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Household Savings in Selected Southern European Countries

Evidence from Cross-Country Micro-Level Data

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ABSTRACT: The paper looks into the puzzle of low household savings in three Southern European (SE3) countries – Cyprus, Greece, and Portugal. Building on the household saving drivers literature, we employ cross-country micro-level data and investigate the key saving patterns, examining their heterogeneity across households in SE3 countries relative to the EA average. The results confirm the prominent role of income, along with interest rate, inflation, fiscal balance, and debt in shaping household savings in SE3 countries. Quantile regressions employed to analyze saving behavior across the distribution of households suggest that households with lower savings tend to see their savings dip (or dissavings rise) more-than-proportionately with shocks to income, interest rate, inflation, and government balance. Our policy simulations across the distribution of households suggest that targeted rather than universal policy intervention could improve household savings, especially of the most vulnerable ones.

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Contents

Annexes

I. Introduction

Household saving behavior across Euro Area (EA) countries is very heterogeneous. Specifically, household saving rates for EA periphery countries are persistently lower than the EA average. This cross-country divergence became particularly wider in the run-up to the 2007-08 global financial crisis (GFC), reflecting fast consumption growth in the EA periphery countries. Following a temporary increase during the GFC, the household saving rates in periphery EA dropped significantly during the European sovereign debt crisis (SDC), recovering somewhat thereafter, but remaining among the lowest in the EA. After a broad-based surge in overall household savings during Covid-19, household savings have come down again after the pandemic.

Low household savings have important implications for economic growth and economic imbalances. First, household savings are typically important for financing investment and thus economic growth. This is particularly relevant for the EA periphery, given their need to raise convergence prospects. Second, low household saving rates may result in persistent external imbalances, as domestic investment becomes more reliant on foreign savings, thereby making these countries more vulnerable to external shocks. Third, low household savings are often associated with weak household balance sheets. Households with low saving rates may have to borrow more to smooth consumption in response to economic shocks or purchase durable goods including housing, and high household indebtedness represents a source of financial vulnerability. Moreover, given that low-income households are typically saving less, low saving rates may indicate that inequality of income or wealth across households may be an issue.

The paper aims to investigate the causes of persistently low household savings in three Southern European countries: Cyprus, Greece, and Portugal (SE3) with among the lowest household saving rates in the EA. Specifically, i) What are the main factors driving household savings in SE3 countries? ii) Why do SE3 countries have different household saving behavior from more advanced EA countries? iii) How is the saving behavior in SE3 countries expected to be affected by the current context of high inflation and monetary policy tightening? Drawing on the findings, the paper sheds light on how economic and structural policies could help raise household savings in a sustainable way in the SE3.

The paper answers the above questions primarily by examining household-level data based on the Household Finance and Consumption Survey (HFCS). A statistical matching approach is applied to impute consumption and income for each household, using additional information from Household Budget Surveys (HBSs) and national accounts. In addition to descriptive analysis that helps reveal the dynamics and motivation for household savings, multivariate regressions are conducted to further investigate the drivers for saving behavior and differences between SE3 and other EA countries. Furthermore, quantile regressions are employed to examine the distributional differences in household saving behavior. Finally, drawing on the econometric analyses, the paper also constructs simulations to assess the impact of macroeconomic shocks on household savings, overall and across the distribution of households.

The results indicate that income plays a prominent role in shaping households saving behavior, but other drivers, including financial conditions, fiscal policies, and household characteristics such as size and age, are also important. Uncertainty about future leads to precautionary savings, particularly during the GFC and the Covid-19 pandemic. In addition, the respective magnitudes of the drivers differ between SE3 and other EA countries, in particular for income, deposit rate, inflation, and government balance. The results of quantile regressions suggest that households with lower savings are more sensitive to economic shocks. The distributional effects are also illustrated in policy simulations, suggesting that targeted rather than universal policy intervention could improve household savings, especially for the lower-saving households.

The rest of the paper is structured as follows. Section II discusses the main factors driving household saving decisions based on a literature review. Section III investigates the saving patterns of the SE3 and examines the heterogeneity in saving behavior across households using descriptive statistics. It also empirically analyzes the main factors contributing to saving rates across EA countries using standard cross-sectional and quantile regressions. Section IV simulates the impact of macroeconomic and policy variables on the saving behavior of households. Section V summarizes the main findings of our analysis and discusses key policies that could increase household savings.

II. Theoretical Drivers of Household Savings

This section provides a conceptual framework for the empirical analysis undertaken in the subsequent sections. Based on a comprehensive literature review, it identifies the main factors driving household saving decisions. A summary with expected signs and key references is presented in Annex I.

The life-cycle and permanent income theories have served as a benchmark framework to analyze household savings behavior. Departing from the absolute income hypothesis developed by Keynes (1936) that postulated savings would be a positive function of current income, the life-cycle and permanent income theories recognize the intertemporal nature of household consumption and savings. According to the basic standard life-cycle theory hinging on consumer heterogeneity formulated by Modigliani and Brumberg (1954), young people work, earn income, and save while they spend their savings (dissave) once they stop working, e.g., in retirement. Relying on the assumption of homogenous consumers, the basic permanent income theory proposed by Friedman (1957) postulates that only a permanent income component has a significant impact on consumption and savings, with a transitory component having a limited or no effect. While these theories suggest that household saving behavior depends not only on current income, but also on other factors affecting their long-term income potential, they typically do not explicitly reflect the role of bequest, uncertainty about the future, wealth, access to financial markets, and household heterogeneity across various characteristics.

Households save to secure retirement and consumption smoothing throughout their lifetime. While the standard life-cycle theory is a useful departure point to analyze household saving behavior, it abstracts from bequest motives (Kopczuk and Lupton, 2007) and precautionary savings arising from longevity risk (Ameriks and others, 2020). Once these features are embedded in the models, savings can be positively correlated to age. Both the life-cycle theory and the permanent income hypothesis imply that income is a critical determinant of household savings (Deaton, 1992). Current income is generally expected to be correlated positively with savings because the marginal propensity to save increases with disposable income, as evidenced by Dynan and others (2004) and Grigoli and others (2014). Accounting for permanent income or expectations regarding future income proxied by education suggests that higher education is translated into higher savings (Browning and Lusardi, 1996; Dynan and others, 2004; Attanasio and Weber, 2010).

The impact of interest rates on savings can be ambiguous. There are three distinct effects at play that determine the overall impact of interest rates on household savings (Elmendorf, 1996; Schmidt-Hebbel, 1997). The substitution effect involves postponement (substitution) of today's consumption to future, as a higher interest rate allows for higher future consumption that is gained by forgoing present consumption and saving more. The income effect arises as higher interest rate translates into fewer current dollars needed to fund a given amount of future consumption. As future consumption becomes less expensive, making people better off in a lifetime sense, people increase their current spending and save less. Finally, the wealth effect can work through two channels. With an increase in the interest rate, the present value of future labor income, pension

benefit, as well as future capital income and life-long accumulated assets declines. Both of these channels make people worse off in a lifetime sense and lead them to consume less today and save more.

Uncertainty about future leads to precautionary savings. Following the seminal work of Friedman (1957), and Hall (1978), subsequent literature has explicitly introduced uncertainty in models and analyzed its impact on household savings through the precautionary motive (Skinner 1988; Zeldes 1989, Deaton 1991, Carroll 1992). The models developed by Deaton (1991) and Carroll (1992, 1997) predict that households accumulate a buffer stock of wealth to insure against possible adverse shocks. The buffer-stock savers have a target wealth to permanent income ratio such that if actual wealth is below the target, the precautionary saving motive will dominate impatience, and the consumer will save, while if actual wealth is above the target, impatience will dominate prudence, and the consumer will dissave (Jappelli and others 2008). While higher uncertainty about the future reduces current consumption and increases savings (Loayza and others, 2000), introducing uncertainty into the model results in savings that are above the level predicted by the standard permanent income and life-cycle hypotheses (Carroll, 1992; Schmidt-Hebbel, 1997). Longevity risks associated with bequests and health costs can be an important element of precautionary savings (Ameriks and others, 2020).

Borrowing constraints may play a significant role in household saving decisions. Relaxing the assumption of perfect capital markets makes credit institutions relevant for household consumption and saving decisions. Households are usually exposed to housing through borrowing to finance a property purchase and house price fluctuations associated with the wealth effect (Muellbauer, 2007). There may be restrictions on mortgage availability because of high down payment for mortgage loans, so households need to accumulate larger amounts for down payments and thus save more (Japelli and Pagano, 1994; Deaton, 1999). House price declines reduce the availability of home-equity-based borrowing and lead to lower consumption and higher savings (Campbell and Cocco, 2007; Case and others, 2001).

Household heterogeneity has important implications for saving behavior too. Family characteristics can have important implications for household savings behavior (Love, 2010). For example, while households with fewer children devote a smaller share of income to support dependents and consequently save more, declining family sizes mean that the ratio of workers per retiree decreases and the current working age population may need to save more (Curtis and others, 2015). Gender can be a contributing factor too, with evidence provided by Lupton and Smith (2003) that female-headed households typically generate lower savings because of differences in investment behavior (Hira and Loibl, 2005; Jianakopolos and Bernasek, 1998) and less time spent in workforce that affects earning (Ryan and Siebens, 2012; Sierminska and others, 2010).

Fiscal policy can have some bearing on household savings behavior as well. The Ricardian equivalence hypothesis suggests that an increase in permanent government consumption would be fully offset by lower private consumption (Seater, 1993). This is because households anticipate future tax increases, which are necessary to finance higher government debt reflecting higher current government consumption. Assuming consumption smoothing, a drop in expected future income will dampen current consumption and thus increase current household savings. Public insurance schemes may also influence household savings (Feldstein, 1985). Availability of government-provided retirement income programs can make households consider their retirement benefits as a substitute for their working-age savings and reduce their pre-retirement savings.

This paper contributes to the vast literature on household savings in important ways. While there are numerous studies examining the determinants of household savings for European countries, these are either based on macroeconomic cross-country data (Rocher and Stierle, 2015) or done individually for countries using household-level data (Kolerus and others, 2012). To our knowledge, there are only a few studies analyzing household saving behavior using household-level data for EA countries, which include the work of Rodriguez-Palenzuela and others (2016) and Le Blanc and others (2016). However, these studies rely on cross-sectional

data for EA countries covering 2009-2011 and do not treat the household saving rate as a continuous variable. The earlier studies employing household-level data focus on examining the drivers of household savings, but do not explicitly examine the differences between SE3 and other EA countries. Neither do they provide insights on the distributional impact of individual factors on household savings in SE3 countries. Our paper employs the measure of household savings in the form of continuous variable for three waves of household-level data—spanning periods beyond the GFC and SDC stress episodes—for 10 EA countries. To analyze the distributional impact of individual factors on household savings, this study employs a quantile regression approach. Furthermore, building on the results from the econometric analysis, the paper conducts policy simulations and proposes measures to increase household savings in SE3 countries.

III. Empirical Investigation

This section presents data sources and empirical analysis. Building on the identified drivers of household savings, the first part discusses evidence from descriptive statistics, while the second part presents a multivariate regression analysis conducted to assess the simultaneous effect of individual factors.

A. Data

The analysis is conducted on household-level data augmented by standard macroeconomic variables. The ECB's HFCS provides rich information on households' characteristics in a harmonized fashion across three waves.[1] The dataset contains 192 micro indicators for a total of 170,699 households in 10 EA countries with individual-country sample size ranging from 3,829 for Cyprus to 40,726 for France. To limit the extent of missing values or non-response items, the source dataset provides five imputed values generated by stochastic imputation conditional on observed variables (ECB, 2020). We follow Lamarche (2017) and Browning and others (2003) and impute consumption spending to each household in the dataset using a framework that was largely based on country-level estimation of the Engle curve equations from data of expenditures on food, utilities, and rents as well as demographic variables such as age, household size and labor status. Similarly, we also estimate net income from gross income reported in HFCS using tax rate data from OECD. Appendix II provides the technical details of these imputations. Macroeconomic data are sourced from IMF, OECD, and World Bank.

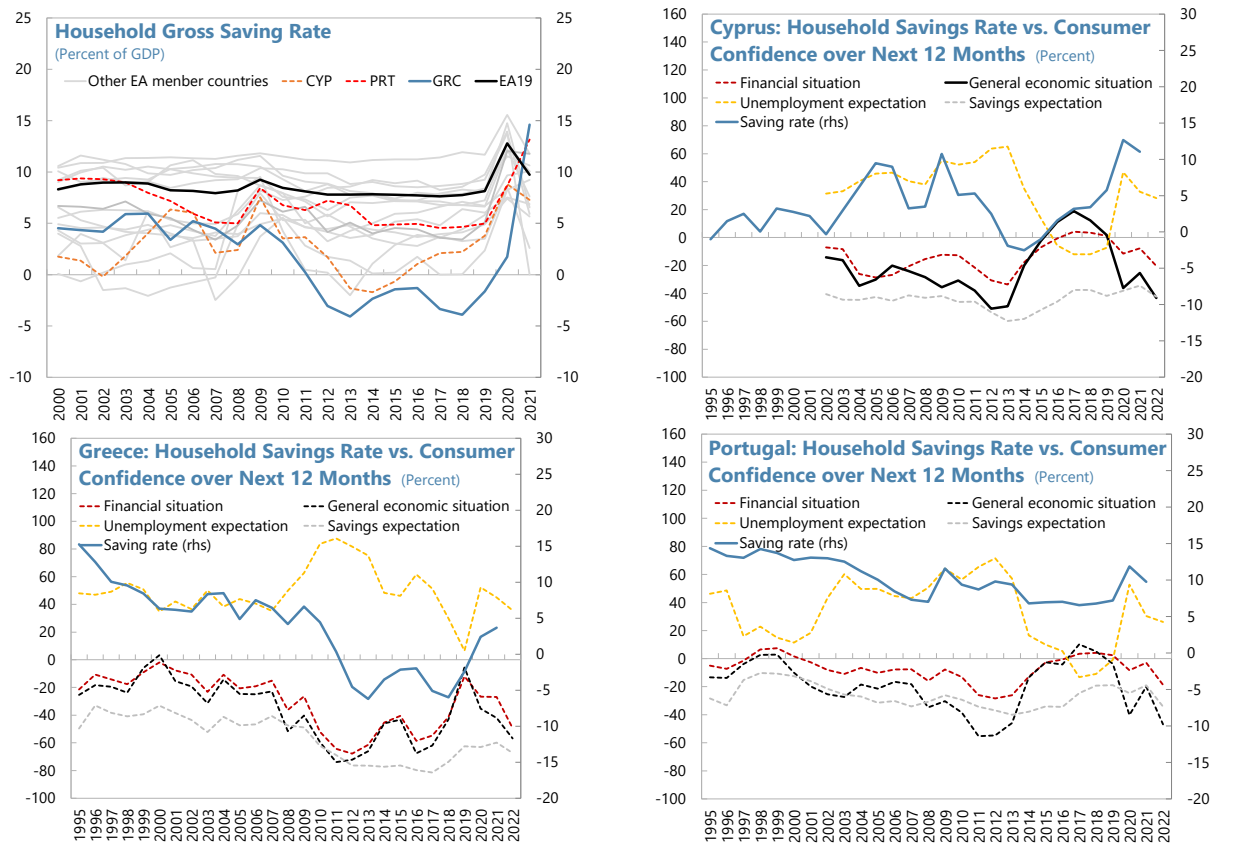
B. Descriptive analysis

SE3 countries have historically recorded one of the lowest savings rates among the EA countries, even when these rates increased during stress periods (Figure 1). Low overall savings have a significant contribution from the household savings rate. While the household savings rate of EA countries was relatively stable until the GFC crisis, saving rates in SE3 countries recorded a noticeable decline in the run-up to the crisis. When the GFC hit, there was a significant increase in savings across the EA countries, with SE3 countries experiencing a particularly steep increase, reflecting most likely the precautionary motive associated with high uncertainty about the future (Mody and others, 2012), as documented by confidence indicators. While the ensuing recession and subsequent SDC were relatively short-lived for most of the EA countries, SE3 countries experienced particularly deep and protracted recessions, leading to a sharp decline in household savings. In

[1] Most of the data collection took place between 2009-2011 during the first wave. The second wave was conducted between 2013-2014 for the second wave; and the third wave between 2014-2018. Given that revised weights were not available at the time of writing the paper, they have not been incorporated in the dataset.

fact, household savings of Cyprus and Greece plummeted into the negative territory and recorded the lowest rate in the EA, remaining negative for almost a decade in case of Greece. With the COVID pandemic in 2020, household savings jumped in an unprecedented fashion across EA, including in SE3. The improvement in household saving rates reflected both precautionary savings, involuntary savings due to pandemic-related restrictions, as well as policies protecting employment and income (Dossche and Zlatanos, 2020).

