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LOW INTEREST RATES - DO THEY REVISE HOUSEHOLD SAVING MOTIVES IN THE EURO AREA?

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Abstract

This paper presents the impact of decreasing MFI interest rates on household deposits and saving goals in 12 Monetary Union member countries in the years 2009-2015. It analyses tendencies in household deposits (overnight, with agreed maturity and redeemable at notice), and attempts to link them with certain household saving motives (target, retirement and precautionary). The paper identifies those deposit categories which appeared as sensitive to declining interest rates and indicates the Eurozone countries whose populations are expected to revise their savings plans. Precise implications are drawn for target saving motives of households in Austria, Cyprus and Malta. However, in the case of two other motives, the analysis does not conclude on the impact of decreasing MFI interest rates.

JEL classification: G21, D14, G01
Keywords: household deposits, MFI interest rates, household saving motives

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Introduction

In recent years, the turmoil on the financial market has broadened and intensified. Finally, it spilled into the real economy and launched the period of historically lowest interest rates. Since December 2008, the monetary policy decisions of the European Central Bank (ECB) have focused on the constant decline of interest rates to achieve economic recovery in the Monetary Union (MU). However, this activity has also shaped household returns on deposits placed with monetary financial institutions (MFIs), which were the most important financial assets for the Eurozone populations. The occurrence of certain categories of household deposits (overnight, redeemable at notice and with agreed maturity) resulted from precise saving motives, such as those targeted on the possession of specified goods or services, focused on putting aside part of income for retirement and bequest purposes, or for precautionary reasons. The inability to achieve expected returns in the low interest rate environment might influence household goals, and result in negative consequences, e.g., for national economies and for funding stability of MFI sectors.

The aim of this paper is to identify the euro area member states in which the decline of interest rates in the period from January 2009 to August 2015 may result in the verification of household saving motives. The study has been conducted for 12 MU member states, which meet the criteria of data availability.

The paper answers the following questions:

1) Were the MU member states homogeneous in terms of the levels of total deposits per household and the significance of saving motives?
2) Which household deposits were characterised by an upward trend and which by a downward trend during the turmoil?
3) Were household deposits volumes affected by MFI interest rates in the euro area, in the analysed period?
4) Which saving goals could be the subject of revised household perceptions and in which countries could this phenomenon occur?

The following hypothesis is tested: *Since 2009, the sequential decline of MFI interest rates has been affecting the levels of household deposits in the Eurozone. In some member states, this impact has led to the consecutive drop in selected deposits, which might significantly revise household savings motives.*

The paper is structured as follows: related literature; description of research methods and variables applied in the study; results of empirical analysis on the impact of low MFI interest rates on household deposits, and saving motives in the MU member countries states; conclusions; acknowledgements.

Related literature

This paper refers to the literature on household saving motives, household deposits and MFI interest rates, but only part of the former research can be related to this work. This is caused by the evolving conditions of economies and financial markets, as well as by the instability of households' tastes over time (Kantona, 1951, 1957). This paper attempts to fill in the gap in the literature, presenting the relationship between household saving motives, household deposits and MFI interest rates in the Eurozone, during the progressing economic downturn of the years 2009-2015.

Theories of household savings have been developed since the 1930s and have resulted in a number of distinguished studies (Fisher, 1930; Friedman, 1957; Ando & Modigliani, 1963). Literature presents different aspects of saving, including its motives (Xiao & Noring, 1994; Alessie et al., 1997; Boeree, 1998; Johnson, 1999; Devaney et al., 2007; Bouyon, 2014), the ability and willingness of households to save (Katona, 1951; Thaler & Shefrin, 1981; Deaton, 1989), as well as determinants of saving, e.g.: socio-demographic (Xiao & Noring, 1994; Jappelli & Pagano, 1997; Boeree, 1998; Devaney & Anong, 2007), institutional (Callen & Thimann, 1997; Jappelli & Pagano, 1997; Beverly & Sherraden, 1999) and macroeconomic (Aghevli et al., 1990; Masson et al., 1995; Jappelli & Pagano, 1997; Holzhausen & Sikova, 2014). Boeree (1998) and Devaney et al. (2007) highlight the precise hierarchy of household saving purposes. The authors identify the following stages of the savings goal pyramid: physiological (basic); safety; security in future; love/societal; esteem/luxuries; self-realisation. According to them, individuals move onto higher-level purposes as lower-level ones are satisfied. However, literature shows that the motives may vary from country to country. On the basis of previous research, the primary saving motives of the Eurozone populations were identified and analysed in this study.

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Recent literature about household deposits in the euro area member states appears relatively poor. This is caused by the distinct move of the financial market during the years preceding the last financial crisis toward product innovation, which broadened household asset portfolios and drew the attention of researchers to their riskier components. However, some recent considerations on the position of deposits among other financial assets of the Eurozone populations can be found (European Central Bank, 2013; Kochaniak, 2015). Bouyon (2014) presents the impact of yields and liquidity expectations on individuals' choices of deposit type: overnight, with agreed maturity or redeemable at notice. The links are identified on the basis of ECB definitions of household deposits.

In the case of literature on interest rates in the euro area, there is an evident lack of research on MFI interest rate impact on household saving motives and household deposit levels during the current turmoil. However, it is possible to find working papers focused solely on market interest rates during the last financial crisis, e.g. Illes & Lombardi (2013).

Data and methodology

The study was conducted for twelve Eurozone member states, i.e.: Austria, Belgium, Cyprus, Germany, Greece, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, Slovakia and Spain. Their selection was due to the availability of required information. The analysis consisted of two parts, which contributed to the final conclusions and verify the hypothesis.

The first part of the study examined the relations between declared saving goals and total deposits per household in separate MU member states. It was conducted on individual quantitative and qualitative data derived from the Eurosystem Household Finance and Consumption Survey (HFCS). The study used a set of variables organised as follows:

1) *Quantitative*, describing:
   a) household deposits: sight deposits (*DST*); saving deposits (*DSV*); total deposits (*DTT*),
   b) the number of surveyed households (*NSH*),
2) *Qualitative*, describing declared saving goals, such as: purchase of own home (*SPH*); other major purchases (*SOP*), e.g. other residences, vehicles, furniture; setting up a private business or financing investments in an existing business (*SFB*); investments in financial assets (*SFA*); provisions for unexpected events (*SUE*), paying off debts (*SPD*); travels and holidays (*STH*); old-age provisions (*SOA*); education/support of children and grandchildren (*SES*); bequests (*SBQ*); taking advantage of state subsidies (*SAS*); other (*SOT*).

