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Households Expectations and Investing in Safe and Risky Financial Assets*

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Abstract

Drawing upon data from the European Commission's consumer survey, this paper examines how four types of household expectations affect household financial portfolio decisions in the three largest euro area countries: Germany, France, and Italy. Focus is placed on the dynamic response of the shares of safe (currency and transferable deposits) and risky (equity and investment fund shares) financial assets in relation to the total value of financial assets held by the household sector to the shocks in expectations. The results illustrate that expectations are an important determinant of household financial portfolio decisions. In general, in response to improved expectations, households increase the share of risky assets and reduce the share of safe assets. However, country and expectations-type specific differences were observed. The effects of income, prices level, deposit rate and stock price shocks on the household financial portfolio are also documented and compared and the economic policy and financial industry implications of the results are discussed.

1. Introduction

According to Eurostat data (Eurostat, 2020a), households in Germany, France and Italy, the three largest euro area economies, at the end of the third quarter of 2019 in aggregate held 27%, 10%, and 23% respectively, of their financial assets in the safest and most liquid form – currency and transferable deposits (*safe assets*). In equity and investment fund shares (*risky assets*), they kept 21%, 27 %, and 32% respectively, of their financial assets. While this clear cross-country diversity in the structure of household financial portfolio is an important research and policy relevant question[1], an equally important question is whether and how economic and consumer-psychological factors affect the share of safe and risky assets in the household financial asset portfolio.

The present paper draws on data from the European Commission's (2020a) consumer survey and investigates how financial portfolio structure decisions of households are affected by shocks to different types of household expectations: the financial situation of the household expectations, the general macroeconomic situation expectations, consumer prices level expectations and country unemployment expectations. The study is performed for the three largest euro area countries: Germany, France, and Italy. The paper focuses only on two types of

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[1] See e.g. Guiso et al. (2003), Guiso and Sodini (2013), and Arrondel et al. (2016) for the research on the factors of European cross-country heterogeneity in the structure of financial assets of households.

financial assets held in the financial portfolio of households: 1) currency and transferable deposits (which we denote as safe assets) and 2) equity and investment fund shares (which we denote as risky assets)[2].

The study of the role of psychological factors (e.g., consumer confidence, uncertainty) in forecasting consumer decisions has a long tradition. A growing body of literature has provided evidence of the relationship between consumer confidence and consumption and household investment decisions (Bram and Ludvigson, 1998; Ludvigson, 2004; Barsky and Sims, 2012; Khan et al., 2019). The role of psychological factors in household decisions on the structure of the financial portfolio has only recently attracted attention. The research has primarily focused on the United States (US) and uncertainty (Cardak and Wilkins, 2009; Brown et al., 2016; Bayer et al., 2019; Gábor-Tóth and Georgarakos, 2018), confidence as a composite indicator (Di Bella and Grigoli, 2019), inflation expectations (Malmendier and Nagel, 2016; Vellekoop and Wiederholt, 2019), the expectations of general economic conditions (Roth and Wohlfahrt, 2019) and investment sentiment (expectations of returns in the financial market) (Hilliard et al., 2019; Giglio et al., 2019).

This study contributes to the literature by providing evidence about the dynamic relationship between household expectations and household financial portfolio structure. The present study is macroeconomic in nature in that it focuses on the household sector as an aggregate, drawing on national financial accounts data. The existent studies are mostly microeconomic in nature[3].

Given the observed heterogeneity in the structure of the household financial portfolio across euro area countries, we treat individual countries in our empirical model as heterogenous. Hence, we conduct the research separately for each sampled country over the period of 2000q1 through 2019q3. The model also controls for macroeconomic (income per capita, price level) and financial market (deposit rate, stock market prices) developments that could possibly impact household portfolio decisions. The empirical model is estimated using a vector autoregressive (VAR) model with a Bayesian estimator.

The rest of the paper is structured as follows. This Introduction is followed by a brief Literature review. The Methodology presents the empirical model and the estimation method. The Data and empirical results section describe the data and present the empirical results and discussion, while the robustness of the results is presented in Robustness of the results section. The Conclusion summarizes the primary findings and implications.

2. Literature Review

The literature, to which our study is the most related, inspects the role of household (consumer) expectations, confidence, and uncertainty on household

[2] Note that financial portfolio assets, according to the European System of Accounts (Eurostat, 2013), also consist of other assets (e.g., other deposits, gold, insurance schemes, pension schemes).

[3] The existent studies, reviewed in the Literature review section, primarily rely on survey(s) of individual (household) consumer sentiment. These studies investigate how sentiment, individual household characteristics and different exogenous shocks impact portfolio decisions of individual households (consumers).

financial portfolio decisions. Di Bella and Grigoli (2019) construct a theoretical model in which changes in expectations of consumers and entrepreneurs of the future economic growth, formation of which is prone to information problems (insufficient information and herd behavior), have self-fulfilling macroeconomic implications. The deterioration of expectations in their model leads economic agents to hoard money, a safe asset. They show that when this happens, the riskiness of economic agents´ financial portfolio reduces, the propensity to save increases, consumption and investment reduces, and labor market data worsen.