Figure 1. Saving Rate and Uncertainty

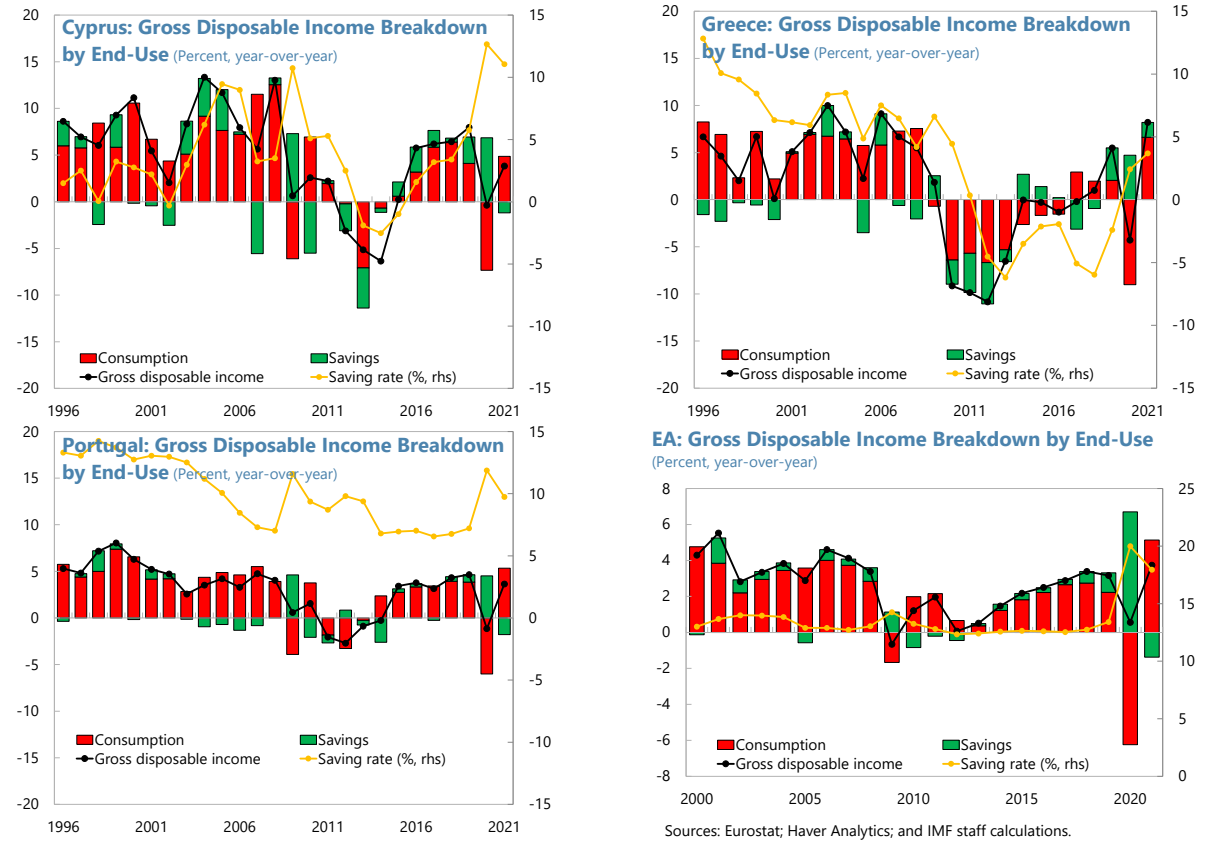


Source: European Central Bank, and IMF staff calculations.

The breakdown of disposable income into consumption and savings offers additional insights (Figure 2). Prior to the GFC, savings behavior was largely determined by disposable income dynamics. This co-movement was particularly significant for SE3 and was driven predominantly by high consumption dynamics. This pattern changed dramatically during the GFC when savings spiked despite a drop in disposable income reflecting a sharp decline in private consumption, offset by a jump in precautionary savings. The recovery in disposable income for the EA average, which started earlier than for SE3 countries, was accompanied by some decrease in savings and a significant increase in consumption. While the drop in disposable income and consumption was particularly pronounced and protracted for Greece, it was also to some extent the case for Cyprus and Portugal. Given that the level of the saving rate was still lower compared to pre-GFC level, especially for SE3 countries (except Cyprus), this might suggest some consumption smoothing behavior of households (Rodriguez-Palenzuela and others, 2016). During the pandemic, the pattern was to some extent similar to the GFC. A sharp increase in household saving rate was accompanied by a drop in consumption, as social

distancing reduced consumption of services (Dossche and others, 2021), which was partially offset by savings boosted by fiscal transfers.

Figure 2. Household Disposable Income

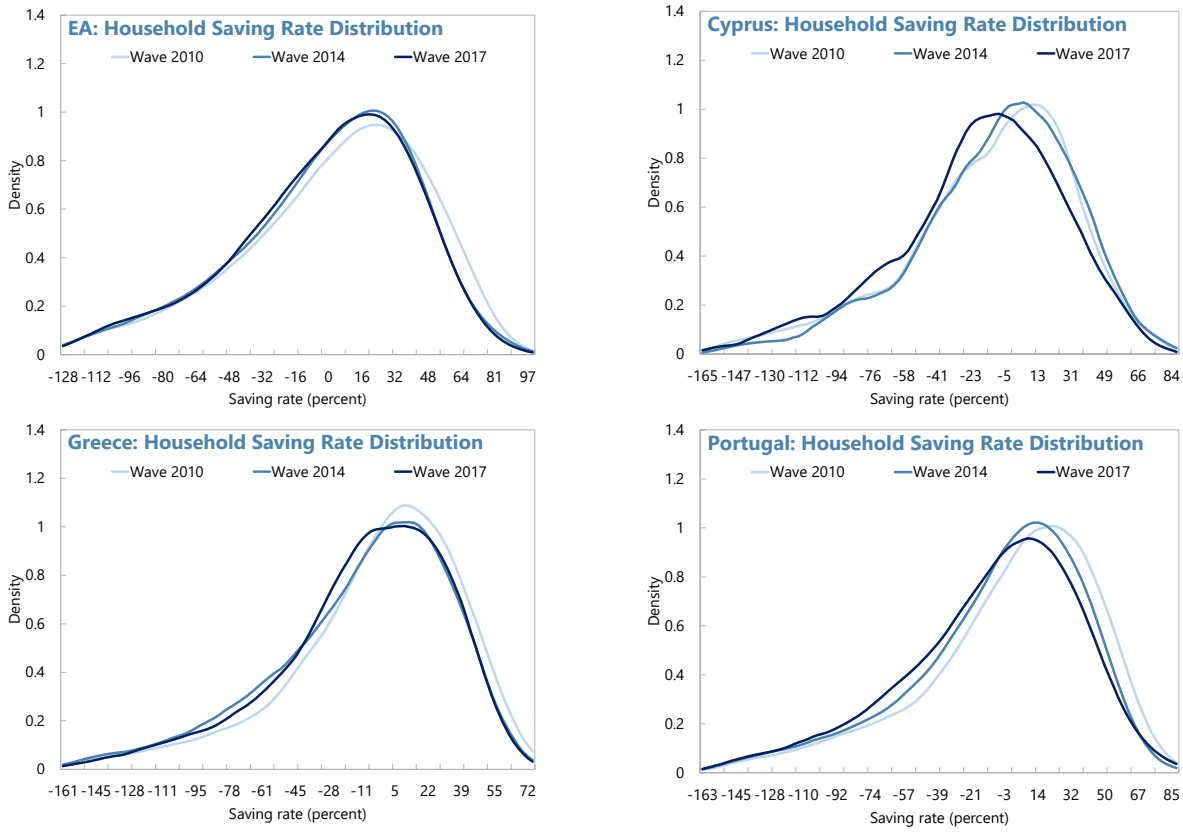


Source: European Central Bank.

Sources: Eurostat; Haver Analytics; and IMF staff calculations.

The household-level data confirm the dynamic pattern of savings as observed in the macroeconomic indicators and provide additional insights on their distribution (Figure 3). Saving rates in the EA countries declined over the three waves of the HFCS. Household saving rates in SE3 countries noticeably differ from the EA benchmark with the average saving rate being below the EA average, especially for Cyprus and Greece. In terms of savings dynamics, SE3 countries recorded a more pronounced decline in the saving rate across the waves than the EA average. In addition, the saving rate in the EA countries is characterized by a negatively skewed distribution. This reflects the fact that consumption is typically positive, but income can essentially sometimes be close to zero, leading to large negative saving ratios for some households, which is consistent with evidence for other advanced economies (Finlay and Price, 2015). SE3 countries differ in terms of their distributions from the EA benchmark, exhibiting a slightly longer tail of negative saving ratios. Finally, there is also some evidence suggesting a contraction in savings for the right-hand side of the distribution across the waves, with top savers generally reducing their saving rate following the GFC, as shown by the data for waves 2 and 3.

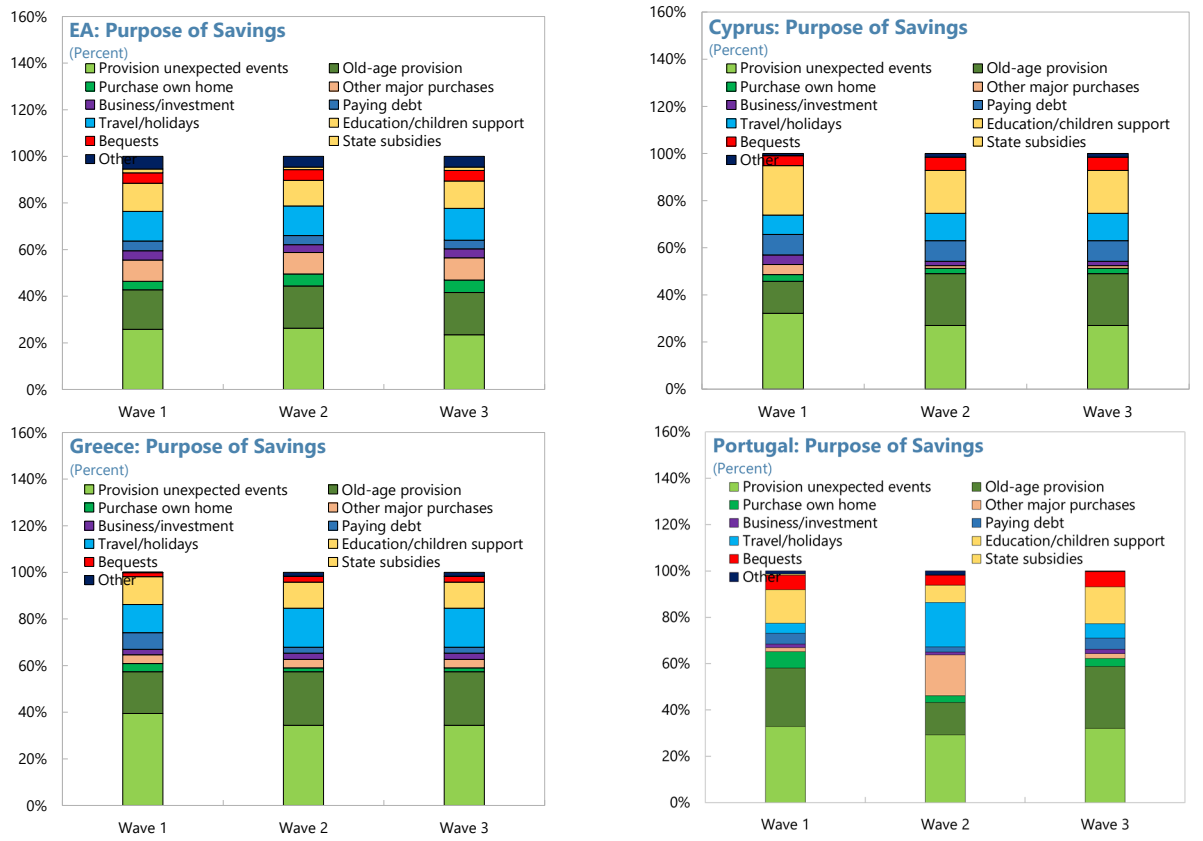
Figure 3. Household-Level Saving Distribution



Source: European Central Bank, HFCS database; and IMF staff calculations.

The HFCS survey allows to analyze self-declared motives for savings by households (Figure 4). The evidence from the HFCS survey suggests that an important saving motive for EA households is to have protection against unexpected events, which is in line with theory and empirical findings from studies for advanced economies. Households in Cyprus and Greece declare to save more for this motive compared to the EA average, with Greece recording the strongest precautionary motive among them. The other key declared motives, also in line with the previous studies, include old-age provision, education and support of children, and travel, which reflect savings for retirement, consumption smoothing, and support of dependents. Other motives for savings include home purchase, bequest, investment, and debt repayment, as well as other major purchases, but are typically less important. Comparing to the EA average, households in Cyprus seem to save more for debt repayment, while households in Greece and Portugal save less for this purpose and the importance of this motive declined across waves.

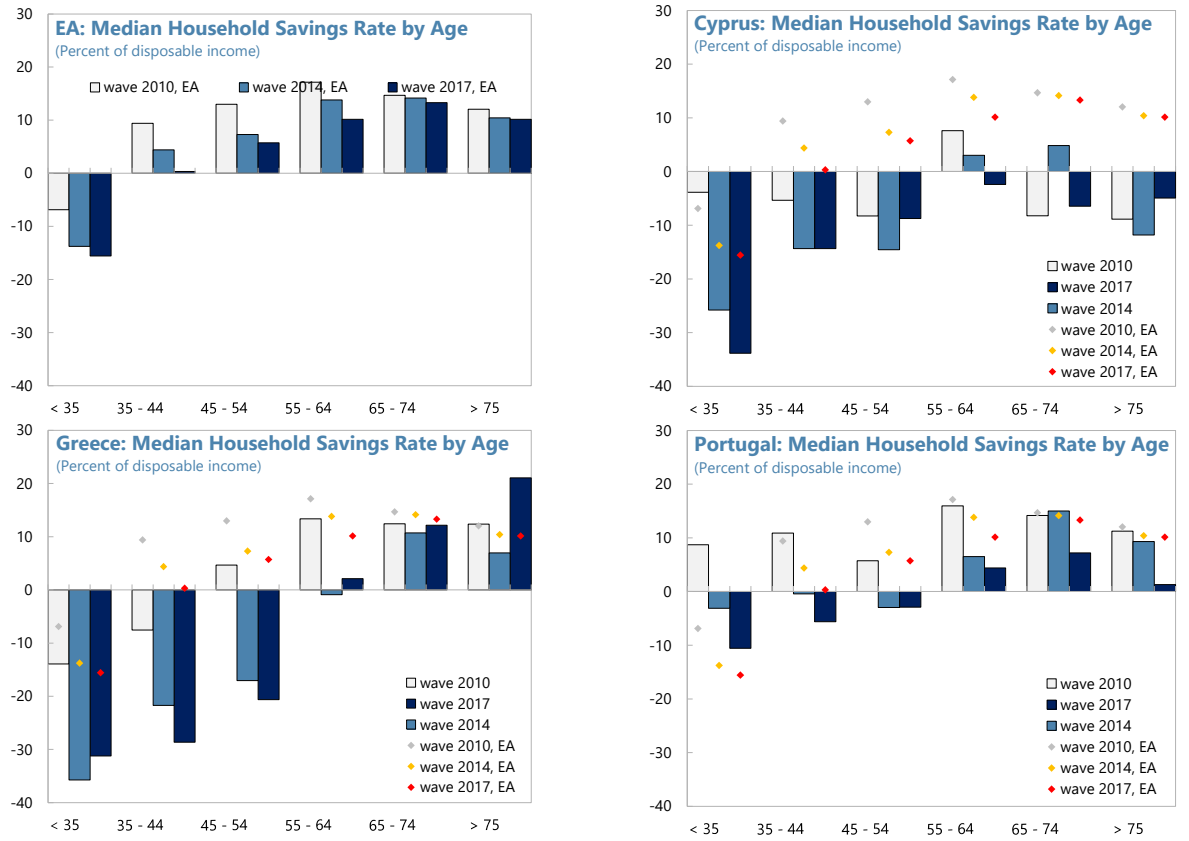
Figure 4. Purpose of Saving



Source: European Central Bank, HFCS database; and IMF staff calculations.

