



A Review of Policy Options for Monitoring Household Saving

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Abstract

Proper understanding and monitoring of household saving are necessary to conduct appropriate macroeconomic policies aiming at a balanced economic recovery in the EU-15. The process of monitoring household saving is twofold: on the one hand, it concerns the liquidity level of the household savings portfolio (*liquidity approach*); and on the other hand, it places emphasis on the saving rates of households (*saving rates approach*). Within the *liquidity approach*, in theory, each of the household motives (target saving, precautionary saving and pension saving) is related to specific saving products. However, inadequate financial education and low confidence in banking systems can distort the relationship of saving motives to saving products and lead to a sub-optimal savings portfolio, with poor yields and excess liquidity (especially with regards to pension saving). Nevertheless, overall, yield spreads do have an impact on the corresponding relative savings market shares, confirming the effectiveness of monetary policy transmission mechanisms into the liquidity levels of household savings portfolios.

Regarding the *saving rates approach*, data show differentiated dynamics across EU-15 countries, partly owing to specific local habits and developments in financial markets. The persistent saving ratio differentials across countries, which also mirror differentiated propensities to accumulate target saving, could be partially reduced by the design of regulations whose primary goal is to improve the overall attractiveness of mortgage and consumer credits. In addition, since 2007, consistently significant beta-convergence observed in the results of the panel data regressions indicates that the need for balance sheet repair was stronger for countries with low saving ratios in the years preceding the financial crisis. The absence of correlation between saving ratios and different types of saving yields suggests the poor transmission of monetary policies in the trade-off between private consumption and saving. Conversely, the results confirm the prominent role played by the precautionary motive during the financial crisis of 2008-09, which is reflected in the strong impact of unemployment rates and housing prices.

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Executive summary

While a significant number of the current domestic and European economic policies aim at improving the conditions for a sustainable recovery, the role that household saving should play in this respect often remains vague. Typically, the amount of household saving will affect macroeconomic variables as diverse as the household final consumption expenditure, the household demand for retail loans, the funding pattern of banks, the interest rates and exchange rates, the current account deficit of the economy and the resilience of the economy to shocks. As a result, proper understanding and monitoring of household saving are necessary to conduct appropriate macroeconomic policies aimed at balanced economic growth.

The process of monitoring household saving is twofold: on one hand, it concerns the liquidity level of the household savings portfolio (*liquidity approach*); on the other hand, it places emphasis on the saving rates of households (*saving rates approach*). The former implies the understanding of the substitution dynamics between the different saving products available on the markets; the latter aims at influencing the trade-off between private consumption and saving.

Household saving motives play a key role in the determination of the overall level of saving liquidity, since each of them is related to specific saving products: in theory, target saving should boost high-liquidity products, pension saving gives priority to low-liquidity saving and precautionary saving embraces all types of saving products. However, inadequate financial education and low confidence in banking systems can distort the relationship of saving motives to saving products and lead to a sub-optimal savings portfolio,¹ with poor yields and over-liquidity (especially with regards to pension saving). Nevertheless, overall, the correlations between yield spreads and the corresponding relative market shares are generally high and positive in the euro area and confirm the effectiveness of monetary policy transmission mechanisms into the liquidity levels of household savings portfolios.

Regarding the *saving rates approach*, data shows differentiated dynamics across EU-15 countries, partly owing to specific local habits and financial markets developments. The persistent saving ratio differentials across countries,² which also mirror differentiated propensities to accumulate target saving, could be partially reduced by the design of regulations whose primary goal is to improve the overall attractiveness of mortgage and consumer credits.

In addition, specific convergence processes and several exogenous macroeconomic factors have shaped the evolution of domestic saving ratios since 2007 and have revealed somewhat the weight of each saving motive in total saving. The consistently significant beta-convergence observed in the results of the panel data regressions indicates that the need for balance sheet repair was stronger for countries with low saving ratios in the years preceding the financial crisis. Given that convergence processes in saving ratios are likely to alleviate the differentiation in the macroeconomic conditions across the EU-15 domestic economies and to indirectly contribute to reinforcing the effectiveness of monetary policies in the euro area (by reducing the diversity in domestic macroeconomic reactions to new monetary policies), they should be encouraged within the realms of possibility.

¹ In line with other studies on saving behaviours, “saving” refers to a flow variable, whereas “savings” relates to a stock variable.

² The saving ratio is the saving of households to disposable income ratio.

The absence of correlation between saving ratios and different types of saving yields suggests the poor transmission of monetary policies in the trade-off between private consumption and saving. Conversely, the results confirm the prominent role played by the precautionary motive during the financial crisis of 2008-09, which is reflected in the strong impact of unemployment rates and housing prices. This implies that policies aimed at reducing unemployment rates and tools used to adjust housing prices are likely to affect markedly saving ratios of households, even though these policies and tools do not intend to influence saving behaviours at first. These findings confirm the necessity for regulators to remain vigilant regarding unemployment and housing prices developments, as sharp unexpected changes in these two variables are likely to affect markedly household saving ratios, resulting in significant variations in private consumption of households and GDP growth.

In conclusion, a broad policy approach, notably integrating some elements of labour and housing policies, could address some of the shortcomings of a purely yield policy approach, proving to be highly beneficial to efficient monitoring of household savings. The creation of a "Bank Saving Survey", based on the model of the "ECB Bank Lending Survey" and published on a regular basis with analyses on the determinants and liquidity levels of household saving, could be a valuable tool to strengthen the overall understanding of household saving and to assist regulators in calibrating appropriate instruments for monitoring saving ratios.

1. Introduction

Household savings³ in the euro area have accounted on average for most of the savings accumulated by the non-financial sector since 2007 (governments, households and non-financial corporations) and as such play a significant role in economic developments. For example, the total amount of household savings will impact not only on household final consumption expenditure and household demand for retail loans,⁴ but also on the funding pattern of banks, the interest rates and exchange rates, the current account deficit of the economy and the resilience of the economy to shocks. Therefore, proper understanding and monitoring of household saving are necessary to conduct appropriate macroeconomic policies aimed at balanced and robust economic growth, especially in the current context of persistent household deleveraging needs.⁵

Different approaches can be adopted to monitor macroeconomic variables. Firstly, regulators can set ex-ante a transparent target for the monitored variable and commit to the achievement of this target within a given time period (*full targeting approach*). This type of monitoring is common practice for some macroeconomic variables: for instance, central banks often publicly target monetary aggregates,⁶ inflation rates or exchange rates.⁷ However, no variables in relation to household saving have been monitored in that manner by any of the main central banks. As such, the present paper will place the focus on two other types of monitoring. Within the second approach, some variables can be monitored for the purpose of supporting a specific targeting policy (*intermediary targeting approach*). For instance, the inflation targeting of the ECB can be fulfilled by the monitoring of different macroeconomic variables, notably household saving rates (given that, in a context of stable disposable income, decreasing saving rates imply further private consumption and therefore heightened pressures on consumer prices). In that

³ In line with other studies on saving behaviours, “saving” refers to an annual flow variable, whereas “savings” relates to a stock variable and, as such, is the share of household wealth held as deposits. Savings exclude cash.

