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The Macroeconomic Drivers for Household Deposits Growth in the Eurozone

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Abstract

We analyzed the potential impact of macroeconomic indicators on deposit growth rate in the Eurozone area during January 2003-June 2019. We used OLS methodology (Ordinary Least Squares). We run specific tests for multicollinearity and stationarity and we added robust standard errors to correct heteroskedasticity for our panel data. The macroeconomic variables used in our analysis are: GDP annual growth rate, Inflation rate, Harmonized unemployment rate, Interest deposit rate, with agreed maturity lower than a year and also Interest deposit rate, with agreed maturity greater than a year, short-term debt securities, long-term debt securities and listed shares. Besides the unemployment rate, all the other variables have a positive impact on the household deposits growth rate.

Key words

Households deposits growth rate, Macroeconomic variables, Eurozone

JEL Codes: C23, D14, G21

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1. Introduction

Regarding to the euro area households in 2019 the officials of the International Monetary Fund state that they retain 40% of their financial assets as bank deposits (Lagarde, 2019). Household financial behavior has been studied in relation to different factors – interest rates, economic cycles, trust in banking system, level of financial literacy, financial innovation, cultural factors, distribution of income, retirement age, life expectancy etc. Household savings are a developmental tool that helps reduce their exposure to economic shocks, can contribute to risk management, reduce poverty and improve their quality of life. Various saving opportunities can be accessed by households and usually a saving portfolio could consist of currency, deposits, listed shares and other capital market instruments, claims on insurance, pension and guarantee schemes, investment fund shares, debt securities etc. According to Eurostat statistics, published in 22.02.2018 (Eurostat, 2018), household financial assets are now higher than before the financial crisis. Household financial assets decreased from 213% of GDP in 2006 to 182% in 2008, before a recovery to 205% in 2009, and a subsequent steady increase to reach almost 230% of GDP in 2016. In other words, financial assets of households in the EU were slightly higher in GDP terms in 2016 than before the crisis.

Traditionally speaking, the risk aversion of households sways them towards financial investments that are not well diversified, showing a tendency towards classic savings instruments, such as bank deposits. Due to the decrease of the means to finance banking businesses through sources of funding from parent banks, interbank loans and investments or capital market loans, the banks realized the importance of household deposits. The banks are increasingly more aware of the necessity to develop new banking services in order to attract household deposits. Influencing the saving behavior of the households is not an easy task for banks and banking companies report an increasing need towards the household deposits, but the potential benefits of attracting stable financing sources make them worth pursuing. Concepts such as “war for deposits” have been present in the banking specialized literature which shows a competition between banks to attract deposits, including household deposits and they have to face numerous challenges from the battle on interest rates to innovative service packets in order to lure customers. Before the beginning of the financial crisis, the behavior of a few important Belgian banks was studied in the timeframe 1993-2002 by some authors (De Graeve *et al.*, 2007), that came to the finding that the deposit prices of well capitalized and highly liquid banks are least responsive to changing market conditions. Otherwise, the immobility of the interest rate for bank deposits in correlation with the changes in the money market have been underlined for the Portuguese banking system between 1990 and 2002 (Antao, 2009). Evolving after having faced the financial crisis, the banks developed increasingly complex methods of attracting customers, but, unfortunately, low or even negative interest rates on bank deposits are discouraging customers from choosing this particular saving method. New liquidity requirements from within the European Union bring additional pressure for banks to attract sources of funding for assets, in the context of the Basel 3 regulations that require banks to maintain a high-quality

refinancing base. The indicator the Net Stable Funding Ratio NSFR obliges banks to accumulate substantial amounts of retail deposits or long-term loans and bonds from the market and these two last categories are considered to be more expensive.

In previous years deposits have become a key issue for banks in the euro area, a fact presented in the European statistics, which have shown the growth of deposits. For example, a monetary study concerning the first trimester of 2019 published by the European Central Bank shows that from the perspective of the holding sectors of deposit in Monetary Aggregate M3, the annual growth rate of deposits placed by households stood at 5.7% in March 2019 (European Central Bank, 2019). The following figure shows an upward evolution of household bank deposits in the euro area from 3.31 trillion EUR to 7.60 trillion EUR between January 2000 and June 2019.