Total household deposits (*DTT*) comprised sight deposits (*DST*) and saving deposits (*DSV*). The first (*DST*) consisted of fully transferable overnight deposits (*ON*), and also non-transferable ones that were convertible on demand or by close of business the following day. The second (*DSV*) included the following:

1) deposits with a given maturity which may be subject to the payment of a penalty in the event of early withdrawal and some non-marketable debt instruments, such as non-transferable certificates of deposit,
2) deposits redeemable at notice where holders must respect a fixed period of notice before withdrawing funds. Withdrawals may be accepted in defined amounts during specified periods and early withdrawals are subject to penalty fees.

Information on precise saving goals introduced three generalised household saving motives, which were analysed in the study, i.e.: target – represented by eight goals (*SPH, SOP, SFB, SFA, SPD, SES, SAS, SOT*), *retirement & bequest* – signifying *SOA* and *SBQ*, and *precautionary* – recognised as *SUE*. Using the output of theoretical literature, time horizons for the motives could be defined as: short-term and medium-term for *target*; long-term for *retirement & bequest*. In the case of the last, its uncertainty did not assume a precise time span.

The analysed euro area member states became divided into sub-sets according to the attitudes of populations to deposit possession and saving motives. For this purpose, the following metrics were applied:

1) total deposits per household (*ATS*), described as:

$$ATS = \frac{\sum DTT}{NSH} \quad (1)$$

where: $\sum DTT$ = the sum of all deposits declared by the households surveyed,

NSH = the number of households surveyed,

2) the fraction of households declaring the target saving motive (H_{TM}), described as:

$$H_{TM} = \frac{NH_{(SPH;SOP;SFB;SFA;SPD;STH;SES;SAS;SOT)}}{NSH} \quad (2)$$

where: $NH_{(SPH;SOP;SFB;SFA;SPD;STH;SES;SAS;SOT)}$ = the number of households who declared one or more of the following saving goals: *SPH, SOP, SFB, SFA, SPD, STH, SES, SAS, SOT;*

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NSH = the number of households surveyed,

3) the fraction of households declaring a precise target saving goal (H_X), described as:

$$H_X = \frac{NH_X}{NSH} \quad (3)$$

where: *X* = the precise saving goal, i.e.: *SPH, SOP, SFB, SFA, SPD, STH, SES, SAS* or *SOT,*

NH_X = the number of households declaring a precise goal;
NSH = the number of households surveyed,

4) the fraction of households declaring the retirement&bequest saving motive (H_{RM}), described as:

$$H_{RM} = \frac{NH_{(SOA;SBQ)}}{NSH} \quad (4)$$

where: $NH_{(SOA;SBQ)}$ = the number of households who declared old-age provisions and/or bequests,

NSH = the number of households surveyed,

5) the fraction of households declaring the precautionary saving motive (H_{PM}), described as:

$$H_{PM} = \frac{NH_{SUE}}{NSH} \quad (5)$$

where: NH_{SUE} = the number of households who declared provisions for unexpected events,

NSH = the number of households surveyed.

The second part of the study focused on the links between aggregated levels of specified household deposits and corresponding MFI interest rates in the Eurozone in the period: January 2009 – August 2015. Quantitative data was derived from the ECB Statistical Data Warehouse and comprised the following:

1) Household deposits (*D*) in MFIs, in outstanding amounts at the end of monthly periods in the Eurozone, such as:
   a) ON deposits (*ON*),
   b) deposits redeemable at notice up to 3 months (*RU3*),
   c) deposits redeemable at notice over 3 months (*RO3*),
   d) deposits with agreed maturity up to 2 years (*AU2*),
   e) deposits with agreed maturity over 2 years (*AO2*),
2) Average interest rates on household deposits at the Eurozone level, such as:
   a) average interest rate on ON deposits (*ION*),
   b) average interest rate on deposits redeemable at notice up to 3 months (*IU3*),
   c) average interest rate on deposits redeemable at notice over 3 months (*IO3*),
   d) average interest rate on deposits with agreed maturity up to 2 years (*IU2*),
   e) average interest rate on deposits with agreed maturity over 2 years (*IO2*).

This part of the study required the recognition of the main categories of household deposits, which resulted from specified saving motives. For this purpose, the ECB definitions of household deposits focusing on their positions in monetary aggregates (M1-M3) were applied, as well as assumed time horizons for certain saving motives. The categories considered in the analysis were as follows:

1) deposits related to the target saving motive (*DTS*), which consisted of: *ON*, *AU2* and *RU3*,
2) deposits related to the retirement&bequest saving motive (*DRS*), comprised: *AO2* and *RO3*.

However, the precautionary saving motive could not be referred to certain deposit types because of its unclear time dimension.

The compliance of directions of the changes in the aggregated level of certain deposits and corresponding MFI interest rate was examined on the basis of Pearson's correlation coefficient. The same metric was used to assess the convergence of the directions of changes in different types of deposits in order to identify those that might substitute one another.

For the analysis of the dynamics of deposit levels in time, the following trend models were used (Maddala, 2014): linear (6) and exponential (7), which can be described as:

$$y_t = \alpha + \beta t + \varepsilon_t \quad (6)$$

where: y_t – the aggregated level of certain deposits in subsequent months of the period under consideration;

t – time (t = 1, 2, …, 80);

α, β – fixed parameters of the model (β – a directional factor of a straight line, which represents a constant direction of the changes in deposit level during the analysed period);

ε_t – random variable.

$$y_t = e^{\alpha+\beta t+\varepsilon_t} \quad (7)$$

where: β – constant growth rate of deposits. The increase of the time variable by one unit (1 month) was accompanied by the change in deposit level equal to, on average, $(e^{\beta} - 1) \times 100\%$;

the other symbols – as above.

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The impact of a given interest rate on the aggregated level of corresponding deposits in the Eurozone was tested on the basis of exponential, linear and power regression models (Maddala, 2014), but the best fit in the statistical sense characterised the two latter ones (8-9). Apart from the models assuming immediate impact, tested also were the models with lagged variables assuming a delay of 1 to 5 months. Finally, two models were used to prove the impact of interest rate on deposit level: linear with 4-months' delay and power with immediate impact. The proposed set of explanatory variables also comprised the time variable (denoting consecutive months), but stepwise regression did not identify it as significant. The adopted models can be described as:

$$y_t = \alpha + \beta x_{t-4} + \varepsilon_t \quad (8)$$

where:

y_t – deposit level in month *t* (t = 5, 6,..., 80);

x_{t-4} - interest rate in month *t-4*.

$$y_t = \alpha \cdot x_t^{\beta} \cdot \varepsilon_t \quad (9)$$

where: β - elasticity of explained variable in relation to explanatory variable - if X increases by 1%, an average change in Y is equal to β %, (*t = 1, 2, ..., 80*);

the rest - as above.