⁴ According to the Bank Lending Survey published by the ECB, between Q1 2008 and Q3 2014, household savings in the euro area ranked fourth among negative contributors to both the demand for housing loans (behind consumer confidence, housing market prospects and non-housing related consumption) and the demand for consumption loans (behind consumer confidence, securities purchases and spending on durable consumer goods). Between Q4 2011 and Q3 2014, despite the successive cuts in the ECB’s policy rate (by a total of 135 bps), household savings has become on average a stronger negative contributor than between Q1 2008 and Q3 2011. In Q3 2014, household savings was even the main negative contributor to the demand for both types of loans.

⁵ The persistent weakening of the EU economy is often attributed to the deleveraging needs of households, who repair their balance sheets notably by substituting debt for saving. This was especially true in 2009 when real debt of households in the EU-15 contracted for the first time in more than a decade and the EU-15 household saving ratio increased by 1.5 pp despite decreasing disposable income per capita.

⁶ Many domestic central banks in the Central and Eastern European economies targeted monetary aggregates in the 1990s and early 2000s.

⁷ The targeting of real macroeconomic variables such as unemployment rates has also been implemented (in particular by the American Federal Reserve, which was targeting a 6.5% unemployment rate till April 2014 and was notably considering this target when fixing its policy rates). Finally, the debate on nominal GDP targeting has grown significantly in recent years, especially in the US and Canada, where several economists have shown some support for this approach (See Mark Carney, current governor of the Bank of England, who analysed nominal GDP targeting when he was the governor of the Bank of Canada (<http://www.bankofcanada.ca/2012/12/guidance/>) or Paul Krugman on his blog (<http://krugman.blogs.nytimes.com/2011/10/19/getting-nominal/>)).

case, the monitoring can be designed notably to reach intermediary targets necessary for the achievement of the final target. Finally, some variables can be monitored in order to fulfil overall objectives (*overall objective approach*). For instance, a proper management of the liquidity levels of household savings could contribute to maintaining financial stability, since rising liquidity levels are likely to pose upside risks of maturity mismatch for banks.

The setup of such monitoring policies usually contains four distinctive steps. First of all, the monitored variables and the chosen indexes need to be carefully defined. In the case of household saving, this process could be twofold: on one hand, it concerns the liquidity level of the household savings portfolio (*liquidity approach*); on the other hand, it places emphasis on the saving rates of households (*saving rates approach*). The former could be measured by specific indexes including some elements of liquidity metrics; the latter adopts the index of household saving ratios (household saving to disposable income ratio). Secondly, it is necessary to analyse the main objectives of the monitoring process. The *liquidity approach* will aim at influencing the substitution dynamics between the different saving products available on the markets;⁸ the *saving rates approach* will help to impact on the trade-off between private consumption and saving. The third step involves the determination of the value of possible “internal targets”: is it a fixed value or a range? The “internal targets” for household saving rates and saving liquidity can be set *ex ante* without being made public and are not destined to be binding. Their aim is primarily to provide a framework for the monitoring. Finally, the fourth step would focus on the study of the main drivers behind the monitored variables. The analyses of the related factors are essential to better understand the dynamics of the macroeconomic variables and to observe which targets are realistic. The present paper proposes to focus primarily on this fourth step in order to provide some insight into the best policy options at the disposal of the regulator to steer the two chosen variables towards the defined target.

Within the *liquidity approach*, a focus will be first placed on the impact of yield spreads between different groups of saving products on saving products allocation and liquidity in order to assess the effectiveness of monetary policy transmission mechanisms in the trade-off between saving products. Secondly, some analyses will be provided on the relationship of saving motives to saving products: indeed, households save for different purposes and, in theory, their saving motives will shape their liquidity preferences and their choice of saving products. As such, a proper understanding of the concept of household saving requires revisiting these different motives.

Regarding the *saving rates approach*, a quick look at domestic data reveals the high heterogeneity of saving patterns across EU-15 member states. For example, member states with low pre-crisis levels have generally registered high growth in saving ratios since the start of the financial crisis, whereas several countries with high pre-crisis values have moved along downward paths in recent years. These differentiated domestic developments reveal the complexity of the phenomenon of household saving rates, whose dynamics result from some combination of saving motives and local habits, as well as of convergence processes and specific domestic macroeconomic conditions.

⁸ This objective will provide a better appreciation of the complexity of the phenomenon and address the financial risks related to potential over-liquidity. For example, the rising liquidity of households' savings portfolios observed during the financial crisis in the euro area, mirroring notably the increasing market share of overnight deposits, has posed a noticeable threat to banks' balance sheets by raising somewhat maturity mismatch and liquidity risks (IMF, 2010 and 2014).

It is rather difficult to measure the exact impact of each motive on the overall propensity to save, as many assumptions would be needed;⁹ however, some macroeconomic factor of saving ratios are likely to mirror one or several saving motives and a specific preference for liquidity. For example, developments in the labour markets are likely to affect consumer confidence and could therefore contribute to the amount of precautionary saving as defined in the model.

Specific panel data regressions will assist in assessing the impact of different domestic macroeconomic factors on saving ratios across the EU-15 and will give some insight into the contribution of each motive to household saving. In addition, specific convergence processes, such as beta-convergence,¹⁰ will be tested for significance in order to better appreciate country group dynamics.

Overall, these different analyses and the results of the panel data regressions will contribute to a better understanding of the main drivers behind household saving decisions and will help assess the best available policy options to better target and monitor household saving rates and household savings liquidity levels.

2. Saving motives

The motives and determinants of the saving ratio for individual households have been the object of rich and diversified academic literature. While saving motives can interact with one another, they also have their own dynamics. In theory, the three main saving motives for households are:

- (1) target saving;
- (2) precautionary saving;
- (3) retirement saving.

Each of these motives implies a different objective and can have specific effects on the retail banking markets. The provided order aims at reflecting their time horizon: target saving is usually grounded on short-term or medium-term prospects, while retirement saving is obviously related to long-term considerations. Finally, precautionary saving occurs in response to uncertainty regarding future income and, as such, its time horizon is rather vague.

2.1 Target saving

Households accumulate target savings in order to cope with significant expenditures, such as the purchase of durable goods, the payment of tuition fees, vacation spending, etc. Once the expenditure materialises, the household will dis-save correspondingly. In other words, the alternating periods of target saving and dis-saving are due to the “time mismatch” between income receipts and consumption expenditures (Sturm 1983). In many cases, the process can be reversed: households acquire the good first and accumulate the necessary savings later,

⁹ As highlighted by Ziegelmeyer (2009), the precise magnitude of each type of savings has not been satisfactorily determined in empirical literature.

¹⁰ Beta-convergence is the term describing the process or the certain tendency of the countries involved towards greater similarity or equality of certain variables (in the present case, it concerns the beta-convergence of household saving ratios).

under the form of gradual debt repayment. Depending on the prevailing process in an economy, the saving and debt ratios¹¹ should differ markedly across countries.

Target saving can also be the result of a “forced process”. Some individual households, especially the young ones, wish to purchase durable goods but cannot borrow from banks, owing to poor collateral and low incomes. These constrained households will be therefore compelled to save in order to acquire durable goods.

