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DOES UNCERTAINTY MATTER FOR HOUSEHOLD CONSUMPTION? A MEAN AND A TWO TAILS APPROACH

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ABSTRACT

This paper complements the existing literature on the relationship between uncertainty and private consumption expenditure for a panel of 14-euro area countries over the period 1997 to 2021. We account for uncertainty by employing composite, economic and financial risk indices and utilize alternative panel estimators with heterogeneous coefficients and an error term to consider cross-country heterogeneity. Further, we explore the effect of uncertainty on household consumption over its conditional distribution. In addition, considering the differences in economic and financial systems across the countries examined, we gauge the heterogeneous effects of uncertainty on household consumption spending. The empirical evidence substantiates the impact of uncertainty on consumption expenditures and uncovers a significant effect between uncertainty and consumption expenditure along the conditional consumption distribution. Notably, this finding appears to be stronger for the lower quantiles of the consumption distribution, reckoning the presence of asymmetries in the relationship. Our analysis has documented the importance of uncertainty in understanding and explaining consumption behavior.

JEL-classification: D80, E44, D12

Keywords: Consumption; uncertainty; wealth; liabilities; quantile regression

Disclaimer: The views expressed are those of the authors and not those of their respective institutions.

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1. Introduction

The permanent income hypothesis theory (Friedman, 1957) and the life-cycle model (Ando and Modigliani, 1963) imply that consumers use their lifetime disposable income and wealth to smooth consumption. Consumers respond to income and wealth changes resulting in variations in consumption (Boone et al., 2001). These models assume that credit markets work perfectly, consumers do not face liquidity constraints and, as a result, consumers adjust their consumption to positive and negative changes out of income and out of wealth components at the same rate. Recently, empirical evidence has suggested that increases in wealth are associated with increases in household debt affecting output growth and household consumption (Dynan, 2012; Mian et al., 2013; McCarthy and McQuinn, 2017; Manou et al., 2021). Still, the evidence of the effect of household debt on consumption expenditures remains unclear. McCarthy and McQuinn (2017) claim that a household's decision to deleverage has negative implications for consumption and Mian et al., (2013) show that leverage strengthens the negative wealth effect on consumption in areas with declining house prices. Conversely, Manou et al., (2021) provide evidence that household debt has a positive effect on consumption in Greece, indicating that households use part of their liabilities for consumption reasons.

A plethora of theoretical and empirical studies has attempted to identify the role played by uncertainty on various macroeconomic variables, including household consumption expenditures and the business cycle (Castelnuovo, 2023; Coibion et al., 2021). The presence of large-scale events, such as the materialization of the Great Recession, and the Covid-19 pandemic has reinvigorated the discussion on the connection between uncertainty and macroeconomic outcomes. The basic idea is that in the presence of uncertainty, households spend less, and firms reduce investment and employment (Weber et al., 2022). Following the work of Bloom (2014) on uncertainty, the empirical work on these transmission channels remains open and unexploited, and more research is required. Recently, Coibion et al., (2021) using a survey of European households have shown that higher macroeconomic uncertainty induces households to reduce their spending on non-durable goods and services suggesting that macroeconomic uncertainty can have an important impact on household decisions and consequently on economic outcomes. Similarly, Dietrich et al., (2022) report that the rise in household uncertainty accounts for two-thirds of the fall in output.

In addressing uncertainty, the empirical literature employs a range of measures and indices. These include measures of macroeconomic and financial uncertainty, such as the Economic Policy Uncertainty Index (EPU), proposed by Baker et al., (2016), the measures of uncertainty estimated by Jurado et al., (2015) or simple indicators of uncertainty, such as the implied or realized volatility of stock market returns, the cross-sectional dispersion of stock returns, and the cross-sectional dispersion of survey-based forecasts. Recently, Zhao et al., (2022) suggest that financial risks represent important considerations in restricting green growth across the globe. Even though research into the effects of uncertainty on the business cycle has proceeded at a feverish pace, still, little is known about the impact of uncertainty on household spending behavior. Ignoring this impact remains an important drawback in empirical literature and policymaking. Our paper contributes to the empirical literature by bridging this gap.

Motivated by the above-mentioned developments, the contribution of our paper is fourfold. First, we examine the relationship between uncertainty and private consumption expenditure for a panel of 14-euro area countries, from 1997 to 2021. Although data availability restricts extending the analysis of the sample, the advantage of the countries selected is that they operate under the same currency and the expansion of the euro area economy, especially since 2013 has been mainly driven by domestic demand and unambiguously by private consumption expenditure. We account for composite, economic, and financial risks using indices from the International Country Risk Guide (ICRG). In addition, we calculate standardized weighted indices for economic risk (ER) and financial risk (FR) employing the recent approach of Schwab et al., (2020). While the existing literature attempting to measure uncertainty is flourishing, we pioneer in quantifying the impact of economic and financial risks on household consumption expenditures by creatively constructing comprehensive indices to measure economic and financial uncertainty. Further, a unique dataset comprising flow of funds data on consumption, disposable income, wealth components, liabilities, and interest rates provides a thorough structure to explore the interrelations among the selected variables at the euro-area level.

Second, we examine the effects of uncertainty as depicted by composite, economic and financial risk, on consumption expenditure using alternative panel estimators with heterogeneous coefficients and an error term that takes into consideration cross-country heterogeneity. The analysis allows considering the presence of various sources of heterogeneity among countries, such as cross-country variations in economic structure and business environment.

Third, we explore the effect of uncertainty on household consumption over the conditional distribution. This modelling strategy allows us to observe the relative importance of uncertainty, as depicted by composite, economic and financial risk indices, across the conditional distribution of consumption rather than focusing solely on its conditional mean, reckoning the presence of asymmetries in the relationship. To the best of our knowledge, this is the first study that examines the effect of uncertainty on consumption in a quantile panel framework. Moreover, following recent developments in quantile regression techniques, we compute grouped quantile analogs of the fixed effects estimators for panel data, as suggested by Melly and Pons (2023) and Pons (2022). The main advantage of the grouped quantile regression estimator is that it remains consistent in the presence of unobserved heterogeneity, which biases quantile regression estimators, as well as quantile regression estimators with fixed effects.

Fourth, we analyze for heterogeneous effects on consumption expenditure in the presence of various levels of risk. Considering the differences in country risks and economic and financial systems across countries, we creatively estimate the heterogeneous effects of uncertainty on consumption expenditures. From a policy-making perspective, ignoring these interrelations may set the stage for possible errors in consumption-related policies.

Our paper effectively complements the related literature on household spending in three aspects. First, to the best of our knowledge, this paper is one of the few studies that investigate the impact of uncertainty on household expenditures. Second, we examine the effects of uncertainty on household consumption expenditures throughout the conditional distribution, employing recently developed quantile regression estimators for each quantile of the conditional distribution, accounting for the presence of asymmetries in the relationship. Third, considering the differences in economic and financial systems across the countries examined, we creatively gauge the heterogeneous effects on household consumption spending. This can provide a useful reference for governments to implement specific and appropriate policies and structural reforms to foster consumption expenditure and consequently economic growth.

To get a flavor of the empirical findings of our analysis, we provide evidence that increasing composite, economic and financial risk leads to lower consumption expenditures in the panel of the euro area countries sample. We view these results as conveying the message that economic and financial stability and certainty are important drivers of enhancing spending decisions by households. Our findings deepen our understanding of the role of uncertainty in affecting households' spending and this finding remains robust to sensitivity checks. At the same time, our modeling approach allows us to extend our understating of uncertainty on consumption behavior and connects results from the effects of uncertainty on macroeconomic outcomes and specifically household spending. Finally, as consumption forms the largest and most stable component of GDP, we develop a more complete and sophisticated approach for policymakers on the effects of income, wealth, household debt, and interest rates in the presence of uncertainty. The use of a unique dataset comprising of flow of funds data on consumption, disposable income, net wealth components and interest rates along with a novel approach to accounting for economic and financial uncertainty strengthens the policy implications and findings of our analysis.

Figure 1 is a graphical representation of the evolution of the composite risk index capturing prominent crisis episodes in the Eurozone countries, namely, the 2008-2009 financial crises, the Eurozone banking crises of the 2012-2013 period, and more recently the 2020-2021 pandemic crises. In all these episodes, a striking pattern emerges: Uncertainty highly exacerbates, as reflected in the sharp drop in the composite risk index. Specifically, Fig. 1 depicts the relationship between consumption and uncertainty with a focus on the outburst of the pandemic. The decline in spending, which was in full force in 2020, namely the first year of the pandemic, coincided with heightened levels of uncertainty, as reflected in the steep decrease in the risk index. Importantly, the peculiar nature of the pandemic induced an amalgam of extraordinary circumstances and risks surrounding the macroeconomic outlook, which in turn further amplified and depressed consumption dynamics. Concisely, this highly uncertain macroeconomic environment could provide an additional explanation for why spending plummeted so dramatically in 2020, in the 14-euro area countries of our sample. However, as the pandemic-induced slump was unprecedented in modern times, so was the countercyclical monetary and fiscal response internationally, which morphed into a significant reduction in uncertainty and supported consumption in 2021.

Insert Figure 1 here

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 presents the estimated model, the data and the methodology used in the analysis. Section 4 reports the empirical findings of the analysis, while Section 5 presents the robustness findings. Section 6 provides concluding remarks.

2. Literature review

2.1 Consumption through the lens of uncertainty

Some level of uncertainty is part of the fundamental characteristics of reality, reflecting constant movement and change, as contained in the famous phrase of the ancient Greek philosopher Heraclitus "All is flux, nothing stays still". However, when uncertainty surpasses acceptable levels, it adversely affects both investors' and households' expectations about the future, and the fear of the unknown –too many unpredictable dimensions, namely job insecurity, wealth variation, and profits' path - prevails in all their forward-looking decision-making. Castelnuovo (2023) suggests that uncertainty plays an important signaling role in how households foresee their future income and wealth, and how investors estimate their future profits. The channels through which rising uncertainty impacts economic activity vary. Both investors and consumers become more cautious and anxious (Bloom et al., 2007). The former chooses to delay/postpone investments or defer hiring (Bloom, 2009; Meinen and Roehe, 2017; Kumar et al., 2023), while the latter responds usually with an increase in precautionary savings (Carroll and Kimball, 2006; Giavazzi and McMahon, 2012). This typically serves as a buffer against risk pressures, including rising borrowing costs due to increased risk premia (Gilchrist et al., 2014). Consequently, households' willingness to consume and investors' willingness to invest is reduced, dampening economic activity (Leduc and Liu, 2016; Basu and Bundick, 2017; Bonciani and Oh, 2019). In this context, Christiano et al., (2014) empirically find that fluctuations in risk are the most crucial shock driving the business cycle. This is in line with Gieseck and Largent, (2016), who prove that extreme macroeconomic uncertainty is a destructive force with devastating effects on economic activity in the euro area. Closely related to this argument, Jackson et al., (2020) empirically identify contractions in households' consumption and businesses postponing investment as the main channels through which uncertainty weighs on economic activity (GDP). Working with a non-linear VAR model, the authors prove that consumers and investors react more abruptly in periods of high uncertainty than in periods of low uncertainty. In addition, Pruser and Schlosser (2020) find empirically that investors and financial market participants react stronger than consumers to uncertainty shocks, as measured by the European economic policy uncertainty (EPU) measure.