The estimation of structural parameters was conducted on the basis of the ordinary least squares method (*OLS*), after the logarithmic transformation of models (7) and (9) to the linear form.

Results

The first part of the study, based on individual household data from the Eurosystem HFCS, elicited an answer to the following question: Were the MU member states homogeneous in terms of the levels of total deposits per household and the significance of saving motives?

For this reason, an average level of total deposits per household (*ATS*) was estimated for each member state (Figure 1). On the basis of the lowest and highest outcomes in the group, a common boundary of EUR 32,678 was identified. It allowed for the division of the countries into the following sub-sets:

1) large sums of deposits per household (over EUR 32,678), comprised of Belgium, Germany, Luxembourg, the Netherlands and Spain,

2) small sums of deposits per household (up to EUR 32,678), comprised of Austria, Cyprus, Greece, Malta, Portugal, Slovakia and Slovenia.

Regardless of a country's affiliation to the sub-sets, the average amounts of household deposits could be devoted to household saving motives, i.e.: *target, retirement&bequest* and *precautionary*. Their significance for individual populations was the focus of further evaluations.

The *target saving motive* became linked to the deposits placed with MFIs for the short and medium term. It appeared as the most frequently declared by households across the euro area, but also as the most complex in terms of vast outgoes, and heterogeneous because of different popularity of the precise goals in the member states. In order to be able to compare the countries, the number of households involved in at least one of the precise saving goals were calculated and related to the total of households in the national samples. On that basis the importance of the target saving motive for individual populations was assessed (*HTM*). The lowest significance appeared in Spain (27.8%), while the Netherlands boasted the highest (85.2%). The central boundary was found at 56.5% and allowed for the emergence of the following subsets of countries:

1) high significance of target saving motive: Austria, Cyprus, Germany, Luxembourg, Malta, the Netherlands and Slovakia,

2) low significance of target saving motive: Belgium, Greece, Portugal, Slovenia and Spain.

It is worth noting that the first set was comprised of almost all the core member states from the group, and complemented by the peripheral and post-communist ones (Cyprus, Malta and Slovakia). The second set chiefly comprised peripheral countries experiencing severe turmoil (Greece, Portugal and Spain), including the beneficiaries of international aid programmes, as well as one core – Belgium, and one post-communist – Slovenia.

Individual populations of the Eurozone appeared heterogeneous in terms of the distribution of declared numbers of target saving goals (Figure 2). Despite the overall dominance of households focused on up to four goals, there were two countries in which households with more fragmented goals constituted a significant part of the samples surveyed: the Netherlands (26.7%) and Malta (9.6%). Moreover, Dutch households that were interested in targeted saving, indicated on average more than three specific goals, while Maltese – almost two (Figure 3).

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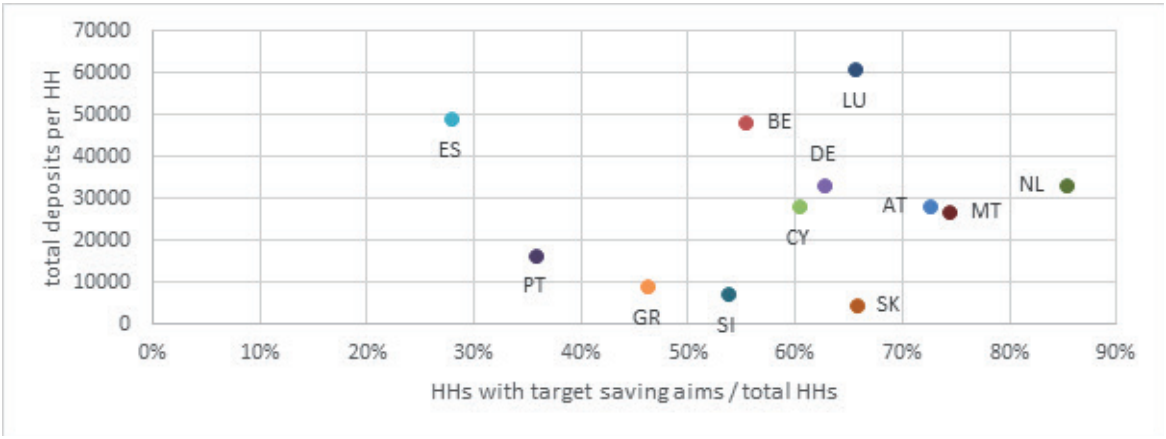
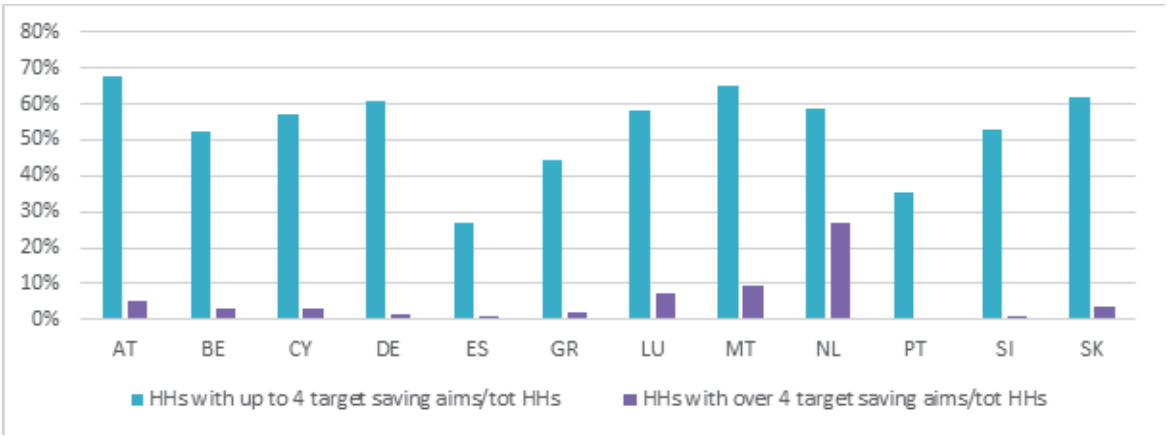
Figure 1: The position of the Eurozone countries measured by total deposit value per household (in EUR) and the significance of target saving motive (in%)