Eventually, target saving can involve the need or the desire to accumulate wealth for the purpose of increasing down payments in the future purchase of an expensive durable good and reducing the value of the contracted loan. This is especially true in the case of house purchase, where some households can decide to save further in order to reduce the loan to value ratio. Higher loan to value ratios can also be imposed by regulators and/or banks, sparking a broadly similar effect on the amount of target savings.¹²

2.2 Precautionary saving

Precautionary saving integrates the concept of uncertain future real incomes and interest rates. In order to smooth their consumption over time, households substitute a part of their current real consumption for further saving. Rising unemployment and poor economic prospects tend to exacerbate the risk of lower future income and to boost the current saving of individual workers. However, it is relatively complex to measure the perception of households regarding uncertainty and the chosen discount rate. Empirical literature often suggests that the discount rate and the final level of precautionary saving result from some combination of objective and subjective elements.

2.3 Retirement saving

Saving for retirement is at the centre of the life-cycle hypothesis (LCH), which assumes that most households plan their consumption and savings over the very long term, with the aim of maintaining “decent” lifestyles. Households are supposed to maximise their utility from the intertemporal consumption stream subject to an available resource constraint. This requires that at any time the discounted present value of all future consumption equals the sum of present net wealth plus the discounted present value of all future earned income. One of the main limitations of the original LCH is that the model assumes perfect information regarding future income, their date of death, etc.¹³

However, one interesting feature of this theory is its ability to highlight the differentiated propensity to consume and save across age groups of households. On one hand, some groups tend to borrow against future income (young households, typically composed of one individual) or to use savings (aging or retired individuals). On the other hand, middle-aged

¹¹ The debt ratio is the total debt of households (residential debt and consumer credit) to disposable income ratio.

¹² In theory, the decision to accumulate target saving to increase down payments in the future purchase of an expensive durable good is based on a yield assumption: at any time, the accumulated target saving (including discounted present value of future yields) more than offsets the corresponding discounted present value of the future purchase (including interest rates on the related contracted loan).

¹³ The assumption of perfect information on future events was relaxed later, notably with Hubbard et al. (1995), who incorporated uncertainty in life-cycle models.

individuals have a greater propensity to save and a lower propensity to consume, enhanced by a typically higher income.

Finally, by removing the assumption of life-cycle saving, a fraction of savings accumulation can be attributable to intergenerational transfers. This type of dynamics is referred to as “bequest motive”.

However, despite rich literature on the topic, it has remained difficult to assess the different economic and demographic determinants involved.¹⁴

2.4 Somewhat ambiguous role of yields and inflation

Fluctuations in saving yields are likely to affect saving motives, saving liquidity and saving rates, since current and expected yields are typical parameters used to choose discount rates. Nevertheless, it is worth emphasising that economic theory remains ambiguous on the overall impact of the yield on the final decision of households.

Firstly, an increase in the nominal interest rate on savings can generate two opposite effects. On one hand, the individual household prefers saving further in response to the higher opportunity cost of consuming (substitution effect); on the other hand, owing to the higher yield on savings, the individual household can choose another optimum with less saving and more consumption, provided that the future income perceived from the interest rate on saving more than offsets the loss of income due to the decrease in saving (income effect). Nevertheless, empirical literature generally concludes that the substitution effect prevails.

Secondly, inflation in consumer prices (with nominal incomes perfectly indexed to CPI inflation) can affect the saving ratio through two channels. If not properly anticipated, increases in nominal income can be misinterpreted as real income growth, thereby leading households to increase real consumption and in the end to reduce saving (money illusion). Based on the assumptions of a perfect anticipation of inflation from households and a lagged adjustment of interest rates, the yield spread between real assets and savings widens momentarily, and households rearrange their portfolios, increasing their holdings of real assets at the expense of savings.

3. Liquidity levels of household savings portfolios

3.1 New categories of saving products

Saving motives can shape households’ choices in terms of saving products. Depending on the motive behind the saving decision, the individual can opt for specific saving products,

¹⁴ In theory, whatever the predominant saving motive, the value of the saving ratio will fluctuate over time only within an expanding economy. A steady state economy, with stable population and GDP, implies a stable saving ratio. For example, in the context of retirement saving and a steady state economy, saving by middle-aged individuals will be offset by dis-saving by the young (once the bank loans them the money), aging or retired individuals, resulting in a stable saving ratio. If the economy is growing, the value of the saving ratio will depend on the share of middle-aged individuals in the total population. This reasoning can be applied to other motives: at the equilibrium, target saving by some households will be offset by dis-saving by individuals purchasing items. Similarly, dis-saving from newly incurred consumer credit will be counterbalanced by debt repayment (saving) by previous borrowers. If the economy is growing, the saving ratio will depend on the financing mode of items, and the more consumer credit is used, the lower it will be.

providing particular yields and levels of liquidity. According to ECB definitions, households can have access to three broad categories of savings products: overnight deposits, deposits with agreed maturity and deposits with redeemable at notice.

The first type includes deposits with next-day maturity and comprises mainly those sight/demand deposits that are fully transferable (by cheque or similar instrument). It also includes non-transferable deposits that are convertible on demand or by close of business the following day. Deposits with an agreed maturity are mainly time deposits with a given maturity that, depending on national practices, may be subject to the payment of a penalty in the event of early withdrawal. Some non-marketable debt instruments, such as non-transferable (retail) certificates of deposit, are also included. Finally, deposits redeemable at notice are savings deposits for which the holder must respect a fixed period of notice before withdrawing the funds. In some cases, there is the possibility of withdrawing on demand a certain fixed amount in a specified period or of early withdrawal subject to the payment of a penalty.

Using liquidity metrics, three new categories can be developed from the breakdown of the three existing categories of saving products. The first one, the “high-liquidity savings” category (HLS), contains overnight deposits, which are traditionally included in the most liquid monetary aggregate (M1). The “medium-liquidity savings” category (MLS) includes deposits with agreed maturity of up to two years and deposits redeemable at notice of up to three months, two segments incorporated into the M2 aggregate (and not M1). The “low-liquidity savings” category (LLS) comprises deposits with agreed maturity of over two years and deposits redeemable at notice of over three months: both segments are classified in longer-term financial liabilities of the MFI sector.

3.2 Relationship of saving motives to saving products

In principle, target saving reflects high preference for liquidities, especially if the aim is to purchase the good in the relatively near future. In this context, households will accumulate HLS. However, provided that households do not plan to purchase the desired goods in the short term, households increase first their MLS share to earn higher yields and convert these savings into HLS once the due term of the financial product occurs and households effectively complete their purchase.

Once again, precautionary saving raises many questions, as it could match with all product categories. Should savers not believe in the resilience of the banking system, they would prefer to hold precautionary saving easily convertible into cash and, as such, increase their HLS share. The precautionary savings portfolio can also reasonably contain a significant share of MLS and LLS.

Finally, retirement saving is a perfect match for LLS, provided that households trust their bank’s ability not to go bankrupt. The accumulation of HLS for retirement purposes is essentially attributable to low financial education or very poor households’ confidence in banks, as retirement saving is in principle related to long-term investments, with higher yields notably incorporating liquidity premiums.

3.3 Index of liquidity and the role of yield spreads

Based on these three new categories, it is possible to build an index of liquidity attributing a weight of 2 for the share of HLS in total savings, 1 for the share of MLS and 0 for the share of LLS, and measure overall liquidity on a scale of 0 to 100. The obtained liquidity index provides

the overall liquidity of the savings portfolio: a value of 100 would imply perfect liquidity, while a value of 0 would mean complete illiquidity. Rising liquidity is likely to pose upside risks of maturity mismatch for banks.

