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Questioni di Economia e Finanza

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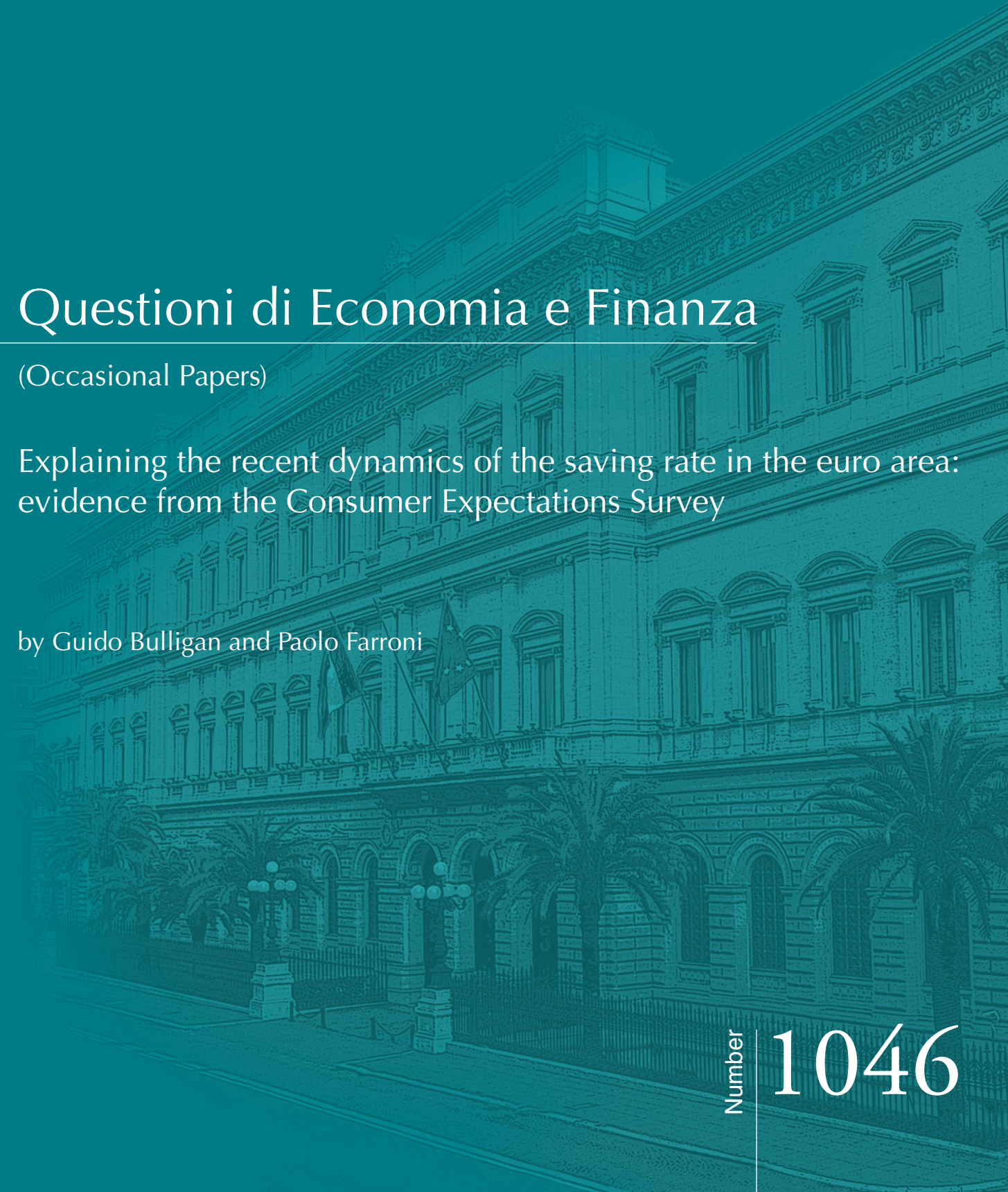
by Guido Bulligan and Paolo Farroni



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EXPLAINING THE RECENT DYNAMICS OF THE SAVING RATE IN THE EURO AREA: EVIDENCE FROM THE CONSUMER EXPECTATIONS SURVEY

by Guido Bulligan* and Paolo Farroni*

Abstract

We examine the post-COVID relationship between household-level income uncertainty and consumption-saving behaviour, using granular data from the ECB Consumer Expectations Survey (CES). We find that higher uncertainty is associated with higher saving rates and lower nominal consumption, with stronger responses among lower-income and liquidity-constrained households. By decomposing uncertainty into downside and upside components, we show that most of the effect is driven by downside risk. At country level, aggregated income uncertainty provides some information beyond the traditional determinants of national saving rates, although its contribution to improving macro-model point forecast accuracy is limited.

JEL Classification: D12, D84, E21, D91.

Keywords: uncertainty, income risk, saving rate, household expectations, liquidity constraints, macroeconomic forecasting.