Banks balance sheet - Deposits

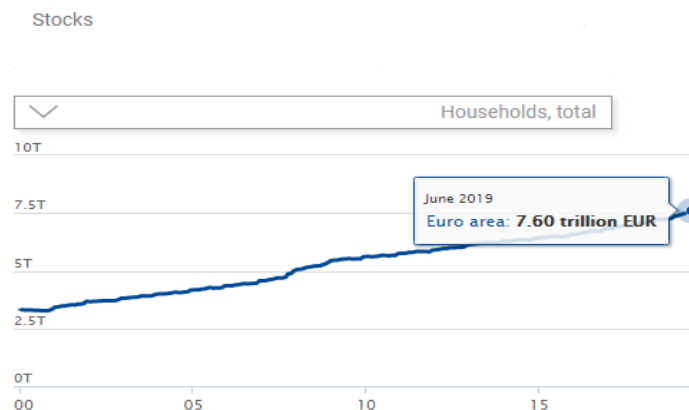


Figure 1. Evolution of household bank deposits in the euro area, January 2000- June 2019

Source: <https://www.euro-area-statistics.org/banks-balance-sheet-deposits?cr=eur&lg=en&page=0&template=1>

2. Literature review

The question “If banking household deposits are dependent on certain economic variables?” has already been analyzed in the specialized literature and various studies have been published. Bank deposits are considered a major issue for the banking system, taking into account that the shortage of deposits has become a major reason for banks’ declining loan supply and ultimately is responsible for a substantial part of the investment weakness and GDP decline in affected European countries (Wahrenburg and Kaffenberger, 2015). The authors plead for the creating of a truly integrated European market for retail deposits.

In the Eurozone, specific academic papers explore for several countries the relationship between household bank deposits and different influencing factors, but we find a literature gap regarding the unified studies across the entire Eurozone. Household bank deposits in Slovakia applying quarterly data Q2 1998 - Q1 2015 have been analyzed using the ADRL methodology and the results argue that the real interest rate, elderly dependency ratio, inflation and gross disposable income boost up deposits, while income growth reduces household deposits (Pitonakova, 2016). 13 monetary union member states (Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Italy, Luxembourg, Malta, the Netherlands, Portugal, and Spain) have been studied from the viewpoint of high value deposits, using a logistic regression model (Kochaniak, 2016a). The findings show that the occurrence of large deposits is determined by the relation of certain factors to a household’s wealth and socio-demographic characteristics. The same author studied 12 monetary union member countries (Austria, Belgium, Cyprus, Germany, Greece, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, Slovakia and Spain) in the years 2009-2015 (Kochaniak, 2016b) regarding the interest rate impact on household saving motives and household deposit levels during the current turmoil. For the Slovak banking sector for the period 2006-2017 the investigation of the interest rate developments for household deposits and their influencing factors was conducted through linear regression analysis by Gavurova *et al.* (2019), who found that the development and value of the interest rate on deposits from households may be affected by various factors, in particular determinants such as supply and demand for money, central bank monetary policy, interbank interest rates, bank performance, economic performance, inflation and exchange rate developments as well as competitors interest rates, concentrations in deposit market, loans received from clients, or capitalisation. Some authors studied the major banks in the United Kingdom in order to find information about the household deposit funding (Chiu and Hill, 2018). The authors estimated a panel of Bayesian vector autoregression models

on a unique data set compiled by the Bank of England, and identify deposit demand and supply shocks, both to individual banks and in aggregate, using micro founded sign restrictions. Based on the impulse responses, they estimate by which margin banks would be required to increase their deposit rates to cover a deposit gap caused by funding shocks. A large set of confidential data from 2262 German banks over the period from 2003 and 2015 was analyzed regarding the determinants of bank-level deposit volatility (Streit *et al.*, 2016).