In the euro area, the liquidity index has moved along a slight upward trend between the first quarter of 2008 and the first quarter of 2014, mirroring a slight increase in LLS, a marked decrease in MLS and a significant increase in HLS. The pronounced increase in HLS could result from the build-up of precautionary savings and/or target savings due to deteriorating household confidence in banks and/or retail loans. Heightened retirement motive, enhanced perhaps by some tax incentives, could be at the root of the rising market share of LLS.

Regarding macroeconomic factors, the impact of saving yields on the liquidity dynamics of household portfolios is ambiguous to a certain extent. According to Figure 1, the monthly HLS to MLS ratio, admittedly, displays a very high positive correlation with the yield spread between HLS and MLS (above 70%); however, the correlation is null for the MLS to LLS ratio¹⁵ and slightly negative for the HLS to LLS ratio (roughly -12%).

By refining the analysis and considering more groups (see Table 1), the correlation between yield spread and the corresponding relative market share in the euro area stood above 50% for four pairs of products out of ten, between 15% and 50% for three pairs and was almost null for one pair. Only two pairs display noticeable negative correlations (between -15% and -25%) and both involve deposits with agreed maturity over two years. These two negative correlations could perhaps result from inadequate financial education, low confidence in the resilience of the banking system (the latter implies a high preference for liquidity regardless of the level of the yield spreads) or/and the distortion of yields by tax policies. All in all, monetary policy transmission mechanisms seem to be effective in the trade-off between most of the saving products available on the market.

Figure 1. Relationship of yield spreads to relative market shares (yield spreads are in percentage points, relative markets shares are in %, euro area)



Source: ECB and own calculations.

¹⁵ Nevertheless, it is worth highlighting that the sharp decrease in the yield spread (MLS-LLS) at the end of 2008 was accompanied by a significant decrease in the corresponding relative market share.

Table 1. Correlation between monthly yield spreads and relative market share of saving products (in %; interest rates for new businesses; market shares for outstanding amounts, January 2007-April 2014, euro area)

		Denominator				
		Overnight deposits	Deposits with agreed maturity up to two years	Deposits with agreed maturity over two years	Deposits redeemable at notice, up to three months	Deposits redeemable at notice, over three months
Numerator	Overnight deposits		52.5	-18.4	31.8	86.1
	Deposits with agreed maturity up to two years			20.5	19.6	-6.6
	Deposits with agreed maturity over two years				-20.9	74.0
	Deposits redeemable at notice, up to three months					82.6

Source: ECB; own calculations.

4. Factors of saving ratios

4.1 Evolution of saving ratios

Saving ratios have moved along different paths in 2007-13 (see Table 2). The slope of the linear trend stood below -0.4 in Austria, Belgium, Italy and Spain, between -0.4 and 0.4 in Finland, Germany, Ireland and the Netherlands, and above 0.4 in Portugal, Sweden and the UK. In comparison with 2007 levels, in 2013 saving ratios lost more than 2 percentage points in Austria, Belgium and Italy, but increased by more than 2 percentage points in Denmark, Ireland, Portugal, Sweden and the UK.

In terms of levels, saving ratios differ markedly across EU-15 member states.¹⁶ Over the 2001-13 period, according to saving ratio level, the countries can be roughly divided into three groups (see Figure 2):

- high (above 15%): Belgium (16%), France (15.3%) and Germany (16.4%);
- medium (between 10% and 15%): Austria (14%), Ireland (10.1%), Italy (14.7%), the Netherlands (12.4%), Spain (12%) and Sweden (10.8%);
- low (less than or equal to 10%): Denmark (7%), Finland (8.7%), Portugal (9.9%) and the UK (4.8%).

One possible explanation behind these differentiated levels could be the role of target saving. Depending on local social habits and/or the functioning of credit markets, the propensity of households to save or contract debts in order to acquire durable goods could vary noticeably across countries and impact the final value of both saving ratios and debt ratios. Evidence of the role of target saving and retail loans can be seen in the high negative correlation (-45%) between average saving ratios and debt ratios over the period 2000-12 in the EU-15.

¹⁶ Greece and Luxembourg have been excluded from the sample due to the unavailability of some data.

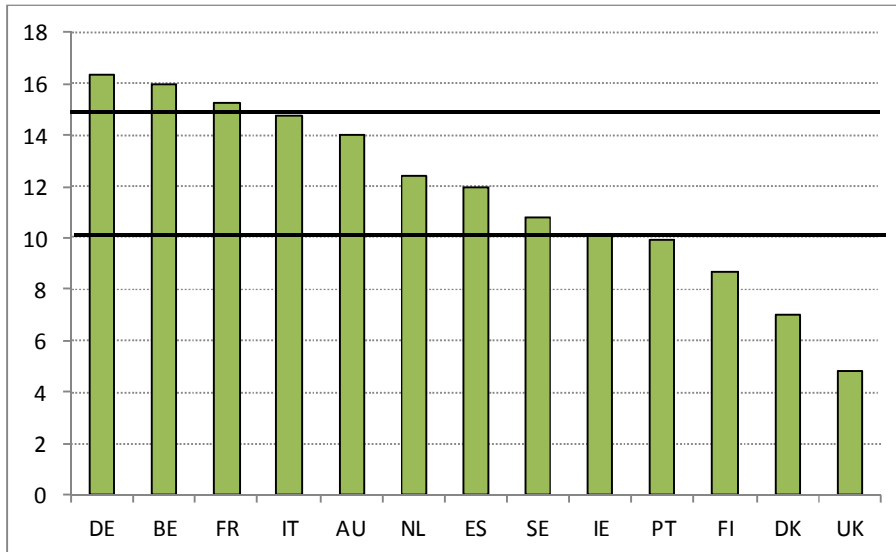
Table 2. Characteristics of the saving ratios in the EU-15 (in %)

	BE	DK	DE	IE	ES	FR	IT	NL	OS	PT	FI	SE	UK
Slope of the linear trend													
2001-2007	-0.4	-1.1	0.2	0.3	-0.2	-0.1	-0.1	-0.3	0.6	-0.6	-0.2	-0.2	-0.6
2007-2013	-0.5	0.4	-0.2	0.2	-2.5	-0.4	0.0	-0.6	-0.3	-0.9	0.9	0.1	0.7
Levels													
2001	17.9	9.6	15.2	5.8	11.0	14.8	15.8	14.7	12.6	10.6	8.1	9.9	5.9
2007	16.4	4.2	16.8	7.2	10.4	15.1	15.5	13.0	16.3	7.0	7.2	10.1	2.1
2013	13.9	7.0	16.2	11.8	10.4	15.3	12.9	11.5	12.1	12.6	8.8	14.8	5.1

Note: Ireland: 2002 instead of 2001.

Sources: European Commission Directorate General for Economic and Financial Affairs annual macro-economic database (AMECO) and European Credit Research Institute (ECRI).

Figure 2. Saving ratios in the EU-15 (average over the period 2001-13; in %)



Note: Ireland: 2002 instead of 2001.

Sources: European Commission (AMECO) and ECRI.