The empirical studies on the relationship between the expectations of households and their financial portfolio decision include Malmendier and Nagel (2016), Vellekoop and Wiederholt (2019), Roth and Wohlfahrt (2019), Hilliard et al. (2019), and Giglio et al. (2019). Malmendier and Nagel (2016) study inflation expectations of consumers participating in the Reuters/Michigan Survey of Consumers and find age-related differences in inflation expectations which are due to different inflation experiences. This in turn explains differences in financial decisions (borrowing/lending) of consumers (ibidem)[4]. Vellekoop and Wiederholt (2019) apply Dutch Household Survey data for the period of 1993-2016 to analyze how inflation expectations of individual consumers (survey respondents) are related to their financial characteristics. They find that respondents with higher inflation expectations hold less net worth, have less liabilities and are less invested in risky assets than households with lower inflation expectations. In 2017, Roth and Wohlfahrt (2019) conducted two experimental online studies on individual US consumers to study the role of personal expectations and their impact on consumer behavior. They found that the negative expectations of general economic conditions over the course of the next year negatively affected personal unemployment and financial conditions expectations. Based on a follow-up survey, they elaborated that the pessimistic expectations of general economic conditions resulted in the negative adjustment of planned consumption expenditure growth and a reduction in the share of risky assets (stocks) in the household financial portfolio. Hilliard et al. (2019) investigate how the pessimistic/optimistic sentiment of individual investors in mutual funds in the US over the period of 1984-2014 was reflected in their risk profiles. They find that investors rebalance their portfolios from risky (equity funds) to less risky (money funds) assets when investor sentiment[5] (measured by the Investor Intelligence Sentiment Index) decreases. Giglio et al. (2019) conducted a household survey among US consumers (i.e., clients of a large asset firm) highly invested in financial markets. They studied their beliefs about returns on bonds and stocks and GDP growth and the impact of their beliefs on their investment decisions. The authors document a strong association between beliefs and financial portfolio structure choice. More specifically, improvement in beliefs results in the shift towards more risky assets.

[4] Inflation expectations are important also for household consumption decisions (Duca et al., 2018; Coibion et al., 2020), because they determine the real interest rate. Inflation expectations are more important in this respect when nominal interest rates reach their lower (zero) bound (Duca et al., 2018). Duca et al. (2018) show that in euro area the probability of consumers to spend more is positively related to their inflation expectations.

[5] Some studies that focused on the association between consumer confidence and investor sentiment (e.g., Jansen and Nahuis (2003), and Fisher and Statman (2003)) found a positive association.

The association between uncertainty and household asset portfolio composition is studied by Cardak and Wilkins (2009), Brown et al. (2016), Bayer et al. (2019), and Gábor-Tóth and Georgarakos (2018). Cardak and Wilkins (2009) investigate the response of the financial portfolio decisions of Australian households to income uncertainty. For this purpose, they analyze micro-level result data from the Household, Income and Labour Dynamics in Australia survey. They compute income uncertainty as the variability of income of the participating respondents over the first and the second wave of the survey. They find that increased income uncertainty is associated with a reduction in the households´ share of risky assets. Brown et al. (2016) conducted a similar study, relying on data from a US Panel Study of Income Dynamics Survey. Data was collected from 1999 through 2013. They demonstrate that increased income uncertainty (estimated by several regression methods) prompts survey participating households to reduce the overall financial asset risk profile. More specifically, households reduce their share of risky (i.e., equity) assets and increase their share of less risky (i.e., savings accounts) assets[6]. Bayer et al. (2019) develop a theoretical model to study the relationship between income uncertainty, consumption, and household investments into liquid and non-liquid assets. They illustrate that households cut back on consumption and rebalance their portfolio from illiquid to liquid assets in response to an increase in income uncertainty. The result is achieved under the assumption of the costly trading of illiquid assets during periods of elevated uncertainty. They empirically assess their model by fitting a VAR model for the US, drawing on data from the Survey of Income and Program Participation over the period of 1984-2013, and confirm the theoretical predictions. Gábor-Tóth and Georgarakos (2018) construct a measure of individual US household exposure to economic policy uncertainty. This is based on the responses of households participating in the US Health and Retirement Study over the period of 2002-2014. They establish a positive association between the economic policy uncertainty indicator and the individual household´s stock market participation.