Indicators of bank ownership (Foreign banks, State banks) and the financial infrastructure (Deposit insurance, POS terminals, Credit information, Creditor rights) have been taken into account when studying the relationship with the share of households with bank accounts for 29 transition economies (Beck and Brown, 2011). Studies on bank deposit of households have also analyzed the situation in EU countries that are outside of the euro area. For example, the deposits made with active banks in Romania by the householders of the population have been studied through Vector Autoregression Model VAR between January 2007 and December 2012 in correlation with some variables: the interest rate on the deposits set up in banks by householders, the consumer price index, the unemployment rate and the monthly net wages in the economy (Danuletiu *et al.*, 2014). The results suggest that the interest rate is the variable that has the biggest influence on the evolution of deposits. Also, the households saving behavior in Romania was studied with multiple regression from January 2011 to March 2016 in correlation with four variables: consumer price indices, monthly net average earning per total economy, interest rates for time deposits and deposits redeemable at notice in national currency and interest rates for time deposits and deposits redeemable at notice in euro (Babucea and Balacescu, 2016). Only the last two variables have been found to be significant for the econometric model and have influence on household deposits. The recent literature contains some studies on banking clients behavior in Romania (David, 2019) or household saving behavior referring to another countries, such as Russia (Malkina, 2019) or Japan (Latsos, 2019). The first study investigates the factors affecting the level of private deposits in banks in Russian regions and the verification of various theoretical concepts of personal savings and the author has built a set of alternative Cobb–Douglas-type regressions with fixed time effects and logistic-type regressions based on panel data of 80 Russian regions from 2014–2016. The second paper focused on the household savings behavior since 1998 and found that the monetary policy had a significant impact on Japan's household behavior via three channels: the interest rate channel, the redistribution channel, and the wealth channel.

3. Methodology of research

In the paper we analyzed the impact of macroeconomic factors on household deposits growth rate. We used monthly data for the period January 2003–June 2019 for a sample that includes Eurozone countries: “Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia and Spain” (<https://www.euro-area-statistics.org/banks-balance-sheet-deposits?cr=eur&lg=en&page=0&template=1>).

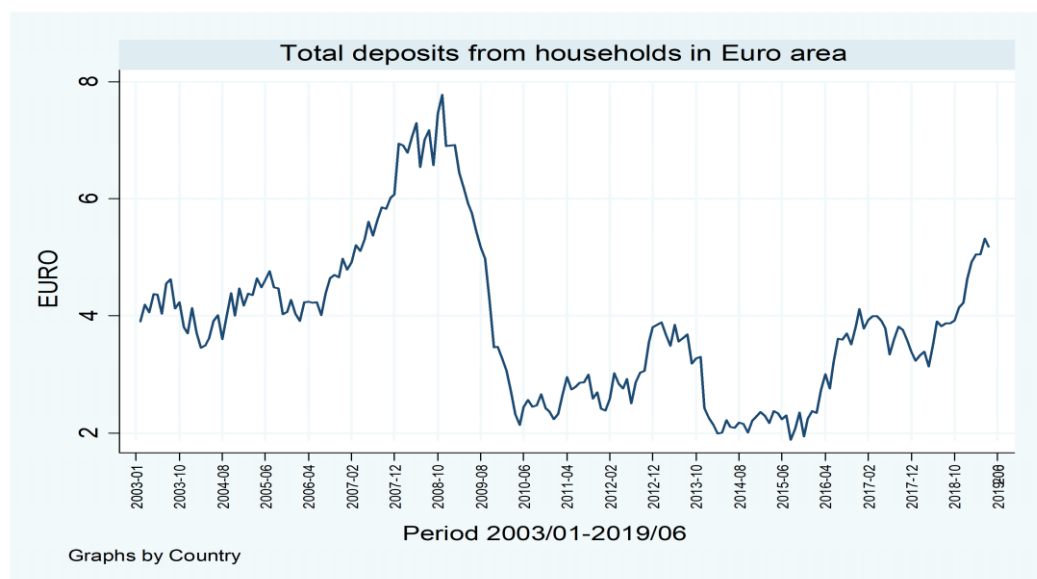


Figure 2. Households total deposits growth rate in Eurozone, in period January 2003 – June 2019, (€)

Source: Authors' own calculation

The variables used in our paper are presented in Table 1.