4.2 Model specification

Specific domestic macroeconomic variables, such as the disposable income per capita of households, unemployment rates, nominal house prices, nominal and real interest rates and consumer prices could have shaped domestic saving ratios since the onset of the financial crisis.¹⁷

¹⁷ Some demographic variables could also determine the short-term saving ratio outcomes. The effective average exit age from the labour force is an index published by Eurostat and should affect essentially retirement saving. According to the life-cycle hypothesis (LCH), households accumulate savings during their active life in order to financially prepare for retirement. Deferred retirement implies that

In the meantime, domestic saving ratios could have been partially driven by some beta-convergence processes. Beta-convergence is the term describing the process or the certain tendency of the countries involved towards greater similarity or equality of certain variables. Typically, this concept is used for economies' per capita incomes, and the central assumption is that poorer economies tend to grow at faster rates than richer economies due to a "catch-up effect".

Nevertheless, the theoretical tools of beta-convergence have been applied to other macroeconomic variables, such as inflation rates, unemployment rates, etc. (see Lopez et al., 2011 and Estrada et al., 2013). In this context, the question is to assess if national values converge towards a mean rather than to gauge the existence of "catch-up effects". The economic interpretation behind the beta-convergence process is therefore indispensable to understanding properly what is at stake.¹⁸

Regarding saving ratios, the potential beta-convergence implies that a higher negative spread in the previous year between the domestic saving ratio and the unweighted average saving ratio in the EU-15 will lead to a higher rate of growth in the domestic ratio in the current year. Conversely, increasing positive spreads should trigger lower growths in domestic ratios.

The methodology used here to measure the impact of both the macroeconomic factors and the beta-convergence estimates a simple growth equation, whose details and explanations are provided in Annex 1. A negative and significant relationship between the growth rate Δy_t^i and the initial level $(y_{t-1}^i)^p$ (namely β is negative and significant) is the sign of a convergence process. The speed of convergence is given by the size of the coefficient β : complete convergence occurs when β is significant and equal to -1, while perfect divergence appears when β is significant and equal to 1. In the specific case where γ is equal to 0, the dynamics of domestic saving ratios is essentially driven by beta-convergence.

4.3 Econometric application

A static panel regression model will be used to assess the convergence dynamics and the main macroeconomic variables and possible motives that can explain the trends in saving ratios. The regression will be based on an unbalanced panel model including 13 EU-15 national markets (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the UK) and seven time observations (from 2007 to 2013). The model specification is variation in percentage points for saving ratios (provided by the EC), unemployment rates (EC) and nominal interest rates (ECB), and variation in percentages for current disposable income per capita (EC), real interest rates (ECB), consumer price indexes (ECB) and nominal house price (ECB).

households have more time to generate savings, which should raise the aggregate saving ratio. On the other hand, the stretching of the retirement span should contribute to further dis-savings and lower national saving ratios. Data on life expectancy is available for all countries till 2012. However, limited data is available regarding the exit age: there is no cross-section data published by Eurostat after 2010 and this data is available only for six countries in 2010. As a result, demographic variables will not be integrated into the regressions.

¹⁸ In the case of household saving ratios, questions on their convergence remain indispensable for the euro area, since the level of dispersion of domestic saving ratios reflects notably the differences in terms of current accounts balances.

Owing to the results of a simple Hausman specification test¹⁹ (Hausman, 1979), the fixed effects model is preferred to the random effects model. The fixed effects model assists in controlling for unobserved heterogeneity that is constant over time and correlated with exogenous variables. Another effect is related to time: a specific external shock, such as the 2009 crisis, might have deeply distorted saving ratios in all or most countries and led to prolonged effects, no matter the value of the different determinants. As such, a trend correlated to time has been added to the regressions.²⁰

Several regressions have been conducted to reflect the main factors and related motives behind households' saving dynamics since the onset of the crisis (see Annex 2). The choice of the macroeconomic factors also partly responds to the need for slight potential correlation between explanatory variables, in order to avoid serious bias in the results of the regressions. Nevertheless, concerns about endogeneity cannot be completely dismissed. For example, there might be some reverse causality from saving to unemployment, in so far as an exogenous increase in saving reduces aggregate demand and labour. This concern is at least somewhat less important than in older analyses of saving rates, since the process of globalisation in recent decades has reduced the dependence of domestic production on domestic demand and financing. Similarly, the endogeneity of the yields with respect to domestic household saving has weakened (Mody et al., 2012).

4.4 Convergence of saving ratios

According to the results of the regressions in Annex 2, strong beta-convergence (see “ β convergence”) was observed across EU-15 countries between 2007 and 2013 (strong convergence occurs when β is significant and negative). The results in Annex 4 confirm the robustness over time of the relationship between “lagged saving spread” and current saving rates. In the years following the financial crisis of 2008-09, saving ratio dynamics across the EU-15 were even essentially driven by the convergence process. In other words, the saving ratios observed in the pre-crisis period seem to have influenced households' behaviours during the crisis and in its aftermath. For example, all countries with levels below 10% in 2007 have registered significant increases since then (see Table 2 and countries such as Denmark, Finland, Ireland, Portugal and the UK); conversely, countries that scored above 12% in 2007 all recorded decreases in 2013, excluding France.

One possible interpretation of these findings is that the need of balance sheet repair was stronger for the first group of countries. Households in countries with repetitive low saving ratios in the years preceding the financial crisis probably recorded draining wealth prior to the crisis. Rising income uncertainties resulting from the financial crisis most likely prompted many households in these countries to substitute debt for saving and, as such, to save a higher fraction of their disposable income. Significant beta-convergence in household saving ratios has contributed positively to the harmonisation in macroeconomic conditions across the EU-15, notably in respect to domestic current account balances.

¹⁹ In panel data econometrics, the Hausman test is often used to differentiate between the fixed effects model and the random effects model. Under the current specification and due to the results of the test, the initial hypothesis that the individual-level effects are adequately modelled by a random effects model is reasonably rejected for most of the 18 regressions shown in the Table 2 and Table 3.

²⁰ The variable “Year” takes the value 0 for the year 2007, 1 for the year 2008, 2 for the year 2009, etc.

4.5 Unemployment rate

At a microeconomic level, there is little doubt that rampant unemployment in labour markets tends to raise the precautionary and retirement savings of many workers, provided that their income is sufficient. Rising unemployment heightens uncertainties regarding future income and workers need to save in order to protect themselves from future job losses. Meanwhile, the unemployed are likely to dis-save to maintain decent lifestyles. As a consequence, at a macroeconomic level, the impact of unemployment rates on saving ratios will depend on the cumulative effect of both phenomena.

The results shown in Annex 2 suggest that, in a context of increasing unemployment, workers' saving more than offsets the dis-saving of the unemployed. Based on these results, the level of unemployment proves to be a powerful determinant of the household saving ratio's dynamics in the EU-15, mirroring precautionary saving and, to a lesser extent, retirement saving. In the peripheral euro area countries (Ireland, Italy, Portugal and Spain), unemployment has even been the only significant factor in saving ratio developments (see Annex 3).

