10.5937/ekonhor1502109J

Keynes, J. M. (with Krugman, P.). (2007). *The General Theory of Employment, Interest and Money*. Hampshire, UK: Palgrave Macmillan. (Original work published 1936).

Košmelj, B. (1983). *Uvod v multivariatno analizo*. Ljubljana, SI: Faculty of Economics.

McKinnon, R. (1973). *Money and Capital in Economic Development*. Washington, DC: The Brookings Institution Press.

Ricardo, D. (2015). *On the Principles of Political Economy and Taxation*. Cambdrige, UK: Cambridge University Press. doi:10.1017/CBO9781107589421 (Original work published 1817)

Rocher, S., & Stierle, M. H. (2015). Household saving rates in the EU: Why do they differ so much? *European Commission Discussion Paper 005*. Luxembourg, LU: Publications Office of the European Union.

Shaw, E. (1973). *Financial Deepening in Economic Development*. New York, NY: Oxford University Press.

Smith, A. (1994). *An Inquiry into the Nature and Causes of the Wealth of Nations* (E. Cannan, Ed.). New York, NY: Modern Library. (Original work published 1776).

Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics, 70*(1), 65-94. doi:10.2307/1884513

Statistical Office of the Republic of Slovenia (SORS). (2023). *SiStat Database.* Ljubljana, Slovenia: Statistical Office of the Republic of Slovenia.

Swan, T. (1956). Economic growth and capital accumulation. *Economic Record, 32*(2), 334-361. doi:10.1111/j.1475-4932.1956.tb00434.x

Todorović, V., Jakšić, M., & Tomić, N. (2017). Bank regulations in modern financial environment. *Facta Universitatis, Series: Economics and Organization, 14*(3), 217-230. doi:10.22190/FUEO1703217T

Torkar, G. (2022). Načrti financiranja bank za prihodnja tri leta v luči izkušnje pandemije COVIDA-19. *Bančni vestnik, 71*(1-2), 26-31.

Malči Grivec is an assistant professor at the University of Novo mesto, Faculty of Economics and Informatics, the Republic of Slovenia. Her research interests include accounting, corporate finance, entrepreneurship, business ethics, marketing communication and macroeconomics.

Srečko Devjak is an assistant professor at the MLC, Management and Law College Ljubljana, the Republic of Slovenia. He holds a PhD from quantitative finance. Key area of his scientific research is treasury risk management in banking.

UTICAJ PANDEMIJE COVID-19 NA OBIM DEPOZITA DOMAĆINSTAVA: SLUČAJ REPUBLIKE SLOVENIJE

Malči Grivec[1] i Srečko Devjak[2]

[1]*University of Novo mesto, Faculty of Economics and Informatics, Novo mesto, Slovenia*
[2]*MLC Management and Law College, Ljubljana, Slovenia*

U radu se ispituje uticaj pandemije COVID-19 na štednju slovenačkih domaćinstava u bankama. U tu svrhu, razvijen je ekonometrijski model i identifikovane makroekonomske varijable koje ispoljavaju statistički značajan uticaj na depozite domaćinstava. Istraživanje je pokazalo da, među razmatranim makroekonomskim varijablama, samo dve imaju statistički značajan uticaj. To su referentna kamatna stopa EONIA, koja je korišćena kao aproksimacija za stopu prinosa, i cena Bitcoin-a, kao pokazatelj prinosa na alternativne oblike investiranja. Rezultati ovog istraživanja su važni kako za centralnu vladu Slovenije, tako i za slovenačke banke, budući da su depoziti domaćinstava izvor finansiranja banaka u uslovima krize. Takođe, važni su i zbog činjenice da obim odobrenih zajmova ubrzava rast BDP-a kao dokaz uspešne implementacije ekonomske politike.

Ključne reči: bankarstvo, depoziti domaćinstava, EONIA, Bitcoin, indeks slovenačke berze, COVID-19

JEL Classification: E21, G21, G52, D14