Our study is also related to research on the forecasting ability of consumer confidence (and expectations) for household consumption and investment decisions. A large body of literature examines the role of consumer confidence as an autonomous propagator of consumption (Bram and Ludvigson, 1998; Ludvigson, 2004; Malgarini and Margani, 2007; Barsky and Sims, 2012; Leduc and Sill, 2013; Bachmann et al., 2015). Bram and Ludvigson (1998) evaluate the forecasting power of consumer confidence in the US (measured by the University of Michigan Consumer Survey and Conference Board Consumer Survey data), finding such an evidence. Ludvigson (2004) elaborates on the same confidence indicators and argues that, in order to assess the forecasting power of consumer sentiment indicators, the empirical model must control for macroeconomic (such as GDP, inflation) and financial market (e.g., stock market) developments. Malgarini and Margani (2007) document the forecasting power of consumer sentiment surveys for consumption using an Italian sample. Barsky and Sims (2012) utilize a VAR model to analyze the dynamic relationship between income, consumption, and consumer confidence in the US over the period of 1960-2008. They find a positive association between

[6] Similar studies on the effect of income uncertainty, determined by household surveys, on individual household portfolio decision were also conducted for some other countries (Brown et al., 2016).

confidence shocks and macroeconomic variables that does not disappear once other control variables (i.e., inflation, stock prices) are added to the model. Leduc and Sill (2013) also fit a 6-variable VAR model. Their model includes unemployment expectations, the unemployment rate, inflation, stock market returns, the long-term interest rate, and the monetary policy rate for the US. They show that consumer unemployment expectations are predictive of the future development of the included variables. Bachmann et al. (2015), who study the association between the inflation expectations of consumers, participating in the Michigan Survey of Consumers, and their consumption spending, document a negative association between the variables.

The role of consumer confidence in housing investment decisions is analyzed by Khan et al. (2019). They conduct a VAR study on US data for the period of 1960-2017 to infer the response of housing investments upon a consumer confidence shock, controlling for macroeconomic, financial, and housing market developments. They document a positive response of housing investments to a positive confidence shock. Abildgren et al. (2018) apply a VAR model to study the association between consumer confidence shocks and house prices in Denmark during the period of 1974-2015. They find that positive shocks in confidence lead to house price increases. They also document that consumer optimism was associated with an increase in housing investments[7].

3. Methodology

A VAR model is specified for each country to study the dynamic response of the safe and the risky asset shares in relation to the total value of the financial assets of the household sector to the shocks in different types of household expectations. This modeling setting, applied by Barsky and Sims (2012), Abildgren et al. (2018), and Khan et al. (2019), allows for controlling for macroeconomic and financial market variables that could possibly impact the relationship, assuming the endogenous relationship between all of the variables. Given a large diversity in the financial portfolio of households across the three studied countries and in the importance of possible factors affecting it (see Guisso and Sodini, 2013; Arrondel et al., 2016), we opt for a country VAR instead of panel VAR, since estimation of a panel VAR would raise a series of issues, including homogeneity of regression coefficients and cross-section dependence (see e.g. Pesaran, 2006). The model, estimated for each sampled country, is as follows (Miranda-Agrippino and Ricco, 2018):

[7] A study of consumer financial behavior in the event of elevated uncertainty caused by exogenous shocks was studied by Malmendier and Nagel (2011), Kick et al. (2014), and Wang and Young (2019). Malmendier and Nagel (2011) examine how differences in individual consumer experiences of past macroeconomic shocks affect financial portfolio composition. Drawing on the Survey of Consumer Finance database, over the period of 1964-2004, consumers that experienced larger macroeconomic (higher inflation) shocks and larger losses in stock markets are found to be more risk averse and less invested in risky assets. Kick et al. (2014) studied the effect of the sovereign debt crisis and credit supply shocks in the euro area, relying on security portfolio data for clients at German banks. They elicit that these shocks, which led to wealth losses and increased credit constraints, resulted in greater risk aversion and smaller asset concentrations of banks´ clients. Wang and Young (2019) research the portfolio rebalancing of households in the event of terrorist attacks in the US over the period of 1970-2010. They observed the rebalancing of portfolios towards safer assets in response to such exogenous shocks. They associate this shift from riskier to safer assets with a negative sentiment following these events.

$$z_t = b + A_1 z_{t-1} + A_2 z_{t-2} + \cdots + A_p z_{t-p} + u_t, \quad (1)$$

where z_t is an $n \times 1$ vector of endogenous variables, including GDP per capita ($GDPpc_t$), used as a measure of income per capita, the consumer price index (cpi_t), the deposit rate (i_t), and a particular type of household expectations over the course of the next 12 months (cex_{kt}; one of the following type of expectations is considered at a time: the financial situation of the household expectations, the general (macro)economic situation expectations, consumer prices level expectations, and the unemployment in the country expectations), the share of the assets´ type m value in relation to the total financial assets value of households in the country[8] (afp_{mt}; two types are possible, safe assets (currency and transferable deposits) and risky assets (equity and investment fund shares), whereby one is considered at a time), and the national representative stock market price index ($stpr_t$). $GDPpc_t$, cpi_t, i_t, and $stpr_t$ are common macroeconomic and financial market variables included in the referenced literature[9] (Barsky and Sims, 2012; Abildgren et al., 2018; Khan et al., 2019). b is an $n \times 1$ vector of intercepts, A is an $n \times n$ matrix of regression coefficients, t denotes time in quarters, p is the lag order of the VAR model, and u_t is an $n \times 1$ vector of errors. Variables cex_{kt}, i_t and afp_{mt} enter the model in levels, while $GDPpc_t$, cpi_t, and $stpr_t$ enter the model in log levels[10].