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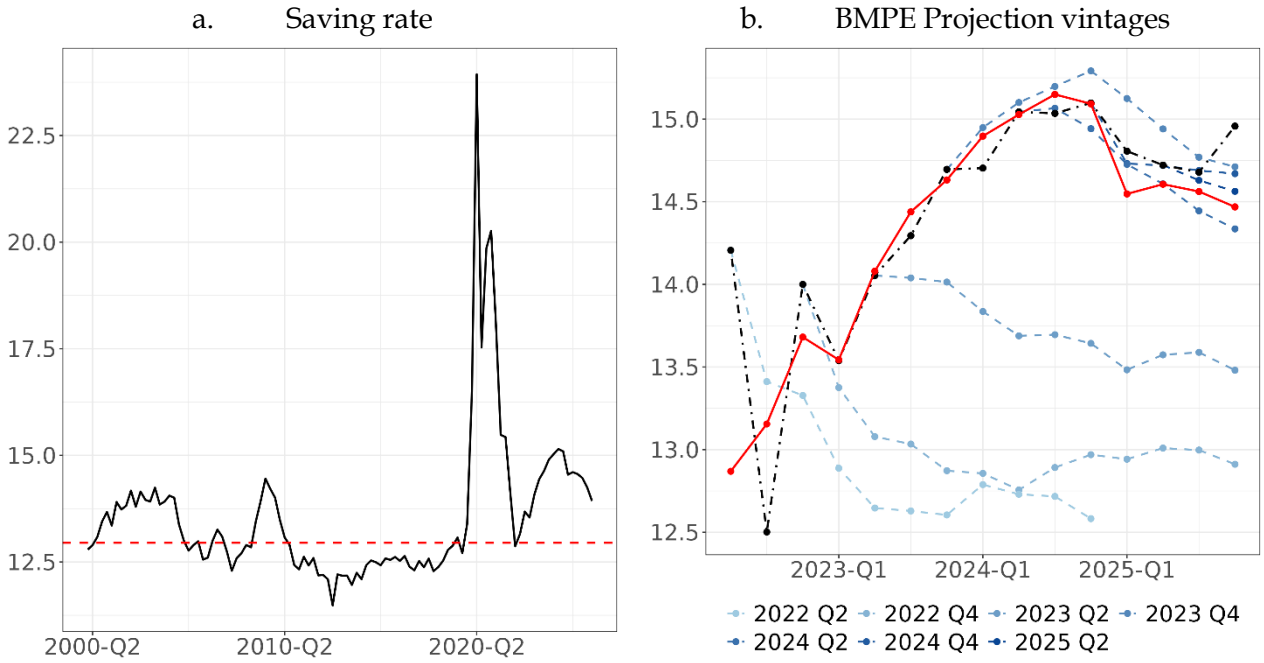
* Banca d'Italia.

1 Introduction

After the unusually sharp and partly forced increase during the COVID-19 crisis, when it peaked at 22%, the household saving rate in the euro area briefly returned to its pre-pandemic average in 2022 (around 13%). Since then, savings have increased, reaching 15% of disposable income in 2025, about 3 percentage points (p.p.) above the pre-COVID average (Figure 1, panel a). Such protracted increase has surprised most forecasters, including the ECB, which expected a gradual return towards pre-COVID average level (Figure 1, panel b).

FIGURE 1. EVOLUTION OF AGGREGATE SAVING RATE



Notes: The figures show the evolution of the saving rate in the Euro area (panel a) and the last BMPE projection vintages (panel b). In panel a) the dashed red line denotes the long run average over the period 2000Q1-2019Q4. In panel b), the dashed lines correspond to the Broad Macroeconomic Projection Exercise (BMPE) vintages, the solid red line represents the latest vintage of the realized saving rate, and the dot-dashed black line denotes the real-time data of the saving rate available at the time of the respective BMPE projections.

In this work we analyze the link between household-level uncertainty and consumption-saving decisions in the euro area by exploiting the granular and timely information embedded in the ECB Consumer Expectations Survey (CES). More precisely, we construct a measure of households' income uncertainty from the CES and relate it to household savings, nominal expenditures and inflation expectations. Consistently with economic theory, we find a positive (negative) relationship between uncertainty and the saving rate (nominal consumption). A standard deviation shock in income uncertainty is associated with an increase in the saving rate of about 0.5 p.p. and a reduction in

consumption of about 4.5 percent. We also find a positive effect of uncertainty on inflation expectations, suggesting that the fall in nominal consumption is mainly driven by a reduction in real consumption. Decomposing uncertainty into upside and downside income risk, we show that households respond much more strongly to downside risk. Finally, we aggregate household-level uncertainty at the country-quarter level and show that it contains information that can improve the Broad Macroeconomic Projection Exercise (BMPE) forecast errors only to a limited extent.

Since the COVID pandemic, uncertainty has often been cited as one of the most important factors driving the business cycle; yet its measurement and empirical relevance remain elusive, also due to its multifaceted nature and measurement issues.[1] Macro-models in use in central banks and private institutions alike often lack an explicit role for it.[2] Indeed, while traditional consumption models emphasize the role of expected income and interest rates, a large body of literature (e.g. Attanasio and Weber 2010, Bloom 2014, Ludvigson et al. 2021) highlights that uncertainty regarding macroeconomic conditions, inflation, and individual economic prospects can independently shape spending decisions. This perspective is especially relevant in settings where households face incomplete insurance and borrowing constraints as precautionary motives for savings arise: if households become more uncertain about future income, employment, or purchasing power, they place a higher value on liquid buffers and reduce current consumption even if mean expectations remain unchanged. Uncertainty can also influence the composition of consumption, with durable goods spending being particularly sensitive because purchases are lumpy and can be postponed when households adopt a "wait-and-see" behavior (Bernanke, 1983; Dixit and Pindyck, 1994).

As emphasized in Bloom (2014), estimating the causal effect of uncertainty on consumption and savings is difficult as uncertainty is endogenous: it rises during downturns, co-moves with expected income growth and correlates with credit conditions and other determinants of consumption. In this respect, the use of household-level data presents a key advantage over aggregate approaches. Microeconomic data allows for a clear

[1] See for instance Ahir, Bloom and Furceri (2025).
[2] See for instance the consumption equation in the New Area-Wide Model for the euro area (Christoffel et al. 2008) and in the FRB-US model (Brayton and Tinsley 1997).

distinction between first moments (mean expectations about inflation, income growth) and higher moments (uncertainty, or tail risks) and for empirical tests of whether households respond to uncertainty rather than to changes in first moments (see for instance Fischer et al. 2025, Coibion et al. 2024, and Christelis, Georgarakos, Jappelli, and van Rooij 2020).

Our work contributes to the growing body of literature that leverages microeconomic data to address macroeconomic questions; in particular, it adds to studies that use survey data to examine how agents' beliefs shape their economic behavior. The papers closest to ours are Coibion et al. (2024) and Fischer et al. (2025): using data from some waves from the CES, the former employs a Randomized Control Trial (RCT) to study how uncertainty about economic growth affects household consumption plans in the euro area; the latter also uses a RCT to analyze the effects of inflation uncertainty on household expectations and spending in the UK. Our focus differs in two main respects. First, we analyze households' uncertainty on their own income and on a longer time span, which is likely more relevant for consumption and saving decisions than aggregate macroeconomic variables and over which households should also have better information. We further decompose uncertainty into its upside and downside component and show that households react mostly to downside risk. Second, we aggregate household-level uncertainty and relate it to macroeconomic forecast errors from the BMPE. In this way, we attempt to overcome a key limitation of most micro-data studies, which typically provide little insight into how uncertainty shapes the business cycle and explains aggregate variables such as consumption and the saving rate.