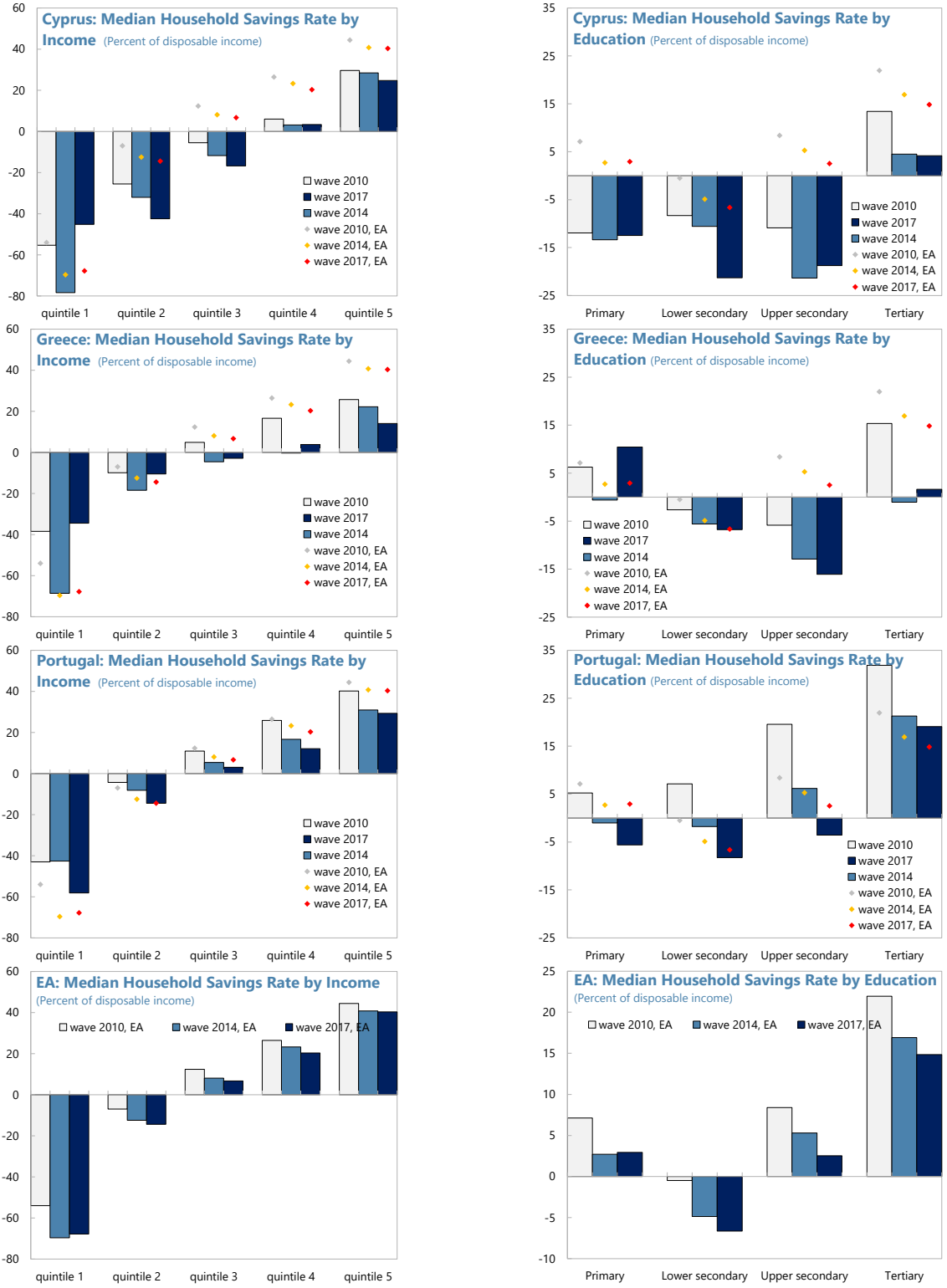
Variables capturing retirement and consumption smoothing appear to be associated with savings (Figure 5 and 6). The evidence from household-level data demonstrates hump-shaped age saving profiles. While the saving rate for the elderly does not typically enter the negative territory, as suggested by the basic life-cycle theory, this is in line with theoretical underpinnings of richer models and evidence from Bosworth and others (1991) and Poterba and others (1994). Of note, the general pattern is that the saving rate for the elderly declined across waves, although Greece was an exception in this respect for wave 3, reflecting perhaps the particularly uncertain period for this country following the SDC and the large income gap by age associated with relatively high social protection benefits and high youth unemployment. For Cyprus, the households of Cyprus above 65 have lower (or negative) saving rates, reflecting the relatively high at-risk poverty rate of elderly people. There is also evidence for a positive relationship between income and savings, which might in part reflect consumption smoothing behavior after transitory variations in income (Rodriguez-Palenzuela and others, 2016). More specifically, savings are negative for the first and second income quintiles and the highest for the top quintile, confirming the findings of Browning and Lusardi (1996). Education approximating permanent and future income is also positively correlated to savings, with particularly strong evidence for those with tertiary education, although declining across waves for both SE3 countries and EA average. For Greece, the income gap by education is shrinking likely due to rising unemployment for high education population and low demand for skilled labor. For Cyprus, the saving pattern by education likely reflects the wage premium for the tertiary education.

Figure 5. Household Saving Rate by Age



Source: European Central Bank, HFCS database; and IMF staff calculations.

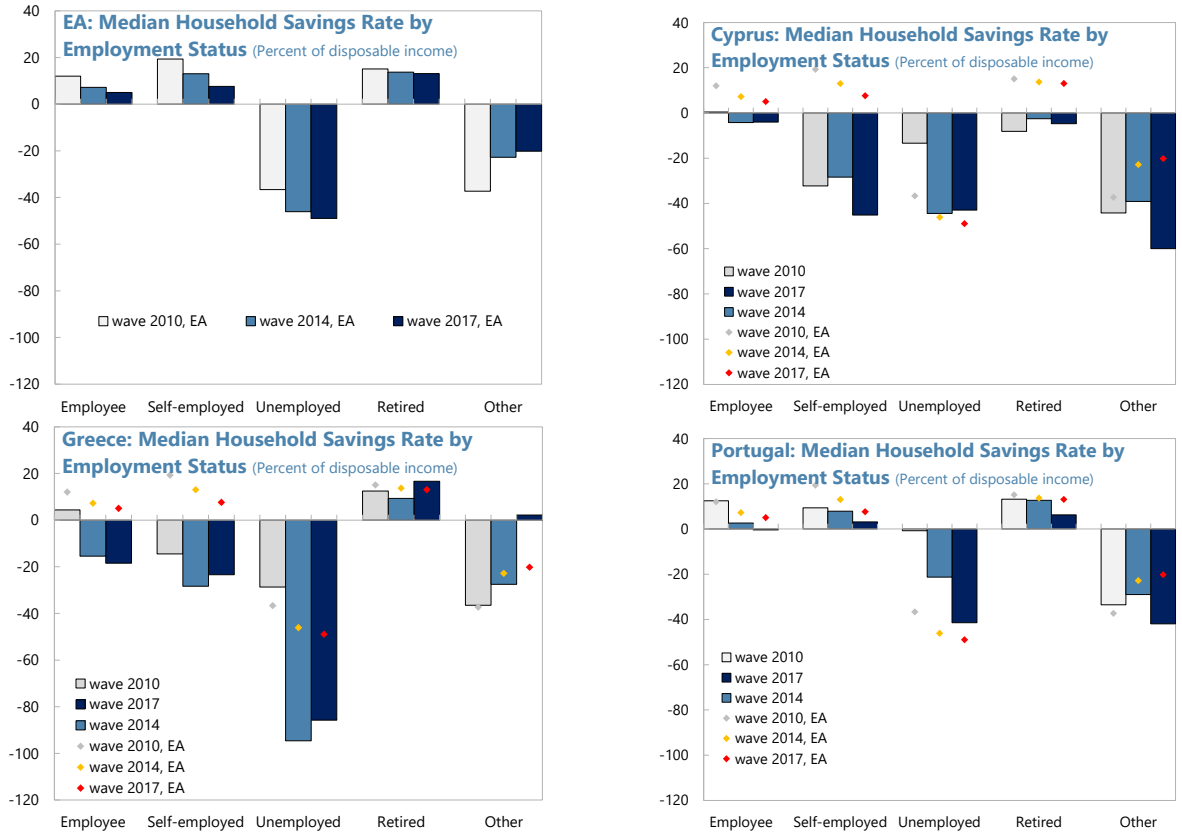
Figure 6. Household Saving Rate by Income and Education



Source: European Central Bank, HFCS database; and IMF staff calculations.

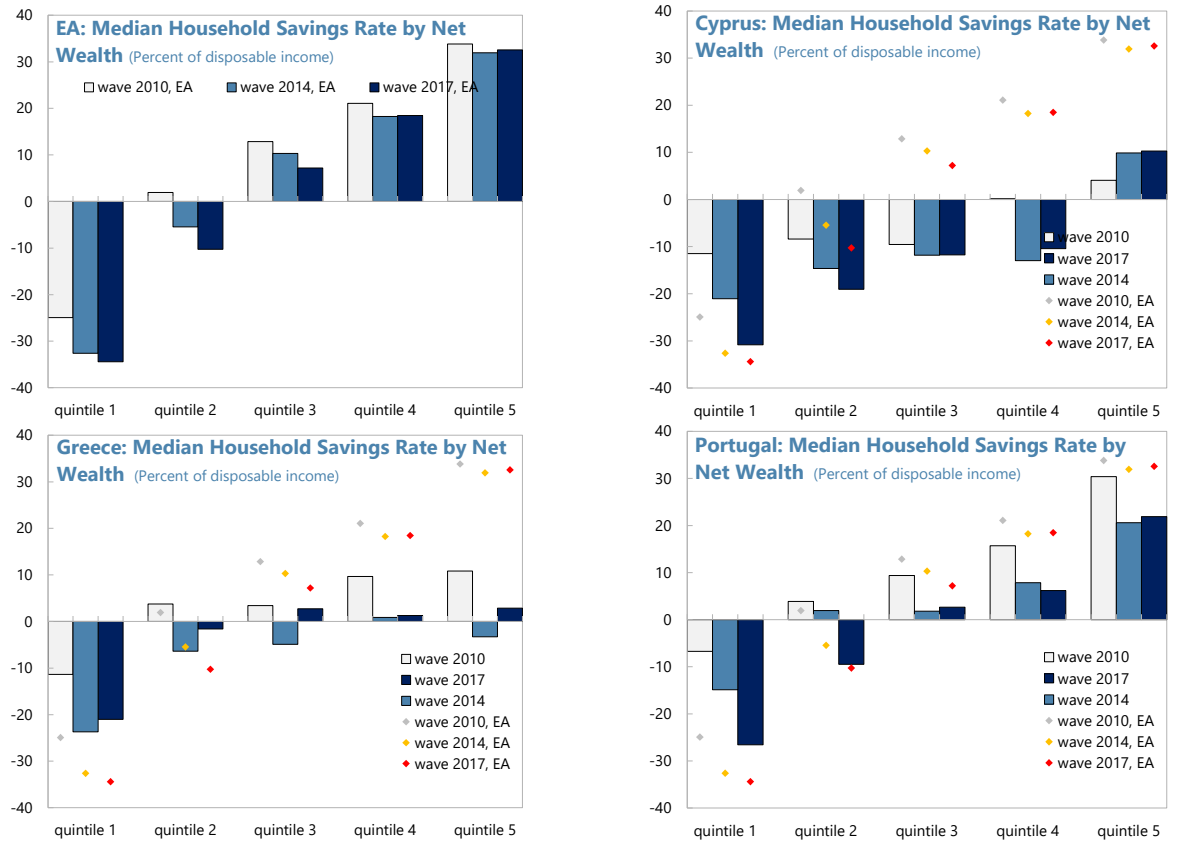
Evidence for precautionary motive is marred by multiple effects, possibly acting in opposite directions (Figure 7 and 8). Building on the theoretical contributions of Carroll (1992, 2001), unemployment and wealth are suggested to be shaping household savings. Unemployment is considered to reflect uncertainty about the future, particularly in terms of labor income, therefore higher unemployment rate would suggest higher household savings. But higher unemployment has also a direct negative effect on savings originating from lower income of those unemployed, as suggested by Callen and Thiman (1997) and Juster and Wachtel (1972). The evidence suggests that households whose heads are unemployed have predominantly a much lower savings rate compared to those in different labor statuses, which is also to a certain extent captured by the negative relationship between household savings and unemployment rate at the macroeconomic level. While the median saving rates are negative for all employment status for Cyprus, average savings rates are generally higher due to the skewed distribution. Furthermore, in presence of shocks, a reduction in wealth requires a higher saving rate as households accumulate savings to regain the optimal level of precautionary wealth, suggesting a negative correlation between household savings and wealth. There can however be an offsetting factor at play associated with the fact that wealth can be considered as a proxy for permanent income, which would imply a positive correlation with savings (Rodriguez-Palenzuela and others, 2016). The evidence from household-level data suggests that the positive effect dominates the negative effect, as evidenced in terms of stylized facts by Finley and Price (2015) for Australia. For Cyprus, although the disparity of savings behavior across households with different net worth is generally similar to other countries, the net savings are more concentrated in households with highest net worth.

Figure 7. Household Saving Rate by Employment Status



Source: European Central Bank, HFCS database; and IMF staff calculations.
Note: Others include: student/pupil/intern; permanently disabled; compulsory military service/social service; fulfilling domestic tasks; and not working for pay.

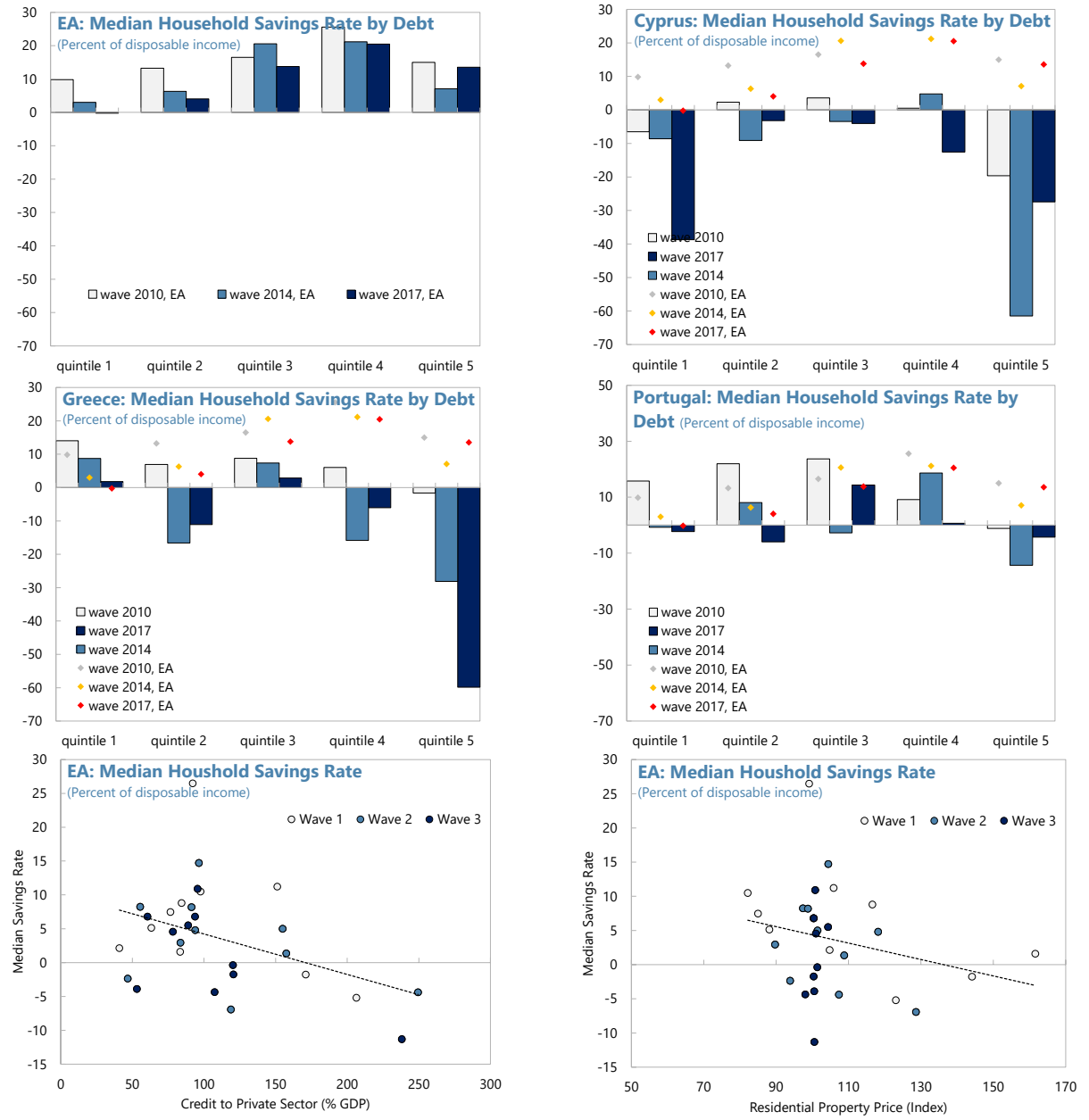
Figure 8. Household Saving Rate by Net Wealth



Source: European Central Bank, HFCS database; and IMF staff calculations.

Borrowing constraints seem to shape savings (Figure 9). With a relaxation of borrowing constraints and ensuing increase in household debt prior to the GFC, there was subsequently a need for balance sheet repair, which led to tighter regulatory requirements and deleveraging (Cuerpo and others, 2013). Earlier evidence suggests that households subject to tighter credit conditions have more limited access to credit and tend to accumulate more savings, especially for those countries deleveraging significantly (Bouis, 2021). As shown by household-level data, this was the case for Greece and to some limited extent for Cyprus where household debt declined significantly following the GFC and SDC, suggesting that households with lower debt in those countries tend to have higher savings. This correlation appears to be much less clear for the EA average, with some nonlinear effect present, which may stem from a much more subdued deleveraging. There is also support for the role of borrowing constraints based on macroeconomic data. Specifically, tightening of credit conditions proxied by credit to income is accompanied by increasing savings, while house price declines working through the wealth effect are associated with higher savings (Mody and others, 2012).

Figure 9. Household Saving Rate and Borrowing Constraints



Source: European Central Bank, HFCS database; and IMF staff calculations. Scatter plots include all the countries in the sample.