Due to the relatively large number of parameters and a relatively small dataset, a Bayesian method is applied, which in this case has an advantage over the OLS estimator as it reduces the issue of degrees of freedom (Canova, 2007). More specifically, the Bayesian estimation applied assumes the multivariate normal distribution of the regression coefficients. For the variance-covariance matrix of residuals, the inverse Wishart distribution is assumed (with the univariate AR elements on the diagonal) (see Dieppe et al., 2018; Miranda-Agrippino and Rossi, 2018). The own first lag prior and the hyperparameters of the regression coefficients priors (overall tightness, lag decay, tightness of the constant) are optimized for each specified model by a search algorithm proposed by Dieppe et al. (2018) and implemented in their BEAR toolbox (ibidem). The posterior distributions are of the same type as the priors (see Dieppe et al., 2018). The optimal lag order of VAR, p, is, as suggested by Dieppe et al. (2018), determined by the minimization of the deviance information criteria of Spiegelhalter et al. (2002), where the largest allowed lag is 4 quarters.

Based on the estimation results of model (1), orthogonal impulse responses are computed. The responses are derived by the Gibbs sampler on 10,000 repetitions, while maintaining the results of the last 5,000 repetitions. As is common in the

[8] The focus of this investigation is on safe and risky assets. However, there is a third group of assets. This includes the remaining types of financial assets in which households hold their savings: debt interest-bearing assets (e.g., deposits with agreed maturity and debt securities) and assets in insurance and pension schemes (Eurostat, 2013). We refer to this group of assets as medium risk assets.

[9] In the literature, GDP or income is commonly applied. We opted for GDP per capita, because afp_{mt} is defined relatively (i.e., as a share in total financial assets). In a sense, the later represents the financial portfolio structure of ″an average″ citizen from a country.

[10] A VAR model in levels is common in empirical applications. Sims et al. (1990) show that the results of the model are consistent even if the variables entering the model are a combination of stationary (e.g. stock market returns are typically stationary) and nonstationary time series (e.g. GDPpc).

Bayesian VARs, 68 percent confidence intervals are computed. All computations were conducted using MATLAB toolbox BEAR (Dieppe et al., 2018)[11].

The identification of shocks is achieved by applying a Cholesky scheme. We largely follow Barsky and Sims (2012) and Leduc and Sill (2013) in ordering the variables in z_t. Household expectations, cex_{kt}, are ordered first. This order is justified by the fact that the European Commission (2020a,b) measures household expectations for the period over the next 12 months. Thus, they are formed ahead of the other variables in the model (Leduc and Sill, 2012). Macroeconomic variables ($GDPpc_t$, cpi_t) are ordered next; $GDPpc_t$ before cpi_t implying that $GDPpc_t$ is contemporaneously impacted only by household expectations, while cpi_t is contemporaneously impacted by cex_{kt} and $GDPpc_t$. Next in the order is the deposit rate, i_t, followed by the stock price level, $stpr_t$. The share of the asset type m in the household financial portfolio, afp_{mt}, is placed last, assuming that it is contemporaneously impacted by all other variables in the empirical model.

4. Data and Empirical Results

This study is focused on the three largest euro area countries: Germany (DE), France (FR), and Italy (IT). The frequency of the data is quarterly, and the observation period is 2000q1 – 2019q3. A detailed specification of the variables and the data sources are presented in Table 1.

Household expectations of various types over the investigated period are illustrated in Figure 1. Until 2007, the dynamics of the household financial situation expectations (cex_{1t}) across the countries were relatively synchronized, whereby from 2005 German households had higher expectations than the households in France and Italy. From 2010, a divergence in expectations of the financial situation of households between Germany, on the one hand, and France and Italy, on the other, is noticeable. In the former, the balance of expectations became more and more optimistic. It rose to the highest level in the first quarter of 2019. In the latter, the households were generally pessimistic, with the balance of expectations reaching the lowest point at the end of 2012 and the start of 2013. A more correlated evolution is documented for the general economic situation expectations (cex_{2t}), the consumer prices development expectations (cex_{3t}**),** and the country unemployment expectations (cex_{4t}). During the Great Recession, the household general economic situation expectations in Germany fell more than in France and Italy but rebounded more strongly afterwards. Consumer prices level expectations during the observed period were the highest in Germany, followed by France and Italy. The expectations were the most significantly depressed in the first half of 2009, coinciding with the deteriorated macroeconomic conditions. Outside this period, the expectation of a rising prices level can be observed in Germany and France. The prices level expectations in Italy were pessimistic (expectations of prices level reduction) from 2013 onwards. Unemployment expectations were the highest during period 2008q3-2010q1, peaking in the first quarter of 2009. From 2010, unemployment expectations

[11] The BEAR toolbox is available on the ECB website: https://www.ecb.europa.eu/pub/research/working-papers/html/bear-toolbox.en.html.