Nevertheless, as shown in Annex 4, the relationship is not consistently significant over time in the EU-15. Admittedly, labour market dynamics have been one of the main drivers of household saving during the financial crisis of 2008-09; however, the impact has been almost null for the subsequent period. In 2009, as a result of the economic recession, unemployment rates increased on average by 2.2 pp²¹ in the EU-15, thereby raising uncertainties and prompting workers to accumulate precautionary saving. As a consequence, the average saving rate rose by 2.1 pp in 2009 alone. In 2010-11, unemployment continued to increase, albeit at a much slower pace (cumulative growth of +0.6 pp) and average saving rates slightly decreased. The fading impact of unemployment on saving ratios over the 2010-13 period could be explained by rising macroeconomic dis-saving in the domestic economy, resulting from additional unemployed: the dis-saving of the unemployed has therefore more or less offset the precautionary saving of workers.²²

Considering econometric elements, the relationship between saving ratios and unemployment rates could be partially biased because of the domestic institutional backdrop. In theory, substantial unemployment allowances should indeed distort saving ratios at two levels. Firstly, workers could be less prone to save, knowing that they would be entitled to unemployment benefits in case of job loss (Engen et al., 2001). Secondly, job seekers benefit from allowances that could help them dis-save to a lesser extent to maintain descent lifestyles.

However, significant allowances require funding: as such, they are likely to drain disposable incomes of workers and boost costs for employers. The former effect would reinforce the argument of less saving on the workers' side. The latter could be detrimental to job creation and lead to a longer length of the average unemployment span, which could trigger a new round of uncertainties and eventually favour precautionary saving of workers.

At first glance, the scale of unemployment benefits does not seem to impact saving ratios. For instance, in 2010, countries with the longest duration of unemployment insurance benefits²³ recorded very different saving ratios: Belgium, Denmark, France, Spain, Finland, Portugal and Sweden. The observation is broadly similar when considering the unemployment insurance gross replacement rates for the same year.

²¹ "pp" stands for percentage points.

²² The inclusion of the variable disposable income per capita could partly control for this effect. However, to be definitely validated, such an interpretation would require further econometric tests.

²³ The data comes from the Social Policy Indicator Database published by Eurostat.

4.6 Nominal house prices

Nominal house prices are typically used in empirical literature as a proxy for household wealth. Given that comparable cross country data on the stock of housing wealth is not available, housing stock is assumed to be constant over time (admittedly, a strong assumption) and only housing prices are expected to change over time (in line with Mody et al., 2012). Price developments on the housing market can affect saving of households through three channels. Firstly, since housing is a major component of households' wealth, rising house prices may stimulate private expenditure by increasing households' perceived wealth (*perceived wealth effect*). Increasing housing equities may boost consumer confidence and the need to build precautionary saving could fade.²⁴ Conversely, the loss of housing equities could damage consumer confidence, resulting in further precautionary saving to offset the loss. Secondly, an increase in housing prices provides stronger collateral and better accessibility to credit markets (*financial access effect*). Homeowners who were 'forced' to save in order to acquire consumer goods prior to the inflation of housing prices can contract consumer loans more easily and have fewer incentives to save (Campbell et al., 2007).²⁵ Thirdly, persons who do not own a house and wish to acquire housing partially or entirely through an accumulation of target savings might boost their saving even further following the increase in house prices (*target saving effect*).

As a result, the theoretical impact of rising house prices on saving ratios is ambiguous. Improved perceived wealth and more valuable collateral should trigger negative effects, whereas target saving for those who plan to purchase housing could hike. However, the empirical results in Annex 2 indicate a significant and robust negative correlation between nominal house prices and saving ratios in the EU-15. According to Annex 4, this significant relationship operates essentially between 2007 and 2009, when the upward trend in house prices observed over the preceding decade abruptly reversed. One possible interpretation is that the combination of sharp and unexpected rising unemployment and decreasing house prices markedly raised uncertainties for households and could have led to the accumulation of significant precautionary savings. Therefore, as a consequence of contracting house prices, the increase in saving sparked by heightened precautionary motive and lesser access to retail loans for house owners more than offsets the increase in target saving for the persons who intend to acquire a dwelling. The absence of a significant relationship between 2010 and 2013 could be due to the fact that the effects triggered by fluctuating house prices (the *perceived wealth effect*, the *financial access effect* and the *target saving effect*) gradually counterbalanced each other.

4.7 Interest rates and consumer price index (CPI)

No consistent data across countries is available on the total interest rate on new businesses of saving. As an alternative, the interest rate on overnight deposits is a good proxy for the total interest rate, due to the high market share of overnight deposits and the high correlation with interest rates on other types of deposits.²⁶ The consistently insignificant impact of nominal

²⁴ A broadly similar mode of reasoning can be adopted with retirement saving.

²⁵ For example, "home equity loans" enable house owners to borrow money (in order to purchase a car, home appliances, etc.) against equity in their dwelling (this is common practice notably in the UK).

²⁶ Indeed, for most countries of the sample, the stock of overnight deposits has been on average much above one-third of the total savings since 2005. On the other hand, in the euro area, monthly overnight interest rates displayed very high correlations with interest rates on other types of deposits since January 2005: 85% with deposits with agreed maturity up to two years, 68% with deposits with agreed

interest rates on household saving shown in Annexes 2, 3 and 4 tends to prove that households do not consider nominal yield as a criterion to decide on their saving rates. These results could also be interpreted within the income-substitution effect framework: income effect perfectly offset substitution effect or both effects are null.

More surprisingly, the variations in the CPI have no impact on saving ratios. A quick interpretation is that households are unable to integrate the opportunity costs of holding savings in a context of inflation and cannot avoid the pitfalls associated with money illusion. However, further tests would be necessary to assess in detail the ability of households to respond adequately to price shocks since 2007.

Finally, the impact is also null for real interest rates. Beyond the interpretation of a possible case of money illusion, this result could reflect rational behaviour of agents, knowing that real interest rates on overnight deposits are negative in 90% of the cases in the studied panel. Regarding deposits with agreed maturity and deposits redeemable at notice, the proportion of negative real interest rates is also very high, reaching respectively 46% and 40% of the available figures.

4.8 Disposable income per capita

Higher unemployment may lead to higher saving rates by reducing income. To control for this effect, current disposable income was added to the regressions. The mechanisms behind the saving response to income changes have fuelled many debates in academic spheres, but it is usually accepted that the marginal propensity to save (namely, the proportion of each additional unit of household income that is used for saving) tends to rise when unexpected increases in current household income occur. In a context of increasing income, the ensuing rising marginal propensity to save will boost the value of saving ratios. At an aggregate level, these assumptions reflect the idea that wealthier nations usually have higher saving ratios. As a consequence, the share of the income used for consumption purposes declines.

Nevertheless, most studies on the impact of disposable income per capita on household saving consider wider samples, including developed economies, as well as emerging and very poor countries. As such, disposable income per capita is highly heterogeneous across these samples and robust correlations can be observed with saving ratios, while subsets containing only industrial economies with low income dispersion typically display poor correlations with saving ratios. Therefore, it comes as no surprise that the correlation between saving ratios and disposable income per capita is relatively poor in a sample including only EU-15 economies (see Annex 2 and Annex 4).

5. Policy assessment and recommendations

Based on the different findings of the previous analyses, some of the best available policy options can be assessed to better target household saving rates and saving liquidity. Some tools are related to policies whose connection with household saving is commonly acknowledged, while some other tools will effectively influence saving despite the fact that these tools have been designed and used to attain goals completely different from the achievement of an expected saving ratio.

maturity over two years, 97% with deposits redeemable at notice of up to three months and 88% with deposits redeemable at notice of over three months.