There is also support for correlation of other household characteristics to savings (Figure 10). Evidence based on household-level data confirms that household characteristics identified in the literature correlate to some extent with savings, although there is some heterogeneity in the sample. Family size appears to be broadly negatively associated with savings, except for singles. The average EA and Portuguese households with dependents appear to generate positive savings, while the Cypriot and Greek households with dependents generally dissave, especially for wave 2 and 3. In line with previous studies, female-headed households tend to have lower savings compared to male-headed households, likely reflecting less time spent on average by

females in workforce that is affecting their earning, although the difference is much smaller for Cyprus and Greece.

Figure 10. Household Saving Rate by Household Characteristics

Source: European Central Bank, HFCS database; and IMF staff calculations.

C. Econometric Analysis

Methodology

We conduct a multivariate regression analysis to consider variables simultaneously. Building on the literature identifying drivers of household savings and our findings from the descriptive statistics section, we estimate the following equation:

$$SR_{ij} = \alpha_0 + \sum_{k=1}^{F} \alpha_{1,k} HSV_{k,ij} + \sum_{k=1}^{Z} \alpha_{2,k} MACFV_{k,j} + \sum_{k=1}^{N} \alpha_{3,k} OTHV_{k,ij} + \varepsilon_{ij}$$

where SR denotes the saving rate in household *i* in country *j*, which is explained by household characteristics variables (HSV) that comprise income, age, size, gender, income uncertainty, wealth, debt, and housing; macroeconomic and financial variables (MACFV) that include inflation, interest rate, government budget balance, private debt, and government pension; and other variables (OTHV) that are considered in the robustness checks.

Both standard cross-sectional and quantile regressions are employed. As shown earlier, the saving rate is characterized by a negatively skewed distribution. Consequently, the OLS regression that captures the average effect may inadequately capture the nature of the relationship between the average household saving rate and the set of explanatory variables. In particular, the linear regression does not allow to perform shape change analysis. To provide a more refined analysis that allows examining the distributional impact, the quantile regression technique developed by Koenker and Basset (1978) is employed. As a robustness check, we also implement an instrumental variable technique for the quantile regression developed by Chernozukov and Hansen (2005, 2008) and Machado and Santos Silva (2019), as well as robust and limited dependent model regressions. Annex III provides information on data definitions, as well as additional tables and graphs with results.

Regression results

The first set of specifications encompassing basic household-level variables sheds light on household saving drivers (Table1). Consistent with the evidence from descriptive statistics, median regressions suggest that savings are positively associated with income and age and negatively correlated to household debt service. Quintile regressions reveal that the associations between income and debt are particularly strong for the lowest quintile of savers. In addition, median regressions also confirm the relevance of household size and gender for household savings, with the latter suggesting that households headed by males save more compared to households headed by females, as suggested by previous studies and descriptive statistics. The impact of household size across the distribution of savings is much more pronounced for lower quintiles compared to higher quintiles (Figure 11).

There is some support for the prevalence of precautionary motive. In line with evidence from descriptive statistics, median regressions indicate that uncertainty captured by unemployment does not on average appear to confirm the predictions of the buffer-stock model. This result is consistent with the findings obtained by Kolerus and others (2012) using household-level data for Germany, Finley and Price (2015) for Australia, and Rodriguez-Palenzuela and others (2016) for EA countries. But the results based on quantile regressions shed more light, suggesting that uncertainty is positively correlated to savings for more than 50 percent of the distribution of savings and implying that the precautionary motive seems to be at work for a sizeable portion of households (Figure 11). This may reflect the dominance of the positive effect stemming from the precautionary motive over the negative effect on savings originating from lower income, which broadly confirms the relevance

of unexpected events as a motive for savings declared by households in the survey. Consistent with the buffer-stock model, there is also support for the adverse impact of wealth on consumption and savings, likely reflecting that a reduction in wealth requires a higher saving rate as households accumulate savings to regain the optimal level of precautionary wealth. There is much higher sensitivity to wealth for households with lower savings (Figure 11).

Borrowing constraints and financial variables are estimated to impact household saving as well. Controlling for the household characteristics, we use private credit to GDP as a proxy to capture credit conditions as in Mody and others (2012). Our results suggest there is a negative association between credit conditions and savings, especially for those households with higher savings. This indicates that an increase in households' credit implies that households can borrow resources to offset the negative income shock and may reduce precautionary savings. Real interest rate on deposits tends to increase with household savings, pointing to the likely dominance of the substitution and wealth effects over the income effect. The result is consistent with the evidence from Mody and others (2012), Grigoli and others (2014, 2018), and Checherita-Westphal and Stechert (2021), obtained from macroeconomic cross-country data. The impact of the interest rate is estimated to be much stronger for those households with higher savings and negative for households in the lowest quintile (Figure 11).

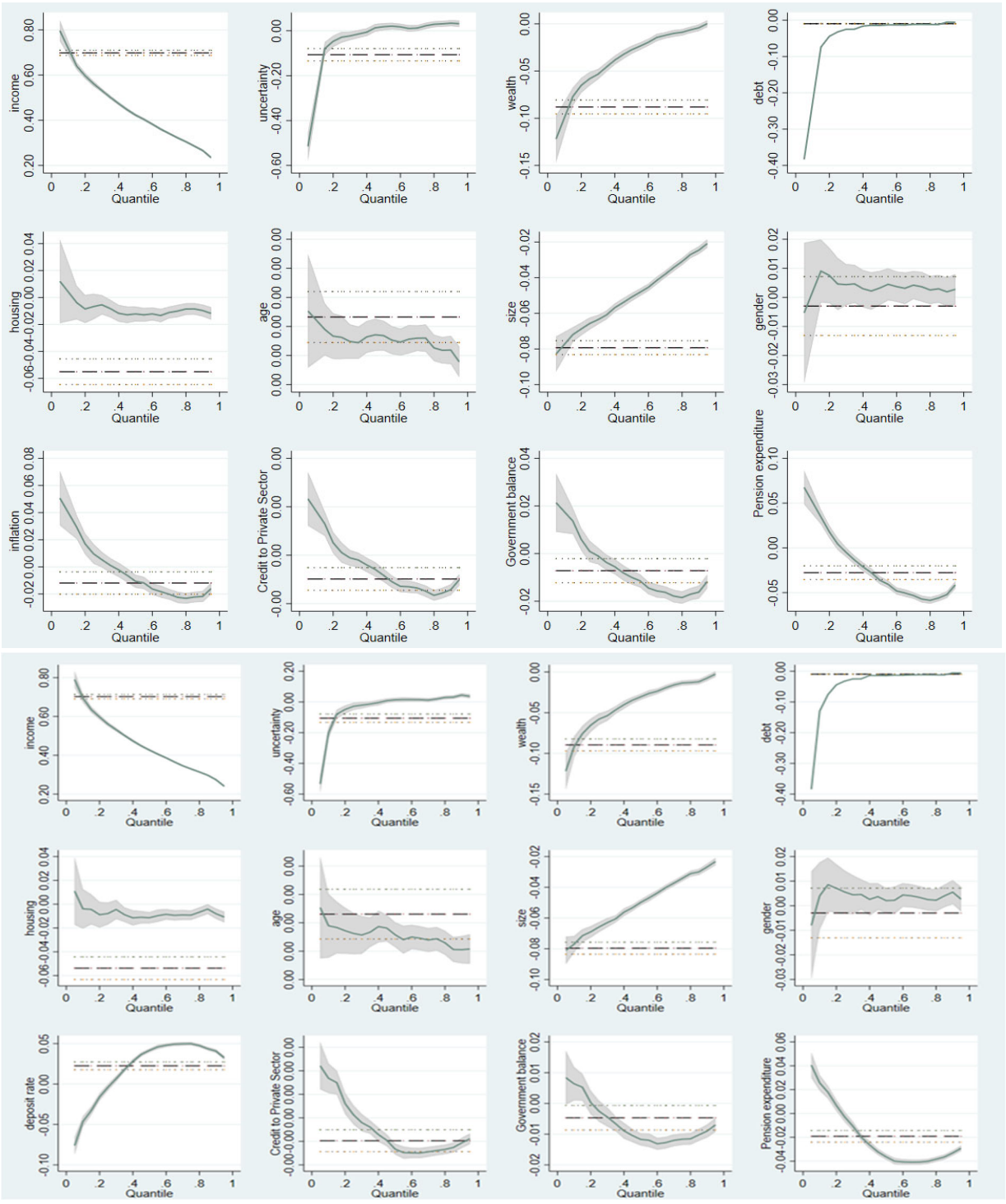
Fiscal policy and macroeconomic environment are found to have some impact too, after controlling for household characteristics. Higher government deficits are found to be associated with higher household savings, confirming the relevance of the Ricardian equivalence, consistent with evidence from Callen and Thiman (1997) and Checherita-Westphal and Stechert (2021). The impact of government budget balance is estimated to be much weaker for households with lower savings, becoming even positive for households with a very low level of savings. Higher spending on government-provided pension schemes tends to be negatively correlated with household savings, suggesting that households consider their retirement benefits as a substitute for their working-age savings and reduce their pre-retirement savings, in line with evidence from Amaglobeli and others (2019). While the impact of inflation can be subject to forces acting in opposite directions, as suggested by Juster and Wachtel (1972) and Grigoli and others (2014, 2018), there is evidence showing a negative association between inflation and savings. This likely reflects the dominance of the intertemporal consumption argument suggesting that inflation may encourage expenditures on durables at the expense of savings, which appears to be stronger that the macroeconomic instability aspect that suggests a positive impact. The finding is in line with the results from Checherita-Westphal and Stechert, (2021).

Table 1. Baseline Regressions

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	OLS	QR	OLS	QR	OLS	QR	OLS	QR	OLS	QR	OLS	QR	OLS	QR	OLS	QR
Income	0.699***	0.425***	0.741***	0.445***	0.657***	0.405***	0.697***	0.425***	0.681***	0.422***	0.698***	0.423***	0.694***	0.441***	0.702***	0.427***
	(0.003)	(0.002)	(0.004)	(0.002)	(0.006)	(0.004)	(0.006)	(0.004)	(0.006)	(0.004)	(0.006)	(0.004)	(0.006)	(0.004)	(0.006)	(0.004)
Age	0.001***	0.002***	0.000**	0.002***	0.002***	0.002***	0.002***	0.002***	0.003***	0.002**	0.003**	0.002**	0.003**	0.002**	0.003***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Debt	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01**	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.08***	-0.05***	-0.09***	-0.05***	-0.08***	-0.05***	-0.08***	-0.05***	-0.08***	-0.05***	-0.08***	-0.05***	-0.08***	-0.06***	-0.08***	-0.05***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Gender	-0.00	0.02***	-0.00	0.01***	-0.00	0.01***	-0.00	0.01	-0.00	0.01***	-0.00	0.00	-0.00	0.01**	-0.00	0.00
(male)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.004)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)
Income					-0.11***	0.00	-0.11***	0.02**	-0.12***	0.00	-0.11***	0.02**	-0.11***	0.00	-0.11***	0.01*
Uncertainty					(0.014)	(0.010)	(0.014)	(0.009)	(0.014)	(0.009)	(0.014)	(0.009)	(0.014)	(0.009)	(0.013)	(0.008)
Wealth					-0.07***	-0.02***	-0.09***	-0.03***	-0.08***	-0.02***	-0.09***	-0.03***	-0.09***	-0.03***	-0.09***	-0.03***
					(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.003)	(0.004)	(0.002)
Housing					-0.07***	-0.03***	-0.06***	-0.01***	-0.07***	-0.02***	-0.06***	-0.01***	-0.06***	-0.01***	-0.05***	-0.01***
					(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)
Inflation									-0.03***	-0.02***	-0.01***	-0.01***				
									(0.002)	(0.002)	(0.004)	(0.003)				
Deposit rate													0.042***	0.057***	0.023***	0.042***
													(0.002)	(0.001)	(0.002)	(0.002)
Private credit									-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***
									(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fiscal									-0.03***	-0.02***	-0.01***	-0.01***	-0.02***	-0.01***	-0.00**	-0.01***
balance									(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Pension									-0.03***	-0.01***	-0.03***	-0.04***	-0.02***	-0.01***	-0.02***	-0.04***
									(0.001)	(0.001)	(0.004)	(0.003)	(0.001)	(0.001)	(0.003)	(0.002)
Constant	2.311***	1.391***	2.415***	1.465***	4.103***	1.963***	4.147***	1.940***	4.591***	2.188***	4.507***	2.345***	4.550***	2.203***	4.427***	2.405***
	(0.019)	(0.012)	(0.023)	(0.014)	(0.047)	(0.033)	(0.050)	(0.034)	(0.053)	(0.035)	(0.069)	(0.045)	(0.052)	(0.035)	(0.060)	(0.039)
Fixed effect	no	no	yes	yes	no	no	yes	yes	no	no	yes	yes	no	no	yes	yes
Observation	68246	68246	68246	68246	56103	56103	56103	56103	56103	56103	56103	56103	56103	56103	56103	56103
adj. R-sq	0.419		0.435		0.426		0.440		0.432		0.441		0.435		0.442	

* p<0.10 ** p<0.05 ***p<0.01. EA sample. Standard errors in brackets.
Sources: IMF staff estimates.

Figure 11. Coefficients Across Distribution of Savings

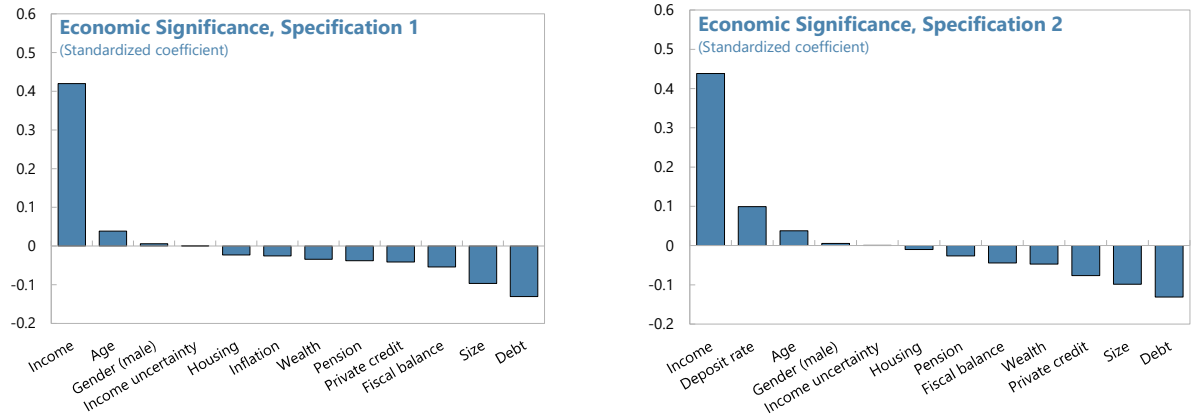


Source: IMF staff estimates.

Note: Coefficient estimates based on OLS regressions are represented by horizontal dotted bands and the estimates based on quantile regressions by shaded bands. Based on Table 1, the upper panel reflects estimation (6), while the lower panel reflects estimation (8).

The analysis of economic significance of factors underpinning household savings sheds light on the relative importance of individual drivers. Employing standardized coefficients allows to compare the relative importance of explanatory variables on household savings, so that a change of one standard deviation in the explanatory variable results in a certain standard deviation change in the dependent variable. The results suggest that in addition to the prominent role of income, other drivers shape savings decisions in a meaningful way too. The combined effect of borrowing constraints and financial variables is estimated to be significant. Specifically, an increase in household debt service ratio and private credit by one standard deviation is estimated to decrease household saving ratio by around 0.1 standard deviation, respectively. Similarly, an increase in deposit rate by one standard deviation is associated with an increase in household saving ratio by around 0.1 standard deviation. Furthermore, the results also suggest that family size and age play some role as well, with the former estimated to have a comparable impact as debt and deposit rate. The combined impact of fiscal variables is estimated to be smaller, while the other variables are estimated to play even a less important role.

Figure 12. Economic Significance



Source: IMF staff estimates.
Note: Specification 1 reflects estimation (6) in Table 1, while specification 2 reflects estimation (8) in Table 1

While the drivers of savings for SE3 countries are broadly similar to the EA average, their respective magnitudes differ, in particular for income, deposit rate, inflation, and government balance. Building on these findings, regressions are run using data for SE3 countries, with results broadly in line with the ones based on the whole sample (Table 2). The magnitude of the impact for these variables is also different for SE3 countries (coefficients are often smaller in SE3 relative to the EA). Given the marginal propensity to consume declines with higher income, increasing income will increase saving rates. However, due to the lower income level of SE3 countries, households in SE3 need to allocate a higher share of income on consumption on necessities. With higher income, the share of consumption on necessities in SE3 declines more rapidly than other EA countries. The results also suggest that inflation has a smaller impact on savings in SE3 countries, which may reflect the fact that inflation in those countries was historically below the EA average. The impact of the interest rate is also smaller in SE3 countries, likely reflecting a stronger income effect and the lower financial market development in SE3 countries. The impact of the government balance is estimated to be smaller too, reflecting generally higher fiscal multipliers (Kilponen and others, 2016) and informality in SE3 countries (Schneider, 2021).