2 Data

The Consumer Expectations Survey (CES) is a mixed-frequency, panel survey of the euro area household sector. Data on households' expectations, perceptions and behaviors have been collected by the European Central Bank since April 2020 with some questions asked monthly and others quarterly or annually. The CES is designed to be nationally representative, with the sample stratified by age, gender, region and country. Each month, approximately 15,000 respondents from eleven countries of the euro area are surveyed on a wide range of aggregate and household-specific economic variables. The CES has been extensively used to study expectation formation and information processing. Its rich panel

dimension makes it particularly well suited to analyze how shocks propagate to households' expectations while controlling for possible unobserved confounding factors. Georgarakos and Kenny (2022) provide a more detailed description of the CES, and ECB (2021) contains a first evaluation of the survey.[3]

To measure households' uncertainty, we exploit two questions on households' expectations about their future income and about the future inflation rate in their country of residence at monthly frequency. Specifically, the survey respondents are asked to distribute 100 points among 10 possible adjacent brackets (from more than 12% to less than -12%) in which their household's net income or prices in general could change in the subsequent 12 months (see Figure A.1 in the Appendix for exact wording and brackets). Drawing on information collected from these probabilistic questions, uncertainty about own future income and nation-wide inflation can be gauged by the standard deviation of every respondent's probability distribution.[4] Information on households' saving rates is drawn from the replies to the question in the quarterly module of the CES, specifically asking about their savings in the last three months. We combine this variable with respondents' expenditures over the same period to derive households' implicit income.[5] We then obtain the saving rate at monthly frequency as the ratio of savings to income, assuming both variables are evenly distributed across the three months of the quarter.

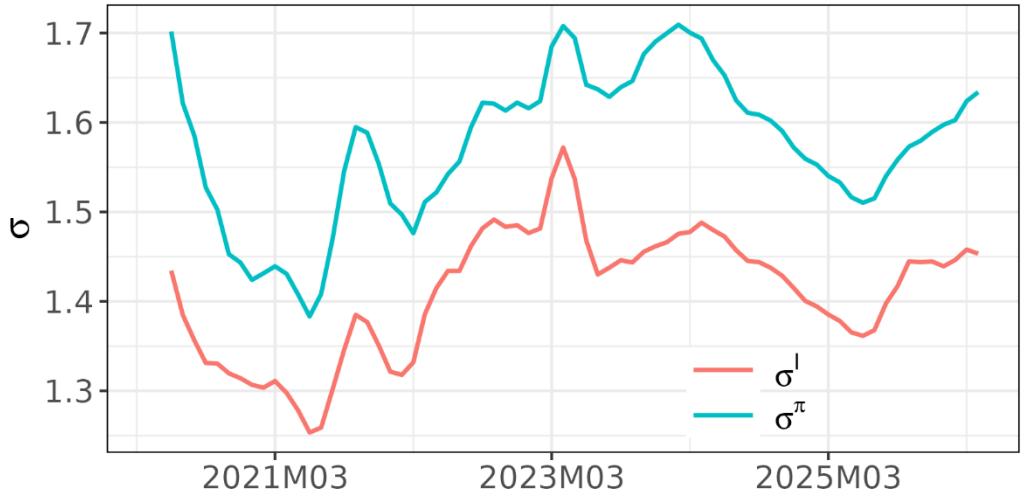
Despite its limited historical depths, average households' perceived uncertainty about their own future income show a clear cyclical pattern: strongly declining during 2020 and in the first semester of 2021 (2021H1), as the euro area economies managed first to adapt and then to recover from the COVID pandemic (Figure 2).

[3] Further details on the survey design and the full questionnaire are available at: https://www.ecb.europa.eu/stats/ecb_surveys/consumer_exp_survey/html/index.en.html#about

[4] When computing moments for probabilistic questions we use the midpoint of each bin as possible outcome on which households form expectations.

[5] We checked that our reconstructed income measure is consistent with the income bins directly reported by households in the survey.

FIGURE 2. EVOLUTION OF AGGREGATED MICRO UNCERTAINTY



Notes: The figure shows the evolution of Euro area households' uncertainty on future income σ^I and future inflation σ^π from the CES. For each month and country in the CES we aggregate both measures using the corresponding survey weights.

After a minimum observed in 2021H1, uncertainty followed a phase of sustained increase which led to a cyclical peak in 2023H1 at the height of the energy crisis and amid strong geopolitical tensions. Since then, income uncertainty has gradually decreased, albeit it recently spiked up in conjunction with the start of the US-Iran war. Inflation uncertainty shows a very similar pattern, with the main difference that its decline started with a lag of almost a year, in 2024, compared to income uncertainty. Indeed, the two measures move together so closely that, in the rest of this note, we will focus only on income uncertainty.[6]

Table 1 reports summary statistics for selected variables from the CES and their correlation with income uncertainty. Our sample spans from the inception of the CES in April 2020 to April 2026 and includes around 83k distinct households from Germany, Spain, France and Italy for a total of 867k observations, accounting for around 70% of the total.[7] Furthermore, while more countries report in later waves of the CES, the major four have been included in the survey since its inception.

[6] Our findings are robust to using inflation uncertainty.
[7] We use the full sample of countries only in the panel exercise of the last section where we relate BMPE forecast errors to aggregate uncertainty from the CES.