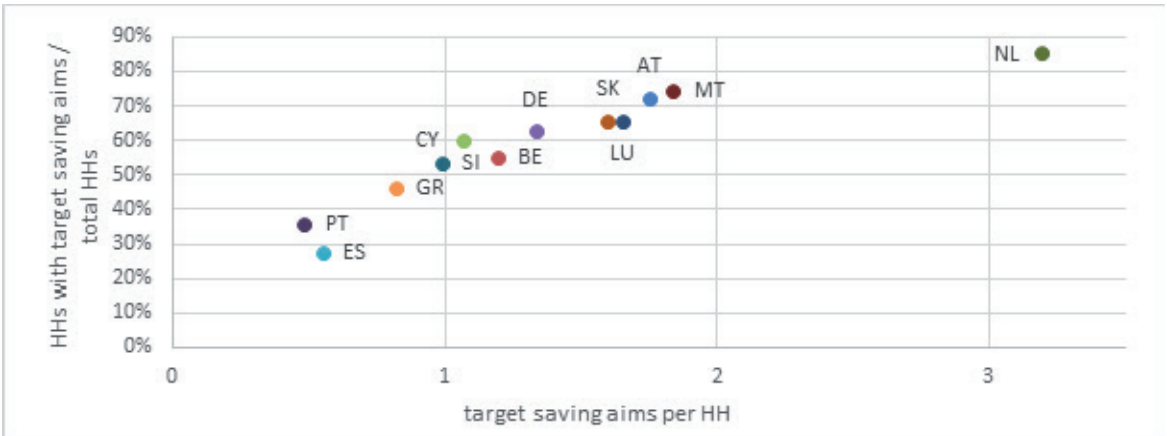
Source: Own study based on the Eurosystem HFCS data

Figure 2: The distribution of households in the samples (in %), according to the number of declared target saving goals – up to four goals and over four goals



Source: Own study based on the Eurosystem HFCS data

Figure 3: The position of the Eurozone countries, according to the number of target saving goals per household and the significance of the target saving motive (in %)



Source: Own study based on the Eurosystem HFCS data

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Apart from the above differences between countries, the MU could be perceived as an area of common (supranational) importance of declared targeted goals. All the goals confirmed by more than 10% of households from the national sample became considered as important for the population (Table 1). On this basis, saving for travel and vacations appeared to be the most popular in all analysed member countries. Households identified with this target constituted from 13.7% (in Slovenia) to 67.7% (in the Netherlands) of national samples. The lower significance of this goal could be observed only in Portugal. The second most popular targeted goal in the euro area was to educate and support children and grandchildren. The percentage shares were double-digits in the entire group, ranging from 11.3% (in Spain) to 48.9% (in the Netherlands). The third goal in the hierarchy was titled "other major purchases", which included the acquisition of: real assets (other than main residences), vehicles, furniture, etc. This motive was significant in the Netherlands (59.1%), Austria (35.8%), Germany (34.6%), Slovenia (24.8%), Luxembourg (24.3%), Malta (21.7%), Slovakia (20.2%) and Belgium (16.4%). The fourth important goal was to pay off debts. The highest shares of households interested in this motive were found in the Netherlands (19.1%), Malta (18.1%), Cyprus (16.5%), Slovakia (12.3%), Greece (12.2%) and Luxembourg (11.1%).

Of all the analysed countries, the Netherlands stood out as having specific household saving attitudes (Table1). In this country, eight of nine specific targeted goals appeared as significant for the local population. Shares of households in the sample who declared them varied from 13.5% for the purchases of own home to 67.7% for travel and holidays, and 86.2% for the category "other". The following populations could also be indicated as having "multi-purpose saving" goals: Maltese with six goals assessed as significant, Luxembourgian with five goals, and both Belgian and Slovakian with four goals.

The *retirement&bequest saving motive* resulted in the occurrence of the longest-term deposits. It was declared in all countries, although its level of popularity differed (Figure 4). On the basis of the lowest (14.4% in Spain) and the highest (69.6% in the Netherlands) percentage share of households affirming that motive in national samples, the euro area threshold was placed at 42%, leading to the identification of the following sub-groups of countries:

1) high significance of retirement&bequest saving motive: Belgium, Luxembourg, Malta, the Netherlands, Portugal and Slovakia,

2) low significance of retirement&bequest saving motive: Austria, Cyprus, Germany, Greece, Slovenia and Spain.

Table 1: The shares (in %) of household declaring saving motives and specific saving goals in the national samples of households surveyed

SM	AT	BE	CY	DE	ES	GR	LU	MT	NL	PT	SI	SK
H_{TM}	74,9	60,9	62,0	63,2	29,0	47,2	69,4	77,6	85,2	41,5	53,9	70,2
H_{PM}	66,8	53,9	61,0	42,6	19,1	67,1	61,4	84,2	80,2	54,7	35,6	57,0
H_{RS}	36,8	39,0	25,6	38,4	11,7	30,4	36,8	43,4	66,1	41,9	36,4	37,2
H_{SPH}	9,7	9,7	5,4	6,5	1,2	6,0	15,1	13,4	13,5	0,0	6,4	9,1
H_{SOP}	35,8	16,4	8,0	34,6	7,5	6,3	24,3	21,7	59,1	2,8	24,8	20,2
H_{SFB}	2,4	1,4	3,5	0,7	2,3	1,5	3,1	3,7	4,2	1,1	1,7	3,6
H_{SFA}	3,3	2,7	4,2	1,9	6,6	2,5	4,2	10,7	18,8	1,6	0,0	2,9
H_{SPD}	9,0	3,9	16,5	3,2	2,7	12,2	11,1	18,0	19,1	7,7	5,8	12,3
H_{SOA}	36,8	39,0	25,6	38,4	11,7	30,4	36,8	43,4	66,1	41,9	36,4	37,2
H_{STH}	35,4	22,5	15,7	25,2	14,8	20,5	37,9	45,6	67,7	7,2	13,7	33,6
H_{SES}	22,3	24,6	39,5	19,2	11,0	20,2	23,7	35,7	48,9	24,1	15,2	30,3
H_{SBQ}	7,4	14,7	7,8	0,7	4,8	2,9	13,6	17,1	21,5	10,2	1,5	15,7
H_{SAS}	11,8	11,9	0,2	1,4	0,0	0,3	6,3	0,0	15,1	0,9	0,0	2,7
H_{SOT}	5,8	5,1	1,9	16,1	6,7	0,0	4,9	3,2	86,2	2,2	8,2	0,1