Table 2. Baseline Regressions for Southern-European Countries

	(1)	(2)	(3)	(4)
Income	0.366***	0.368***	0.532***	0.531***
	(0.00550)	(0.00552)	(0.00781)	(0.00763)
Income uncertainty	-0.00741	-0.00881	0.0196	0.0143
	(0.0118)	(0.0126)	(0.0157)	(0.0164)
Wealth	-0.00792***	0.000297	-0.0610***	-0.0614***
	(0.00301)	(0.00320)	(0.00428)	(0.00418)
Debt	-0.0136***	-0.0134***	-0.0135***	-0.0135***
	(0.0000543)	(0.0000535)	(0.000116)	(0.000116)
Housing	-0.00342	-0.00459	-0.0115**	-0.0136**
	(0.00376)	(0.00383)	(0.00574)	(0.00561)
Age	0.00243***	0.00266***	0.00267***	0.00249***
	(0.000177)	(0.000181)	(0.000248)	(0.000254)
Size	-0.0393***	-0.0427***	-0.0766***	-0.0752***
	(0.00155)	(0.00172)	(0.00249)	(0.00249)
Gender (male)	0.0169***	0.0186***	-0.00201	-0.00294
	(0.00385)	(0.00397)	(0.00548)	(0.00555)
Deposit rate	0.0745***		0.0153***	
	(0.00167)		(0.00266)	
Inflation		-0.0605***		-0.0129***
		(0.00300)		(0.00226)
Private credit	0.00152***	0.00761***	0.0000588	0.000241**
	(0.000297)	(0.000519)	(0.000113)	(0.000111)
Government budget balance	-0.0341***	-0.0787***	-0.00977***	-0.0109***
	(0.00236)	(0.00366)	(0.000944)	(0.000990)
Government pension	-0.0263***	-0.0908***	-0.000249	-0.000570
	(0.00229)	(0.00466)	(0.00149)	(0.00151)
SE	1.139***	1.050***		
	(0.0873)	(0.0852)		
Income*SE	0.166***	0.163***		
	(0.00946)	(0.00910)		
Income uncertainty*SE	0.0270	0.0231		
	(0.0198)	(0.0215)		
Wealth*SE	-0.0531***	-0.0617***		
	(0.00523)	(0.00510)		
Debt*SE	0.0000755	-0.000123		
	(0.000109)	(0.000108)		
Housing*SE	-0.00811	-0.00896		
	(0.00692)	(0.00658)		
Age*SE	0.000241	-0.000170		
	(0.000303)	(0.000311)		
Size*SE	-0.0372***	-0.0325***		
	(0.00299)	(0.00305)		
Gender male*SE	-0.0189***	-0.0215***		
	(0.00685)	(0.00680)		
Deposit rate*SE	-0.0592***			
	(0.00321)			
Inflation*SE		0.0476***		
		(0.00378)		
Private credit*SE	-0.00146***	-0.00737***		
	(0.000320)	(0.000532)		
Government budget balance*SE	0.0243***	0.0678***		
	(0.00255)	(0.00379)		
Government pension*SE	0.0261***	0.0903***		
	(0.00274)	(0.00489)		
Constant	1.528***	1.654***	2.668***	2.704***
	(0.0484)	(0.0484)	(0.0715)	(0.0715)
Observation	56103	56103	20981	20981
R-sq	0.415	0.424	0.487	0.488

* p<0.10 ** p<0.05 ***p<0.01. Specifications (1) and (2) are based on the EA sample, while (3) and (4) are based on the SE sample.
Sources: IMF staff estimates.

We ran a set of robustness checks based on the EA sample, with the aim of examining the sensitivity of the estimations to different aspects (Annex III presents tables with results). Specifically:

- *Permanent income*. Drawing on Finley and Price (2015), a proxy for permanent income is estimated through a regression analysis conditioning income on such household characteristics as education, unemployment, age, gender, and marital status, with fitted values approximating permanent income. The results show an important role played by education, which is in line with the descriptive analysis and the findings of Attanasio and Weber (2010). The results based on the specification accounting for the permanent income proxy and education do not qualitatively differ from the baseline specifications.
- *Endogeneity*. Given likely endogeneity issues between households and individual regressors, especially income, we apply an instrumental variable technique for the quantile regression developed by Chernozukov and Hansen (2005) and Kaplan and Sun (2017). The instruments include education and individual characteristics. The results do not qualitatively differ compared to the baseline regressions.
- *Uncertainty*. In addition to the income uncertainty defined at a household level, regressions are estimated taking into account a measure of uncertainty defined at a macroeconomic level, which follows the approach taken by Kolerus and others (2012). The results do not qualitatively differ from the baseline median regressions, showing nevertheless a much stronger positive association between uncertainty and household savings.
- *Housing*. Similarly, in addition to reflecting housing wealth at a household level, the regressions are estimated using a measure representing developments in housing prices at a macroeconomic level. The results do not qualitatively differ from the baseline regressions.
- *Outliers*. Sensitivity to outliers is formally investigated. Following Blanchard and Leigh (2013), we re-estimate the baseline specification using robust regression, which down-weighs observations with larger absolute residuals using iterative weighted least squares (Andersen, 2008). Employing this methodology results in a broadly similar outcome to the baseline regressions, although there seems to be a stronger effect associated with uncertainty for which the coefficient becomes positive and statistically significant, confirming some relevance of the precautionary motive.
- *Alternative estimator*. Since the dependent variable can be considered a limited dependent variable due to its natural upper bound of unity, we apply Tobit regressions as Lugauer and others (2019) in their study of household savings based on household-level data. Employing this methodology results in a broadly similar outcome to the baseline regressions. But when savings are censored, there is strong support for the role of uncertainty for which the coefficient becomes positive and statistically significant, confirming the relevance of the precautionary motive.
- *HFCS waves*. Estimating the baseline regression for individual waves does not reveal major differences among the results except for the results for Wave 1 with unemployment and housing switching signs compared to the baseline regressions. This is likely because wave 1 includes a very volatile period of GFC.

IV. Policy Simulations

The regression analysis presented in the previous section suggests that income, inflation, interest rate, and government budget balance are important macroeconomic determinants of household savings. Using these explanatory variables, this section constructs simple model-based simulations to examine the sensitivity of household saving behavior to those macroeconomic shocks depending on the size of their actual saving rate. Assuming these variables can be influenced by policies, the simulations not only help assess the impact of

changing macroeconomic conditions and policies on household savings but also provide more granular insights into the impact on different household characteristics.

The quantile regression-based simulations were conducted separately on: i) the full sample of EA countries, assuming the baseline specifications as in columns 6 and 8 in Table 1, as well as ii) on a subsample of SE3 economies as in columns 3 and 4 in Table 2. In both cases, the model parameters were estimated for each of the 99 percentiles. This approach allows us to assess how households' saving behavior in SE3 countries differs from the average distribution of household saving across the EA. While the exercise provides a detailed response of household saving rates to shocks, it remains illustrative as it does not account for general equilibrium effects. As such, as the exercise is based on cross-sectional regressions, e.g. does not consider the role intertemporal factors, the results can be considered as estimates of long-term relationships, capturing comparative static effects.

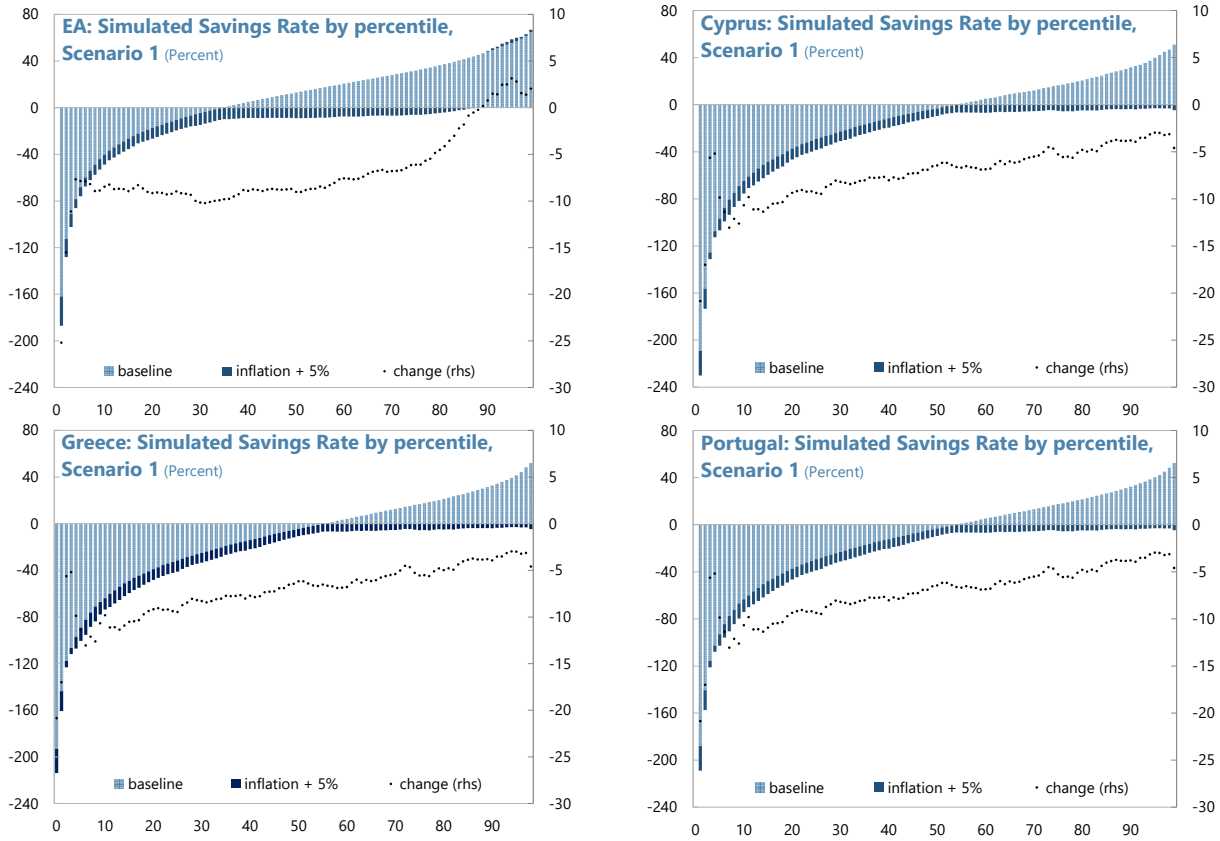
This section predicts saving rates at the household level and then examines the response of household saving rates across the savings distribution, under five macroeconomic policy scenarios. The first scenario assumes a 5-ppt increase in the inflation rate. The second scenario simulates the impact of a 200-bps increase in the real interest rate. The third scenario explores the impact of stronger government balance by 2 ppt of GDP. The fourth scenario simulates the impact of a stylized untargeted income support to households by assuming that each household receives a lump-sum income transfer equivalent to 3 percent of an average income in the country. Finally, the fifth scenario assumes that the same total amount of transfers—as assumed under scenario four—is distributed only to low-income households. The magnitudes of the scenario shocks are mainly illustrative, not meant to reflect specific country developments. Under the baseline, a sizeable portion of households in the EA are projected to have negative savings, which aligns with the findings of the descriptive analysis. The percentage of dissaving households is found to be higher in SE3 countries (Figure 12-16).

A. Inflation Shock

Higher inflation has a significantly adverse effect on the household saving rate. On average, a 5-ppt increase in inflation reduces aggregate household saving rate by 3.6 ppts for the EA (Figure A.III.1), with the least-saving households being affected disproportionally more by the inflation shock. The impact of the higher inflation on household savings eases as households move up in the distribution and the impact eventually turns positive for households near the highest saving quintile. In particular, the household saving rate of the top decile household increases, on average, by about 2 pps in response to the inflation shock, suggesting that the highest-saving households may perceive high inflation as a signal of macroeconomic instability, raising their precautionary motive of saving.

Among SE3 countries, household saving rate in Greece seems to be impacted the least by the inflation shock (by about 1.8 pps) while Cyprus household saving rate is estimated to drop by 4.3 pps. In general, the responses of SE3 households are comparable to those of the EA households, e.g., mostly negative response across the distribution, but on average, the size of estimated adjustment tends to be smaller. Similarly, the least-saving households in SE3 are hit particularly hard and the higher-saving households are impacted much less. Nonetheless, the positive impact of higher inflation on saving rates of top saving households is not present in case of SE3 households.

Figure 13. Simulation Results, Inflation Shock



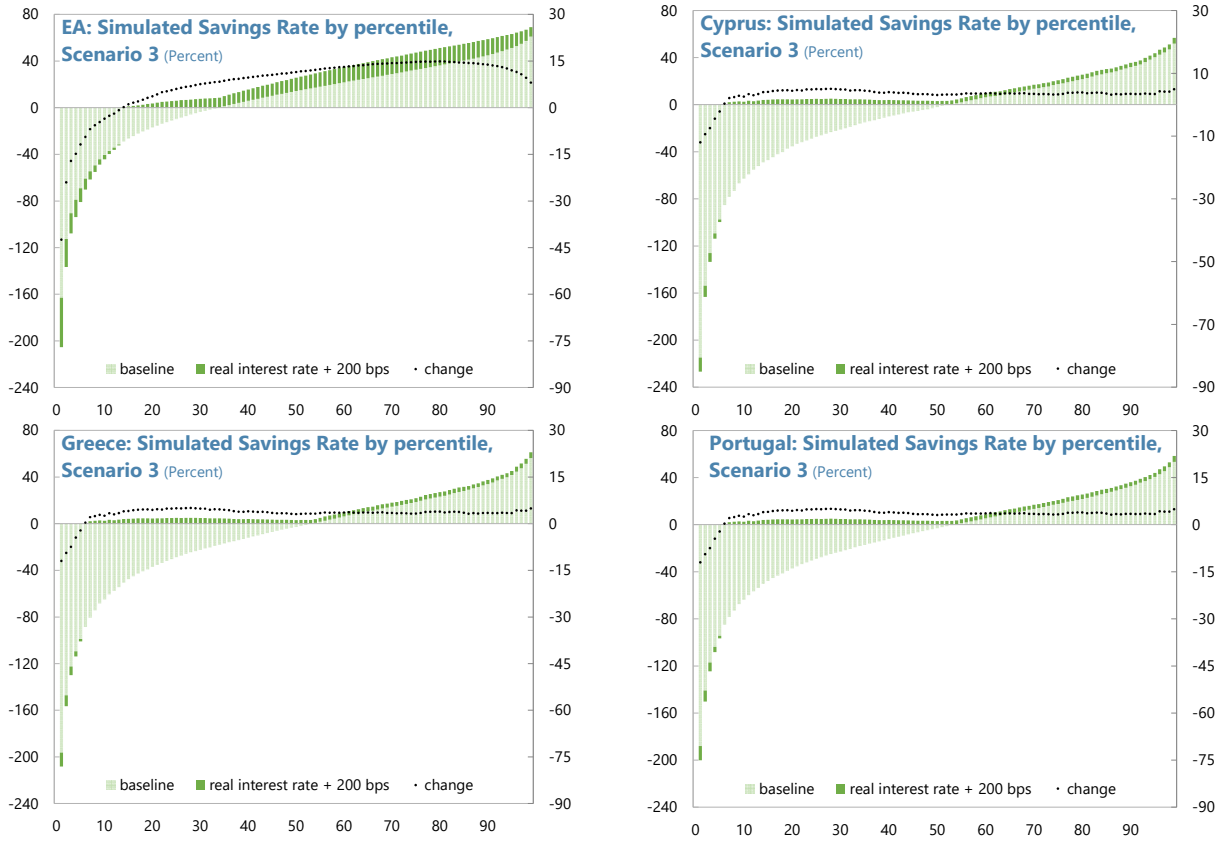
Source: IMF staff estimates.
Note: Baseline represents the predicted saving rate level using specification 6 presented in Table 1. Inflation + 5% represents the impact of the shock. Change is defined as the difference between the predicted median household saving rate under the baseline and the shock scenarios.

B. Interest Rate Shock

An interest rate shock has a markedly positive effect on the household saving rate. The effect of higher interest rate by 200 bps is found to raise the household saving rate by 4.6 ppts for EA, and by around 1-2 ppts for Cyprus, Greece and Portugal. However, the increase is highly uneven across the distribution. As expected, the saving rate of the high-saving households tends to increase the most, while the households with lowest savings take sizeable loss in their savings, reflecting the more dominant income effect over the substitution and wealth effect. These results suggest, that without additional income support to low-saving households, monetary tightening risks leaving the lowest-saving households significantly worse off, despite the overall impact being positive.

Similar to the inflation shock, the responses of SE3 households, when compared to the EA sample, tend to be smaller in size across the distribution, reflecting the lower level of private savings in S3 countries compared to the EA. In addition, the distributional impact also exhibits less linearity, as the simulated increase in household saving rate peaks at around 5 ppts for households near the 30th percentile before gradually easing and stabilizing at around 3-4 ppts.