The role of uncertainty has begun to dominate in the evolving empirical literature of consumption dynamics and has attracted the interest of economic analysts and policymakers. Ghirelli et al., (2019) find that unexpected changes in EPU and financial uncertainty impact consumption in a persistent and powerful way in Spain. Using a SVAR model over the period 1997Q1-2018Q2, the authors show that the EPU shock generated an initial drop in consumption of 0.2 p.p., which remains significant at a 5% level until quarter 4. Working with European household survey data, Coibion et al., (2021) identify how the spending decisions of households with perceived exogenous changes in macroeconomic activity are impacted. After controlling for the first moments, the authors reveal that uncertainty itself, and not concerns about the anticipated trajectory of the economy, is behind the plunge in consumption. The authors document that elevated levels of uncertainty led consumers to pull back on spending, mainly on non-durable goods and services, as well as to become more risk-averse regarding investing in financial assets, such as mutual funds. Similarly, Nam et al., (2021) working with a variety of macroeconomic uncertainty indices emphasize that positive shocks of these indices depress U.S. households' consumption and affect household consumption choices. Gavaldón et al., (2023) study the effects of specific categories of uncertainty on the euro area for the four largest countries, namely Italy, Spain, Germany, and France. Their analysis suggests that the political and domestic regulation types of uncertainty dominate consumption dynamics in all countries. In addition, the authors observe heterogeneity effects across countries, thereby driving the relationship between uncertainty and consumption. For example, while uncertainty acts as a headwind in Italy, Spain, and France, its effects are muted or even positive in Germany. The explanation given by the authors is Germany's role as "a safe heaven" country, whereas "the flight-to-safety effect" is predominant, especially during the financial crisis. McKay (2017) suggests that the time-varying idiosyncratic risk matters in impeding consumption growth through the process of altering the precautionary savings motive. The author finds that the idiosyncratic risk spikes during the Great Recession, and this contributes to a 2.0 percentage point fall in aggregate consumption.

Overall, using diverse proxies for uncertainty[1], the latest strand of studies has attempted to examine swings in consumption through the prism of uncertainty, empirically verifying the presence of a reverse relationship. This relationship is quite relevant considering the recent economic episodes, such as the pandemic and the energy crisis. Interestingly, the bigger effects of uncertainty shocks are documented under a nonlinear framework instead of a linear one.

2.2 Consumption, wealth effects, indebtedness, and interest rates

Economic theory suggests that household consumption expenditure depends mainly on income and wealth. According to the standard life cycle (Modigliani and Brumberg, 1954) and the permanent income hypothesis (Friedman, 1957), household consumption is greatly influenced by the discounted value of its expected lifetime resources. Underlying this analysis lies the assumption that only permanent changes in wealth and income influence variation in consumption patterns. Early literature emphasizes the role of aggregate wealth and income in determining consumption (Fernandez-Corugedo, 2004). Other studies examine, along with income, aggregate net wealth that is total wealth free of liabilities (Davis and Palumbo, 2001; Tan and Voss, 2003). Over the past several decades, a plethora of studies has attempted to establish new knowledge of the wealth effect on consumption among various channels.

To examine whether changes in the value of housing or financial wealth may mirror a sense of welfare improvement, thereby creating new opportunities for consumption, several studies distinguish between these two types of wealth. Most researchers have recognized a more powerful role for housing wealth in influencing consumption (Caroll et al., 2011; Benjamin et al., 2004; Case et al., 2013; Bostic et al., 2009; Barata and Pacheco, 2003; Catte et al., 2004; Ludwig and Slok, 2004; Dreger and Reimers, 2012; Marquez et al., 2013; Barrell et al., 2015). In a cross-country analysis, Sierminska and Takhtamanova (2012) utilize harmonized financial and housing wealth microdata from Canada, Finland, Italy, Germany, and the US to identify consumption elasticities in different age groups. Their findings reveal that in Finland, Italy, Germany, the US, and certain age groups in Canada, the impact of housing wealth outweighs that of the financial one. On the contrary, another strand of researchers finds that the financial wealth effect predominates the housing one (De Bonis and Silvestrini, 2012;

[1] For an in-depth review of the different measures of uncertainty encountered in the literature, see Cascaldi-Garcia et al., (2023).

Navarro and de Frutos, 2015; Kichian and Mihic, 2018; Arrondel et al., 2019). Sousa (2009) examining the euro area provides evidence that only the financial wealth effect is large and significant. More recently, de Bondt et al., (2020) by linking micro and macro data, posit that the long-term elasticity of financial wealth is four to five times larger than that of non-financial wealth and in the long term, disposable income and wealth determine private consumption. The authors highlight the need to disaggregate income -into labour and non-labour components - and wealth - into financial and non-financial - to better uncover consumption behavior. In the short term, however, other contributing factors such as interest rates, consumer indebtedness, government debt burden, income uncertainty, and demographics drive consumption dynamics.

Recently, the "wealth effect to income" relationship has gained a new understanding via the application of more sophisticated econometric methods. These methodologies account for asymmetries to better explain the large swings in financial and real assets (housing wealth) primarily in the wake of the recent emerging crises, namely the financial crisis and more recently the pandemic and energy crises. In this context, Cronin and MacQuinn (2021) using a 22-country panel between 1996-2017, provide evidence that consumption responds asymmetrically to changes in overall housing net worth. Their findings are consistent with the "negativity bias" literature addressed by Nguyen and Claus (2013) and Cooper and Dynan (2016), where households react more powerfully to bad news than good news. Accordingly, the authors reinforce the conclusion reached by Guerrieri and Iacoviello (2017) and De Roiste et al., (2021) that a fall in households' net worth is more impactful to consumption dynamics than a relevant increase. This asymmetric consumption behavior may mirror precautionary savings motives. Nevertheless, some recent empirical results of Coskun et al., (2022) contrast the mentioned literature, as they support the view that consumers do not significantly cut back on consumption when faced with drops in their income and wealth in a recessionary period. The rationale behind this behavior may lie in households' efforts to preserve a standard of living during difficult times.

Furthermore, a large body of research enriches the examination of the relationship between consumption, wealth, and uncertainty by accounting for the interaction of other underlying and influential determinants, such as indebtedness and interest rates (Aron et al., 2012; Estrada et al., 2014; Mian and Sufi, 2016; Kartashova and Tomlin 2017; Jin et al., 2022).

Some research emphasizes that the build-up of the debt process to a certain extent can bolster an economy (Cecchetti et al.; 2011) buoyed by resilient consumer spending (Mian and Sufi, 2016; Kartashova and Tomlin, 2017). Recently, Jin et al., (2022) have underlined the existence of a positive relationship between consumption and debt in China, which became weaker only when controlling for economic policy uncertainty peaks. Manou et al., (2021) study the asymmetric linkages of net financial wealth components and consumption in Greece from 1999Q4-2017Q4. Their findings demonstrate that consumption elasticity out of debt is statistically significant with a positive effect, implying that Greek households built of debt buoy consumption. Conversely, the long-run deleveraging process during the crisis years, following the burst of the financial crisis was behind the lackluster performance of Greek consumption.

Household deleveraging dominates in the literature as a precipitating factor of a recession and consumption expenditure cutback. In a seminal work, Mian and Sufi (2014a) provide evidence of the mechanism at work during the financial crisis; when housing prices start to fall, the consumption crisis for the most vulnerable-indebted households that follows spills over to the US economy at large fostering a generalized depression. Mian et al., (2020) support the view that when credit supply expansion influences households' demand, that is when borrowing boosts consumption, the business cycle amplifies, and the outcome is a recession of greater severity. Dynan (2012) shows that the debt overhang has triggered a vicious deleveraging cycle that had implications for consumption in the US. Bunn and Rostom (2015) employ microdata to show that following the financial crisis, the more indebted households in the UK pulled back on spending more than less debt-burdened households, contributing to the deepening of the crisis. This finding is similar to Mian et al. (2013), Mian and Sufi (2016), and McCarthy and McQuinn (2017) who underline that the deleveraging process acts as a drag on consumption.

Lately, Fasianos and Lydon (2022) have examined whether the non-durable consumption of indebted households in the UK responded differently to positive and negative shocks to income and wealth. Their results reveal that highly debt-burdened households respond more strongly to negative income shocks relative to low or medium-debt-burdened ones. The authors explain this asymmetry by arguing that indebted households face liquidity risks and pull back on consumption more in the presence of shocks than burden-free ones.

Finally, a different strand of the literature examines the relationship between interest rates and consumption. Lehrer and Light (2018) find that lower interest rates stimulate consumption under an income fluctuation framework. The mechanism at work is the concavity of the consumption function that favors the predominance of the substitution effect over the income effect. Kozlov (2023) shows that lower interest rates facilitate elevated levels of indebtedness and in turn, trigger a short-term consumption boost for younger individuals. Nordstrom (2020) focuses on examining whether the relationship between consumption growth and the short interest rate in the USA and Sweden has been time-varying, during the periods of the Great Moderation and the financial crisis. His findings suggest that the response of consumption to interest rates has not varied, implying the same degree of effectiveness for the monetary policy compared to the recent history. In contrast, Staal (2023) working with a panel data set from 20 OECD countries, covering the period 2000 to 2020, examines households' savings behavior in a negative interest rate environment. His analysis provides strong evidence that negative interest rates cause savings to rise in a statistically and economically significant way. His results also suggest that formulating a monetary strategy of negative interest rates to fuel consumer consumption is ineffective.