SM - saving motive; AT – Austria; BE – Belgium; C – Cyprus; DE – Germany; ES – Spain; GR – Greece; LU – Luxembourg; MT – Malta; NL – the Netherlands; PT – Portugal; SI – Slovenia; SK – Slovakia

Source: Own calculations derived from the Eurosystem HFCS data

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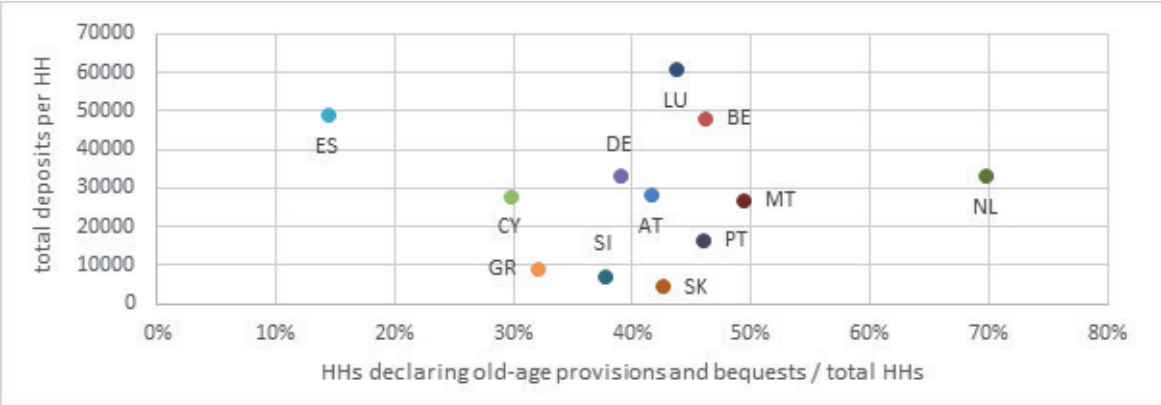
Figure 4: The position of the Eurozone countries, total deposits per household (in EUR) and the significance of the retirement &bequest saving motive (in %)



Source: Own study based on the Eurosystem HFCS data

A similar analysis was conducted for *the precautionary saving motive*. In its case, the lowest share of households declaring this motive was recognised for Spain (19.1%) and the highest for Malta (84.2%). Thus, a common threshold was adopted at the level of 51.7%. The identified sub-groups of countries with the opposite perception of that motive were as follows (Figure 5):

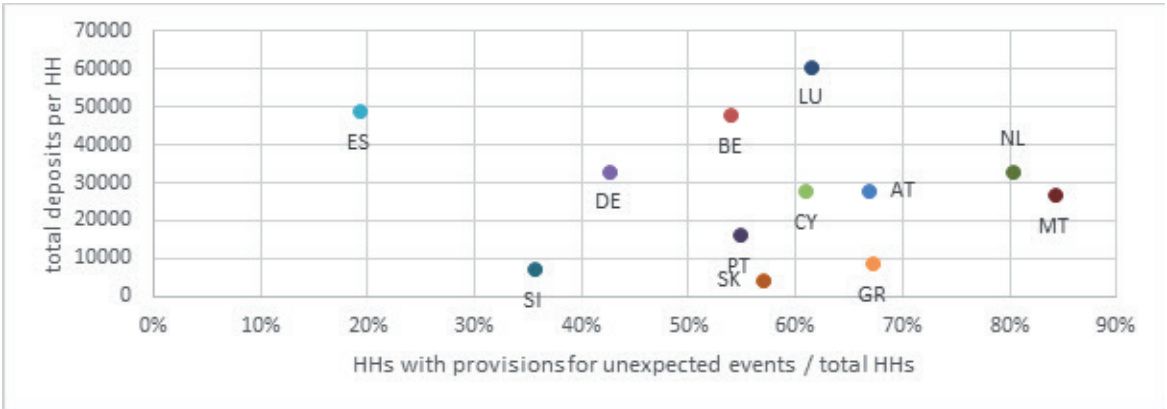
1) high significance of precautionary saving motive, comprised of: Austria, Belgium, Cyprus, Greece, Luxembourg, Malta, the Netherlands, Portugal and Slovakia,

2) low significance of precautionary saving motive, comprised of: Germany, Slovenia and Spain.

Summing up the results of the first part of the study, it can be concluded that in the analysed group of the euro area member states, some were identified, in which all three motives appeared as significant for domestic populations. These were: Luxembourg, Malta, the Netherlands and Slovakia. In the case of the Netherlands, the wide variety of saving motives was accompanied by relatively high average household deposits, while in Malta and Slovakia – by low average levels of deposits. On the other hand, a group of countries was identified, where households were not really willing to declare saving motives, such as Slovenia and Spain. However, Spanish households were characterised by high average household deposits, as opposed to Slovenia, whose deposits appeared to be quite poor.

The second part of the study was dedicated to links (at the Eurozone level) between average MFI interest rates and corresponding household deposits placed with MFIs, in the period dating from January 2009 to August 2015. Thus, it provided the answers to the following questions: Which household deposits were characterised by an upward trend and which by a downward trend during the turmoil? Were the levels of household deposits under the influence of MFI interest rates in the Eurozone during the research period?

Figure 5: The position of the Eurozone countries, total deposits per household (in EUR) and the significance of the precautionary saving motive (in %)



Source: Own study based on the Eurosystem HFCS data

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The analysis was preceded by the recognition of the main household deposit categories, which resulted from specified saving motives. These were:

1) deposits related to the target saving motive (*DTS*), which consisted of: *ON*, *AU2* and *RU3*,
2) deposits related to the retirement&bequest saving motive (*DRS*), comprising: *AO2* and *RO3*.