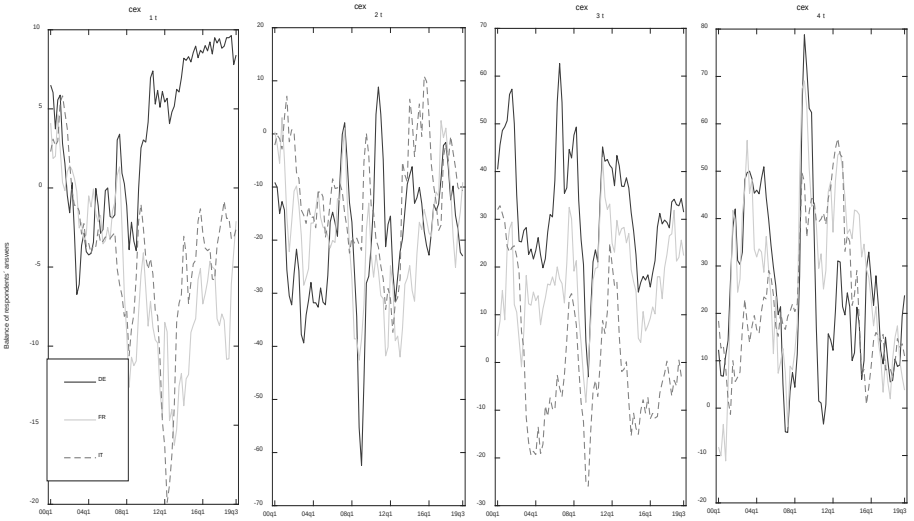
were generally lower in Germany than in France and Italy, reflecting better macroeconomic prospects.

Table 1 Model (1) Variable Specifications

Notation	*Definition and data source*
$GDPpc_t$	Quarterly level of real GDP per capita, computed from real GDP (chain-linked volume), seasonally and calendar day adjusted, in 2015 euros (obtained from Eurostat (2020b)), divided by the country´s population (obtained from Eurostat (2020c)). Quarterly population is obtained from annual data by assuming linear growth of the population during the year. GDP per capita in euros is transformed to the index (2015=100) and a natural logarithm is taken.
cex_{kt}	Household expectations of type k in the individual country. The following types of household expectations are considered: financial situation of the surveyed households over the next 12 months (cex_{1t}), general (country) economic situation over the next 12 months (cex_{2t}), consumer prices level over the next 12 months (cex_{3t}), and unemployment prospects (number of unemployed) in the country over the next 12 months (cex_{4t}). Data source is the European Commission (2020a). Expectations are computed as a balance of positive (higher value of variable) and negative (smaller value of variable) opinions of survey respondents. A positive balance (value of the variable) implies that more respondents believed the variable for which expectations were formed will increase than reduce. The series is seasonally adjusted by the European Commission. For further definition details and measurements, refer to the European Commission (2020b). Quarterly level of expectations is computed as the average of the monthly data.
cpi_t	Natural logarithm of quarterly (end of period) Harmonized Index of Consumer Prices, obtained from Eurostat (2020d).
i_t	The average quarterly level rate for new deposits of households and non-profit institutions serving households at the monetary financial institutions in the individual country; all deposits of all agreed maturities are considered. Data source is ECB (2020).
afp_{mt}	The quarterly share (in percent) of the value of assets type m in the value of total financial assets of households and non-profit institutions serving households (household sector) in the individual country. m can take on the following values: the share of the safe assets (i.e., the sum of currency and transferable deposits) (afp_{1t}) and the share of the risky assets (i.e., the sum of equity and investment fund shares) (afp_{2t}). Data source is Eurostat (2020a). For more detail about the definitions and measurement of the variables, see Eurostat (2013). Data is seasonally adjusted by the JDemetra toolbox (Grundowska, 2015), applying the X13 method.
$stpr_t$	The average quarterly level of the country´s representative share prices index, computed from the closing daily levels, retrieved from the OECD (2020). Finally, a natural logarithm of the variable is taken.

Source: Author´s own construction.

Figure 1 Different Types of Household Expectations in Germany, France, and Italy over the Period 2000q1-2019q3