3. Model, data and econometric methodology

3.1 Estimated model

To account for the impact of uncertainty on consumption expenditures we make use of a panel of 14-euro area countries, over the period 1997 to 2021, driven by data availability. In the selected country group consumption forms the largest and the most stable component of GDP. The dependent variable is household consumption expenditure and to account for uncertainty we employ three indices from the International Country Risk Guide (ICRG) published by the Political Risk Services (PRS) group. Country risk is assessed by the composite risk index (CR), the economic risk index (ER) and the financial risk index (FR). Disposable income, financial assets, households' liabilities, and interest rate are included as regressors in the analysis.

Following the aforementioned empirical strategy, along with Coskun et al., (2022) and Manou et al., (2021), we empirically estimate equations (1), (2) and (3) to examine whether uncertainty can hamper household consumption. Our baseline specifications are for composite risk:

$$lc_{it} = a_1 + \beta_1 CR_{it} + \beta_2 ldi_{it} + \beta_3 lhw_{it} + \beta_4 lfa_{it} + \beta_5 lliab_{it} + \beta_6 rhp_{it} + U_{it} \tag{1}$$

for economic risk:

$$lc_{it} = a_1 + \beta_1 ER_{it} + \beta_2 ldi_{it} + \beta_3 lhw_{it} + \beta_4 lfa_{it} + \beta_5 lliab_{it} + \beta_6 rhp_{it} + U_{it} \tag{2}$$

and for financial risk:

$$lc_{it} = a_1 + \beta_1 FR_{it} + \beta_2 ldi_{it} + \beta_3 lhw_{it} + \beta_4 lfa_{it} + \beta_5 lliab_{it} + \beta_6 rhp_{it} + U_{it} \tag{3}$$

Where lc_{it} is the household consumption per capita of the country i at time t and β_i denotes coefficients to be estimated. CR_{it} is the country's composite risk index, ER_{it} is the economic risk index, FR_{it} is the financial risk index, ldi is the disposable income per capita, lhw denotes the housing wealth per capita, lfa denotes financial assets per capita, $lliab$ is households' liabilities per capita, rhp is the long-term interest rate for household purchases and U_{it} is the error term. All variables enter the regressions in logarithmic form except for the rhp and the three uncertainty variables (CR, ER, FR). It is assumed that the regressors are uncorrelated with the disturbance term U_{it}. The disturbances are allowed to be autocorrelated and heteroskedastic. Increased (lower) country risk could hamper (increase) household consumption. The composite risk (CR) index, which is an aggregate of political risk, financial risk, and economic risk, ranges from 0 to 100. Higher scores indicate lower risk for the selected country. Therefore, we expect the coefficient of the country risk to be positive, as a lower risk for the selected country would increase household consumption. The economic risk and the financial risk are standardized weighted indices. The main advantage of our empirical approach is that it makes it straightforward to switch between the three indices employed as uncertainty indices. All variables used in equations (1), (2), and (3) are explained below.

3.2 Data

In the analysis, we employ a panel dataset of 14-euro area countries (Austria, Belgium, Germany, Estonia, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Slovenia) over the period 1997 to 2021. The analysis is restricted to these countries due to data availability. All variables are expressed in logarithmic form excluding the interest rate and the risk variables. The notation l is used in the analysis to denote the natural logarithmic of the variables employed in the analysis. Final consumption expenditure (c), disposable income (di), housing wealth (hw), financial assets (fa), liabilities (liab) and long-term interest rate for house purchases (rhp), for households and non-profit institutions serving households (NPISH) are derived from the Statistical Data Warehouse (SDW) of the ECB (See Appendix). The data is compiled in accordance with the methodological framework established in the ESA 2010 and presented in real (deflated by the consumption deflator) per capita (using population data from the SDW) terms, to enhance the meaningfulness of cross-country comparisons.

3.2.1 The explained variable

The explained variable, final consumption expenditure (c) of households and non-profit institutions serving households (NPISHs), consists of the expenditure (including imputed expenditure) incurred by resident households and NPISHs on goods and services (food, clothing, housing services/rents, energy, durable goods -notably cars-, spending on health, on leisure and on miscellaneous services).

3.2.2 Independent variables

Independent variables cover a broad range of variables encountered in the relevant literature and more precisely: disposable income (di), which represents the sum of household final consumption expenditure and savings; we expect household disposable income to be positively correlated to the dependent variable; housing wealth (hw) which is defined as the stock of households dwellings net of depreciation; financial assets (fa) that is currency and deposits, debt securities, equity, investment fund shares, insurance, pension and standardized guarantees and other accounts receivable held by households and NPISH; we expect financial assets to positively affect consumption; household debt (liab) reflecting household financial liabilities, which is defined as consumer loans, mortgage loans and other loans of households and NPISH; we expect households to use part of their liabilities to support consumption; long-term interest rate for house purchases (rhp) refers to new long-term loans with an initial rate of fixation up to one year and is expected to negatively affect the dependent variable.

To account for uncertainty, we utilize data from the International Country Risk Guide (ICRG) published by the Political Risk Services (PRS) group. Country risk is assessed by three risk indices, the composite risk index (CR), the economic risk index (ER), and the financial risk index (FR).

The composite risk (CR) is an index calculated as an aggregate of political risk, financial risk, and economic risk. The score for the composite risk ranges from 0 to 100 while for the economic and financial risks the scores range from 0 to 50. Higher scores indicate lower risk for the selected country. We further proceed to calculate standardized weighted indices for economic risk (ER) and financial risk (FR). Following the recent approach of Schwab et al., (2020) these indices are computed using a generalized least-squares method weighting procedure, as described in Anderson (2008). The primary merit of this approach is that it increases the efficiency of the estimated index by assigning less weight to highly correlated indicators. To construct the standardized weighted index of economic risk (ER), we utilize five indicators, namely GDP per head, real GDP growth, annual inflation rate, budget balance as a percentage of GDP, and current account as a percentage of GDP. To construct the standardized weighted index of financial risk (FR), we employ five dimensions of financial risks that is foreign debt as a percentage of GDP, foreign debt as a percentage of goods and services, current account as a percentage of exports of goods and services, net international liquidity as months of import cover and exchange rate stability.

Table 1 reports the summary statistics for the dependent and independent variables employed in the analysis.

Insert Table 1 here

Figure 2 presents the graphs of the real per capita consumption expenditure and the composite risk index. As depicted in Fig. 2, over the last two decades, real per capita final consumption expenditure has exhibited a high degree of heterogeneity across euro-area countries. However, more recently, the pandemic crisis has overwhelmed all euro-area economies and has weighed on consumption dynamics. This was consistent with an overall landscape of increasing economic uncertainty and deteriorating risk perceptions for all countries, as reflected in the sharp drop in the economic risk indicator in 2020. In the following years, as uncertainty receded, almost all countries of our sample experienced a rebound in the reference index.

Insert Figure 2 here

3.3 Econometric methodology

Using advanced spectrum estimation methods, we perform mean regression analysis to estimate equations (1), (2) and (3) to explore the effect of uncertainty on household consumption expenditures. Building on traditional panel OLS fixed effects (FE) estimators, we additionally perform fixed-effects regression estimation with multiple levels of fixed effects. To account for potential heteroskedasticity and autocorrelation, prefecture-level clustered standard errors were estimated by the panel data models with high-dimensional fixed effects (Correia, 2016). We further allow for the slope coefficients to differ across panel members by using the mean group (MG) estimator that implements a panel time-series estimator, allowing for heterogeneous slope coefficients across group members (Pesaran and Smith, 1995; Eberhardt, 2012). The estimated coefficients are averaged across panel members and MG calculates the coefficients using maximum likelihood.

As a next step, we allow the coefficient to vary across quantiles and perform a minimum distance quantile estimation method, following the recent and novel approach of Melly and Pons (2023) and Pons (2022). In particular, we perform the grouped quantile regression estimation in two steps, as we account for the within-group heterogeneity. In the first step, using individual-level covariates at each selected quantile group level, quantile regressions are performed. In the second step, we regress the fitted values from the first step on all the variables on individual-level and group-level variables using the generalized method of moment (GMM). We fit fixed-effects model estimation. The grouped quantile regression estimation has two crucial advantages. First, the grouped quantile regression estimator remains consistent in the presence of unobserved heterogeneity, which biases quantile regression estimators as well as quantile regression estimators with fixed effects. Second, the grouped quantile regression estimation is simple to perform and flexible.

4. Empirical findings

The estimated practices of this study are as follows: First, to estimate the impact of uncertainty on household consumption we begin by conducting preliminary tests, such as the homogeneity test to examine whether heterogeneity exists across countries for the data set (Section 4.1). Second, the benchmark panel mean regression estimation is conducted to examine the effect of uncertainty on consumption (Section 4.2). We estimate equations (1), (2) and (3) using a combination of traditional and most recently developed estimation methods. Initially, we report empirical estimates using the traditional FE panel estimators. Then, to account for potential heteroskedasticity and autocorrelation, prefecture-level clustered standard errors are estimated by the panel data linear regression models with high-dimensional fixed effects (Correia, 2016). Next, we implement a panel time-series estimator that allows for heterogeneous slope coefficients across group members. To this end, we use the mean group (MG) estimator proposed by Eberhardt (2012), according to which the standard errors are constructed by testing the significant difference of the average coefficient from zero. This allows for utilizing statistical inference in the estimation of heterogeneous coefficient models in panels with a large number of observations over country groups and periods. Third, a quantile regression panel estimation at selected points of the conditional household consumption distribution (Section 4.3) is employed to examine the impact of uncertainty at various points of the conditional consumption expenditures distribution. Fourth, a heterogeneous analysis is performed accounting for the presence of risk by dividing the sample into high- and low-level risk groups of countries (Section 4.4).

4.1 Preliminary tests

4.1.1 Slope homogeneity and unit root testing

The slope homogeneity test of Pesaran and Yamagata (2008) is employed to examine whether heterogeneity exists across the countries of the sample. Utilizing Monte Carlo experiments, the adjusted (Delta-adjusted: Δ_{adj}) version of the dispersion test has the correct size and satisfactory power in panels with exogenous regressors for various combinations of N and T, irrespective of whether the errors are normally distributed or not. Table 2 supports that the null hypothesis is rejected suggesting the heterogeneity of the slope coefficients (Delta and Delta-adjusted). Having verified that the slope coefficients are heterogeneous, we run the fisher-type test with augmented Dicky Fuller options and 1 lag. This test is a modification of the inverse chi-square method proposed by Choi (2001) and the null hypothesis of non-stationarity is rejected. The test ensures that the series are stationary (Table 3).