Table 1. Description of variables

Symbol	Description	Source
Households deposits %	"Monetary financial institution balance sheet statistics, growth rates of total deposits from euro area households (all currencies combined, all maturities, not seasonally adjusted, annual percentage changes)."	ECB site
GDP annual growth rate, %	"Gross domestic product at market prices, total economy, domestic currency (may include amounts converted to the current currency at a fixed rate), chain-linked volumes (rebased), growth rate over one year, seasonally and working day-adjusted."	Eurostat
Unemployment rate, %	"Harmonised unemployment rate (as a percentage of the civilian labour force), standardised across countries, all ages, male and female, seasonally adjusted, not working day-adjusted."	Eurostat
Inflation rate, %	"Harmonised competitiveness indicators (HCIs) based on consumer price indices (period averages; index: Q1 1999=100). The consumer price indices measure the average change over time in the prices paid by households for a specific basket of consumer goods and services."	Eurostat
Deposit, agreed maturity; $x \leq 1Y$, %	"Euro-denominated deposits with an agreed maturity of up to one year from euro area households (percentages per annum, rates on new business)."	Eurostat
Deposit, agreed maturity; $x > 1Y$, %	"Euro-denominated deposits with an agreed maturity of more than one year from euro area households (percentages per annum, rates on new business)."	Eurostat
Short-term debt securities; $x \leq 1Y$	"Total net issues of short-term debt securities (nominal value, all currencies combined, denominated in euro, issued by residents)." For this variable we calculated the growth rate from previous month.	Eurostat & authors' own calculations
Long-term debt securities; $x > 1Y$	"Total net issues of long-term debt securities (nominal value, all currencies combined, denominated in euro, issued by residents)." For this variable we calculated the growth rate from previous month.	Eurostat & authors' own calculations
Listed shares	"Total net issues of listed shares (market value, denominated in euro, issued by residents)." For this variable we calculated the growth rate from previous month.	Eurostat & authors' own calculations

Source: Authors' own calculations

After we analyzed the relevant literature we did not find studies considering the analysis of the relationship between household deposits growth rate and macroeconomic variables for Eurozone area. Therefore, we have used a sample of countries from Euro area analyzed for a period of 17 consecutive years, starting with January 2003 and until June 2019.

The first step in methodology was to remove the outliers from our data sample. We used winsorization methodology, so all the data from our sample below the 5th percentile and all the data above 95th percentile was replaced with the largest or smallest value from our sample (Bonfim and Kim, 2012). The second step was to check the stationarity of the variables with Dickey–Fuller (Fisher-ADF) test (Table 2). The null hypothesis of the test is that "all panels contain unit-roots". We used two commands for the test; the first one includes drift and one lag in all regressions and the second one includes drift and two lags in all regressions.

Table 2. Fisher-ADF unit root tests

Fisher-ADF unit root tests				
Fisher-ADF tests with drift, one lag and cross-sectional means removed				
	Inv. chi-squared	Inv.N	Inv.L	M.Inv chi-squared
Households deposit	161.9259 [0.000]	-9.2685 [0.000]	-10.2096 [0.000]	14.2153 [0.000]
GDP annual growth rate	233.2362 [0.000]	-12.1236 [0.000]	-14.8026 [0.000]	22.3951 [0.000]
Unemployment rate	81.2784 [0.000]	-4.4562 [0.000]	-4.4720 [0.000]	4.9644 [0.000]
Inflation rate	126.7308 [0.000]	-7.0631 [0.000]	-7.7125 [0.000]	10.1781 [0.000]
Interest deposit rate, $x \leq 1Y$	145.5443 [0.0000]	-8.4673 [0.0000]	-9.1387 [0.0000]	12.3362 [0.0000]
Interest deposit rate, $x > 1Y$	212.2288 [0.000]	-11.0182 [0.000]	-13.7901 [0.000]	20.7688 [0.000]
Short-term debt securities; $x \leq 1Y$	1155.0200 [0.000]	-31.6410 [0.000]	-73.4210 [0.000]	128.1310 [0.000]

Fisher-ADF unit root tests				
Fisher-ADF tests with drift, one lag and cross-sectional means removed				
	Inv. chi-squared	Inv.N	Inv.L	M.Inv chi-squared
Long-term debt securities; x >1Y	1231.8064 [0.000]	-33.3135 [0.000]	-78.3021 [0.000]	136.9390 [0.000]
Listed shares	862.8884 [0.000]	-26.8640 [0.000]	-59.8224 [0.000]	103.8610 [0.000]
Fisher-ADF tests with drift, two lags and cross-sectional means removed				
	Inv. chi-squared	Inv.N	Inv.L	M.Inv chi-squared
Households deposit	166.8940 [0.000]	-9.5612 [0.000]	-10.5394 [0.000]	14.7852 [0.000]
GDP annual growth rate	241.5807 [0.000]	-12.3838 [0.000]	-15.3340 [0.000]	23.3523 [0.000]
Unemployment rate	77.1223 [0.000]	-4.4688 [0.000]	-4.3286 [0.000]	4.4876 [0.000]
Inflation rate	119.4310 [0.000]	-6.6868 [0.000]	-7.2100 [0.000]	9.3408 [0.000]
Interest deposit rate, x ≤1Y	136.8950 [0.000]	-8.1193 [0.000]	-8.5786 [0.000]	11.3440 [0.000]
Interest deposit rate, x >1Y	169.4549 [0.003]	-9.4648 [0.000]	-10.9532 [0.000]	15.7278 [0.001]
Short-term debt securities; x ≤1Y	930.5675 [0.000]	-27.8543 [0.000]	-59.1520 [0.000]	102.3845 [0.000]
Long-term debt securities; x >1Y	997.4613 [0.000]	-29.5800 [0.000]	-63.4055 [0.000]	110.0578 [0.000]
Listed shares	594.2550 [0.000]	-21.7459 [0.000]	-42.5596 [0.000]	72.8450 [0.000]