TABLE 1. SUMMARY STATISTICS

	N	P25	P50	Avg	P75	$\text{corr}(\sigma^I, \cdot)$
Income unc. (σ^I)	493970	1.0	1.7	2.3	3.0	100.0
Saving rate	734780	1.5	8.6	16.3	23.2	2.1
Past inflation	815497	2.0	5.0	7.5	10.0	6.4
Exp. inflation	819716	1.0	3.0	5.2	6.5	4.1
Exp. cons. growth	709965	−4.0	0.0	−1.9	1.0	−1.7
$\mathbb{P}$(unemp)	481581	0.0	1.0	9.6	10.0	6.6

Notes: The table reports summary statistics for selected variables from the CES. The last column (corr(σ^I,)) reports sample correlations with respect to income uncertainty. Past (exp.) inflation denotes nation-wide inflation perceptions (expectations) for the previous (next) 12 months; exp. cons growth is expected real household consumption growth in the next 12 months deflated using households' inflation expectations; P(unemp) is the self-assessed probability the respondent will lose his/her job in the next 3 months. All units are in percentage. Our sample includes DE, ES, FR and IT and spans from 2020M04 and ends in 2026M04.

Income uncertainty is positively correlated with the saving rate, with both perceived and expected inflation, as well as with the self-assessed probability of becoming unemployed in the next three months, and negatively correlated with expected real consumption growth.[8] Moreover, there is a significant dispersion in all variables which is particularly pronounced for the saving rate, suggesting that strong heterogeneity permeates the survey.

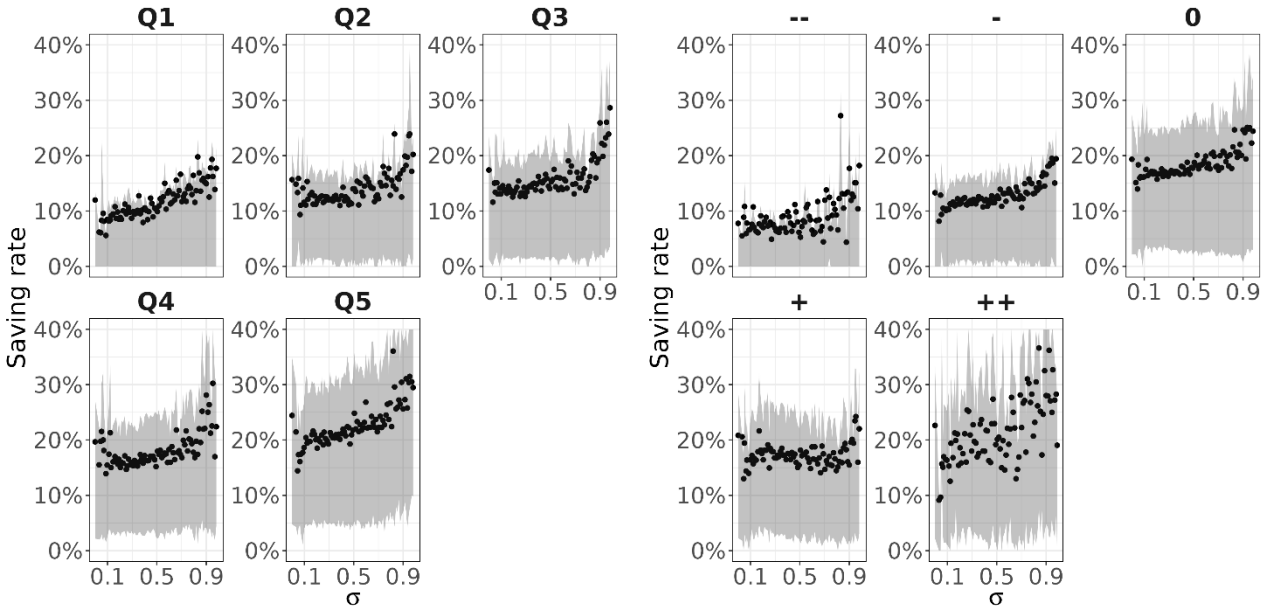
In Figure 3 we investigate some cross-sectional dimensions of heterogeneity which may be particularly relevant to understand non-linear effects of uncertainty on the saving rate. Panel a) plots a bin scatter of normalized[9] income uncertainty (on the x-axis) and the saving rate (on the y-axis) for the different household income quintiles, from the poorest (Q1) to the richest (Q5). The black points are averages (within bin) of uncertainty and savings. The figure hints at a positive relationship between the saving rate and uncertainty across all quintiles. Panel b) offers a complementary perspective focusing instead on households' expected financial situation. Also in this case, higher uncertainty is associated with an increase in the saving rate, although the dispersion is more pronounced among households that anticipate a significant deterioration or improvement in their future

[8] All correlations are significant at the 1% level with standard errors clustered at the household levels. We exclude from our sample all households that report no income uncertainty.
[9] After removing outliers, we rescale the range of income uncertainty to the unit interval.

financial situation. For both panels, the lower and upper bounds of shaded areas denote the cross-sectional 1st and 3rd quantile, suggesting a high degree of cross-sectional variability.

FIGURE 3. HETEROGENEITY IN UNCERTAINTY AND THE SAVING RATE

a. Income quintile b. Prospective financial situation



Notes: The figures show the distribution of the reported saving rate conditional on our (normalized) measure of uncertainty and partitioned by income quintiles (panel a) and self-reported outlook for own financial situation (panel b). In panel b) "--" indicates households that expect to be much worse off in the next 12 months; "-" indicates somewhat worse off; "0" indicates about the same; "+" indicates somewhat better off; and "++" indicates much better off. Points shown in the plot represent within-bin averages of the x- and y-variables; for each sub-panel we construct bins by dividing the distribution on the uncertainty in centiles. The lower and upper bound of the shaded area denote cross-sectional 1st and 3rd quantile.