Insert Table 2 here

Insert Table 3 here

4.2 Mean regression analysis

Table 4 presents the baseline findings related to the estimation of Eq. (1), (2) and (3) respectively, employing the Panel OLS fixed effect (FE), the panel OLS estimation with multiple levels of fixed effects and the Mean Group (MG) estimators for composite risk (columns 1-6), economic risk (columns 7-12) and financial risk (columns 13-18). Columns 1, 3, 5, 7, 9, 11, 13, 15, and 17 provide values of the estimated models without accounting for the presence of uncertainty, while the remaining columns account for the presence of uncertainty. The benchmark regression for conducting the analysis is the MG estimator as results are robust to slope heterogeneity. The results show that higher values of risk variables, indicating lower country risk, are associated with increases in consumption. The statistical significance of uncertainty, as asserted by the composite, economic and financial risk indices in affecting consumption, is verified in all the estimation methods applied in our study. In accordance with Ghirelli et al., (2019), Nam et al., (2021) and Coibion et al., (2021), we empirically show that the impact of uncertainty on households' consumption is overwhelming. The composite and economic risk indices have positive signs indicating that in a stable environment, household consumption increases. The outcome of the uncertainty, as reflected in the composite risk indicator, becomes larger in magnitude under the MG estimator (column 6) compared to results from panel OLS and Panel OLS with multiple levels of fixed effects (columns 2 and 4, respectively). The same applies when considering the economic risk indicator, where the impact of uncertainty seems to be stronger under the MG estimator (column 12) compared to results from panel OLS and Panel OLS with multiple levels of fixed effects (columns 8 and 10, respectively). For the financial risk index, the intuitive association between risk and consumption is weaker.

As for the other independent variables, the results are in line with the predictions of the theory. Specifically, the disposable income's effect on consumption is positive and has the highest value, ranging from 0.543 to 0.657, implying that a 1% increase in disposable income is associated with a 0.543% to 0.657% increase in consumption. This finding is robust in all specifications. Our findings suggest that the impact of income on consumption is substantial (Marquez et al., 2013; Coskun et al., 2022).) A vital finding of our analysis is that the consumption elasticity out of liabilities is statistically significant in all specifications with a positive effect, suggesting that households use part of their liabilities for consumption purposes. This result is in accordance with Chucherd (2006), Sousa (2008), Kartashova and Tomlin (2017), Manou et al., (2021), and Jin et al., (2022) but contradicts Mian and Sufi (2014a) and Fasianos and Lydon (2022). Kartashova and Tomlin (2017) suggest that a large portion of homeowners' debt is used for non-housing consumption. Manou et al., (2021) advocate that Greek households use part of their liabilities to support consumption. In addition, while Jin et al., (2022) provide empirical evidence for the existence of a positive relationship between household debt and consumption, they see this linkage to weaken considerably when controlling for monetary and exchange rate policy uncertainty. In contrast, other studies put forward that a rise in indebtedness has a dampening impact on consumption. Mian and Sufi (2014a) suggest that the build-up of household debt in the US had a detrimental effect on spending, through the channel of foreclosures. Fasianos and Lydon (2022) show that households' indebtedness intensifies their consumption response to negative income shocks. The reason lies in the limited space the leveraged households have for smoothing consumption in the face of adverse income or wealth shocks.

The effect of financial assets and housing wealth on consumption is weak. This finding contradicts the findings of Marquez et al., (2013) and Kerdrain (2011), but is in line with Sousa (2009). The latter suggests that debt is important in affecting household consumption and its impact on consumption is stronger than the impact of financial or housing wealth. In line with the literature, we report a negative relationship between household consumption and interest rates (Alp and Seven, 2019; Gourinchas and Rey, 2019; Coskun et al., 2022). This negative linkage is documented under the benchmark regression of the mean group (MG) estimator and is robust under all specifications and on accounting or not for the presence of uncertainty.

Insert Table 4 here

4.3 Quantile regression analysis

To examine the effects of the uncertainty at various points of the conditional consumption distribution, we proceed by employing the grouped quantile regression estimation, as suggested by the recent approach of Melly and Pons (2023) and Pons (2022). Following Melly and Pons (2023) and Pons (2022), we estimate a quantile regression with fixed effects at selected points of the conditional consumption distribution. Table 5 (columns 1-15) presents the quantile regression estimates in five of the quantiles (10%-90%). Columns 1-5 of Table 5 report the estimators for the composite risk, columns 6-10 of Table 5 for the economic risk and columns 11-15 of Table 5 for the financial risk.

Our empirical results confirm the presence of a significant positive linkage among all types of uncertainty and consumption, along the conditional consumption distribution. Notably, this finding appears to be stronger for the lower quantiles of the consumption distribution, suggesting the presence of asymmetries in the underlying relationship. Our findings suggest that households' consumption behavior is very responsive to the core uncertainty challenges shaping the macroeconomic environment. In addition, our analysis reveals that the impact of the economic risk index on consumption seems to be the strongest among the uncertainty indices under consideration, reckoning the presence of asymmetries in the relationship. Another noteworthy finding is that households at the lower end of the consumption distribution are more sensitive to an increase in their disposable income to boost further their expenditures, whereas this effect is diminishingly impactful as we move toward the higher end of the distribution. Correspondingly, analogous results are documented for households' response to a rise in their liabilities. Households at the lower end of the consumption distribution respond more strongly to an increase in their liabilities, with a larger surge in their consumption, compared to households toward the higher end of the distribution.

Insert Table 5 here

Specifically, our empirical results provide robust evidence for the existence of a statistically significant positive association between the composite risk index and consumption expenditures along the conditional consumption distribution. We observe a positive and statistically significant effect of the composite risk index on consumption for all quantiles, as the coefficients of the composite risk index are positive and statistically significant along the conditional consumption distribution (columns 1-5 of Table 5). This finding re-echoes the findings of Table 4. A more stable composite risk environment is associated with a higher level of consumption. This channel appears to be more powerful at the lower quantiles of the consumption distribution. The coefficients of the disposable income and liabilities remain consistently significant and positive along the conditional consumption distribution. The association among consumption, housing wealth and financial assets, although positive, remains insignificant across the distribution. The effect of real interest rates is weak along the distribution and the relative coefficients are not significant.

Regarding the economic risk index, the coefficients are positive and statistically significant over the consumption distribution (columns 6-10 of Table 5). The coefficient of the economic risk variable is higher for relatively low levels of consumption and slightly decreases for the upper part of the conditional distribution of consumption. The effect of the economic risk variable on consumption is significantly stronger than that of the composite risk index. It appears that a more secure and stable economic environment promotes household spending, and this effect is noticeable and statistically significant along the distribution of household consumption. The results of the disposable income and liabilities show that their impact remains positive along the conditional consumption distribution for all quantiles. The coefficient of disposable income reaches its highest value in the 25^{th} percentile (q25), conveying a clear meaning: the effect of an increase in disposable income on consumption boosting is more impactful for households at the lower end of the consumption distribution. Conversely, the coefficient of the liabilities decreases at higher quantiles, meaning that households toward the higher end of the consumption distribution rely less on borrowing to further boost their consumption expenditures.

Finally, the coefficients of the financial risk variable are positive and statistically significant for all quantiles, indicating that a more stable financial environment would enhance consumption (columns 11-15 of Table 5). The coefficient of the financial risk variable is higher for relatively low levels of consumption and slightly decreases for the upper part of the conditional distribution of consumption. An increase in household disposable income would augment consumption along the conditional distribution of consumption, with its impact becoming less prominent at higher quantiles. Household liabilities serve as a means of underpinning and facilitating consumption, as the coefficient of liabilities remains positive and statistically significant across the distribution. The coefficient of liabilities is higher for relatively low levels of the consumption distribution and decreases as we move toward the upper part of the conditional distribution of consumption.

4.4 High versus low-risk countries

As the impact of the various types of uncertainty on consumption has been thoroughly documented within our analysis, an interesting question arises: would various levels of uncertainty produce heterogeneous effects on household consumption? To adequately answer this question, we classify our sample into low and high-risk countries and re-estimate eq (1), (2) and (3), respectively.

Table 6 presents the findings of the uncertainty indices with the panel OLS fixed effect (FE), the panel OLS estimation with multiple levels of fixed effects, and the Mean Group (MG) estimators for low-risk countries (columns 1-3, 7-9 and 13-15 in Table 6) and high-risk countries (columns 4-6, 10-12 and 16-18 in Table 6). In the benchmark regression used to conduct the analysis, the MG estimator, the coefficients of the composite and the economic risk indices are positive and statistically significant; for the financial risk, the coefficient is negative and insignificant.

For the composite risk index, the results indicate that in low-risk countries, an improvement in the amalgam of the political, economic, and financial risk environments appears to have a more pronounced positive effect on household consumption compared to high-composite risk countries (Columns 1-6 in Table 6). Concerning the economic risk index, we observe the opposite: it is in high-risk countries that further spurs of economic certainty result in a relatively greater consumption increase (0.045) compared to low-risk countries (0.036), (Columns 7-12 in Table 6). This finding suggests that enhancements in macroeconomic performance and certainty within high-risk countries signal improved economic prospects, potentially encouraging by more consumer spending relative to low-risk countries.

Concerning the control variables, the results demonstrate that the effect of disposable income remains positive and statistically significant in all specifications while increases in real interest rates exert a negative influence on consumption expenditures. A unanimous finding is that under a safer composite, economic, and financial environment household disposable income has a more substantial impact on consumption compared to a less secure one. Furthermore, liabilities tend to affect consumption positively, whereas the impact of housing wealth on consumption, while positive, remains relatively weak in both high- and low-risk countries. Lastly, the impact of financial assets is negative in all low-risk countries. More specifically, in the low economic risk countries, their impact is negative and statistically significant, implying that a reduction in households' financial wealth would have a positive impact on consumption, typically achieved through the sale of shares or the use of deposits and other financial components. Recently, Alp and Seven (2019) have also documented a negative linkage between financial wealth and consumption in Turkey over the period

1998Q1 to 2016Q2, possibly due to cash outflows in the form of capital gains and dividend payments.

Overall, our findings suggest that the analysis at the conditional mean is unlikely to capture the full extent and magnitude of the impact of uncertainty on consumption across the lower and higher quantiles of the consumption distribution. Our study has unveiled the plurality of findings regarding the effects of uncertainty on consumption across the consumption distribution. It has also provided an in-depth analysis of the influence of uncertainty indices on consumption. This is critically important for understanding and elucidating consumption behavior. Additionally, our analysis illustrates that households utilize disposable income and liabilities to bolster their consumption.