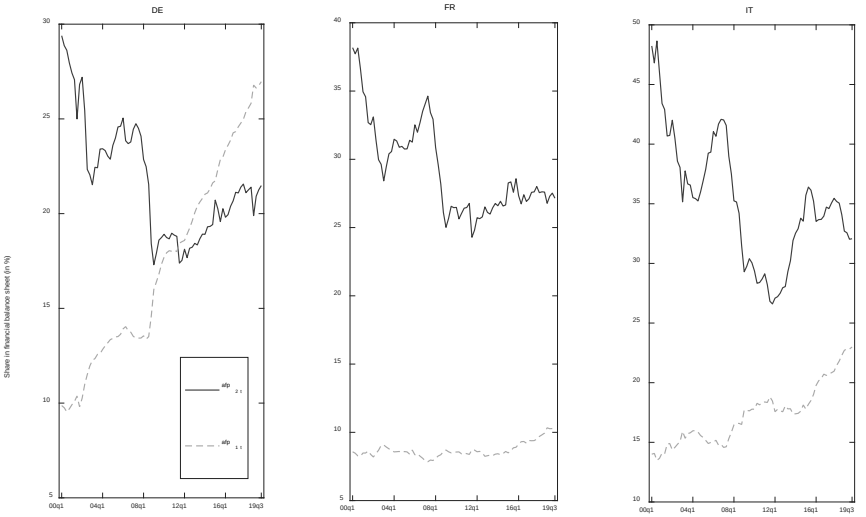


Notes: Types of household expectations over the course of the next 12 months: cex_{1t} = household financial situation expectations, cex_{2t} = general macroeconomic situation expectations, cex_{3t} = consumer prices level expectations, cex_{4t} = country unemployment expectations.

Source: Author´s own construction, based on European Commission (2020a) data.

Figure 2 plots the shares of safe (afp_{1t}) and risky assets (afp_{2t}) in relation to the total value of financial assets held by households in individual countries. At the start of the period, households in Germany held three times as many risky assets than safe assets. The share of risky assets fell considerably, to 17%, with the Great Recession. It gradually increased to 21.5% at the end of 2019q3. For France and Italy, a similar portfolio rebalancing towards safe assets can be observed. The erosion of the share of risky assets was accompanied by an increase in the share of safe assets. The general rebound in stock prices observed from 2010 onwards did not result in the risky assets share regaining their pre-crisis level. Portfolio rebalancing was relatively stronger in Germany, where the share of safe assets increased by almost three-fold during the observed period. Portfolio rebalancing towards safe assets was the weakest in France, where the share of safe assets over the investigated period increased by less than 2 percentage points.

Figure 2 The Shares of Safe and Risky Assets in Relation to the Total Value of Financial Assets of Households in Germany, France, and Italy over the Period of 2000q1-2019q3



Notes: Country notations: DE = Germany, FR = France, IT = Italy; afp_{1t} = the share of safe assets in the household financial portfolio, afp_{2t} = the share of risky assets in the household financial portfolio.

Source: Authors´ own construction, based on Eurostat (2020a) data.

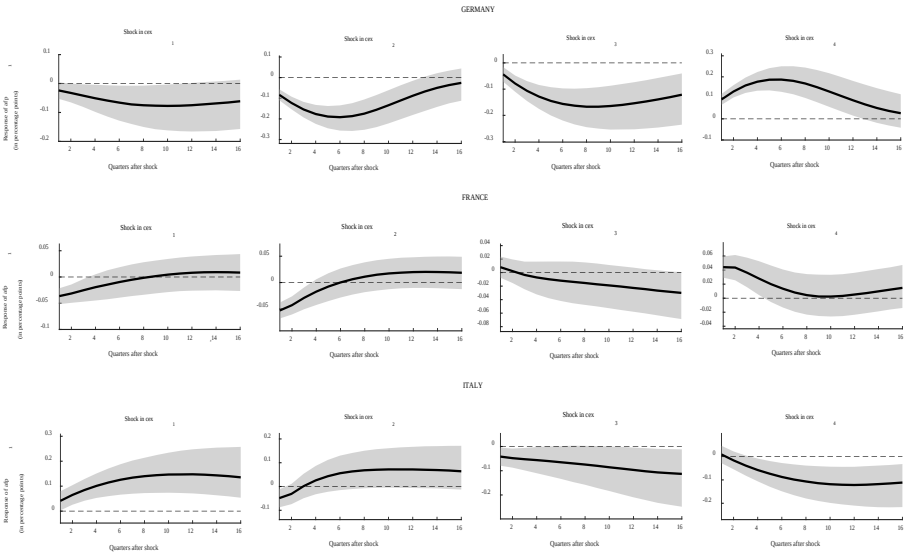
The results of model (1) selection tests are presented in Appendix, part 1. Tables A1 to A6 present the results of estimated parameters at lags from 1 to 4, computed by the search algorithm proposed by Dieppe et al. (2018) and implemented in the BEAR toolbox. For each country and the combination of variables in the VAR model (1), the lag was selected that minimizes the DIC statistics.

We now turn to the impulse responses computed from estimated VAR models. The responses of the shares of the safe (afp_{1t}) and risky (afp_{2t}) assets in relation to the total value of financial assets held by the household sector to different types of household expectation shocks are presented in Figures 2 and 3. The plots in the first row of each figure represent household responses in Germany, the second row in France and the third in Italy.

The first column of Figures 3 and 4 documents a response of the shares of safe and risky assets in relation to the total value of the financial assets of the household sector to a positive shock (i.e., unexpected increase) in the financial situation of the household expectations (cex_{1t}). Households in Germany and France upon a one standard deviation shock in expectations reduce the share of safe assets and increase the share of risky assets. A reduction in the share of safe assets is larger on the impact in France (reaching approximately 0.04 percentage points), but more protracted and larger over the longer time horizon in Germany (reaching up to 0.08 percentage points). The increase in the share of risky assets is larger and more protracted in France than in Germany. In Italy, unlike Germany and France,

households increase the share of safe assets, while the share of risky assets is not significantly affected.