5.1 Yields policies

As shown by the findings in Annex 2, Annex 3 and Annex 4, both nominal and real yields, as well as CPI, have not played any significant role in the developments observed in the EU-15 saving ratios over the last seven years. This could confirm the weakness of the monetary policy transmission mechanisms in the EU-15 in relation to the trade-off between saving and private consumption. However, the correlations shown in the Table 1 tend to confirm the significant role of monetary policy regarding household savings allocation and liquidity. This would mean that monetary policies are inefficient when designed to influence the consumption-saving trade-off; however, they do have an impact on the overall level of household savings liquidity. As such, they remain one of the key tools at the disposal of regulators to influence household saving behaviours.

Different policies are designed in order to influence saving behaviours through yields dynamics. First of all, monetary policy is supposed to affect the liquidity of household saving through two main channels. Nominal interest rates on savings typically mirror movements in central banks' interest rates. However, should the central bank decide to raise its policy rates, the nominal interest rate response is likely to differentiate across saving products, leading to new yield spreads and potential new portfolio allocation. Secondly, the inflation targeting process implemented by many central banks should affect the liquidity levels of household savings portfolios. Indeed, provided that interest rates do not adjust instantly to unexpected inflation and that the adjustment process differs across saving products, new real interest rates and yield spreads will be set on the money markets and will trigger a new asset allocation.

Yields on savings can also be distorted by taxation policies. The "taxation tool" concerns essentially savings with low liquidity. In response to tax hikes on savings with agreed maturity, households could raise the average liquidity of their savings portfolios, by gradually converting their illiquid savings into overnight deposits. At the European level, the EC adopted a Directive on the taxation of savings in 2003,²⁷ but its main goal was to curb tax evasion, through higher transparency between member states, rather than to harmonise savings tax systems across the EU. Overall, tax policies remain a prerogative of member states. Nevertheless, a common fiscal framework in the euro area could help further target and harmonise the liquidity levels of household savings portfolios across the euro area.

In theory, tax on earned income or on consumption can also affect household saving through its impact on the work-leisure choice. Should the substitution effect prevail, an increase in the marginal tax rate on earned income or a VAT hike will reduce work and income of households and should reduce saving rates.²⁸ However, as shown in Table 2, empirical studies reveal that lower disposable income per capita does not consistently affect saving ratios. As such, higher tax rates on income are likely not to have any noticeable effect on saving rates.

5.2 Convergence processes in saving ratios

The strong convergence processes observed throughout the period in both the EU-15 and the euro area (albeit at a slower pace for the latter) are likely to alleviate the differentiation in the macroeconomic conditions across the EU-15 domestic economies, especially in respect to

²⁷ The Directive was revised in 2008 and 2014.

²⁸ At an aggregate level, this analysis makes sense only if the government does not transfer the resources from tax revenues to other groups of households and, on the contrary, dedicates these resources to other sectors, such as private corporations. As such, the national household disposable income per capita decreases.

external balances (through the effect of domestic saving on the current account balance), funding pattern of banks, resilience of the economies to shocks and interest rates. As such, more harmonised household saving rates could indirectly contribute to reinforcing the effectiveness of monetary policies in the euro area, by reducing the diversity in domestic macroeconomic reactions to new monetary policies. Therefore, the convergence process in domestic household saving ratios should be encouraged within the realms of possibility.

5.3 Specific tools for target saving

Several policies can alter somewhat the dynamics of target saving. Admittedly, cultural and social factors can explain much of the target saving's process; however, any policy aimed at reinforcing the contracts of housing and consumer loans, especially in terms of consumer protection, is likely to lift the demand for households' loans and to bring down the accumulation of target savings. The EU regulations of retail financial products, such as the Consumer Credit Directive and the recent Mortgage Credit Directive, should also be designed to improve the attractiveness of mortgage and consumer credit.

On the supply side, lending standards for retail loans depend much on the stance of monetary policy, as expansionary monetary policies should lower interest rates on households' loans and incite households to acquire goods first through debt contraction and to accumulate the necessary savings later, under the form of gradual debt repayment.

5.4 Specific tools for precautionary saving

Regulators can adjust precautionary savings mainly through the 'uncertainties channel'. Downside uncertainties on the labour markets should contribute to rising consumer confidence and decreasing precautionary saving.^{29, 30} The regressions confirm the key impact of wealth effects, modelled by variable housing prices, and unemployment rates on the saving rates over the period 2007-09, mirroring a strong demand for precautionary saving. The fading impact of both variables in subsequent years could reflect the resurgence of contradictory effects: dis-saving by the additional unemployed has more or less offset precautionary saving by workers, while the *perceived wealth effect* at the root of rising precautionary saving during the crisis was gradually offset by the *financial access effect* and the *target saving effect*, all three resulting from housing price fluctuations. These findings confirm the necessity for regulators to remain vigilant regarding unemployment and housing price developments, as sharp unexpected changes in these two variables are likely to affect markedly household saving ratios, resulting in significant variations in private consumption of households and GDP growth.

Eventually, in relation to the choice of saving products, consumer trust in the resilience of the banking system and the promotion of financial education are essential to avoiding the accumulation of very liquid precautionary savings. Further emphasis should be placed on

²⁹ Even though the role of unemployment allowances has not been tested empirically, simple theoretical assumptions and developments indicate an ambiguous impact of the scale of unemployment benefits on individuals' saving behaviours, as multiple contradictory effects are involved.

³⁰ At a microeconomic level, it is worth mentioning that one of the main difficulties in dissipating uncertainties through a contraction in unemployment rates is that both objective and subjective elements are involved. The risk of losing a job differentiates across sectors, companies and even departments within a company, but the perception and the "saving response" to this risk by workers can also be biased by personal experiences and situations, such as the loss of a job in a previous company, the unemployment of another member of the household or even high mortgage instalments.

financial education, as rising liquidity levels of precautionary savings is likely to lead to upside risk of maturity mismatch by numerous retail banks and their offering sub-optimal portfolios to individuals, with poor yields and over-liquidity.

5.5 Specific tools for retirement saving

Financial education is even more important regarding retirement saving. Once again, the lower the level of financial education, the higher the propensity to accumulate very liquid and low-return retirement savings. The incorporation of personal finance education into school curricula, websites, seminars, etc., could help individuals manage their savings portfolios in an optimal way and not to fall into the “liquidity trap” (Lewis et al., 2012).

Confidence in banks (and other financial institutions) is also essential when retirement saving is involved, especially as the related products are designed for long-term prospects. Regulators play a key role in reinforcing the confidence of consumers in their banking system and can foster consumer confidence in long-term savings products through different policies. First of all, proper financial information and a high degree of transparency in relation to financial products are essential to enhancing consumer confidence and are the vital complements to financial education. Secondly, a resilient banking system, which is the main objective of most wide-ranging banking reforms in recent years, will prevent consumers from accumulating highly liquid savings when their objective is to prepare for retirement.

In conclusion, a wide-ranging policy approach, notably by integrating some elements of labour and housing policies, could address some of the shortcomings of a purely yield policy approach, and prove to be highly beneficial to efficient monitoring of household savings. The creation of a “Bank Saving Survey”, based on the model of the “ECB Bank Lending Survey”, published on a regular basis with analyses on the determinants and liquidity levels of household saving, could be a valuable tool to strengthen the overall understanding of household saving and to help regulators in the calibration of appropriate instruments.