Insert Table 6 here

5. Robustness analysis

The results presented so far might be questioned on some empirical grounds. In the analysis that follows, we aim to address these potential concerns by conducting robustness checks in four key dimensions. First, we account for alternative notions of uncertainty. In this way, we check the validity of the alternative uncertainty indices employed in estimating equations (1) – (3). The additional uncertainty indices are the economic sentiment indicator (esi) and the employment expectations indicator (eei). Secondly, we explore the robustness of our quantile regression estimates using an alternative approach to the grouped quantile regression estimation by Melly and Pons (2023). We adopt the Method of Moments Quantile Regression (MM-QR) approach developed by Machado and Silva (2019). This approach captures unobserved distributional heterogeneity across countries within a panel and addresses slope heterogeneity. Thirdly, we account for alternative definitions of the dependent variable. Specifically, we employ a different measure of consumption that mirrors the domestic concept of all household expenditures within the domestic territory, including that of non-resident households (tourists). Finally, we account for an alternative notion of the interest rates that reflects the cost of borrowing of households for house purchases, excluding revolving loans and overdrafts. This comprehensive approach aims to enhance the robustness and reliability of our findings by addressing various empirical dimensions.

In- Table 7 we initially present the results of estimating the benchmark equations using the uncertainty indices published by the European Commission's Directorate General for Economic and Financial Affairs. Specifically, we account for uncertainty via the use of the economic sentiment indicator (esi) and the employment expectations indicators (eei). The economic sentiment indicator is a composite indicator made up of five sectors, each assigned different weights: industrial (40 %), construction (5 %), services (30 %), consumer (20 %), and retail trade (5 %). It reflects how both business managers and households perceive economic conditions within their respective countries and anticipate the future trajectory of their economies. The employment expectations indicator, on the other hand, is a newly introduced index that complements the economic sentiment indicator offering valuable insights into the current employment outlook.

The results employing the economic sentiment indicator (esi) (columns 1-3 of Table 7) and the employment expectations indicator (eei) (columns 4-6 of Table 7) remain qualitatively the same as in the case of the benchmark estimation (1). An increase in the economic sentiment indicator and the employment expectations indicator leads to higher household spending, respectively. The magnitude of the effect though is smaller relative to our benchmark estimation of equation (1). This finding is justified by the fact that these indices only partially gauge economic uncertainty. In contrast, the uncertainty indicators employed in the benchmark estimation include a plethora of economic, financial, and political variables that thoroughly represent the stability of a country’s economic and financial environment. A stable and secure economic and financial environment may affect business investment decisions and enhance household consumption expenditures. Finally, in terms of the control variables, the impact of disposable income and liabilities on household consumption is consistent with the benchmark estimations.

Our findings, when employing the economic sentiment indicator (esi) in columns 1-3 of Table 7 and the employment expectations indicator (eei) in columns 4-6, align qualitatively with those obtained in our benchmark estimation (equation 1). Specifically, an increase in the economic sentiment indicator and the employment expectations indicator is associated with higher household spending. However, it is worth noting that the magnitude of these effects is comparatively smaller when compared to our benchmark estimation (equation 1). This discrepancy can be attributed to the fact that these indices only partially capture economic uncertainty. In contrast, the uncertainty indicators utilized in our benchmark estimation encompass a wide array of economic, financial, and political variables that provide a more comprehensive assessment of a country's economic and financial stability. A stable and secure economic and financial environment can significantly influence business investment decisions and subsequently enhance household consumption expenditures.

Finally, concerning the control variables, our analysis reveals that the impact of disposable income and liabilities on household consumption remains consistent with the findings of our benchmark estimations.

Insert Table 7 here

Insert Table 8 here

Next, we explore the robustness of the quantile regression estimations by adopting the framework developed by Machado and Silva (2019) as an alternative approach to Melly and Pons (2023) and Pons (2022) estimation. We implement the Method of Moments Quantile Regression (MM-QR) approach for panel fixed effects developed by Machado and Silva (2019) to explore the impact of uncertainty on household consumption. This approach is particularly well-suited for capturing the unobserved distributional heterogeneity across countries within a panel and for accommodating slope heterogeneity. Table 8 presents the quantile regression estimates across five quantiles (ranging from 10% to 90%). Columns 1-5 of Table 8 display the estimators for composite risk, columns 6-10 for economic risk, and columns 11-15 for financial risk. Wald $\chi 2$ tests have been conducted, confirming the validity of our findings.

Empirical results affirm a significant positive association between composite risk and consumption along the conditional consumption distribution as evidenced in Columns 1-5 of Table 8. The coefficients of the composite risk index are positive and statistically significant along the conditional consumption distribution. These findings re-echo the outcomes presented in Table 5, suggesting that a more stable composite risk environment is associated with a higher level of consumption. This effect appears to be more dominant at lower quantiles of the consumption distribution. The coefficients of disposable income and liabilities remain consistently significant and positive along the conditional consumption distribution. However, the association between consumption and housing wealth remains statistically insignificant across the distribution. Notably, the link between financial assets and household consumption is positively and statistically significant at the 0.50 and 0.75 quantiles, indicating a favorable impact of an increase in financial assets on consumption. Conversely, the effect of real interest rates, while negative along the distribution, is weak.

Regarding the economic risk index, the coefficients are positive across the consumption distribution, but achieve statistical significance only at the 0.75 quantile (columns 6-10 of Table 8). The impact of disposable income and liabilities remains consistently positive along the conditional consumption distribution, with statistical significance observed for the 0.50-0.90 quantiles.

The coefficients of the financial risk variable are positive along the consumption distribution and statistically significant within the 0.25-0.75 quantiles indicating that a more stable financial environment tends to promote consumption (columns 11-15 of Table 8). Household disposable income would augment consumption along the conditional distribution of consumption with its impact becoming more pronounced at higher quantiles. Household liabilities play a role in supporting consumption, as indicated by the positive and statistically significant coefficient on liabilities observed across the distribution. It is worth noting that this effect is more powerful at lower quantiles meaning that households with relatively low consumption levels exhibit a more substantial surge in consumption when their liabilities rise.

Furthermore, we control for different measures of the dependent variable, that is household consumption (Table 9). We incorporate the definition of consumption (*dmc*) that mirrors the domestic concept of total household expenditure within the domestic territory, including that of non-resident households (tourists) while excluding expenditure incurred abroad by resident households. Table 9 presents the baseline findings related to the estimation of Eq. (1), (2) and (3) employing the Panel OLS fixed effect (FE), the panel OLS estimation with multiple levels of fixed effects and the Mean Group (MG) estimators for composite risk (columns 1-3 of Table 9), economic risk (columns 4-6) and financial risk (columns 7-9). Under the benchmark regression framework of our analysis, which utilizes the MG estimator, the coefficients of the composite and economic risk indices are positive and statistically significant while for the financial risk, the coefficient is negative and statistically insignificant.

As for the other independent variables, the results show that the variables in consideration are statistically significant except for housing wealth. Specifically, the effect of disposable income on consumption is positive and exhibits the widest range of values. This finding is robust in all specifications and aligns with our earlier findings reported in Table 5. Further, the consumption elasticity out of liabilities is statistically significant in all specifications with a positive effect. Finally, the negative effects of financial assets and interest rates on consumption are only weakly documented.

Insert Table 9 here

Lastly, we explore the robustness of our findings by considering alternative measures of interest rates (Table 10). We specifically introduce an interest rate variable (mir) that reflects the cost of borrowing of households specifically related to house purchases, excluding revolving loans and overdrafts, convenience, and extended credit card debt. This pertains to new long-term loans comprising all financial contracts, terms and conditions that specify for the first time the interest rate of the loan including renegotiations of existing loan contracts. This indicator developed jointly by the ECB and NCBs, facilitates comparisons of credit conditions across euro area countries with different household borrowing structures. However, it is worth noting that the data for this indicator is available from January 2003, which restricts the size of our sample. The results of the analysis remain quantitatively the same, that is the coefficients of the composite and economic risk indices are positive and statistically significant while for the financial risk the coefficient is insignificant.

Insert Table 10 here

In summary, our analysis has examined the robustness of our findings by accounting for different measures of uncertainty, alternative definitions of consumption expenditure and interest rates. Furthermore, we have explored the robustness of our quantile regression estimations through alternative estimation methods particularly utilizing the approach by Machado and Silva (2019). Overall, our core findings remain unaffected by these variations consistently reaffirming our benchmark results. Our research uncovers a significant and positive relationship between uncertainty and consumption not only at the mean but also along the conditional consumption distribution. Notably, this effect appears more pronounced for the lower quantiles of the consumption distribution. Furthermore, we identify a positive effect of financial assets on consumption notably at the 0.50 and 0.75 quantiles. Finally, there is ample evidence that increases in disposable income and household liabilities enhance consumption expenditure while rising interest rates tend to exert a dampening effect.

6. Conclusions and policy implications

A plethora of theoretical and empirical studies has attempted to identify the role played by uncertainty on various macroeconomic variables, involving household consumption expenditures. The basic notion is that in the presence of uncertainty, households spend less, and firms reduce investment and employment suggesting that macroeconomic uncertainty can have an important impact on household decisions. The core idea at the heart of these studies is that when uncertainty prevails, households tend to curtail their spending, while firms scale back on investments and employment. This suggests that macroeconomic uncertainty acts as a drag on household decision-making processes.

Our paper effectively complements the related literature on household spending in three aspects. First, we examine the relationship between uncertainty and private consumption expenditure across a panel of 14-euro area countries over the period 1997 to 2021. In our analysis, we incorporate various facets of uncertainty, utilizing composite, economic and financial risk indices sourced from the International Country Risk Guide (ICRG). To account for the effects of uncertainty on consumption expenditure we utilize alternative panel estimators with heterogeneous coefficients and an error term that takes into consideration cross-country heterogeneity. Second, we delve into the effect of uncertainty on household consumption over its conditional distribution. This modelling strategy allows us to detect the relative importance of uncertainty across the conditional distribution of consumption rather than focusing solely on its conditional mean, reckoning the presence of asymmetries in the relationship. We perform grouped quantile analogs of the fixed effects estimators for panel data as suggested by the novel approach of Melly and Pons (2023) and Pons (2022). Third, acknowledging the diversity in economic and financial systems among the countries under examination, we creatively gauge the heterogeneous effects on household consumption spending. Our empirical analysis is conducted using a unique dataset comprising the flow of funds data related to consumption, disposable income, wealth components, liabilities and interest rates.