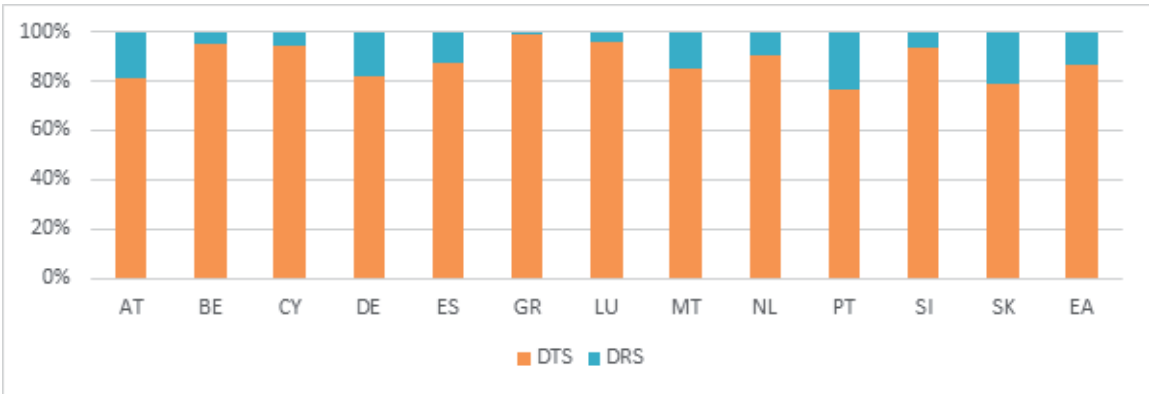
The precautionary saving motive had to be abandoned because of its unclear time horison dimension.

It should be noted that deposits with agreed maturity played a substitutive role to those redeemable at notice in euro area member states (Kochaniak, 2015). Thus, the occurrence of one of them in a certain MFI sector was accompanied by the insignificant position of the other. In practise, both deposit types were supplemented by *ON*.

Longer-term household deposits – *DRS* – appeared in the analysed group of countries as a category of minor importance for the Eurozone households in the years 2009-2015 (Figure 6). In Belgium, Cyprus, Greece, Luxembourg and Slovenia, their shares in average household deposit totals were the lowest and did not exceed 10%. Hence, household deposits in the MU, firstly, served the targeted goals, which were focused on the possession of certain products or the use of specific services, resulting in the dominant position of *DTS*. When developing this analysis, it was noted that *DTS* and *DRS* were characterised by specific structures in individual countries (Figures 7-8). In some member states *DTS* were comprised chiefly of *AU2* (e.g. Austria, Cyprus, Greece, Portugal and Slovenia), while in others – by *ON* (e.g. Germany, Luxembourg, Slovakia) or *RU3* (Belgium and the Netherlands). In Malta and Spain, the significance of *ON* and *AU2* was assessed as being almost equal. In the case of *DRS*, the strongest but not dominant position of *RO3* was observed only in Cyprus and Germany. The other component of *DRS* – *AO2* was identified as its main driver across the euro area.

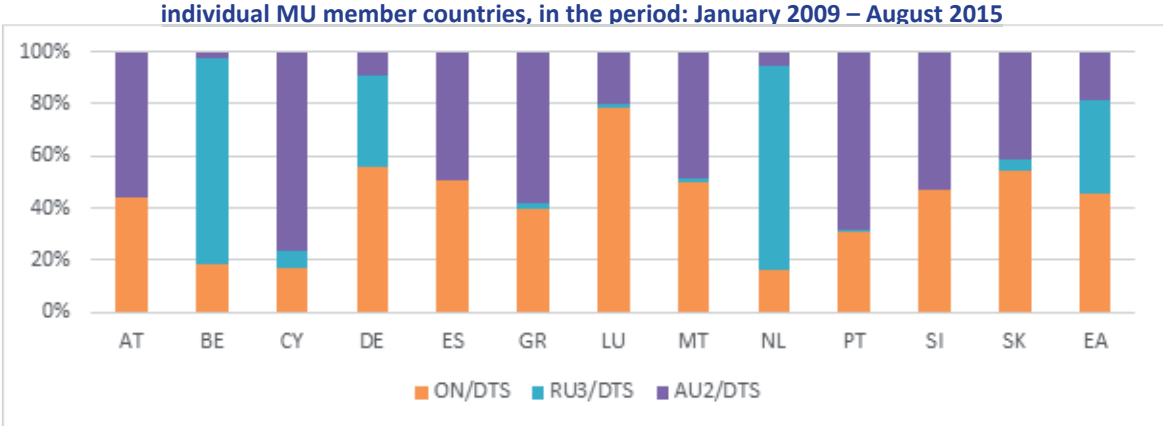
Analysing monthly levels of individual types of household deposits and their interest rates in the euro area, it was found that, in some cases, the direction of

Figure 6: The structure (in %) of average household total deposits in analysed MU member countries January 2009-August 2015



Source: Own study based on the ECB aggregated data

Figure 7: The structure (in %) of average household deposits resulting from the target saving motive (DTS) in individual MU member countries, in the period: January 2009 – August 2015



Source: Own study based on the ECB aggregated data

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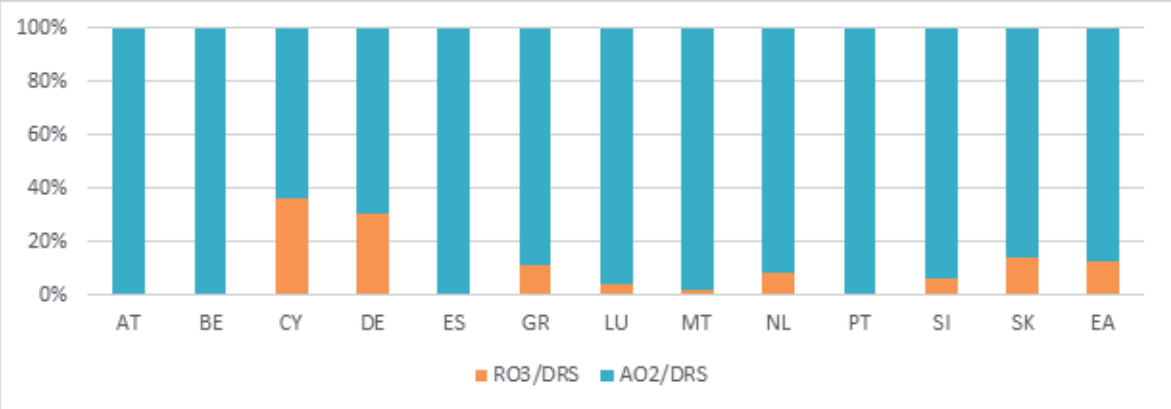
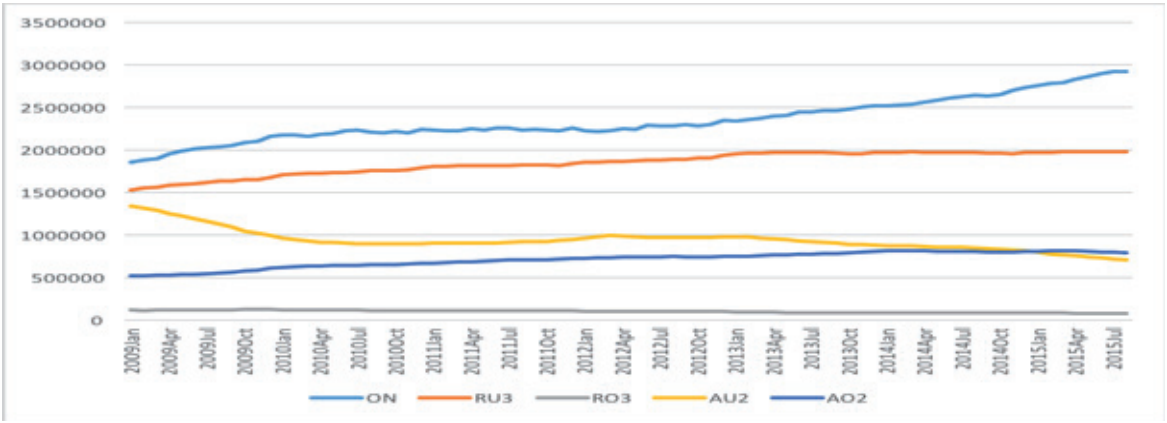
Figure 8: The structure (in %) of average household deposits resulting from the retirement &bequest saving motive (DRS) in individual MU member countries, in the period: January 2009 – August 2015