3 Results

To quantify the relationship between households' uncertainty and their saving rate, we estimate the following linear panel regression:

$$Y_t^{j,c} = \beta_0 + \beta_1 \sigma_t^{j,c} + \Gamma_1 X_{t-1}^{j,c} + \Gamma_2 M_{t-1}^{c} + \lambda^c + \epsilon_t^{j,c} \quad (1)$$

where j denotes the household living in country c, at time t, $\sigma_t^{j,c}$ is own income uncertainty, $Y_t^{j,c}$ is either the saving rate, the (100 x log) nominal expenditure of the household, or the inflation rate that the household expects 3-months from the reference date $\hat{\pi}_{t+15|t+3}$; $X_{t-1}^{j,c}$ is a vector of lagged household level controls that includes past realizations of the saving rate (or consumption), expected income over the next 12 months, past perceived inflation and expected inflation over the next 12 months $\hat{\pi}_{t+11|t-1}$, as well as various household's

characteristics (employment status, education, age and income quintile); M_{t-1}^{c} includes country-level macroeconomic controls (HICP inflation, unemployment and prevailing mortgage rates) while λ^{c} denotes country fixed effects. We do not include household fixed effects since we are trying to compare outcomes Y between two households with the same characteristics (and similar expectations) but that differ on their degree of uncertainty about their own future income.[10] To further strengthen our results, in a related exercise we substitute $\sigma_t^{j,c}$ in equation (1) with its unexpected component, extracted from an auxiliary regression.[11]

Table 2 reports the results for the estimated coefficient of household's uncertainty in the pooled regression (column (1)) and in various subsamples (columns (2)-(5)). In panel A our dependent variable is the saving rate constructed as in Section 2. We find a positive and statistically significant relationship between uncertainty and the saving rate. On average (column 1), a standard deviation increase in income uncertainty is associated with an increase in the saving rate by about $0.7 \approx 1.76 \times 0.422$ p.p. and $0.5 \approx 0.36 \times 1.365$ p.p. for, respectively, our baseline measure σ^{I} and our unpredictable component of uncertainty $\sigma_t^{I} - E_{t-1}[\sigma^{I}]$. Furthermore, we find that households in the first quintile of the income distribution tend to save more compared to those in the last quintile (columns 2-3), when facing higher uncertainty.

[10] Including households' fixed effects would track the belief of the same household across time but given the short time tenure of households in the survey (typically around 24 months) such tests would not be informative.

[11] More in detail, we estimate a regression of the form $\log \sigma_t^{j,c} = \beta_0 + \beta_1 \log \sigma_{t-1}^{j,c} + \Gamma_1 X_{t-1}^{j,c} + \Gamma_2 M_{t-1}^{c} + \lambda^{c} + \epsilon_t^{j,c}$. The residual $\hat{\epsilon}_t^{j,c} = \log(\sigma_t^{j,c}) - E_{t-1}[\log(\sigma_t^{j,c})]$ is our exogenous component of (log) uncertainty.

TABLE 2. INCOME UNCERTAINTY AND HOUSEHOLDS OUTCOMES

	(1)	(2)	(3)	(4)	(5)
	Panel A. Saving rate				
σ_t^i	0.422^{***}	0.397^{***}	0.338^{***}	0.875^{***}	0.350^{***}
	(0.056)	(0.145)	(0.118)	(0.111)	(0.065)
N	125175	16270	35055	24374	100801
$\sigma_t^i - \mathbb{E}_{t-1}[\sigma_t^i]$	1.365^{***}	1.336^{***}	1.115^{***}	2.901^{***}	1.172^{***}
	(0.160)	(0.422)	(0.328)	(0.314)	(0.182)
N	125175	16270	35055	24374	100801
	Panel B. Nominal consumption $(100 \times \log)$				
σ_t^i	-3.885^{***}	-4.935^{***}	-2.910^{***}	-5.959^{***}	-2.900^{***}
	(0.364)	(0.911)	(0.648)	(0.860)	(0.376)
N	126183	16549	35222	24847	101336
$\sigma_t^i - \mathbb{E}_{t-1}[\sigma_t^i]$	-12.569^{***}	-16.578^{***}	-8.763^{***}	-20.202^{***}	-9.334^{***}
	(1.008)	(2.645)	(1.730)	(2.515)	(1.009)
N	126183	16549	35222	24847	101336
	Panel C. Future inflation expectations $\hat{\pi}_{t+15\|t+3}$				
σ_t^i	0.052^{**}	0.189^{**}	-0.052	0.048	0.044^{*}
	(0.023)	(0.083)	(0.046)	(0.055)	(0.024)
N	99516	12821	28139	19572	79944
$\sigma_t^i - \mathbb{E}_{t-1}[\sigma_t^i]$	0.169^{**}	0.566^{**}	-0.077	0.046	0.159^{**}
	(0.071)	(0.237)	(0.118)	(0.176)	(0.072)
N	99516	12821	28139	19572	79944

Notes: The table reports the coefficient β_1 from equation (1) across various subsamples (columns) using our baseline measure of uncertainty σ_t^i and its unpredictable component $\sigma_t^i - E_{t-1}[\sigma_t^i]$ (rows). In panel A the dependent variable is the saving rate, in panel B the log nominal total expenditure, and in panel C is the household expected inflation rate at time $t+3$. Column (1) reports the full sample results; columns (2) and (3) include, respectively, only households in the first and last income quintiles; finally, columns (4) and (5) restrict the sample to liquidity constrained and unconstrained households. All subsamples exclude households that report no income uncertainty. Standard errors are in parenthesis and are clustered at the household level.

Liquidity constraints play a key role in amplifying the effects of uncertainty on the saving rate: for households that report insufficient financial resources to face a hypothetical unexpected liquidity shock (equal to one month of their household income) the effect of uncertainty is more than twice as large as for those with sufficient liquidity (columns 4-5).

In panel B the dependent variable is the household's nominal expenditure. Consistently with panel A, we find a significant and negative effect of higher income uncertainty on nominal consumption with stronger impact for lower income and liquidity constrained households. The magnitudes are large but are overall consistent with previous

studies (Fischer et al. 2025; Coibion et al. 2024). As the effect on nominal consumption could be driven by a decline in prices rather than a decline in real consumption, in panel C we also look at effect of uncertainty on the inflation rate that households expect over the following 3-months.[12] Higher uncertainty is also associated with higher expected inflation in the pooled regression, indicating that the decline in nominal consumption is driven by a stronger decline in real consumption, in line with findings of Fischer et al. (2025) for UK.