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Annex 1. Growth equation to estimate macroeconomic factors and beta-convergence

$$\Delta y_t^i = \alpha + \beta \cdot (y_{t-1}^i)^{sp} + \gamma \cdot X_t^i + u_t^i, \text{ where:}$$

- * Δy_t^i is the growth in pps in the saving ratio over the period t for the country i .
- * $(y_{t-1}^i)^{sp}$ is the value of the spread between the domestic saving ratio and the EU15 unweighted average saving ratio over the period $(t-1)$.
- * α is an intercept.
- * β indicates the speed of convergence.
- * X_t^i is the set of the exogenous macroeconomic variables influencing the dynamics of saving ratios.
- * γ is the set of the coefficients of the exogenous macroeconomic variables.
- * u_t^i is the stochastic error.

Annex 2. Economic determinants of saving ratios in the EU-15 (fixed and time effects, in variations, 2007-13)

Independent variables	Possible motives	Saving rates, yields and unemployment			Housing effects		
		(a)	(b)	(c)	(d)	(e)	(f)
Disposable income per capita		0.08 (0.07)	0.07 (0.32)	0.07 (0.05)	0.11 (0.07)	0.09 (0.07)	0.13** (0.06)
Unemployment rate	(2)	0.66*** (0.18)	0.62*** (0.17)	0.69*** (0.17)	0.81*** (0.20)	0.80*** (0.19)	0.85*** (0.19)
Nominal interest rate		-0.18 (0.43)			0.13 (0.42)		
Real interest rate			0.26 (0.18)			-0.05 (0.20)	
Consumer price index				0.49 (0.30)			0.12 (0.16)
Nominal house price	(1); (2); (3)				-0.11** (0.05)	-0.10** (0.05)	-0.14*** (0.05)
“Lagged saving spread” (β convergence)		-0.32*** (0.12)	-0.39*** (0.12)	-0.36*** (0.11)	-0.42*** (0.13)	-0.45*** (0.13)	-0.41*** (0.11)
Year		-0.20** (0.09)	-0.19* (0.09)	-0.19** (0.08)	-0.46*** (0.11)	-0.51*** (0.13)	-0.46*** (0.10)
Constant		0.42 (0.40)	0.69 (0.42)	0.49 (0.47)	0.89** (0.40)	0.99** (0.41)	0.40 (0.47)
R-squared (overall)		0.19	0.19	0.18	0.22	0.22	0.23
Prob > F		0.00	0.00	0.00	0.00	0.00	0.00
Number of countries		12	12	13	12	12	13
Number of observations		84	82	91	72	71	78

Notes:

***, ** and * denote significance at 1%, 5% and 10%, respectively.

Variations in saving ratios, unemployment rates and nominal interest rates are in percentage points.

Variations in disposable income per capita, real interest rates, consumer price indexes and nominal house prices are in percentages.

The related motives are: (1): target saving; (2): precautionary saving; and (3): retirement saving

Annex 3. Economic determinants of saving ratios, robustness checks (by areas) (fixed and time effects)

Independent variables	Possible motives	Euro area countries included in the EU-15 (2007-13)			Peripheral euro area countries (ES, IE, IT and PT) (2007-13)		
		(g)	(h)	(i)	(j)	(k)	(l)
Disposable income per capita		0.36** (0.13)	0.36** (0.14)	0.31** (0.14)	0.26 (0.27)	0.23 (0.26)	0.14 (0.26)
Unemployment rate	(2)	1.06*** (0.20)	1.05*** (0.21)	0.69*** (0.17)	0.99*** (0.293)	0.99*** (0.30)	1.02*** (0.29)
Nominal interest rate		-0.21 (0.69)			-0.39 (1.94)		
Real interest rate			0.08 (0.24)			0.04 (0.51)	
Consumer price index				0.07 (0.20)			0.19 (0.36)
Nominal house price	(1); (2); (3)	-0.10* (0.06)	-0.10* (0.06)	-0.09 (0.06)	-0.13 (0.12)	-0.14 (0.12)	-0.14 (0.12)
“Lagged saving spread” (β convergence)		-0.27* (0.15)	-0.28* (0.14)	-0.28* (0.15)	-0.43 (0.28)	-0.45 (0.26)	-0.47* (0.25)
Year		-0.36*** (0.13)	-0.33* (0.17)	-0.39** (0.14)	-0.52 (0.34)	-0.53 (0.45)	-0.65* (0.35)
Constant		0.12 (0.65)	0.16 (0.63)	0.12 (0.65)	-0.67 (1.09)	-0.62 (1.09)	-0.72 (1.03)
R-squared (overall)		0.35	0.34	0.33	0.61	0.61	0.61
Prob > F		0.00	0.00	0.00	0.00	0.00	0.00
Number of countries		10	10	10	4	4	4
Number of observations		60	60	60	24	24	24

Notes:

***, ** and * denote significance at 1%, 5% and 10%, respectively.

Variations in saving ratios, unemployment rates and nominal interest rates are in percentage points.

Variations in disposable income per capita, real interest rates, consumer price indexes and nominal house prices are in percentages.

The related motives are: (1): target saving; (2): precautionary saving; and (3): retirement saving.

Annex 4. Economic determinants of saving ratios, robustness checks (by sub-periods) (fixed and time effects)

Independent variables	Possible motives	EU-15 2007-09			EU-15 2010-13		
		(m)	(n)	(o)	(p)	(q)	(r)
Disposable income per capita		0.08 (0.12)	0.08 (0.13)	0.08 (0.09)	-0.19 (0.35)	0.02 (0.20)	-0.10 (0.11)
Unemployment rate	(2)	0.97*** (0.28)	0.98** (0.36)	1.00** (0.39)	-0.09 (0.33)	-0.27 (0.28)	-0.28 (0.35)
Nominal interest rate		0.07 (0.41)			0.28 (0.80)		
Real interest rate			-0.02 (0.24)			0.61 (0.36)	
Consumer price index				0.02 (0.21)			-0.45 (0.27)
Nominal house price	(1); (2); (3)	-0.14** (0.06)	-0.14** (0.06)	-0.16** (0.07)	0.05 (0.10)	0.01 (0.09)	0.03 (0.09)
“Lagged saving spread” (β convergence)		-0.79** (0.31)	-0.79** (0.33)	-0.91*** (0.28)	-0.67** (0.28)	-0.67** (0.26)	-0.70*** (0.22)
Year		-0.77 (0.52)	-0.81 (0.55)	-0.85* (0.49)	0.81*** (0.28)	1.06*** (0.31)	1.08*** (0.28)
Constant		1.70* (0.81)	1.73* (0.82)	1.25* (0.64)	-0.91 (0.58)	-0.55 (0.55)	-0.42 (0.70)
R-squared (overall)		0.32	0.33	0.26	0.11	0.22	0.19
Prob > F		0.00	0.00	0.00	0.00	0.00	0.00
Number of countries		12	12	13	12	12	13
Number of observations		36	36	39	36	35	39

Notes:

***, ** and * denote significance at 1%, 5% and 10%, respectively.

Variations in saving ratios, unemployment rates and nominal interest rates are in percentage points.

Variations in disposable income per capita, real interest rates, consumer price indexes and nominal house prices are in percentages.

The related motives are: (1): target saving; (2): precautionary saving; and (3): retirement saving.