Source: Own study based on the ECB aggregated data

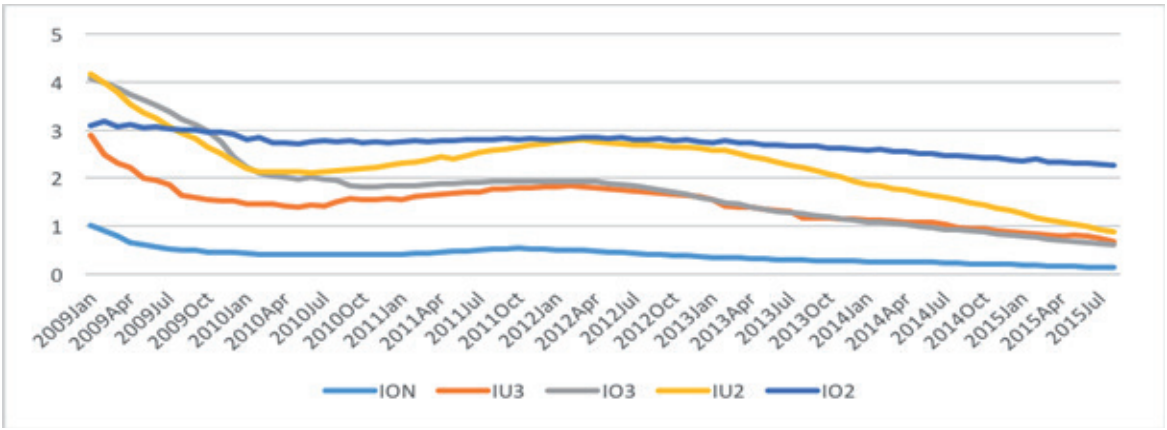
the changes was not in line (Figure 9-10). Negative, statistically significant Pearson's correlation coefficients (*r*) proved converse developments in the following combinations: *ON* and *ION* (r = -0.90), *RU3* and *IU3* (r = -0.75) as well as *AO2* and *IO2* (r = -0.84). This means that declining interest rates were accompanied by increasing levels of the above deposits. In the remaining cases, i.e. *RO3* and *IO3* (r = 0.83), as well as *AU2* and *IU2* (r = 0.93), consistent trends were observed. Thus, *RO3* and *AU2* were the only types in which the scarcer occurrence could have resulted from a low interest rate background. However, household preferences for different types of

Figure 9: Household deposits in the Eurozone (in EUR mil), January 2009-August 2015



Source: own study based on the ECB aggregated data

Figure 10: Eurozone interest rates (in %) on selected types of household deposits in MFIs January 2009-August 2015



Source: Own study based on the ECB aggregated data

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deposits may be affected by factors other than interest rates, e.g.: (I) decreasing confidence in the MFI sector and financial market, deteriorating economic condition of the given country, leading to overall deposit withdrawals or deposit transfers from longer-term accounts to *ON* deposit accounts; (II) increasing confidence in the MFI sector and financial market, which lead to the greater importance of specified longer-term deposits. Such incidents were suggested by Pearson's correlation coefficients for specific pairs of deposits. Negative coefficients were obtained for the following types: *ON* and *RO3* (r = -0.90); *ON* and *AU2* (r = -0.85); *RU3* and *RO3* (r = -0.90); *AU2* and *AO2* (r = -0.80).

For the aggregated deposit categories (*DTS* and *DRS*), which became linked with certain household saving motives, general tendencies in their levels were estimated in the analysed period. Linear and exponential trend models (6-7) were characterised by high quality results demonstrated by R-squared, F-statistics, and S.E. of regression. The models confirmed a slight upward trend of *DTS* and *DRS* in the euro area (Table 2-3). The aggregated level of deposits identified with the target saving motive have been increasing on average by 0.23% per month, which constituted EUR 11,611,000,000 in total values. In the case of deposits related to the retirement&bequest saving motive, the average monthly increase of 0.39% appeared as more intense, and was equal to EUR 3,064,700,000.

However, not all *DTR* and *DRS* components were responsible for their upward trends. For this reason, trend analyses were conducted for individual types of deposits. In *DTS*, deposits with agreed maturity of up to 2 years were indicated as the only ones, which have been decreasing in the Eurozone during the analysed period. The exponential trend model estimated its average decline as 0.43% per month, which in absolute values (linear trend model) was equal to EUR 4,120,000,000. This trend was explained in 61% by the exponential model and in 58% by the latter one. The remaining deposit types appeared as the drivers of *DTR* augmentation, but the major influence was attributed to *ON* which, according to the results from the exponential model, have been increasing monthly on average by 0.44% (R-squared = 0.92). The linear model estimated this average increase at EUR 10,360,000,000 per month (R-squared = 0.91). In the case of *DRS*, its upward trend was positively influenced by *AO2*. This deposit type was characterised by an average monthly increase equal to 0.54% (R-squared = 0.89) or EUR 3,670,300,000 (R-squared = 0.92). However, the second component – *RO3* has had negative impact on *DRS*. That deposit type has been experiencing an average monthly drop of 0.61% (R-squared = 0.93) or EUR 605,700,000 (R-squared = 0.93). From this point, the analysis became