Figure 14. Simulation Results, Interest Rate Shock

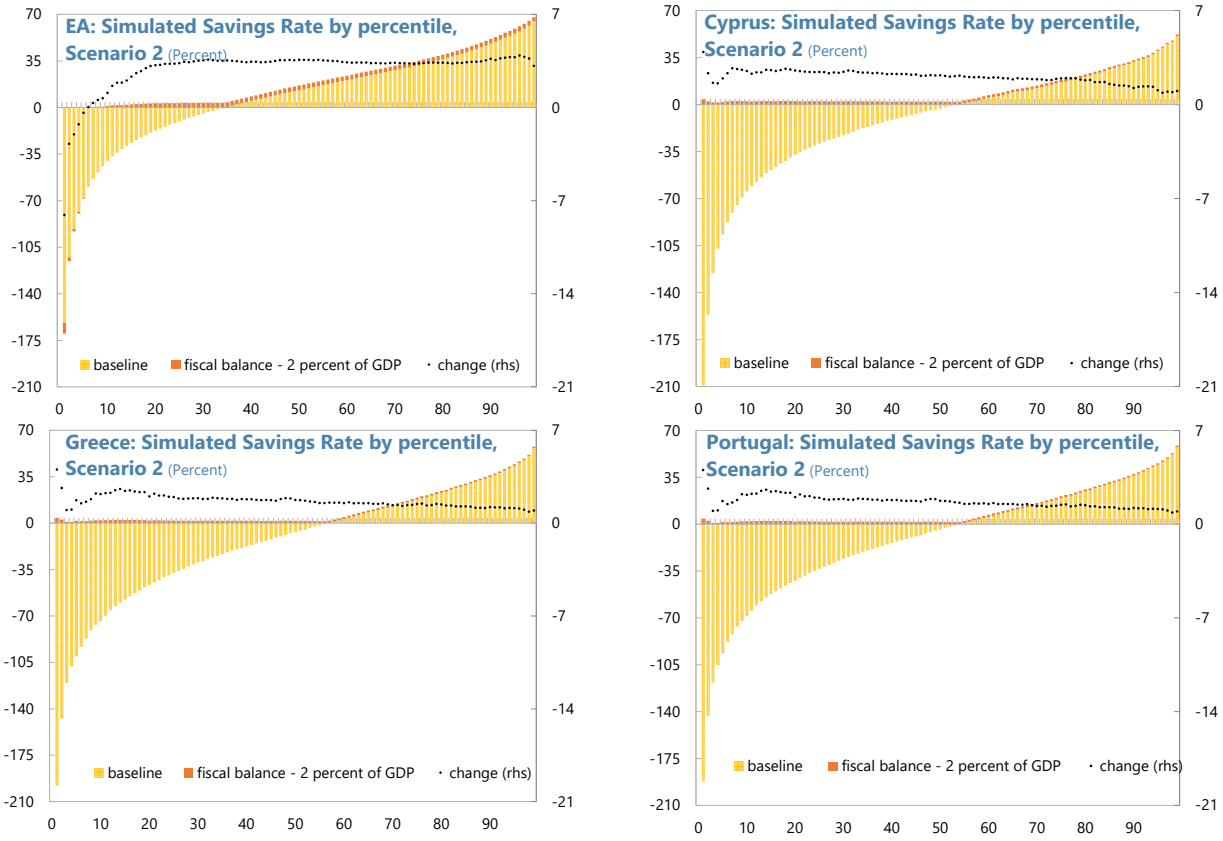


Source: IMF staff estimates.
Note: Baseline represents the predicted saving rate level using specification 8 presented in Table 1. Real interest rate + 200 bps represents the impact of the shock. Change is defined as the difference between the predicted median household saving rate under the baseline and the shock scenarios.

C. Government Budget Balance Shock

Fiscal balance has a modestly negative effect on the household saving rate. A reduction in fiscal balance by 2 percent of GDP raises household savings by more than 1 ppts for EA, and almost 1 ppts for Cyprus, Greece, and Portugal. The resulting changes to the household saving rate are significantly smaller compared to the previous two shocks. Savings for the bottom 10 percent of households decreased by around 1 ppt on average. In contrast, such an adverse impact is not observed in case of the lowest-saving households in SE3 economies. Instead, the lower-saving households in SE3 countries generally see higher increase in their savings. For example, the average savings rate increases by around 2.5 ppts for households in the lowest-saving decile, but only by around 1 ppt for the household in the highest-saving decile. The results suggest that expansionary fiscal policies could be effective in supporting savings of the low-saving households in SE3 economies. However, given the existing large external imbalances and high public debt level, policymakers would have to ensure sufficient targeting of the policy mix.

Figure 15. Simulation Results, Fiscal Balance Shock



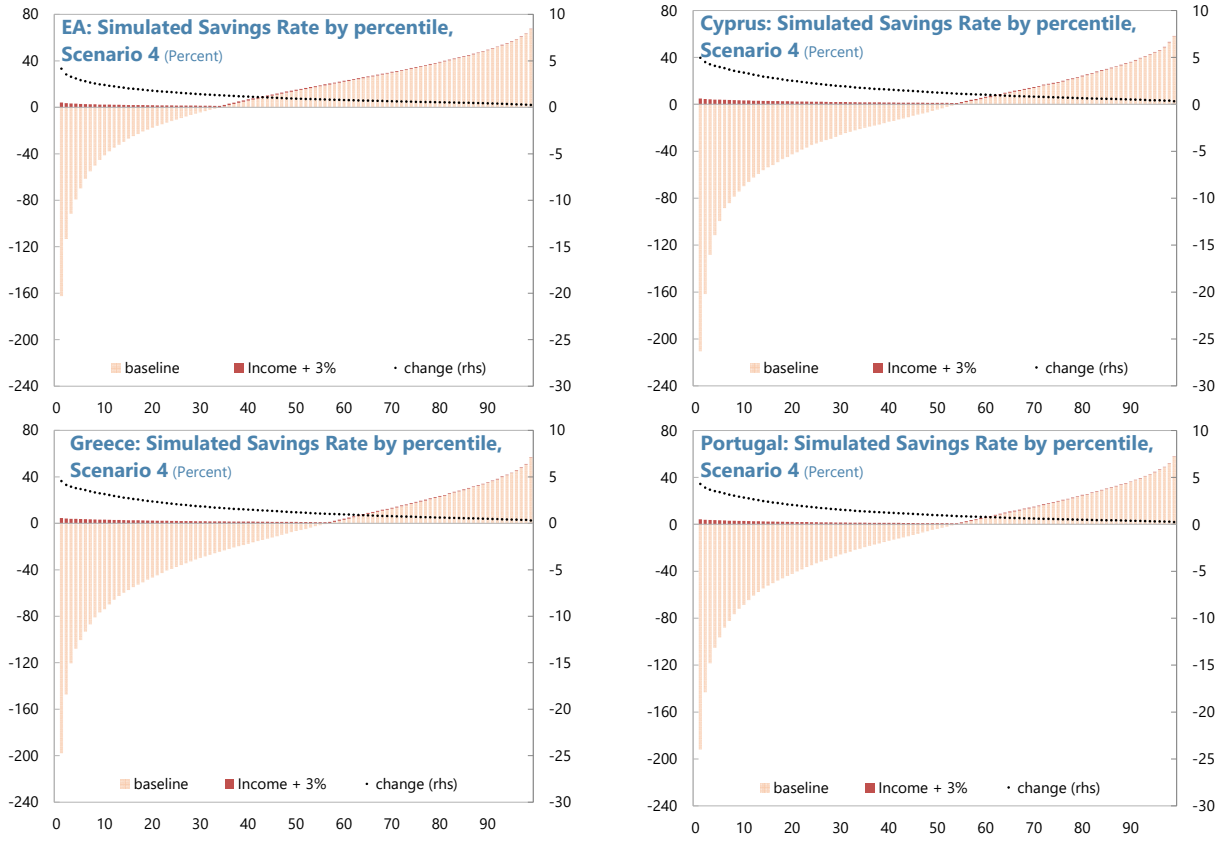
Source: IMF staff estimates.
Note: Baseline represents the predicted saving rate level using specification 8 presented in Table 1. Fiscal + fiscal balance – 2 percent GDP represents the impact of the shock. Change is defined as the difference between the predicted median household saving rate under the baseline and the shock scenarios.

D. Income Shock

Increasing households' disposable income has a noticeable effect on their saving rates, with the impact being stronger in case of low-saving households. For EA, we estimate that a lump sum transfer of 3 percent of the average income improves the median household saving rate by about 1 percentage point.[1] While the impact of a lump sum transfer seems negligible (0.2 percentage point increase) on high-saving households, it is estimated to be much stronger in case of low-saving households (4.2 percentage points increase). Notwithstanding the income gap between SE3 and other EA countries, which to a large extent, explains the differences in saving rates between these two groups of countries, our estimates suggest that the responsiveness of household saving to income in Cyprus, Greece, and Portugal is broadly aligned with the EA.

[1] Under this scenario—e.g., broad-based income support—each household receives a lump sum income transfer equivalent to 3 percent of the average income in each country regardless of its income.

Figure 16. Simulation Results, income shock (broad-based)

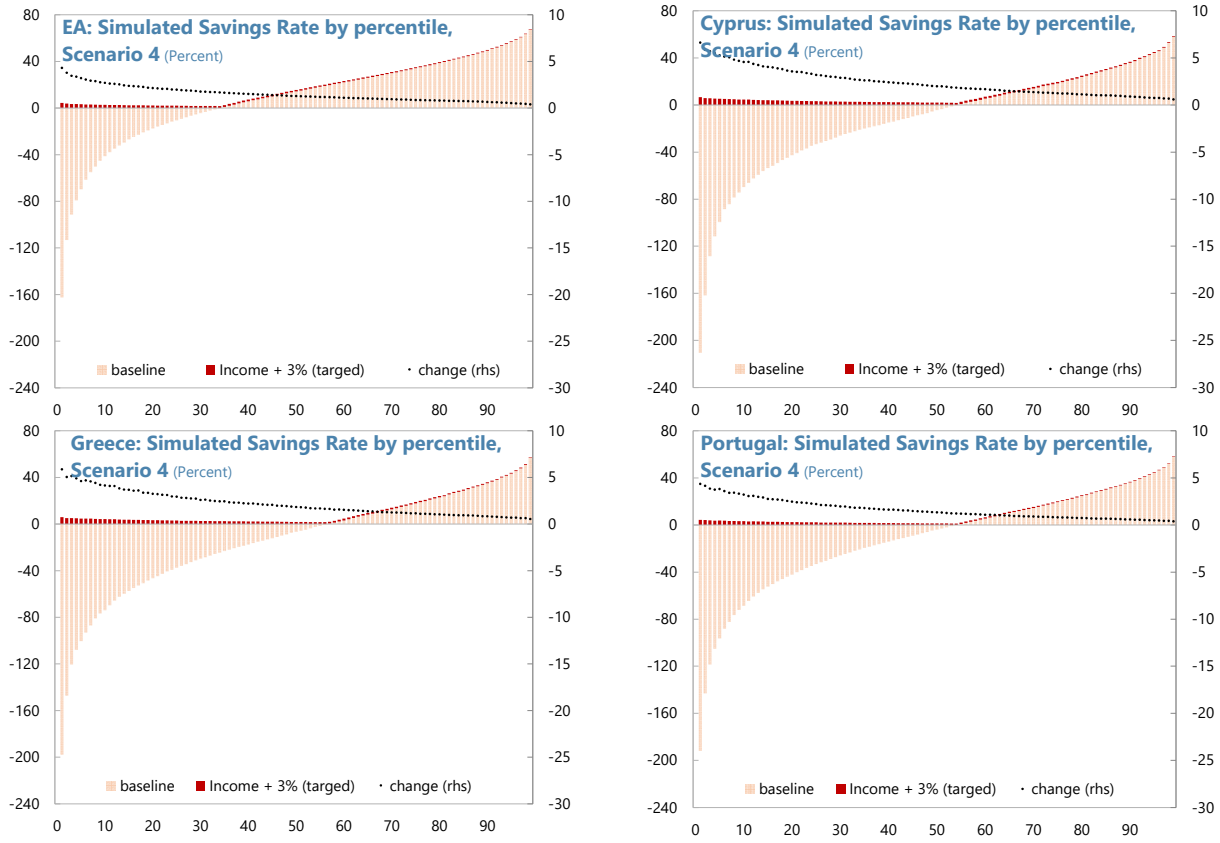


Source: IMF staff estimates.
Note: Baseline represents the predicted saving rate level using specification 8 presented in Table 1. Income + 3% represents the impact of the shock. Change is defined as the difference between the predicted median household saving rate under the baseline and the shock scenarios.

In a modified scenario[2], we estimate the impact of a targeted income support on household saving rates. As the impact of an additional unit of income on savings tends to be more pronounced in case of low-saving households, the effect of the targeted income support on household savings is expected to be stronger relative to the broad-based income support in the previous scenario. For the EA—under the targeted support scenario—we estimate that the saving rate of a median household improves by 1.3 percentage points (0.3 percentage point above the broad-based income support case). While the effect of income targeting on the median-household saving rate in the EA does not seem large, it is estimated to be more pronounced in case of Portugal (1.3 percentage point, e.g., additional 0.4 percentage point above the broad-based scenario) and particularly in case of Cyprus and Greece (2 and 1.8 percentage points, respectively, e.g., additional 0.7 and 0.6 percentage point above the broad-based scenario). The impact on low-income households is estimated to be even stronger, with household saving rates improving by 3, 4.4, and 4 percentage points in case of Portugal, Cyprus and Greece (an additional 0.4, 1.2, and 1 percentage point increase in household savings on top of the effect of the broad-based income support).

[2] Under the targeted income support scenario, the same amount of resources, as under the broad-based income support scenario, is spent, however is distributed only among households with income below the 25th income percentile.

Figure 17. Simulation Results, income shock (targeted)



Source: IMF staff estimates.
Note: Baseline represents the predicted saving rate level using specification 8 presented in Table 1. Income + 3% represents the impact of the shock. Change is defined as the difference between the predicted median household saving rate under the baseline and the shock scenarios.

V. Conclusions and Policy Implications

Our paper seeks to understand how household saving rates in three euro area (SE3) countries—Cyprus, Greece, and Portugal—differ in their levels and determinants from average EA trends. Both EA macro-level indicators and household survey data indicate that these saving rates fell after the GFC and prior to the pandemic, with SE3 countries recording among the lowest saving rates in the EA. Survey data suggest that while the EA saving rate is overall characterized by a negatively skewed distribution, SE3 countries exhibit an even longer tail of negative saving ratios.

Descriptive analysis of the household-level survey data suggests that the household saving behavior varies depending on household characteristics and reveals that: i) there is a positive relationship between income and savings, and the saving gaps between SE3 and other EA countries tend to be wider for higher income households, ii) education is also positively correlated to savings, with highest saving rates for those with tertiary education, iii) employment status has positive influence on savings, with the saving gaps between SE3 and other EA countries being larger for employed households, and iv) family size is negatively associated with savings, and female-headed households tend to have lower savings. Our analysis also indicates that the

deleveraging in the SE3 countries after the GFC was accompanied by increasing household savings, reflecting the positive impact of tighter borrowing constraints on savings, and this correlation appears to be stronger in SE3 countries than the EA average.

Our econometric analysis, while generally supporting the results from the descriptive analysis and related previous studies, provides additional insights on the distributional impact of factors driving household savings. The standard cross-sectional regressions suggest that income, age, and education are positively associated with savings, whereas household debt service and wealth are negatively correlated. Real interest rate on deposits tends to increase household savings but has important distributional differences. While higher government deficits are found to be positively associated with higher household savings—supporting Ricardian equivalence—higher government-provided pension benefits tend to be negatively correlated to household savings, as they lower incentives to raise buffers for future consumption. Applying quintile regressions on household survey micro-level data reveals that households at lower saving quantiles are more vulnerable to macroeconomic shocks. Specifically, associations between household saving rates and income and debt seem particularly strong for lower savers. Higher uncertainty tends to increase savings for more than half of households.

The simulated impact of the macroeconomic and policy shocks on household saving rates indicates that policy calibrations to different shocks to influence savings will depend on the type of the household. Specifically, higher inflation hits lower-saving households harder, reinforcing that controlling inflation is particularly critical for these households. Similarly, low-saving (high-saving) households' saving rates deteriorate (improve) under higher interest rates. Furthermore, a deterioration in fiscal balance tends to increase the savings rates more for lower-saving households than higher-savings ones. Consistent with regression results, our simulation results also suggest that the impact of these shocks is generally smaller for SE3 countries than the EA average. Finally, income support has a noticeable effect on households' saving rates, especially for low-saving households, suggesting that the effect of the targeted income support on household savings is stronger relative to the broad-based income support.

The paper offers important policy implications for SE3 countries. First, addressing low household savings will need a holistic approach as policy measures may entail macroeconomic and distributional trade-offs. For example, given the negative association between fiscal balance and housing savings, policy measures will need to focus on supporting household savings without undermining fiscal balances, given high public debt level in the SE3. This suggests a policy mix to incentivize greater household savings in SE3 countries in a fiscally sustainable way. The takeaways from our work to raise household savings in SE3 suggest:

- Income plays a central role for household savings, emphasizing stronger economic growth for higher household savings. In fact, the income gap between SE3 and other EA countries, to a large extent, explains the differences in saving rates between these two groups of countries. Similarly, if fiscal policy orients to achieving a more growth-friendly composition of government spending, this would address growth bottlenecks and enhance growth potential. Improving public investment management can enhance the efficiency and productivity of public investment.

- Sustainable social security systems, which would guarantee adequate income of the most vulnerable ones, can lower uncertainty, and stimulate household savings, Well-designed and targeted social transfers can increase savings of most vulnerable households, which tend to respond more to changes in income and policy variables. This indicates that targeting income transfers (e.g., by income level or employment status) or means tested social safety nets would raise household savings while limiting the associated costs. Reforms adjusting parameters of the pension schemes in response to current

and projected demographic trends (such as raising retirement age) and recalibrating generosity of public pension schemes, accompanied by targeted antipoverty programs, could not only safeguard long term sustainability of public pension schemes, but also provide incentives for higher private saving for retirement.