We substantiate the impact of uncertainty on consumption expenditures within the panel of euro area countries. Our findings reveal a statistically significant influence of uncertainty on consumption expenditure. We interpret these results as conveying a clear message: economic, political, and financial stability and certainty play pivotal roles in motivating households to make spending decisions. As for the other independent variables, our results show that the effect of disposable income on consumption is positive. A vital finding of our analysis is that the consumption elasticity out of liabilities is statistically significant in all specifications with a positive effect, proposing that households use part of their liabilities for consumption purposes. Our findings deepen our understanding of the role of uncertainty in shaping household spending patterns. Further, we enrich our understanding of the effects of uncertainty at various points within the conditional consumption distribution by employing the innovative grouped quantile regression estimation approach introduced by (Melly and Pons, 2023; Pons, 2022). Our findings unveil a significant negative relationship between uncertainty and consumption, along with the conditional consumption distribution. Importantly, this effect appears more pronounced for the lower quantiles of the consumption distribution, underscoring the asymmetric impact of uncertainty on household spending.

Our results are robust to a battery of robustness checks, including alternative measures of uncertainty, consumption expenditure and interest rates, and alternative estimation methods.

Future avenues of research could delve deeper into the impact of uncertainty on household consumption expenditures, particularly in the context of significant events such as the Great Recession and the COVID-19 pandemic. Exploring the nuanced effects of various dimensions of uncertainty on consumption through micro-econometrics approaches could also be a promising direction for future research. These potential avenues hold the promise of further enhancing our understanding and explanation of consumption behavior.

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Appendix

Variable definitions and sources of data used

Abbreviation	Name of variable	Description	Source
c	Final consumption expenditure	Expenditure, including imputed expenditure, incurred by resident households and NPISHs on goods and services	ECB, Statistical Data Warehouse (SDW)
di	Disposable income	The sum of household final consumption expenditure and saving	ECB, Statistical Data Warehouse (SDW)
hw	Housing wealth	The stock of household dwellings net of depreciation	ECB, Statistical Data Warehouse (SDW)
fa	Financial assets	Currency and deposits, debt securities, equity, investment fund shares, insurance, pension and standardized guarantees and other accounts receivable held by households and NPISH	ECB, Statistical Data Warehouse (SDW)
liab	Household debt	Household and NPISH financial liabilities (consumer loans, mortgage loans and other loans)	ECB, Statistical Data Warehouse (SDW)
rhp	Long-term interest rate for house purchases	New long-term loans with an initial rate of fixation of up to one year.	ECB, Statistical Data Warehouse (SDW)
CR	Composite risk	Country risk, where higher scores indicate lower risk.	International Country Risk Guide (ICRG)
ER	Economic risk	Includes five dimensions of economic risk (GDP per head, real GDP growth, annual inflation rate, budget balance as a percentage of GDP, current account as a percentage of GDP).	International Country Risk Guide (ICRG)
FR	Financial risk	Includes five dimensions of Financial Risk (foreign debt as a percentage of GDP, foreign debt as a percentage of goods and services, current account as a percentage of exports of goods and services, net international liquidity as months of import cover, exchange rate stability).	International Country Risk Guide (ICRG)

Tables and Figures

TABLE 1. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lc	350	16,480.33	5,570.29	3,687.40	31,672.36
CR	350	78.83	6.29	61.87	92.47
ldi	350	18,680.63	6,583.72	3,937.01	38,289.00
lhw	350	78,085.51	44,847.45	16,590.65	299,321.18
lfa	350	61,169.15	35,433.96	3,171.36	171,034.41
lliab	350	20,532.01	13,462.37	516.50	68,964.64
rhp	350	1.67	2.18	-7.75	9.89

TABLE 2. Tests for slope homogeneity

		value	p-value
Slope homogeneity*	Delta test	Model I: Delta 6.837	0.000
		Delta-adjusted (Δadj) 8.291	0.000
		Model II: Delta 9.433	0.000
		Delta-adjusted (Δadj) 11.439	0.000
		Model III: Delta 5.714	0.000
		Delta-adjusted (Δadj) 6.929	0.000

Notes: Model I denotes specifications where the composite risk indicator is employed as a control variable.
Model II denotes specifications where the economic risk indicator is employed as a control variable.
Model III denotes specifications where the financial risk indicator is employed as a control variable.
* The null hypothesis is that slope coefficients are homogeneous.

TABLE 3. Panel unit root tests

	variable	value	p-value
Panel unit root test Fischer-type	lc	7.9785	0.0000
	CR	16.3969	0.0000
	ldi	7.2009	0.0000
	lhw	11.9544	0.0000
	lfa	9.1586	0.0000
	lliab	11.4462	0.0000
	rhp	13.5990	0.0000

Note: The null hypothesis is that the series are non-stationary.

TABLE 4. Consumption, composite risk (CR), economic risk (ER) and financial risk (FR) - baseline results

	Compositite risk (CR)						Economic risk (ER)						Financial risk (FR)					
	Panel OLS (Fixed effects)		*Panel OLS (multiple levels of fixed effects)*		*Mean Group (MG)*		*Panel OLS (Fixed effects)*		*Panel OLS (multiple levels of fixed effects)*		*Mean Group (MG)*		*Panel OLS (Fixed effects)*		*Panel OLS (multiple levels of fixed effects)*		*Mean Group (MG)*	
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
Variables	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc
CR	-	0.004***	-	0.004***	-	0.005***	-	-	-	-	-	-	-	-	-	-	-	-
		(0.001)		(0.001)		(0.001)												
ER	-	-	-	-	-	-	-	0.036***	-	0.021**	-	0.040***	-	-	-	-	-	-
								(0.004)		(0.009)		(0.007)						
FR	-	-	-	-	-	-	-	-	-	-	-	-	-	0.012***	-	0.010**	-	-0.005
														(0.003)		(0.004)		(0.004)
ldi	0.625***	0.543***	0.623***	0.618***	0.636***	0.570***	0.625***	0.647***	0.623***	0.638***	0.636***	0.582***	0.625***	0.610***	0.623***	0.626***	0.636***	0.657***
	(0.032)	(0.031)	(0.079)	(0.073)	(0.097)	(0.092)	(0.032)	(0.028)	(0.079)	(0.074)	(0.097)	(0.085)	(0.032)	(0.031)	(0.079)	(0.076)	(0.097)	(0.099)
lhw	-0.014	0.000	-0.017	-0.016	0.010	-0.006	-0.014	0.007	-0.017	-0.004	0.010	0.034	-0.014	-0.012	-0.017	-0.018	0.010	0.011
	(0.012)	(0.011)	(0.028)	(0.026)	(0.040)	(0.039)	(0.012)	(0.011)	(0.028)	(0.025)	(0.040)	(0.037)	(0.012)	(0.012)	(0.028)	(0.026)	(0.040)	(0.043)
lfa	0.021	0.036**	0.042	0.017	-0.009	0.011	0.021	-0.018	0.042	0.025	-0.009	-0.066	0.021	0.018	0.042	0.032	-0.009	-0.027
	(0.015)	(0.014)	(0.050)	(0.050)	(0.037)	(0.036)	(0.015)	(0.014)	(0.050)	(0.048)	(0.037)	(0.045)	(0.015)	(0.015)	(0.050)	(0.050)	(0.037)	(0.036)
lliab	0.095***	0.117***	0.076***	0.088***	0.064***	0.109***	0.095***	0.094***	0.076***	0.071***	0.064***	0.097***	0.095***	0.103***	0.076***	0.081***	0.064***	0.059**
	(0.008)	(0.008)	(0.014)	(0.013)	(0.023)	(0.029)	(0.008)	(0.007)	(0.014)	(0.014)	(0.023)	(0.032)	(0.008)	(0.008)	(0.014)	(0.015)	(0.023)	(0.026)
rhp	0.001	-0.000	0.002	0.001	-0.005***	-0.005***	0.001	-0.001	0.002	0.000	-0.005***	-0.005***	0.001	-0.000	0.002	0.001	-0.005***	-0.005***
	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)
Constant	0.667***	0.381***	0.652***	0.436***	0.794***	0.440***	0.667***	0.663***	0.652***	0.632***	0.794***	0.962***	0.667***	0.690***	0.652***	0.673***	0.794***	0.824***
	(0.065)	(0.070)	(0.103)	(0.120)	(0.163)	(0.152)	(0.065)	(0.057)	(0.103)	(0.094)	(0.163)	(0.147)	(0.065)	(0.063)	(0.103)	(0.099)	(0.163)	(0.183)
Observations	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Countries	14	14			14	14	14	14			14	14	14	14			14	14

Notes: All variables are expapered in natural logarithms except for the real interest rate, the composite risk indicator (CR), the economic risk indicator (ER) and the financial risk indicator (FR). Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

TABLE 5. Quantile panel regressions and fixed effects - Melly and Pons (2022) estimates

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
Variables	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90
CR	0.006***	0.005***	0.004***	0.003***	0.004***	-	-	-	-	-	-	-	-	-	-
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)										
ER	-	-	-	-	-	0.038***	0.039***	0.035***	0.028***	0.032***	-	-	-	-	-
						(0.005)	(0.004)	(0.004)	(0.005)	(0.005)					
FR	-	-	-	-	-	-	-	-	-	-	0.016***	0.017***	0.012***	0.007***	0.008***
											(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
ldi	0.464***	0.493***	0.510***	0.500***	0.491***	0.604***	0.649***	0.634***	0.621***	0.572***	0.614***	0.614***	0.590***	0.566***	0.577***
	(0.102)	(0.064)	(0.077)	(0.083)	(0.087)	(0.080)	(0.074)	(0.075)	(0.093)	(0.089)	(0.077)	(0.076)	(0.090)	(0.100)	(0.101)
lhw	0.004	0.005	0.004	0.016	0.009	0.002	0.004	0.021	0.025	0.024	-0.016	-0.014	0.004	0.018	0.012
	(0.017)	(0.019)	(0.023)	(0.023)	(0.022)	(0.019)	(0.017)	(0.020)	(0.019)	(0.018)	(0.017)	(0.021)	(0.023)	(0.022)	(0.021)
lfa	0.054	0.049	0.061	0.073	0.080	-0.002	-0.019	-0.007	0.003	0.029	-0.008	0.007	0.049	0.068	0.059
	(0.055)	(0.045)	(0.045)	(0.050)	(0.052)	(0.046)	(0.046)	(0.049)	(0.052)	(0.048)	(0.045)	(0.051)	(0.047)	(0.054)	(0.053)
lliab	0.137***	0.124***	0.113***	0.097***	0.098***	0.102***	0.099***	0.093***	0.085***	0.079***	0.116***	0.111***	0.092***	0.072***	0.086***
	(0.016)	(0.014)	(0.013)	(0.013)	(0.011)	(0.019)	(0.016)	(0.015)	(0.010)	(0.009)	(0.014)	(0.015)	(0.015)	(0.018)	(0.017)
rhp	0.001	-0.000	0.001	0.000	-0.000	-0.003	-0.002	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Constant	0.291***	0.363***	0.384***	0.425***	0.445***	0.708***	0.648***	0.603***	0.612***	0.678***	0.731***	0.691***	0.589***	0.590***	0.586***
	(0.066)	(0.082)	(0.069)	(0.068)	(0.078)	(0.104)	(0.065)	(0.073)	(0.068)	(0.074)	(0.070)	(0.063)	(0.101)	(0.101)	(0.118)
Observations	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