Table 2: Parameters of exponential trend models for DTS and DRS in the Eurozone, January 2009-August 2015

Deposits		B	Std. error	t - Statistic	p-value
DTS	Constant	15.35854	0.00162	9507.618	0.00000
	t	0.00226	0.00004	65.134	0.00000
	R-squared=0.98; F(1,78)=4242.5; p<0.0000; S.E. of regression=0.00716				
DRS	Constant	13.44691	0.00888	1523.424	0.00000
	t	0.00390	0.00019	20.621	0.00000
	R-squared=0.84; F(1,78)=425.22; p<0.0000; S.E. of regression=0.03910				

Source: Own calculations based on the ECB aggregated data

Table 3: Parameters of linear trend models for DTS and DRS in the Eurozone, January 2009-August 2015

Deposits		B	Std. error	t - Statistic	p-value
DTS	Constant	4663774.01	8846.88	527.121	0.00000
	t	11611.00	189.76	61.189	0.00000
	R-squared=0.98; F(1,78)=3744.1; p<0.0000; S.E. of regression=39194.0				
DRS	Constant	689843.71	6208.03	11.121	0.00000
	t	3064.70	133.16	23.015	0.00000
	R-squared=0.87; F(1,78)=529.68; p<0.0000; S.E. of regression=27503.01				

Source: Own calculations based on the ECB aggregated data

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concentrated only on the decreasing components of the key deposit categories – *AU2* and *RO3*.

The impact of interest rates on the levels of *AU2* and *RO3* was assessed on the basis of linear and power regression models (8-9). For *AU2*, the highest Pearson's correlation coefficient (r = 0.99) was identified with *IU2* with 4 months' delay. Thus, the linear regression model with that lagged explanatory variable gave the best results (Table 4) in the statistical sense (R-squared, F-statistics, S.E. of regression).

In the case of *RO3*, the highest Pearson's correlation coefficient (r=0.91) was obtained with free from delay *IO3*. From all tested regression models, the best results were derived from that power, in which the explained variable took on the form of a natural logarithm of *RO3* and explanatory variable – of a natural logarithm of *IO3* (Table 5).

The quality of the above outcomes enabled confirming the statistically significant impact of lowering interest rates (*IU2* and *IO3*) on aggregated levels of *AU2* and *RO3*, leading to their decrease in the euro area. In the case of *AU2*, its important position in total household deposits was identified in the following countries: Austria, Cyprus, Greece, Malta, Portugal, Slovenia and Spain. The latter was assessed as significant in Cyprus and Germany.

Conclusion

The results of both parts of the study provided an answer to the final, fundamental question: Which saving goals could be the subject of revised household perceptions and in which countries could this phenomenon occur?

The first part identified the populations who were most engaged in the target saving motive (i.e. Austrian, Cypriot, Dutch, German, Luxembourgian, Maltese and Slovakian), as well as populations involved in the retirement&bequest saving motive (i.e. Belgian, Dutch, Luxembourgian, Maltese, Portuguese and Slovakian). In the second part of the study, these two motives became linked with certain deposit categories (*DTS* and *DRS*). In spite of the overall upward trend of both of them, their specified components – *AU2* and *RO3* – were characterised by the opposite tendency. Moreover, they constituted an important part of household deposits (*DTS* and *DRS*) in selected Eurozone member states (*AU2* in Austria, Cyprus, Spain, Greece, Malta, Portugal and Slovenia; RO3 in Cyprus and Germany). The outcomes from the regression models led to the conclusion that decreasing MFI interest rates have statistically significantly shrunk deposit levels. In *AU2*, this influence emerged with 4-months' delay, while in *RO3* – immediately.

A low interest rate background did not appear as the common factor revising household interest in target saving motive across the Eurozone in the same manner. Combining the results of both parts of the study, it can be concluded that in Austrian, Cypriot and Maltese populations, the target saving motive has played an important role, and deposits with maturity up to two years (*AU2*) constituted an important part of deposits serving this purpose (*DTS*). Thus, those were the only Eurozone countries where decreasing *IU2* has been significantly affecting AU2 and might lead to the revision of household plans concerning purchase of various types of goods and services. In the case of the Austrian population, the most profound changes might occur in the planned acquisitions

Table 4: Linear regression model results for *AU2* in the Eurozone, January 2009-August 2015

	B	Std. error	t - Statistic	p-value
Constant	560511.00	7284.59	76.941	0.00000
$IU2_{t-4}$	152893.71	3044.92	50.210	0.00000
R-squared=0.97; F(1,73)=2521.31; p<0.0000; S.E. of regression=15161.00				

Source: Own calculations based on the ECB aggregated data

Table 5: Power regression model results for ln *RO3* in the Eurozone: January 2009-August 2015

	B	Std. error	t - Statistic	p-value
Constant	11.37935	0.00946	1203.005	0.00000
ln IO3	0.28529	0.01432	19.922	0.00000
R-squared=0.84; F(1,78)=396.90; p<0.0000; S.E. of regression=0.06016				

Source: Own calculations based on the ECB aggregated data

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of: real assets other than own home, such as: real estate, vehicles or furniture; travel and vacations; education and support of children and grandchildren; advantages from state subsidies. Cypriot households were expected to revise their intentions concerning: travels and vacations; education and support of children and grandchildren. In Malta, the most serious changes might appear in plans concerning the acquisition of own homes; other major purchases; investments in financial assets; paying off debts; travel and holidays; education and support of children and grandchildren. For the other member states, such findings were not observed. It should also be noted that the levels of total deposits per Austrian, Cypriot and Maltese household were recognised as relatively low in the analysed group. Moreover, recalling Boeree's (1998) and Devaney et al.'s (2007) hierarchy of household saving motives, the sensitive goals related to its various stages, such as: safety needs (acquisition of own home; advantages from state subsidies; paying off debts; investments in financial assets); love and social needs (education and support of children and grandchildren); self-esteem and luxury needs (purchases of real assets other than own home; travel and vacations). Thus, the long-term decrease in deposit interest rates could hit various households' plans, but only in selected member states of the euro area.

In the case of the retirement &bequest saving motive, the results do not indicate the countries in which significant changes in household attitudes might actually occur. In spite of the sensitivity of *RO3* to decreasing *IO3*, the significant position of those deposits in individual member states was not accompanied by households' strong declaration of their focus on this saving motive. To conclude, the results acquired from the study proved the hypothesis.

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