Figure 3 Country Responses of the Share of Safe Assets in Relation to the Total Value of Financial Assets of Households ($\mathrm{afp_{1t}}$) to a Specific Type of Household Expectations Shocks



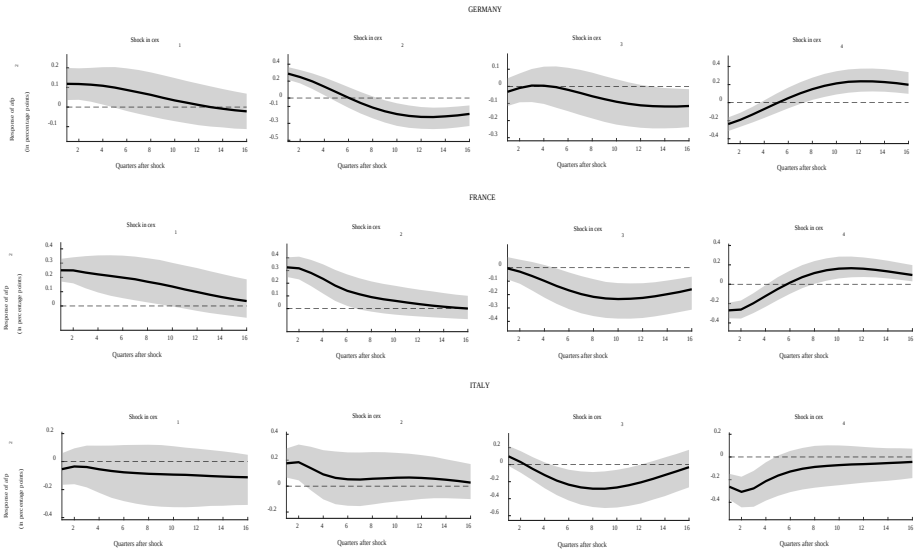
Notes: Impulse responses of $\mathrm{afp_{1t}}$ for Germany, France, and Italy are drawn to a one standard deviation positive shock to a specific type of household expectations: the financial situation of the household expectations ($\mathrm{cex_{1t}}$), the general macroeconomic situation expectations ($\mathrm{cex_{2t}}$), consumer prices level expectations ($\mathrm{cex_{3t}}$), and country unemployment expectations ($\mathrm{cex_{4t}}$), all over the course of the next 12 months. The impulse responses computed over the horizon of 16 quarters from the shock are based on the results of the VAR model (1) for each individual country.

Source: Author´s own calculations.

Responses of the shares of the safe and risky assets, in relation to the total value of the financial assets of the household sector, to a shock in expectations of the general macroeconomic situation (cex_{2t}), are presented in the second column of Figures 3 and 4. We find that the shock causes households across all sampled countries to rebalance the structure of their portfolio towards risky assets. The share of safe assets decreases the most and over the longest horizon in Germany, followed by France and Italy. The share of risky assets increases the most in France, followed by Germany and Italy. The adjustment in the risky assets share in Italy is significant only over a short horizon (3 quarters), while more prolonged in the other two countries. Over the long horizon, a reversal of the adjustment in the riskiness of portfolios can be observed for Germany, where households in the long run reverse the adjustment and reduce the share of risky assets to a level below the initial level at the start of the observed period. In general, the portfolio rebalancing responses of households to cex_{1t} and cex_{2t} shocks are very similar across countries. These results are also in line with the theoretical predictions of Di Bella and Grigoli (2019). The

results also corroborate the empirical findings from the literature (Roth and Wohlfahrt, 2019; Hilliard et al., 2019; Giglio et al., 2019).

Figure 4 Country Responses of the Share of Risky Assets in Relation to the Total Value of Financial Assets of Households (afp_{2t}) to a Specific Type of Household Expectations Shocks



Notes: Impulse responses of afp_{2t} for Germany, France, and Italy are drawn to a positive one standard deviation shock to a specific type of household expectations: the financial situation of the household expectations (cex_{1t}), the general macroeconomic situation expectations (cex_{2t}), consumer prices level expectations (cex_{3t}), and country unemployment expectations (cex_{4t}), all over the course of the next 12 months. The impulse responses computed over the horizon of 16 quarters from the shock are based on the results of the VAR model (1) for each individual country.

Source: Author´s own calculations.

Plots in the third column of Figures 3 and 4 suggest that the shocks to the consumer prices level expectations are an important determinant of household portfolio decisions. Households in Germany are found to be more sensitive to positive shocks to the prices level expectations than their counterparts in France and Italy. The share of safe assets significantly decreases on impact and is long-lasting in Germany. In Italy and France, the response is more delayed and of a smaller magnitude. A reduction in the share of safe assets seems to be a rational response to preserve the real value of savings. It is a bit surprising that the rebalancing of financial assets is not towards the risky assets class (equity and investment fund shares), as the risky assets share also decreases, especially in France and Italy, but must be into medium risky assets. Our findings are in line with the findings of Vellekoop and Wiederholt (2019), who studied Dutch households.