Source: Authors' calculations

We run an OLS equation and we included robust standard errors, to remove heteroskedasticity from our panel data. Another important step was to check multicollinearity between regressors. The assumption for the multiple regression model is that independent variables are not perfectly multicollinear. If the correlation is higher than 0.5 we didn't run regressions including both correlated regressors.

Table 3. Correlation matrix for regressors

	GDP annual growth rate	Unemployment rate	Inflation rate	Interest deposit rate, x ≤1Y	Interest deposit rate, x >1Y	Short-term debt securities; x ≤1Y	Long-term debt securities; x >1Y	Listed shares
GDP annual growth rate	1							
Unemployment rate	-0.1318	1						
Inflation rate	0.0407	0.2013	1					
Interest deposit rate; x ≤1Y	-0.0815	0.0268	0.114	1				
Interest deposit rate; x >1Y	-0.2318	-0.0487	0.1079	0.8318	1			
Short-term debt securities; x ≤1Y	-0.0439	0.039	0.038	-0.0259	-0.0382	1		
Long-term debt securities; x >1Y	-0.0176	-0.0221	0.0675	0.0537	0.0606	0.0081	1	
Listed shares	-0.0092	0.0316	-0.0162	-0.043	-0.0506	0.0284	0.0262	1

Source: authors' own calculations

The impact of macroeconomic variables is examined on a monthly basis through the following model regression.

$$\text{Households deposits} = \beta_0 + \beta_1 \times \text{Macroeconomic variables}_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

Where *Households deposits*_{*i,t*} is growth rates of total deposits from euro area households for country *i* in year *t*, and *Macroeconomic variables*_{*i,t-1*} analysed for country *i* in year *t*.

4. Results

We estimate three main equations: in the first model (1) we analyzed the impact of GDP annual growth rate, Harmonized unemployment rate and Inflation Rate on Deposit Growth Rate. R-squared tell us that 30.8% from variation in the household deposits growth rate is explained by these variables, in the analyzed period. In the second model (2) we added interest deposit rate with maturity smaller than a year. Determination coefficient points that 31.5% from variation in the household deposits growth rate is explained by GDP annual growth rate, Harmonized unemployment Rate, Inflation Rate and Interest deposit rate, $x \leq 1Y$, in the analyzed period. In the third model (3) we added interest deposit rate with maturity higher than a year. R-squared tell us that 31.4% from variation in the household deposits growth rate is explained by GDP annual growth rate, Unemployment Rate, Inflation Rate and Interest deposit rate, $x > 1Y$, in the analyzed period.

Table 4. Macroeconomic determinants of Households Deposits Growth Rate

Variables	(1)	(2)	(3)
GDP annual growth rate	0.224*** (0.0275)	0.257*** (0.0286)	0.242*** (0.0288)
Unemployment rate	-0.342*** (0.0163)	-0.281*** (0.0167)	-0.314*** (0.0182)
Inflation rate	0.162*** (0.00529)	0.156*** (0.00565)	0.149*** (0.00542)
Interest deposit rate, $x \leq 1Y$		0.736*** (0.0475)	
Interest deposit rate, $x > 1Y$			0.591*** (0.0522)
Constant	-9.634*** (0.529)	-10.85*** (0.562)	-9.844*** (0.528)
Observations	3,217	2,941	2,839
R-squared	0.308	0.315	0.314

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors' own calculations

In order to check the consistency of the results the equations including different strategies have been re-estimated. We run our regressions adding other regressors and changing the period of the sample as well. The results suggest that there are - no significant gap with the main regressions for all variables analyzed. In Table 5 we added additional regressors: short-term debt securities, long-term debt securities and listed shares and in Table 6 we considered the post-crisis period.