To avoid dealing with potential reporting errors in the survey, in Table 2 we have excluded from our sample households with no income uncertainty. However, as zero income uncertainty may be plausible for some respondents (e.g., if they are employed and do not expect a pay increase/decrease and believe they will lose their job with very little probability, or if they are pensioneers), we apply a different requirement and replicate our analysis excluding only those households that report zero inflation uncertainty as we find unlikely that households have such steadfast inflation expectations, especially in the very high inflation period of 2022-2023.[13] Our main results remain qualitatively robust but with reduced magnitudes, especially for the case of high-income households (see in Appendix Table A.1, column 3).

Finally, we disentangle the effects of downside and upside uncertainty.[14] While the literature focuses mostly on overall uncertainty, we would expect that is downside uncertainty, i.e. the perceived risk of negative outcomes, that is the main driver of the increase (decrease) of savings (consumption). Table 3 reports our estimates using the same specification and breakdown as in Table 2 where we have substituted individual uncertainty with individual downside and upside uncertainty as separate regressors. Our results are broadly consistent with a stronger and statistically significant effect of downside risk, while upside risk is generally insignificant. Again the results are stronger for low

[12] Consistently with the idea that we are trying to capture a "shock" to income uncertainty we find no contemporaneous effect on inflation or income expectation.

[13] Out of all respondents for which we can measure income and inflation uncertainty, only around 13% report zero income uncertainty but positive inflation uncertainty. This percentage is broadly stable in all years of the survey, even at the very peak of the inflation surge. Unconditionally, between respondents that report no inflation uncertainty and those that do, there does not seem to be any economically major difference in average inflation expectations, age, and income. The only dimension in which the two groups diverge is education, with zero-uncertainty households displaying lower educational attainments.

[14] We measure downside and upside uncertainty at the household level as $\sigma_t^{i,d}=E_t^i\left[I_{t+12|t}^2 \middle| I_{t+12|t}<0\right]^{1/2}$ and $\sigma_t^{i,u}=E_t^i\left[I_{t+12|t}^2 \middle| I_{t+12|t}>0\right]^{1/2}$, i.e., the downside and upside volatility of future income growth.

income and liquidity constrained households compared to higher income and unconstrained ones.[15] Our results suggest that households are especially concerned about the possibility of future income losses, rather than about unconditional income uncertainty.[16]

TABLE 3. DOWNSIDE AND UPSIDE UNCERTAINTY

	(1)	(2)	(3)	(4)	(5)
			Panel A. Saving rate		
$\sigma_t^{i,d} - \mathbb{E}_{t-1}[\sigma_t^{i,d}]$	0.785^{***}	1.671^{***}	0.471^{*}	1.322^{***}	0.737^{***}
	(0.122)	(0.312)	(0.275)	(0.221)	(0.144)
$\sigma_t^{i,u} - \mathbb{E}_{t-1}[\sigma_t^{i,u}]$	0.278^{*}	-0.125	0.647^{*}	0.058	0.256
	(0.143)	(0.335)	(0.340)	(0.277)	(0.168)
N	95181	15426	22632	25406	69775
			Panel B. Nominal consumption $(100 \times \log)$		
$\sigma_t^{i,d} - \mathbb{E}_{t-1}[\sigma_t^{i,d}]$	-6.767^{***}	-11.237^{***}	-2.104	-12.419^{***}	-4.571^{***}
	(1.041)	(2.223)	(1.674)	(2.739)	(1.020)
$\sigma_t^{i,u} - \mathbb{E}_{t-1}[\sigma_t^{i,u}]$	-2.552^{**}	-0.614	1.891	-4.809	-1.726
	(1.192)	(2.219)	(2.019)	(3.220)	(1.159)
N	63385	15807	22822	14513	48872
			Panel C. Future inflation expectations $\hat{\pi}_{t+15\|t+3}$		
$\sigma_t^{i,d} - \mathbb{E}_{t-1}[\sigma_t^{i,d}]$	0.179^{**}	0.480^{*}	0.051	0.201	0.153^{**}
	(0.074)	(0.255)	(0.109)	(0.196)	(0.073)
$\sigma_t^{i,u} - \mathbb{E}_{t-1}[\sigma_t^{i,u}]$	0.036	-0.266	-0.131	0.108	0.001
	(0.084)	(0.299)	(0.134)	(0.218)	(0.084)
N	50195	8118	12649	11453	38742

Notes: The table reports the coefficient β_1 and β_2 from the following equation: $Y_t^i = \beta_0 + \beta_1(\sigma_t^{i,d} - E_{t-1}[\sigma_t^{i,d}]) + \beta_2(\sigma_t^{i,u} - E_{t-1}[\sigma_t^{i,u}]) + \Gamma_1 X_{t-1}^{j,c} + \Gamma_2 M_{t-1}^{c} + \lambda^c + \epsilon_t^{j,c}$ estimated across various subsamples (columns) where $\sigma_t^{i,d} - E_{t-1}[\sigma_t^{i,d}]$ and $\sigma_t^{i,u} - E_{t-1}[\sigma_t^{i,u}]$ denote, respectively, the unpredictable component of downside and upside income uncertainty. In panel A the dependent variable is the saving rate, in panel B the log nominal total expenditure, and in panel C is the household expected inflation rate at time $t+3$. Column (1) reports the full sample results; columns (2) and (3) include, respectively, only households in the first and last income quintiles; finally, columns (4) and (5) restrict the sample to liquidity constrained and unconstrained households. All subsamples exclude households that report no downside risk. Standard errors are in parenthesis and are clustered at the household level.