Notes: The dependent variable is the (real per capita) consumption variable in the natural logarithm. All variables are expressed in natural logarithms except for the risk indicators (CR, ER, FR) and the interest rate variable (rhp).
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

TABLE 6. Consumption in the presence of heterogeneous risks -high vs low risk countries

	Low- composite risk countries (high CR index)			*High- composite risk countries (low CR index)*			*Low- economic risk countries (high ER index)*			*High- economic risk countries (low ER index)*			*Low- financial risk countries (high FR index)*			*High- financial risk countries (low FR index)*		
	Panel OLS (Fixed effects)	Panel OLS (multiple levels of fixed effects)	Mean Group (MG)	Panel OLS (Fixed effects)	Panel OLS (multiple levels of fixed effects)	Mean Group (MG)	Panel OLS (Fixed effects)	Panel OLS (multiple levels of fixed effects)	Mean Group (MG)	Panel OLS (Fixed effects)	Panel OLS (multiple levels of fixed effects)	Mean Group (MG)	Panel OLS (Fixed effects)	Panel OLS (multiple levels of fixed effects)	Mean Group (MG)	Panel OLS (Fixed effects)	Panel OLS (multiple levels of fixed effects)	Mean Group (MG)
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
Variables	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc	lc
CR	0.003***	0.003	0.006***	0.004***	0.003	0.004***	-	-	-	-	-	-	-	-	-	-	-	-
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)												
ER	-	-	-	-	-	-	0.033***	-0.001	0.036***	0.033***	0.024*	0.045***	-	-	-	-	-	-
							(0.005)	(0.017)	(0.009)	(0.005)	(0.012)	(0.011)						
FR	-	-	-	-	-	-	-	-	-	-	-	-	0.007*	0.008*	-0.002	0.012***	0.007	-0.008
													(0.004)	(0.004)	(0.005)	(0.004)	(0.007)	(0.007)
ldi	0.724***	0.717***	0.618***	0.447***	0.539***	0.523***	0.743***	0.724***	0.685***	0.556***	0.542**	0.444***	0.647***	0.721***	0.821***	0.693***	0.715***	0.492***
	(0.052)	(0.055)	(0.170)	(0.037)	(0.107)	(0.081)	(0.047)	(0.059)	(0.127)	(0.035)	(0.139)	(0.082)	(0.059)	(0.148)	(0.131)	(0.041)	(0.056)	(0.129)
lhw	-0.003	0.001	-0.001	0.007	-0.023	-0.010	-0.000	0.004	-0.019	0.020	-0.006	0.104**	-0.096***	-0.078	-0.043	-0.005	0.027	0.064
	(0.019)	(0.028)	(0.060)	(0.014)	(0.034)	(0.054)	(0.015)	(0.019)	(0.047)	(0.018)	(0.051)	(0.050)	(0.023)	(0.041)	(0.071)	(0.014)	(0.019)	(0.047)
lfa	-0.138***	-0.163**	-0.057	0.097***	0.084	0.078	-0.179***	-0.133*	-0.153***	0.055***	0.087	0.051	0.106***	0.086	-0.038	-0.045**	-0.053	-0.015
	(0.023)	(0.058)	(0.037)	(0.018)	(0.056)	(0.052)	(0.020)	(0.059)	(0.049)	(0.020)	(0.072)	(0.055)	(0.025)	(0.086)	(0.037)	(0.020)	(0.047)	(0.065)
lliab	0.132***	0.111*	0.094**	0.109***	0.076***	0.123***	0.138***	0.085*	0.118***	0.077***	0.064**	0.068	0.077***	0.019	0.036	0.103***	0.115***	0.082***
	(0.016)	(0.050)	(0.046)	(0.009)	(0.010)	(0.039)	(0.014)	(0.040)	(0.046)	(0.009)	(0.016)	(0.044)	(0.017)	(0.028)	(0.045)	(0.009)	(0.012)	(0.025)
rhp	-0.010***	-0.010***	-0.007***	0.000	0.001	-0.003**	-0.011***	-0.010***	-0.006***	-0.001	-0.000	-0.005**	0.001	0.005*	-0.005**	-0.004***	-0.002	-0.005***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Constant	0.658***	0.871**	0.507**	0.399***	0.519***	0.373*	1.005***	1.026***	1.222***	0.593***	0.649***	0.615***	0.677***	0.616**	0.683***	0.663***	0.461***	0.966***
	(0.152)	(0.264)	(0.218)	(0.076)	(0.111)	(0.224)	(0.099)	(0.250)	(0.171)	(0.077)	(0.117)	(0.188)	(0.131)	(0.235)	(0.224)	(0.069)	(0.103)	(0.297)
Observations	175		175	175		175	200		200	150		150	175		175	175		175
Countries	7		7	7		7	8		8	6		6	7		7	7		7

Notes: All variables are expressed in natural logarithms except for the real interest rate, the composite risk indicator (CR), the economic risk indicator (ER) and the financial risk indicator (FR).
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

TABLE 7. Consumption in the presence of esi and eei risks

	esi			eei		
	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*
	1	*2*	*3*	*4*	*5*	*6*
Variables	lc	lc	lc	lc	lc	lc
esi	0.001***	0.001***	0.001***	-	-	-
	(0.000)	(0.000)	(0.000)			
eei	-	-		0.001***	0.001***	0.002***
				(0.000)	(0.000)	(0.000)
ldi	0.625***	0.623***	0.686***	0.668***	0.675***	0.676***
	(0.030)	(0.075)	(0.091)	(0.029)	(0.046)	(0.093)
lhw	-0.001	-0.010	0.009	0.010	0.020	0.036
	(0.012)	(0.030)	(0.037)	(0.010)	(0.023)	(0.041)
lfa	0.000	0.029	-0.065	-0.051***	-0.027	-0.074*
	(0.015)	(0.048)	(0.046)	(0.014)	(0.035)	(0.041)
lliab	0.110***	0.083***	0.085***	0.104***	0.091***	0.069**
	(0.008)	(0.014)	(0.026)	(0.008)	(0.015)	(0.034)
mir	0.002*	0.002	-0.002**	-0.002*	-0.001	-0.003
	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)	(0.002)
Constant	0.515***	0.530***	0.664***	0.559***	0.459***	0.606***
	(0.066)	(0.128)	(0.172)	(0.060)	(0.118)	(0.157)
Observations	350	350	350	310	310	310
Countries	14		14	13		13

Notes: All variables are expressed in natural logarithms except for the real interest rate, the esi and the eei.
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

TABLE 8. Quantile panel regressions and fixed effects - Machado and Silva (2019) estimates

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Variables	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90
CR	0.006***	0.005***	0.004***	0.003***	0.003***	-	-	-	-	-	-	-	-	-	-
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)										
ER	-	-	-	-	-	0.052	0.044	0.035	0.027***	0.023	-	-	-	-	-
						(0.104)	(0.071)	(0.032)	(0.007)	(0.017)					
FR	-	-	-	-	-	-	-	-	-	-	0.016	0.013**	0.011***	0.009**	0.008
											(0.010)	(0.007)	(0.004)	(0.004)	(0.006)
ldi	0.531***	0.537***	0.544***	0.551***	0.554***	0.682	0.665	0.645***	0.630***	0.621***	0.608***	0.609***	0.610***	0.611***	0.612***
	(0.094)	(0.064)	(0.042)	(0.050)	(0.061)	(0.698)	(0.474)	(0.217)	(0.047)	(0.116)	(0.106)	(0.069)	(0.043)	(0.044)	(0.056)
lhw	0.002	0.001	0.000	-0.000	-0.001	0.002	0.004	0.007	0.010	0.011	-0.032	-0.021	-0.011	-0.001	0.004
	(0.025)	(0.017)	(0.011)	(0.013)	(0.016)	(0.198)	(0.134)	(0.061)	(0.013)	(0.033)	(0.034)	(0.022)	(0.013)	(0.014)	(0.018)
lfa	0.031	0.034	0.037*	0.040*	0.041	-0.041	-0.030	-0.017	-0.006	-0.001	0.010	0.014	0.018	0.022	0.023
	(0.042)	(0.028)	(0.019)	(0.022)	(0.027)	(0.333)	(0.226)	(0.103)	(0.023)	(0.055)	(0.050)	(0.033)	(0.020)	(0.021)	(0.027)
lliab	0.137***	0.127***	0.116***	0.105***	0.100***	0.112	0.103	0.093*	0.085***	0.080***	0.121***	0.111***	0.102***	0.093***	0.089***
	(0.022)	(0.015)	(0.010)	(0.012)	(0.014)	(0.155)	(0.105)	(0.048)	(0.011)	(0.026)	(0.026)	(0.017)	(0.010)	(0.011)	(0.013)
rhp	0.002	0.001	-0.001	-0.002	-0.003	0.002	0.000	-0.002	-0.003*	-0.004	0.002	0.001	-0.000	-0.002	-0.002
	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.023)	(0.015)	(0.007)	(0.002)	(0.004)	(0.004)	(0.002)	(0.001)	(0.001)	(0.002)
Observations	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

Notes: The dependent variable is the (real per capita) consumption variable in natural logarithm. All variables are expressed in natural logarithms except for the risk indicators (CR, ER, FR) and the interest rate variable (rhp).
Standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