Table 5. Robustness Tests for the period January 2003- June 2019

Variables	(1)	(2)	(3)	(4)
GDP annual growth rate	0.248*** (0.0329)	0.149*** (0.0359)	0.245*** (0.0327)	0.153*** (0.0356)
Unemployment rate	-0.255*** (0.0191)	-0.262*** (0.0225)	-0.261*** (0.0191)	-0.270*** (0.0222)
Inflation rate	0.157*** (0.0103)	0.142*** (0.0116)	0.160*** (0.00949)	0.145*** (0.0104)
Interest deposit rate, agreed maturity; $x \leq 1Y$	0.787*** (0.0571)		0.797*** (0.0551)	
Interest deposit rate agreed maturity; $x > 1Y$		0.538*** (0.0644)		0.548*** (0.0635)
Short-term debt securities; $x \leq 1Y$	0.000584* (0.000335)	0.000568 (0.000359)		
Long-term debt securities; $x > 1Y$			2.76e-05 (0.000282)	0.000277 (0.000304)
Listed shares	8.05e-05 (0.000188)	0.000122 (0.000200)	0.000119 (0.000186)	0.000162 (0.000198)
Constant	-11.15*** (0.979)	-9.328*** (1.090)	-11.45*** (0.916)	-9.561*** (0.990)
Observations	1,961	1,835	2,003	1,879
R-squared	0.316	0.186	0.326	0.205

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors' own calculations

Table 6. Robustness Tests for the period January 2009 - June 2019

Variables	(1)	(2)	(3)
GDP annual growth rate	0.0952*** (0.0301)	0.151*** (0.0363)	0.0298 (0.0351)
Unemployment rate	-0.309*** (0.0163)	-0.279*** (0.0173)	-0.282*** (0.0180)
Inflation rate	0.154*** (0.00563)	0.155*** (0.00578)	0.157*** (0.00591)
Interest deposit rate, agreed maturity; $x \leq 1Y$		0.159* (0.0843)	
Interest deposit rate agreed maturity; $x > 1Y$			0.0752 (0.0701)
Constant	-9.423*** (0.549)	-9.914*** (0.565)	-10.04*** (0.555)
Observations	2,319	2,213	2,085
R-squared	0.309	0.312	0.303

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors' own calculations

We found a positive relationship between gross domestic product and deposit growth rate Yidnekachew (2017) suggests in his PhD thesis that GDP "is the main source of banks deposit growth". Our results also suggest that if the economy is efficient, deposit growth rate will also grow. In the period 2008q3- 2009q4 and 2012 q1- 2013q2 GDP in Eurozone has recorded negative value and in the same period deposit growth period it declined. In conclusion, economic performance reflected through gross domestic product (GDP) can influence the growth of deposits.

The literature indicates that if the "quantity of money supply increases than the inflation rate will increase" (Korkamaz, 2017). When total households' deposits increase than the quantity of money in circulation will decrease and the inflation rate will decrease as well. On the other hand Haroon Khan (Khan, 2015) suggests that when "is inflation in the country due to high interest rates set by government monetary policy, private sector is not interested to take the loan, outflow of the money is on the low level, and so deposits of the banks are not affected". Our results suggest a positive relationship between these two variables.

Unemployment rate has a negative impact on the countries' performance; increasing the number of unemployed in the economy will lead to a decrease in total household deposits. The unemployed will spend the saved money, and if they have not saved, they will borrow to ensure the daily existence.

Our estimates suggest a positive relationship between deposit growth rates and deposit interest rate whatever the maturity is. If interest deposit rate with the maturity lower than a year and interest deposit rate with the maturity greater than a year increase than the household deposits growth rate will also increase. Increasing the rentability to invest in deposits will increase the total deposits.

In order to consolidate our findings, we added additional regressors: short-term debt securities, long-term debt securities and listed shares and we considered the post-crisis period for our analyzed panel. The main results obtained are maintained. Increasing the receivables such as short-term debt securities, long-term debt securities and listed shares is a result of increasing the total debt of a bank. Our findings also suggest a positive relationship between these variables and household deposits growth rate.

5. Conclusions

In our analysis we determine the impact of macroeconomic indicators on household deposit growth rate. We have used a sample that includes only Euro Countries for the period January 2003-June 2019. All the indicators used in our analysis have a positive impact on household deposit growth rate while the unemployment rate and has a negative impact on household deposit growth rate. In order to check the robustness of the results; the equations including different strategies have been re-estimated. In the robustness model we included short-term debt securities, long-term debt securities and listed shares and we considered the post crisis period. The robustness results are maintained in all estimations.

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