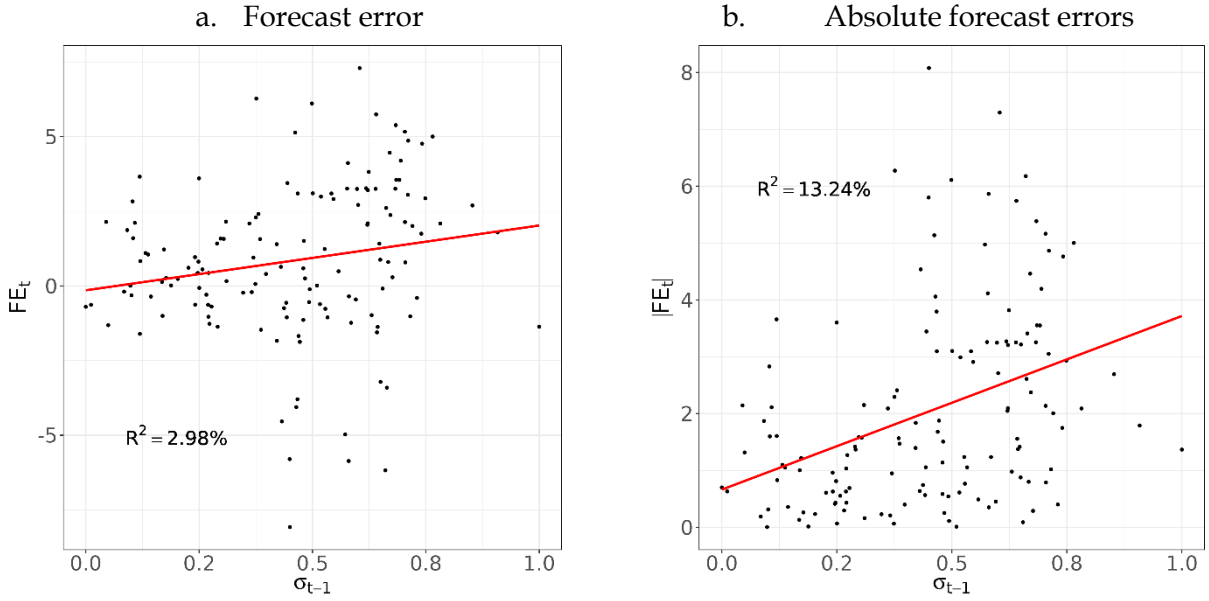
[15] Note that a formal test does not reject the null that the two coefficients of panel A, column (3) are equal, that is exposure to downside or upside income risk is associated with the same increase of the saving rate for richer households.

[16] Table A.2 in the Appendix reports our findings for our measure of downside uncertainty not purged of its predictable component.

4 From micro uncertainty to the aggregate saving rate

Departing from the household-level perspective, in this section we examine whether aggregating CES-based measures of households' income uncertainty to the national level yields useful information for explaining movements in the aggregate saving rate. To this end, for each country covered in both the ECB BMPE dataset and the CES, we relate the 1-quarter ahead forecast error of the saving rate, adjusted for all errors in the technical assumptions, to the corresponding level of household uncertainty. We find a weak positive relationship, suggesting that the latter contains additional useful information only to a limited extent (Figure 3, panel a). Interestingly, we detect a stronger positive relationship in the case of absolute forecast errors (Figure 3, panel b), suggesting that high households' uncertainty might be indicative of higher macro-volatility and lower predictability.[17]

FIGURE 3. MICRO UNCERTAINTY AND AGGREGATE SAVING RATE PROJECTIONS



Notes: The figures show the panel correlation between our (normalized) measure of uncertainty and the 1-period ahead forecast error (panel a) and absolute forecast error (panel b). We aggregate the micro uncertainty at country-quarter level using the corresponding survey weights. For each country-quarter we compute forecast errors as the realization of the saving rate minus the BMPE projection of the previous quarter adjusted for all errors in the assumptions (using the corresponding Basic Model Elasticities (BMEs)). The red line denotes the OLS regression line. Our sample spans from 2021 Q1 to 2025 Q3 and includes all Euro area countries that participate both in the CES and in the BMPE.

[17] Our results are robust to using the previous quarter's value of household nominal consumption as weights when aggregating income uncertainty.

5 Conclusion

In this work, we examine the relationship between household-level income uncertainty and consumption-saving behaviour using the rich and timely information provided by the ECB Consumer Expectations Survey. We find that higher income uncertainty is associated with higher saving rates, in line with precautionary savings' motives.

Moreover, we show that the effects of uncertainty are primarily driven by its downside component. We also document substantial heterogeneity: lower-income and liquidity-constrained households respond more strongly to increases in uncertainty, especially when driven by downside risk, than higher-income and unconstrained ones. These adjustments occur mainly through a reduction in real consumption.

Finally, we assess the extent to which aggregated household-level uncertainty helps explain cross-country variation in national saving rates. We find that it contains information beyond standard determinants such as income, wealth, and interest rates, although the resulting improvements in point-forecast accuracy are modest.

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Appendix

FIGURE A.1. PROBABILISTIC QUESTIONS

a. Prices in general

0 to 100	Valid range

For each of the following probabilistic bins:

1	Prices will **increase** by 12% or more
2	Prices will **increase** by 8% or more, but less than 12%
3	Prices will **increase** by 4% or more, but less than 8%
4	Prices will **increase** by 2% or more, but less than 4%
5	Prices will **increase** by 0% or more but less than 2%
6	Prices will **decrease** by more than 0% but less than 2%
7	Prices will **decrease** by 2% or more, but less than 4%
8	Prices will **decrease** by 4% or more, but less than 8%
9	Prices will **decrease** by 8% or more, but less than 12%
10	Prices will **decrease** by 12% or more

Question wording:

Now we would like you to think about how much prices in general in the country you currently live in are likely to change **in 12 months from now**. We realise that this question may take a little more effort.

Below you see ten possible ways in which prices could change. Please distribute 100 points among them, to indicate how likely you think it is that each price change will happen. The sum of the points you allocate should total to 100.

You can allocate points by typing a percentage in each box. (Note that your answers should sum to 100 – if your sum exceeds 100, you should first decrease the points again in one option before you can add points in another).

b. Net income

0 to 100	Valid range

For each of the following probabilistic bins:

1	**Increase** by 12% or more
2	**Increase** by 8% or more, but less than 12%
3	**Increase** by 4% or more, but less than 8%
4	**Increase** by 2% or more, but less than 4%
5	**Increase** by 0% or more but less than 2%
6	**Decrease** by more than 0% but less than 2%
7	**Decrease** by 2% or more, but less than 4%
8	**Decrease** by 4% or more, but less than 8%
9	**Decrease** by 8% or more, but less than 12%
10	**Decrease** by 12% or more

Question wording:

Below you see ten possible ways in which your household's total net income could change **over the next 12 months**. Please distribute 100 points among them, to indicate how likely you think it is that each income change will happen. The sum of the points you allocate should total to 100.