- Structural reforms in education, labor market, and insolvency frameworks are also important. Policies to support access to higher education, modernizing curricula, increase financial literacy (Lusardi, 2008), improving the quality of vocational training, and active labor market policies are relevant. Steps to raise female labor participation and address gender inequality could help narrow the saving gaps between male- and female-led households. Stronger debt resolution frameworks can facilitate efficient deleveraging of households and help them build healthier balance sheets to improve savings, particularly in low-income households with high leverage (Bover and others, 2016).

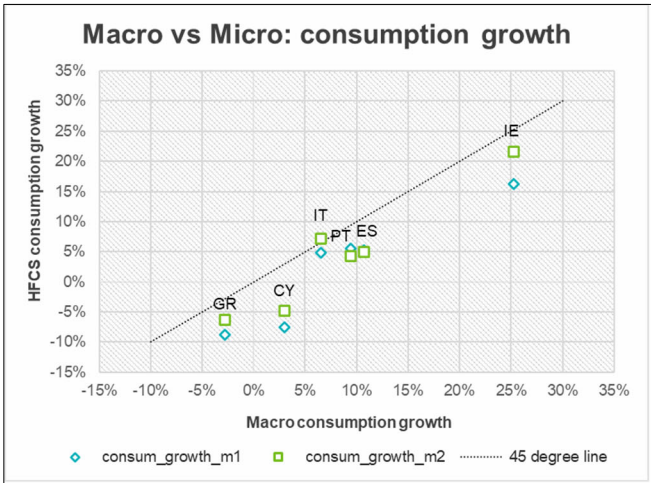
Annex I. Determinants of Household Savings

Variable	Expected sign	References
Income	+	Keynes (1936); Friedman (1957); Dynan and others (2004)
Age	+/-	Modigliani and Brumberg (1954); Kopczuk and Lupton (2007); Ameriks and others (2020)
Uncertainty	+/-	Deaton (1991); Carroll (1992, 1997); Loayza and others (2000); Jappelli and others (2008)
Wealth	-	Carroll (1992, 1997); Jappelli and others (2008)
Housing	-	Muellbauer (2007); Japelli and Pagano (1994); Deaton (1999); Campbell and Cocco (2007); Case and others (2001)
Debt	-	Carroll (1992, 1997); Mody and others (2012)
Size	-	Curtis and others (2015)
Education	+	Browning and Lusardi (1996); Dynan and others (2004); Attanasio and Weber (2010)
Household head gender: male	+	Lupton and Smith (2003); Hira and Loibl (2005); Mdqdnrsdv#dqg#Ehuqdvhn#4<<;,#Ryan and Siebens (2012); Sierminska and others (2010)
Interest rate	+/-	Elmendorf (1996); Schmidt-Hebbel (1997)
Inflation	+/-	Juster and Wachtel (1972); Grigoli and others (2014, 2018)
Private credit	-	Mody and others (2012)
Government budget balance	-	Barro (1974, 1989); Seater (1993)
Government pension	-	Feldstein (1985)

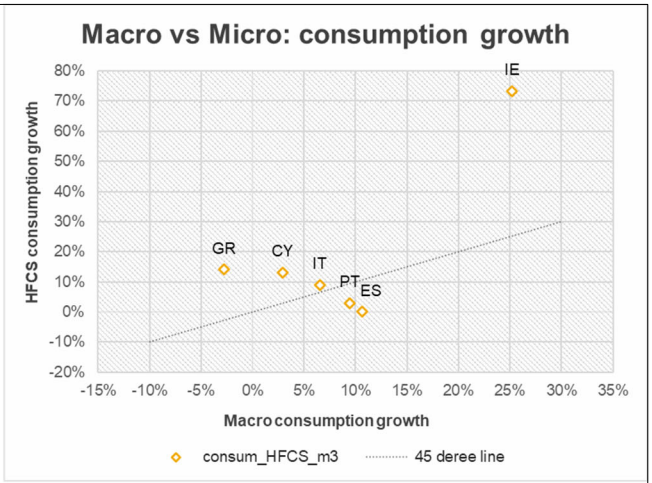
Annex II. Statistical Matching

A.1 Matching HFCS to HBS

Household Budget Surveys (HBS) record household consumption expenditure on 12 subcategories of goods and services, the summation of which gives the total consumption expenditure. In HFCS, the survey is designed in such a way that households are asked about a subset of consumption categories on food, utilities, and rent[1], together with a one-shot question on their total consumption expenditure. While one-shot questions usually receive relatively high response rates, they tend to give significant underestimation of total consumption expenditure compared to more questions asking about a series of subcategories. This is consistent with what we observe in HFCS: levels are off from the national accounts, and changes as well. Figure 1 shows the growth in the total consumption expenditure on consumer goods and services in HFCS, plotted against the consumption growth from national accounts data. While food consumption comoves closely with the macro numbers, the total consumption obtained from single questions barely lines up.



Note 1: macro household consumption source: Haver
Note 2: micro household consumption source: HFCS
measure 1 - Food at home and outside
measure 2 - Food at home and outside + utilities



Note 1: macro household consumption source: Haver
Note 2: micro household consumption source: HFCS
measure 3 - Consumer goods and services
(all household expenses, including food, utilities, and more)

Based on our observation of the available consumption variables in HFCS, we follow Lamarche (2017) to impute total consumption from the subset of consumption categories in HFCS. The imputation method can be traced back to Skinner (1987) and is adopted more recently by Browning et al. (2003), Blundell (2004, 2008), and Attanasio and Pistaferri (2014). The procedure is essentially statistical matching: the total consumption we observe in HBS are imputed to HFCS assuming a linear inverse Engel curve:

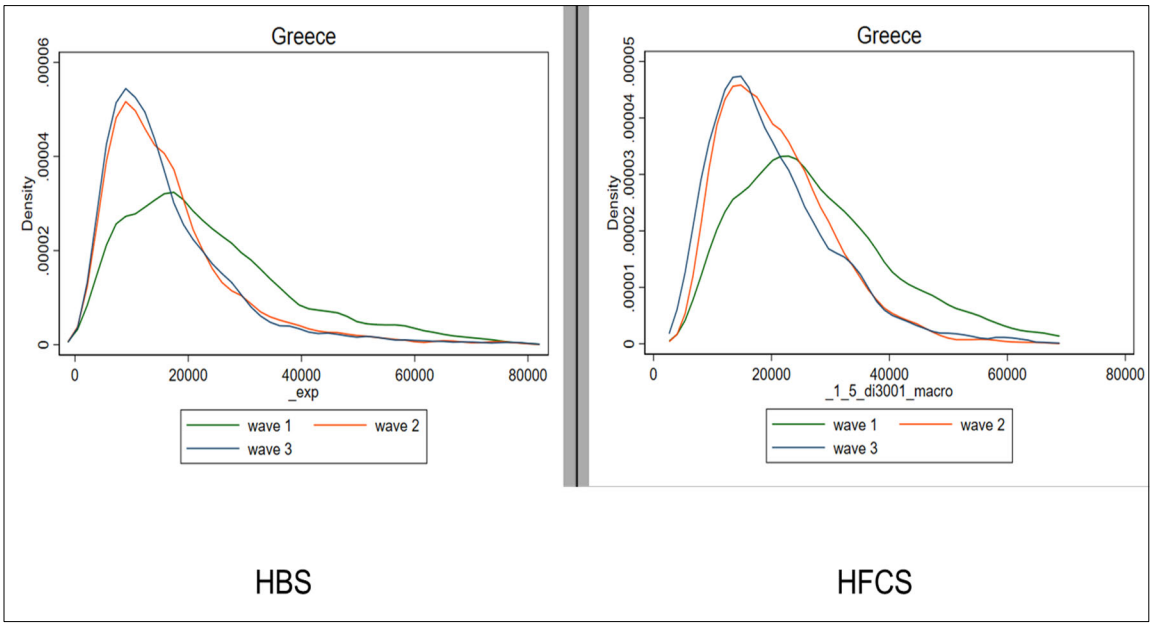
$$\text{HBS: } c_h = \beta_0 + \sum_j c_h^j \beta_j + \gamma' \boldsymbol{X} + \varepsilon_h$$

$$\text{HFCS: } \hat{c}_h = \hat{\beta}_0 + \sum_j c_h^j \hat{\beta}_j + \hat{\gamma}' \boldsymbol{X}$$

where c_h is household total consumption expenditure (in logs), c_h^j is household consumption on food (at home or away from home), utilities, and rent, and $\boldsymbol{X}$ is a vector of household demographic variables. In practice, we incorporate interaction terms of food consumption with household income quintiles to capture the fact that the Engel coefficient varies by household income level.

[1] In wave three, one more subcategory is available on trips and holidays.

Figure 2 is a side-by-side comparison of the distributions of consumption from HBS and HFCS for Greece[2]. We test out different set of covariates to keep the ones with the most explanatory power, with an aim to match as closely as possible the distribution of household total consumption to the HBS observations.



A.2 Matching HFCS to OECD income tax

We follow Slacalek et al. (2020) to compute after-tax income by applying the marginal tax rates according to the household taxable income then plus 2/3 of self-employment income. The income tax rates are obtained from the OECD Tax Database[3].

A.3 Matching HFCS to National Accounts

A well-documented caveat in survey data is the underreporting of income and consumption, and more so for income than for consumption. As a results, the survey sample tends to yield substantially lower savings than the national account numbers (Deaton, 2019). To correct for the underestimation issue, we follow Slacalek et al. (2020) to further match the aggregate income and consumption level to the national accounts. The resulting savings rates in our sample data always match the savings rates obtained from the national accounts. Note that we do not alter the relative level of income or consumption households of the same country[4].

[2] For the other EA countries EA countries in our sample, we have not yet acquired access to their budget surveys and borrow the coefficients estimated by Lamarche (2017) for now.

[3] Income tax data is collected in the HFCS non-core variable files for Italy and Finland. For Germany, we use the income tax formula provided by the OECD tax Database. For all other countries, we apply the marginal tax rates according to the household taxable income brackets.

[4] Deaton (2018) also documents that the underestimation of individual household income is probable. Poorer households may underreport their income even more if part of their income is sourced from shadow economy. This leads to massively negative savings rates for the poorer household. The fact that measurement errors can depend on household types calls for more careful treatment when correcting for the income levels.

Annex III. Empirical Investigation

Econometric analysis

Variable definition and sources

Variable	Description	Source
Income	Logarithm of disposable income	HFCS
Age	Household head age	HFCS
Uncertainty	Unemployment rate	HFCS
Wealth	Logarithm of wealth to disposable income	HFCS
Housing	Share of housing wealth in disposable income	HFCS
Debt	Debt service to disposable income	HFCS
Size	Number of household members	HFCS
Education	Education attainment	HFCS
Household head gender	Gender of the reference person	HFCS
Interest rate	Real deposit rate	IMF
Inflation	Annual dynamics of Consumer Price Index	IMF
Private credit	Private sector credit to GDP	IMF
Government budget balance	General government budget balance to GDP	IMF
Government pension	General government pension expenditures to GDP	IMF

Quantile regressions										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	ols	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
income	0.702***	0.694***	0.597***	0.532***	0.474***	0.427***	0.387***	0.346***	0.314***	0.274***
	(0.00584)	(0.0120)	(0.00727)	(0.00582)	(0.00487)	(0.00421)	(0.00384)	(0.00347)	(0.00341)	(0.00347)
income uncertainty	-0.106***	-0.201*	-0.0489***	-0.0210	-0.00442	0.0135	0.0153*	0.0118	0.0288***	0.0443***
	(0.0139)	(0.103)	(0.0174)	(0.0160)	(0.0122)	(0.00968)	(0.00813)	(0.00854)	(0.00829)	(0.00749)
wealth	-0.0896***	-0.0920***	-0.0654***	-0.0537***	-0.0402***	-0.0306***	-0.0237***	-0.0159***	-0.0130***	-0.00752***
	(0.00374)	(0.00426)	(0.00383)	(0.00300)	(0.00246)	(0.00217)	(0.00208)	(0.00179)	(0.00190)	(0.00198)
debt	-0.00968***	-0.130*	-0.0445***	-0.0252***	-0.0139***	-0.0145***	-0.0133***	-0.0115***	-0.0118***	-0.00532***
	(0.000312)	(0.0703)	(0.000413)	(0.00222)	(0.0000793)	(0.0000798)	(0.0000628)	(0.0000381)	(0.0000352)	(0.0000344)
housing	-0.0538***	-0.00390	-0.00884**	-0.00442	-0.0115***	-0.0114***	-0.00852***	-0.00904***	-0.00671***	-0.00802***
	(0.00486)	(0.0107)	(0.00451)	(0.00419)	(0.00333)	(0.00293)	(0.00279)	(0.00245)	(0.00253)	(0.00248)
age	0.00265***	0.00245***	0.00236***	0.00228***	0.00243***	0.00229***	0.00225***	0.00220***	0.00215***	0.00203***
	(0.000224)	(0.000361)	(0.000250)	(0.000187)	(0.000161)	(0.000135)	(0.000118)	(0.000108)	(0.000101)	(0.000106)
size	-0.0796***	-0.0770***	-0.0690***	-0.0630***	-0.0562***	-0.0499***	-0.0437***	-0.0373***	-0.0311***	-0.0267***
	(0.00199)	(0.00361)	(0.00225)	(0.00166)	(0.00154)	(0.00133)	(0.00115)	(0.00109)	(0.000933)	(0.000946)
gender male	-0.00297	0.00400	0.00711	0.00445	0.00257	0.00207	0.00436*	0.00338	0.00224	0.00553**
	(0.00516)	(0.00693)	(0.00498)	(0.00391)	(0.00339)	(0.00296)	(0.00257)	(0.00246)	(0.00233)	(0.00239)
deposit rate	0.0225***	-0.0464***	-0.0160***	0.00661***	0.0280***	0.0416***	0.0480***	0.0497***	0.0475***	0.0408***
	(0.00247)	(0.00420)	(0.00308)	(0.00253)	(0.00223)	(0.00167)	(0.00128)	(0.00114)	(0.00106)	(0.00112)
private credit	-0.000971***	0.00168***	0.000607**	-0.000202	-0.000711***	-0.00133***	-0.00149***	-0.00144***	-0.00134***	-0.00107***
	(0.000238)	(0.000476)	(0.000275)	(0.000207)	(0.000172)	(0.000159)	(0.000137)	(0.000128)	(0.000114)	(0.000118)
government balance	-0.00467**	0.00640	0.000301	-0.00442**	-0.00892***	-0.0117***	-0.0131***	-0.0120***	-0.0115***	-0.00898***
	(0.00204)	(0.00397)	(0.00226)	(0.00177)	(0.00146)	(0.00135)	(0.00127)	(0.00118)	(0.00102)	(0.00112)
government pension	-0.0192***	0.0257***	0.00680**	-0.0107***	-0.0264***	-0.0364***	-0.0407***	-0.0408***	-0.0384***	-0.0331***
	(0.00251)	(0.00452)	(0.00295)	(0.00232)	(0.00202)	(0.00172)	(0.00143)	(0.00129)	(0.00121)	(0.00127)
constant	4.427***	2.689***	2.558***	2.473***	2.480***	2.405***	2.255***	2.093***	1.940***	1.779***
	(0.0599)	(0.175)	(0.0768)	(0.0620)	(0.0482)	(0.0426)	(0.0363)	(0.0340)	(0.0333)	(0.0323)
N	56103	56103	56103	56103	56103	56103	56103	56103	56103	56103
R-sq	0.442	0.187	0.342	0.398	0.419	0.403	0.391	0.380	0.369	0.363

Standard errors in brackets.

Robustness checks

Permanent Income and Education				
	(1) OLS	(2) OLS	(3) QR	(4) QR
permanent income	0.689***	0.686***	0.424***	0.425***
	(0.00574)	(0.00574)	(0.00463)	(0.00441)
income uncertainty	-0.585***	-0.584***	-0.280***	-0.279***
	(0.0141)	(0.0141)	(0.0110)	(0.0106)
wealth	-0.0528***	-0.0517***	-0.0126***	-0.0106***
	(0.00361)	(0.00361)	(0.00228)	(0.00219)
debt	-0.0096***	-0.0096***	-0.0141***	-0.0141***
	(0.000311)	(0.000311)	(0.000083)	(0.000084)
housing	-0.0812***	-0.0819***	-0.0241***	-0.0246***
	(0.00472)	(0.00472)	(0.00302)	(0.00288)
age	0.00692***	0.00689***	0.00547***	0.00539***
	(0.000238)	(0.000238)	(0.000148)	(0.000147)
size	-0.0427***	-0.0427***	-0.0253***	-0.0271***
	(0.00196)	(0.00196)	(0.00113)	(0.00115)
gender male	0.134***	0.133***	0.0923***	0.0933***
	(0.00526)	(0.00526)	(0.00310)	(0.00303)
education	0.0972***	0.0961***	0.0665***	0.0655***
	(0.00205)	(0.00205)	(0.00131)	(0.00126)
deposit rate	0.0170***		0.0385***	
	(0.00247)		(0.00184)	
inflation		-0.00404		-0.00619***
		(0.00420)		(0.00240)
private credit	-0.0010***	-0.0010***	-0.0014***	-0.0010***
	(0.000241)	(0.000241)	(0.000164)	(0.000155)
government budget balance	-0.00307	-0.00309	-0.0120***	-0.00941***
	(0.00203)	(0.00258)	(0.00138)	(0.00171)
government pension	-0.0135***	-0.0163***	-0.0347***	-0.0313***
	(0.00253)	(0.00390)	(0.00179)	(0.00272)
constant	1.380***	1.412***	0.495***	0.434***
	(0.0650)	(0.0729)	(0.0429)	(0.0471)
N	55835	55835	55835	55835
R-sq	0.442	0.442	0.404	0.410

Standard errors in brackets.