TABLE 9. Consumption in the presence of risks - alternative consumption variable

	Composite risk			Economic risk			Financial risk		
	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Variables	ldmc	ldmc	ldmc	ldmc	ldmc	ldmc	ldmc	ldmc	ldmc
CR	0.002***	0.002	0.004***	-	-	-	-	-	-
	(0.001)	(0.002)	(0.001)						
ER	-	-	-	0.027***	0.017**	0.033***	-	-	-
				(0.004)	(0.006)	(0.011)			
FR	-	-	-	-	-	-	0.002	0.004	-0.005
							(0.003)	(0.007)	(0.004)
ldi	0.609***	0.703***	0.682***	0.660***	0.718***	0.682***	0.641***	0.707***	0.761***
	(0.035)	(0.092)	(0.116)	(0.032)	(0.084)	(0.112)	(0.034)	(0.090)	(0.128)
lhw	-0.002	-0.022	-0.050	0.008	-0.012	-0.025	-0.008	-0.023	-0.034
	(0.013)	(0.037)	(0.056)	(0.012)	(0.038)	(0.059)	(0.013)	(0.036)	(0.058)
lfa	-0.020	-0.059	-0.028	-0.055***	-0.060	-0.089	-0.027*	-0.050	-0.045
	(0.016)	(0.038)	(0.057)	(0.016)	(0.043)	(0.063)	(0.016)	(0.044)	(0.052)
lliab	0.089***	0.063***	0.100***	0.078***	0.053***	0.092***	0.080***	0.059***	0.057*
	(0.009)	(0.013)	(0.035)	(0.008)	(0.011)	(0.034)	(0.009)	(0.012)	(0.031)
rhp	-0.003**	-0.002	-0.002	-0.004***	-0.003	-0.002	-0.002**	-0.002	-0.002
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)
Constant	0.698***	0.727***	0.511**	0.816***	0.823***	0.993***	0.823***	0.847***	0.762***
	(0.079)	(0.190)	(0.213)	(0.064)	(0.136)	(0.214)	(0.068)	(0.140)	(0.227)
Observations	350	350	350	350	350	350	350	350	350
Countries	14		14	14		14	14		14

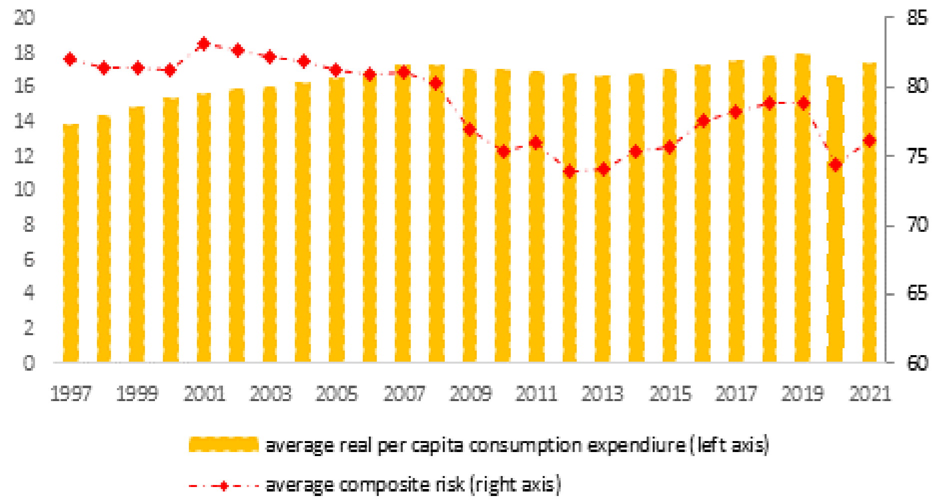
Notes: All variables are expressed in natural logarithms except for the real interest rate variable (rhp) and the composite risk indicator (CR). Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

TABLE 10. Consumption in the presence of risks - alternative interest rate variable

	Composite Risk			Economic Risk			Financial Risk		
	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*	Panel OLS *(Fixed effects)*	Panel OLS *(multiple levels of fixed effects)*	Mean Group *(MG)*
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Variables	lc	*lc*	lc	lc	lc	lc	lc	lc	lc
CR	0.004***	0.003*	0.008***	-	-	-	-	-	-
	(0.001)	(0.001)	(0.002)						
ER	-	-	-	0.036***	0.012	0.042***	-	-	-
				(0.004)	(0.012)	(0.006)			
FR	-	-	-	-	-	-	0.000	0.003	-0.003
							(0.004)	(0.005)	(0.004)
ldi	0.621***	0.739***	0.348*	0.741***	0.739***	0.457***	0.708***	0.737***	0.560***
	(0.041)	(0.082)	(0.185)	(0.036)	(0.089)	(0.112)	(0.042)	(0.092)	(0.178)
lhw	-0.029*	0.014	-0.053	-0.009	0.027	0.006	-0.010	0.022	-0.087
	(0.016)	(0.027)	(0.071)	(0.015)	(0.028)	(0.047)	(0.017)	(0.027)	(0.060)
lfa	-0.026	-0.058	0.076	-0.092***	-0.042	-0.020	-0.055***	-0.040	0.023
	(0.019)	(0.054)	(0.050)	(0.018)	(0.057)	(0.046)	(0.020)	(0.059)	(0.043)
lliab	0.132***	0.087*	0.150*	0.109***	0.067	0.100*	0.074***	0.063*	0.083
	(0.017)	(0.041)	(0.080)	(0.013)	(0.038)	(0.052)	(0.016)	(0.034)	(0.075)
mir	-0.004***	-0.001	-0.005***	-0.004***	-0.001	-0.006***	-0.004**	-0.001	-0.007***
	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)	(0.001)
Constant	0.492***	0.339	0.740*	0.718***	0.495**	1.307***	0.785***	0.526**	1.340***
	(0.092)	(0.230)	(0.389)	(0.075)	(0.215)	(0.337)	(0.085)	(0.208)	(0.445)
Observations	264	264	264	264	264	264	264	264	264
Countries	14	14	14	14	14	14	14	14	14

Notes: All variables are expressed in natural logarithms except for the real interest rate (mir) and the composite risk indicator (CR). Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

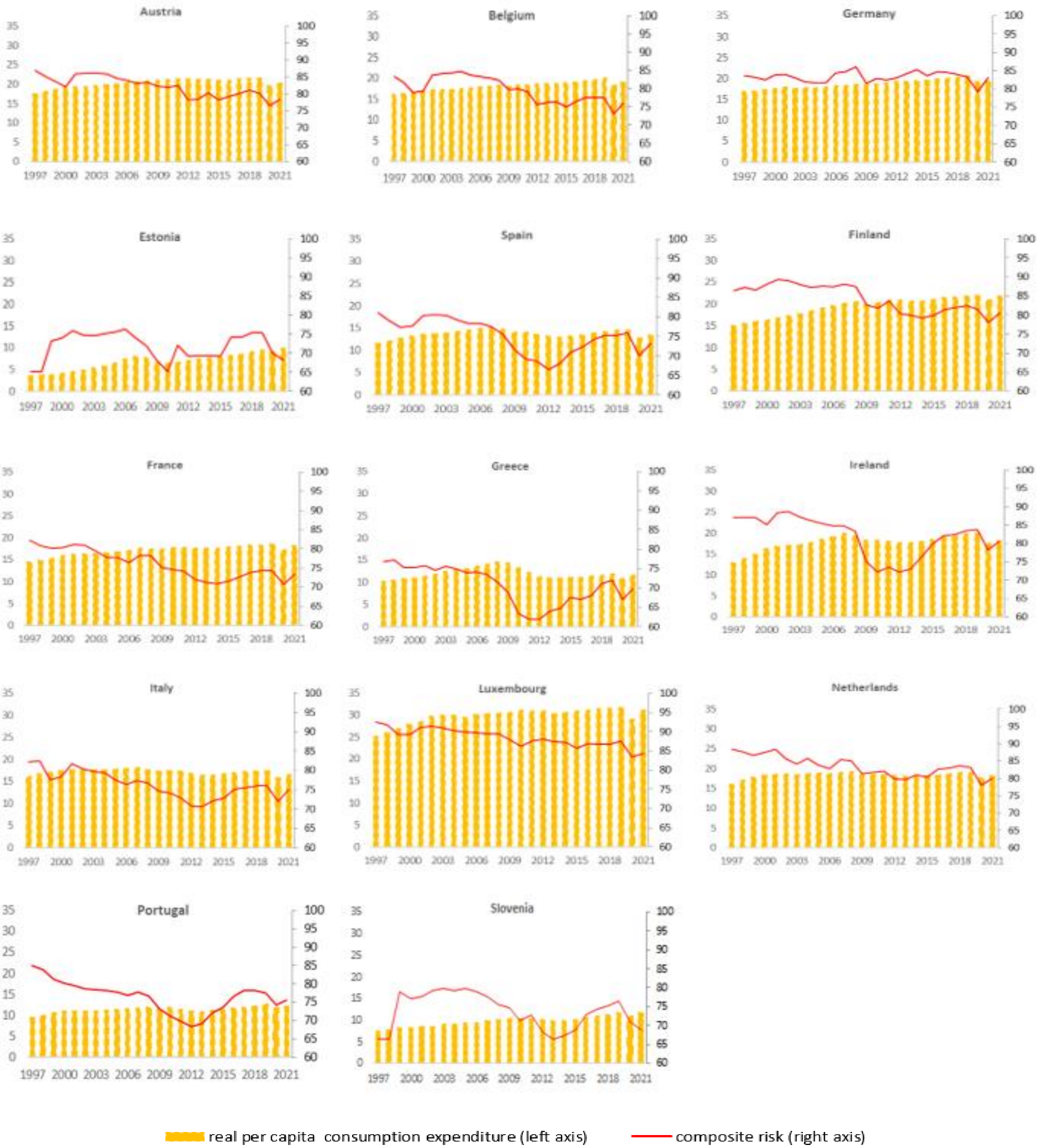
Fig. 1. Households' consumption expenditure and composite risk (average) for 14-euro area countries



The chart depicts the average value of real per capita consumption expenditure and composite risk for 14-euro area countries, over the period 1997 to 2021. *Notes*: the left axis refers to the average value of real per capita final consumption expenditure of households for 14-euro area countries and is depicted in orange bars. The variable is expressed in million euros and deflated by consumers' expenditure deflator; the right axis denotes the average economic risk, as measured by the level of country risk related to governance in the reference countries (scored from 0 to 100 with 0 being highest risk and 100 being lowest risk) and is depicted in red line. The data and countries selected are described in Section 2.2.

Sources: European Central Bank, World Bank - PRS and authors' calculations.

Fig. 2. Consumption expenditure and composite risk



Notes: the left axis refers to the real per capita final consumption expenditure of households and is depicted in orange bars for 14-euro area countries. The variable is expressed in million euros and deflated by consumers' expenditure deflator; the right axis denotes the economic risk, as misused by the level of country risk related to governance in the reference countries (scored from 0 to 100 with 0 being highest risk and 100 being lowest risk). Data is described in detail in Section 4.2.
Sources: European Central Bank, World Bank - PRS and authors' calculations.

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