You can allocate points by typing a percentage in each box. (Note that your answers should sum to 100 – if your sum exceeds 100, you should first decrease the points again in one option before you can add points in another).

Notes: The figure reports extracts from the CES microdata guide for the questions used to construct our measure of price (panel a) and income uncertainty (panel b), with identifiers c1150_1-8-c1152_1-10 for prices, and c3250_1-8-c3251_1-10 for income, respectively.

TABLE A.1. UNCERTAINTY AND HOUSEHOLDS OUTCOMES: DIFFERENT SAMPLE

	(1)	(2)	(3)	(4)	(5)
	Panel A. Saving rate				
σ_t^i	0.270^{***}	0.305^{***}	0.196^{*}	0.541^{***}	0.197^{***}
	(0.044)	(0.109)	(0.104)	(0.086)	(0.051)
N	147811	19809	40231	30068	117743
$\sigma_t^i - \mathbb{E}_{t-1}[\sigma_t^i]$	0.638^{***}	0.793^{***}	0.413^{*}	1.286^{***}	0.461^{***}
	(0.101)	(0.277)	(0.227)	(0.205)	(0.117)
N	147811	19809	40231	30068	117743
	Panel B. Nominal consumption $(100 \times \log)$				
σ_t^i	-1.864^{***}	-2.601^{***}	-0.945^{*}	-3.185^{***}	-1.251^{***}
	(0.303)	(0.794)	(0.563)	(0.723)	(0.314)
N	145933	19293	40040	29508	116425
$\sigma_t^i - \mathbb{E}_{t-1}[\sigma_t^i]$	-3.890^{***}	-6.151^{***}	-1.581	-7.384^{***}	-2.462^{***}
	(0.665)	(1.890)	(1.225)	(1.692)	(0.666)
N	145933	19293	40040	29508	116425
	Panel C. Future inflation expectations $\hat{\pi}_{t+15\|t+3}$				
σ_t^i	-0.014	0.153^{**}	-0.075^{*}	0.031	-0.002
	(0.023)	(0.071)	(0.039)	(0.049)	(0.021)
N	114925	14903	31949	23213	91712
$\sigma_t^i - \mathbb{E}_{t-1}[\sigma_t^i]$	-0.081	0.312^{*}	-0.170^{**}	-0.102	-0.083
	(0.051)	(0.168)	(0.082)	(0.126)	(0.052)
N	114925	14903	31949	23213	91712

Notes: The table reports the coefficient β_1 from equation (1) across various subsamples (columns) using our baseline measure of uncertainty σ_t^i and its unpredictable component $\sigma_t^i - E_{t-1}[\sigma_t^i]$ (rows). In panel A the dependent variable is the saving rate, in panel B the log nominal total expenditure, and in panel C is the household expected inflation rate at time $t+3$. Column (1) reports the full sample results; columns (2) and (3) include, respectively, only households in the first and last income quintiles; finally, columns (4) and (5) restrict the sample to liquidity constrained and unconstrained households. In all columns we exclude households that report no inflation uncertainty but include households that report zero income uncertainty. Standard errors are in parenthesis and are clustered at the household level.

TABLE A.2. DOWNSIDE UNCERTAINTY AND HOUSEHOLDS OUTCOMES

	(1)	(2)	(3)	(4)	(5)
	Panel A. Saving rate				
$\sigma_t^{i,d}$	0.115^{***}	0.342^{***}	-0.033	0.361^{***}	0.083^{**}
	(0.029)	(0.075)	(0.059)	(0.050)	(0.033)
N	95181	15426	22632	25406	69775
$\sigma_t^{i,d} - \mathbb{E}_{t-1}[\sigma_t^{i,d}]$	0.649^{***}	1.729^{***}	0.128	1.296^{***}	0.609^{***}
	(0.101)	(0.277)	(0.210)	(0.184)	(0.120)
N	95181	15426	22632	25406	69775
	Panel B. Nominal consumption ($100 \times \log$)				
$\sigma_t^{i,d}$	-1.372^{***}	-2.337^{***}	-0.703^{**}	-2.227^{***}	-0.805^{***}
	(0.192)	(0.520)	(0.355)	(0.403)	(0.189)
N	96415	15807	22822	26071	70344
$\sigma_t^{i,d} - \mathbb{E}_{t-1}[\sigma_t^{i,d}]$	-5.898^{***}	-10.954^{***}	-3.105^{**}	-8.452^{***}	-4.214^{***}
	(0.657)	(1.971)	(1.241)	(1.458)	(0.695)
N	96415	15807	22822	26071	70344
	Panel C. Future inflation expectations $\hat{\pi}_{t+15\|t+3}$				
$\sigma_t^{i,d}$	0.120^{***}	0.257^{***}	0.175^{***}	0.118^{***}	0.121^{***}
	(0.012)	(0.040)	(0.025)	(0.024)	(0.013)
N	76021	12147	18252	20508	55513
$\sigma_t^{i,d} - \mathbb{E}_{t-1}[\sigma_t^{i,d}]$	0.498^{***}	0.503^{***}	0.377^{***}	0.481^{***}	0.484^{***}
	(0.047)	(0.142)	(0.078)	(0.104)	(0.049)
N	76021	12147	18252	20508	55513

Notes: The table reports the coefficient β_1 from equation (1) across various subsamples (columns) using our measure of downside uncertainty $\sigma_t^{i,d}$ and its unpredictable component $\sigma_t^{i,d} - E_{t-1}[\sigma_t^{i,d}]$ (rows). In panel A the dependent variable is the saving rate, in panel B the log nominal total expenditure, and in panel C is the household expected inflation rate at time $t+3$. Column (1) reports the full sample results; columns (2) and (3) include, respectively, only households in the first and last income quintiles; finally, columns (4) and (5) restrict the sample to liquidity constrained and unconstrained households. In all columns we exclude households that report no downside income uncertainty. Standard errors are in parenthesis and are clustered at the household level.