Endogeneity		
	(1)	(2)
income	0.0870***	0.0774***
	(0.0240)	(0.0214)
income uncertainty	-0.0479***	-0.0470***
	(0.00237)	(0.00604)
wealth	0.129***	0.134***
	(0.0117)	(0.0104)
debt	-0.0160***	-0.0160***
	(0.000890)	(0.000983)
housing	-0.181***	-0.187***
	(0.0105)	(0.00908)
age	0.00106***	0.000992***
	(0.000109)	(0.000155)
size	-0.0282***	-0.0286***
	(0.00102)	(0.000880)
gender male	0.0193***	0.0194***
	(0.00347)	(0.00230)
deposit rate	0.0371***	
	(0.0000443)	
inflation		-0.0134***
		(0.00403)
private credit	-0.00122***	-0.000801***
	(0.000278)	(0.000273)
government budget balance	-0.0135***	-0.0145***
	(0.00271)	(0.00426)
government pension	-0.0347***	-0.0379***
	(0.000276)	(0.00273)
constant	2.336***	2.345***
	(0.0900)	(0.0418)
N	55835	55835

Standard errors in brackets.

Income Uncertainty - Macro				
	(1) OLS	(2) QR	(3) OLS	(4) QR
income	0.705***	0.426***	0.708***	0.428***
	(0.00580)	(0.00380)	(0.00581)	(0.00387)
income uncertainty - macro	0.0108***	0.0131***	0.00735***	0.00997***
	(0.00184)	(0.00120)	(0.00180)	(0.00120)
wealth	-0.0883***	-0.0282***	-0.0896***	-0.0305***
	(0.00374)	(0.00245)	(0.00374)	(0.00249)
debt	-0.00970***	-0.0145***	-0.00967***	-0.0145***
	(0.000312)	(0.000204)	(0.000312)	(0.000208)
housing	-0.0544***	-0.0112***	-0.0534***	-0.00961***
	(0.00486)	(0.00318)	(0.00486)	(0.00324)
age	0.00265***	0.00228***	0.00265***	0.00226***
	(0.000224)	(0.000147)	(0.000224)	(0.000149)
size	-0.0799***	-0.0510***	-0.0802***	-0.0497***
	(0.00199)	(0.00130)	(0.00199)	(0.00132)
gender male	-0.00311	0.00339	-0.00303	0.00219
	(0.00517)	(0.00338)	(0.00516)	(0.00344)
inflation	-0.0176***	-0.0193***		
	(0.00430)	(0.00282)		
deposit rate			0.0214***	0.0408***
			(0.00249)	(0.00166)
private credit	-0.00130***	-0.00120***	-0.00123***	-0.00154***
	(0.000242)	(0.000159)	(0.000242)	(0.000161)
government balance	-0.00455*	-0.00812***	-0.00132	-0.00667***
	(0.00262)	(0.00172)	(0.00220)	(0.00147)
government pension	-0.0567***	-0.0728***	-0.0361***	-0.0583***
	(0.00626)	(0.00410)	(0.00485)	(0.00323)
constant	4.762***	2.661***	4.574***	2.550***
	(0.0796)	(0.0522)	(0.0680)	(0.0453)
N	56103	56103	56103	56103
adj. R-sq	0.441		0.441	

Standard errors in brackets.

Housing - Macro				
	(1) OLS	(2) QR	(3) OLS	(4) QR
income	0.753***	0.434***	0.755***	0.434***
	(0.00416)	(0.00275)	(0.00417)	(0.00267)
income uncertainty	-0.123***	-0.00748	-0.122***	-0.0118
	(0.0132)	(0.00872)	(0.0132)	(0.00845)
wealth	-0.0542***	-0.00386***	-0.0546***	-0.00387***
	(0.00186)	(0.00123)	(0.00186)	(0.00119)
debt	-0.00943***	-0.0128***	-0.00941***	-0.0128***
	(0.000333)	(0.000220)	(0.000333)	(0.000213)
housing - macro	-0.00339***	-0.00433***	-0.00239***	-0.00284***
	(0.000350)	(0.000231)	(0.000373)	(0.000239)
age	0.00212***	0.00208***	0.00213***	0.00215***
	(0.000214)	(0.000141)	(0.000214)	(0.000137)
size	-0.0824***	-0.0507***	-0.0825***	-0.0497***
	(0.00199)	(0.00132)	(0.00199)	(0.00128)
gender male	0.00153	0.00889***	0.00156	0.00875***
	(0.00522)	(0.00345)	(0.00522)	(0.00334)
inflation	-0.0128***	-0.0187***		
	(0.00429)	(0.00283)		
deposit rate			0.0177***	0.0339***
			(0.00265)	(0.00170)
private credit	-0.000327	-0.000222	-0.000469*	-0.000615***
	(0.000250)	(0.000165)	(0.000249)	(0.000160)
government balance	-0.00749***	-0.0110***	-0.00467**	-0.00812***
	(0.00265)	(0.00175)	(0.00213)	(0.00136)
government pension	-0.0418***	-0.0634***	-0.0273***	-0.0466***
	(0.00448)	(0.00296)	(0.00321)	(0.00206)
constant	3.793***	2.548***	3.560***	2.238***
	(0.0788)	(0.0520)	(0.0711)	(0.0455)
N	62766	62766	62766	62766
adj. R-sq	0.429		0.429	

Standard errors in brackets

Sensitivity to Outliers - Robust Regressions						
	(1)	(2)	(3)	(4)	(5)	(6)
income	0.371***	0.370***	0.372***	0.376***	0.371***	0.377***
	(0.00282)	(0.00197)	(0.00280)	(0.00275)	(0.00194)	(0.00273)
income uncertainty - micro	0.0297***	0.0119*		0.0295***	0.0120*	
	(0.00675)	(0.00624)		(0.00658)	(0.00614)	
income uncertainty - macro			0.0152***			0.0108***
			(0.000885)			(0.000849)
wealth	-0.0213***	0.00512***	-0.0215***	-0.0242***	0.00430***	-0.0241***
	(0.00181)	(0.000877)	(0.00180)	(0.00177)	(0.000865)	(0.00176)
debt	-0.0149***	-0.0131***	-0.0149***	-0.0149***	-0.0131***	-0.0148***
	(0.000167)	(0.000174)	(0.000166)	(0.000163)	(0.000171)	(0.000162)
housing - micro	-0.00195		-0.00106	0.000216		0.000768
	(0.00235)		(0.00234)	(0.00229)		(0.00229)
housing - macro		-0.00464***			-0.00278***	
		(0.000165)			(0.000174)	
age	0.00248***	0.00224***	0.00242***	0.00246***	0.00226***	0.00241***
	(0.000108)	(0.000101)	(0.000108)	(0.000106)	(0.0000996)	(0.000105)
size	-0.0435***	-0.0432***	-0.0436***	-0.0433***	-0.0430***	-0.0434***
	(0.000962)	(0.000942)	(0.000957)	(0.000937)	(0.000928)	(0.000934)
gender male	0.00304	0.00823***	0.00289	0.00313	0.00837***	0.00306
	(0.00250)	(0.00246)	(0.00249)	(0.00244)	(0.00243)	(0.00243)
inflation	-0.0134***	-0.0206***	-0.0229***			
	(0.00203)	(0.00202)	(0.00207)			
deposit rate				0.0437***	0.0379***	0.0428***
				(0.00117)	(0.00124)	(0.00117)
private credit	-0.00104***	-0.000316***	-0.00135***	-0.00118***	-0.000687***	-0.00141***
	(0.000116)	(0.000118)	(0.000117)	(0.000112)	(0.000116)	(0.000114)
government balance	-0.0124***	-0.0132***	-0.00929***	-0.0115***	-0.00984***	-0.00656***
	(0.00125)	(0.00125)	(0.00126)	(0.000962)	(0.000991)	(0.00104)
government pension	-0.0415***	-0.0698***	-0.0827***	-0.0354***	-0.0479***	-0.0595***
	(0.00189)	(0.00211)	(0.00302)	(0.00118)	(0.00150)	(0.00228)
constant	1.982***	2.303***	2.322***	1.946***	1.929***	2.128***
	(0.0332)	(0.0372)	(0.0384)	(0.0283)	(0.0331)	(0.0320)
N	56102	62765	56102	56102	62765	56102
adj. R-sq	0.574	0.555	0.578	0.592	0.566	0.594

Standard errors in brackets.

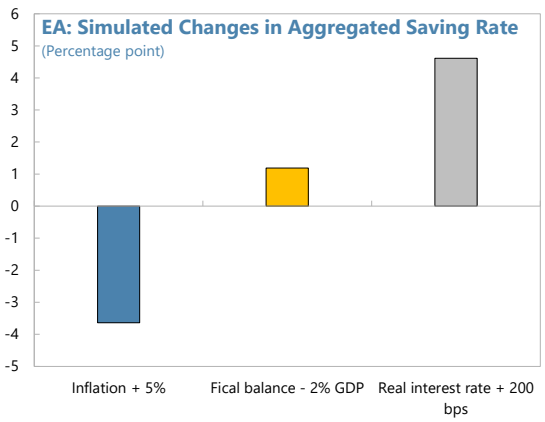
Tobit Regressions				
	(1)	(2)	(3)	(4)
income	0.698***	0.321***	0.702***	0.326***
	(0.00582)	(0.00273)	(0.00584)	(0.00271)
income uncertainty	-0.107***	0.0418***	-0.106***	0.0421***
	(0.0139)	(0.00663)	(0.0139)	(0.00656)
wealth	-0.0881***	-0.0127***	-0.0896***	-0.0151***
	(0.00374)	(0.00165)	(0.00374)	(0.00163)
debt	-0.00971***	-0.00735***	-0.00968***	-0.00597***
	(0.000312)	(0.00181)	(0.000311)	(0.00177)
housing	-0.0551***	-0.000588	-0.0538***	0.000977
	(0.00486)	(0.00215)	(0.00486)	(0.00212)
age	0.00266***	0.00211***	0.00265***	0.00208***
	(0.000224)	(0.0000975)	(0.000224)	(0.0000963)
size	-0.0793***	-0.0384***	-0.0796***	-0.0388***
	(0.00199)	(0.000875)	(0.00199)	(0.000865)
gender male	-0.00299	0.00368	-0.00297	0.00376*
	(0.00516)	(0.00225)	(0.00516)	(0.00222)
inflation	-0.0119***	-0.00783***		
	(0.00419)	(0.00185)		
deposit rate			0.0225***	0.0310***
			(0.00247)	(0.00104)
private credit	-0.000980***	-0.000774***	-0.000971***	-0.000716***
	(0.000239)	(0.000107)	(0.000238)	(0.000106)
government balance	-0.00719***	-0.00832***	-0.00467**	-0.00787***
	(0.00258)	(0.00117)	(0.00204)	(0.000911)
government pension	-0.0277***	-0.0320***	-0.0192***	-0.0254***
	(0.00390)	(0.00173)	(0.00251)	(0.00110)
constant	4.507***	1.602***	4.427***	1.557***
	(0.0686)	(0.0316)	(0.0599)	(0.0276)
N	56103	56103	56103	56103

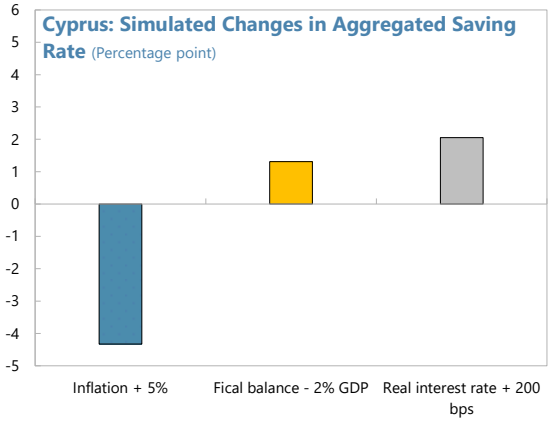
Standard errors in brackets.

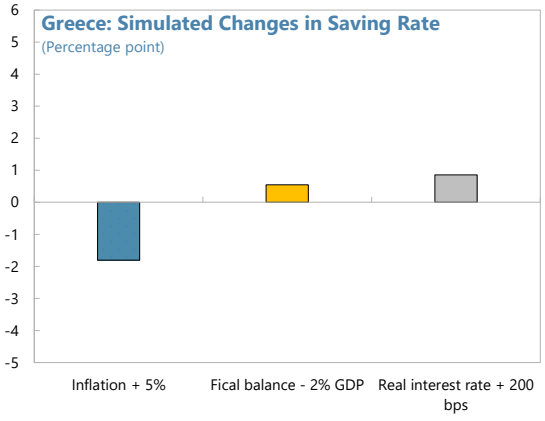
	Waves					
	(1) wave 1	(2) wave 2	(3) wave 3	(4) wave 1	(5) wave 2	(6) wave 3
income	0.453***	0.442***	0.432***	0.465***	0.425***	0.411***
	(0.0108)	(0.00573)	(0.00601)	(0.0103)	(0.00586)	(0.00561)
income uncertainty	-0.0120	0.0158	0.00868	-0.0332	0.00736	-0.00487
	(0.0245)	(0.0134)	(0.0157)	(0.0232)	(0.0138)	(0.0151)
wealth	-0.0467***	-0.0246***	-0.0223***	-0.0519***	-0.0275***	-0.0196***
	(0.00747)	(0.00361)	(0.00379)	(0.00709)	(0.00372)	(0.00365)
debt	-0.0127***	-0.0506***	-0.0145***	-0.0128***	-0.0515***	-0.0146***
	(0.000459)	(0.00131)	(0.000264)	(0.000436)	(0.00135)	(0.000255)
housing	0.00393	-0.0120**	-0.00457	0.0150*	-0.0155***	-0.0115**
	(0.00923)	(0.00480)	(0.00498)	(0.00877)	(0.00493)	(0.00477)
age	0.00110***	0.00270***	0.00219***	0.000573	0.00297***	0.00225***
	(0.000404)	(0.000226)	(0.000229)	(0.000382)	(0.000233)	(0.000220)
size	-0.0472***	-0.0537***	-0.0561***	-0.0466***	-0.0498***	-0.0533***
	(0.00364)	(0.00198)	(0.00205)	(0.00346)	(0.00203)	(0.00196)
gender male	0.00961	0.00721	0.00645	-0.00749	0.00861	0.00665
	(0.00961)	(0.00517)	(0.00527)	(0.00910)	(0.00533)	(0.00509)
deposit rate	0.0979***	0.0562***	0.0995***			
	(0.00462)	(0.00345)	(0.00659)			
inflation				-0.232***	-0.121***	-0.130***
				(0.00998)	(0.00559)	(0.0119)
private credit	-0.000619***	-0.00157***	-0.00236***	-0.00153***	-0.000725***	-0.00159***
	(0.000141)	(0.000107)	(0.000151)	(0.000140)	(0.0000937)	(0.000128)
government budget balance	-0.0161***	-0.0119***	-0.00325*	-0.0285***	-0.0125***	-0.00115
	(0.00290)	(0.00131)	(0.00167)	(0.00291)	(0.00129)	(0.00173)
government pension	0.0187***	-0.00589***	-0.00157	-0.00288	-0.0101***	-0.00253*
	(0.00225)	(0.00125)	(0.00146)	(0.00239)	(0.00132)	(0.00149)
Constant	1.880***	2.190***	2.033***	2.711***	2.398***	2.012***
	(0.0915)	(0.0548)	(0.0554)	(0.0911)	(0.0589)	(0.0534)
N	14669	20039	21395	14669	20039	21395

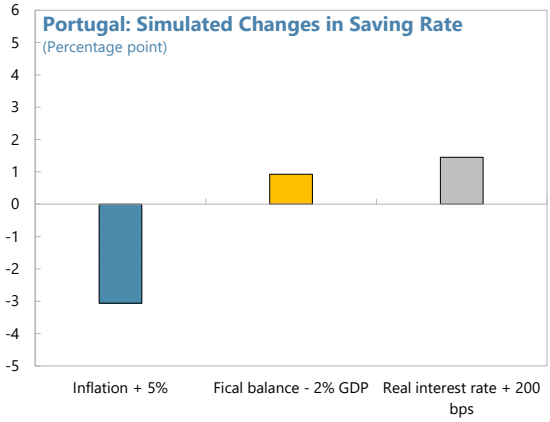
Standard errors in brackets.

Figure A.III.1. Simulation Results, Country Aggregate









Source: IMF staff estimates.
Note: The change in country-level savings rate is proxied using the income-weighted average of the median response.

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