The last column of plots in Figures 3 and 4 illustrate the response to a positive one standard deviation shock to household expectations of unemployment in the country. Note that this in an economic sense is an adverse shock. The response of households across all countries in the short and medium run is to reduce the share of

risky assets and move towards safer assets. In Germany and France, the share of safe assets increases. In Italy, the share of safe assets does not increase, implying that the rebalancing is not towards safe assets, but solely towards medium risky assets. In the long-term, the adjustment of household portfolios in Germany and France is back towards risky assets, as indicated by Figure 4. The presented results supplement the findings of Leduc and Sill (2013), who found that unemployment expectations shocks can generate macroeconomic dynamics (e.g., consumer spending). We show that they are important for the portfolio decisions of consumers as well.

While the main focus of the present paper is the analysis of the effects of shocks to different types of household expectations, some authors (e.g. Bram and Ludvigson, 1998; Malgarini and Margani, 2007; Abildgren et al., 2018; Khan et al., 2019) have focused instead on the composite indicators of consumer (household) expectations. To complement the above results, we also formed an indicator of overall household expectations, comparable to the European Commission (2020a,b) consumer confidence indicator, for each country in our sample, re-estimated model (1) and computed the impulse responses. Our proposed composite indicator of household expectations is computed as an arithmetic mean of three types of expectations, cex_{1t}, cex_{2t}, and cex_{3t}[12]. The model selection test results and the impulse responses are presented in Appendix, part 2 (Table A7 and Table A8) and Appendix, part 3 (Figure A1), respectively. The results presented in Figure A1 show qualitatively comparable results to the one presented in Figures 3 and 4: in response to a positive shock to the composite indicator of household expectations households in all three countries respond by reducing the share of safe assets and increasing the share of risky assets in the relation to the total value of financial assets held by households. The largest response in the share of safe assets (0.18 percentage points 6 quarters after the shock) is observed in Germany, followed by Italy (0.06 percentage points on impact), and France (0.05 percentage points on impact). Response of the share of risky assets is the largest in France (0.31 percentage points), followed by Germany (0.21 percentage points), and Italy (0.17 percentage points), all on impact. Comparing the results presented in Figure A1 with the results in Figure 3 and 4, we can infer that the greatest part of the adjustment in the share of safe assets in relation to the total financial assets held by households to the composite expectations shock in Germany and Italy can be explained by household adjustment to the general macroeconomic situation and the consumer prices level expectations changes, while in France by the response to the financial situation of the household and the general macroeconomic situation expectations changes. The greatest part of adjustment in the share of risky assets in relation to the total financial assets held by households to the shock in the composite expectations in Germany can be explained by the adjustments to the general macroeconomic situation expectations and to the financial situation of the household expectations changes. The same holds for France in the short run, but in the long run the adjustment seems to be mostly due to the adjustment to the prices

[12] cex_{4t} is not considered because its dynamics, unlike the other three types of expectations, is generally considered to be anticyclical. A similar composite indicator, consumer confidence indicator, is computed by the European Commission, as an arithmetic mean of cex_{1t}, cex_{2t}, expectations of major purchase over the next year and a backward-looking opinion of a change in the financial situation of the household in the last year (see European Commission, 2020a,b).

level expectations changes. In Italy, the greatest part of adjustment in the share of risky assets in relation to the total financial assets held by households to the shock in the composite expectations is due to the adjustment to the general macroeconomic situation (in the short run) and the consumer prices level expectations (in the medium to long run) shifts. This exercise shows that disaggregate analysis (i.e. a study of individual types or components of household expectations) can bring valuable insights into the financial behavior of households.

Model (1) enables an inspection of the response of safe and risky financial asset shares to the macroeconomic and financial market shocks. This is documented in Figure 5. With a positive income ($GDPpc$) shock, the share of safe assets, in relation to the total value of financial assets of households (afp_{1t}), statistically significantly decreases in Germany. In France and Italy, the reduction is not significant. The share of risky assets (afp_{2t}) decreases in France and Italy over the course of 6-14 quarters from the shock. In Germany, it only increases in the long run (4 years from the shock).

In response to the price level shock (inflation), households in Germany rebalance the portfolio of financial assets towards risky assets in the short run. In the long run, the adjustment reverses. In France and Italy, households decrease the share of risky assets, while no significant change in the share of safe assets was observed. Deposit rate shock decreases the shares of safe and risky assets. This implies that the attractiveness of interest-bearing assets increases. The observation holds for all countries, with some contrast in dynamics. A positive shock to stock market prices increases the share of risky assets and reduces the share of safe assets. In relative terms, the effect is more pronounced for the former than the latter asset type. This implies that the relative share of medium risky assets in the household financial portfolio decreases. In relative terms, the stock prices shock appears to be the most important shock, leading to an up to 0.6 percentage point increase in the share of risky assets.

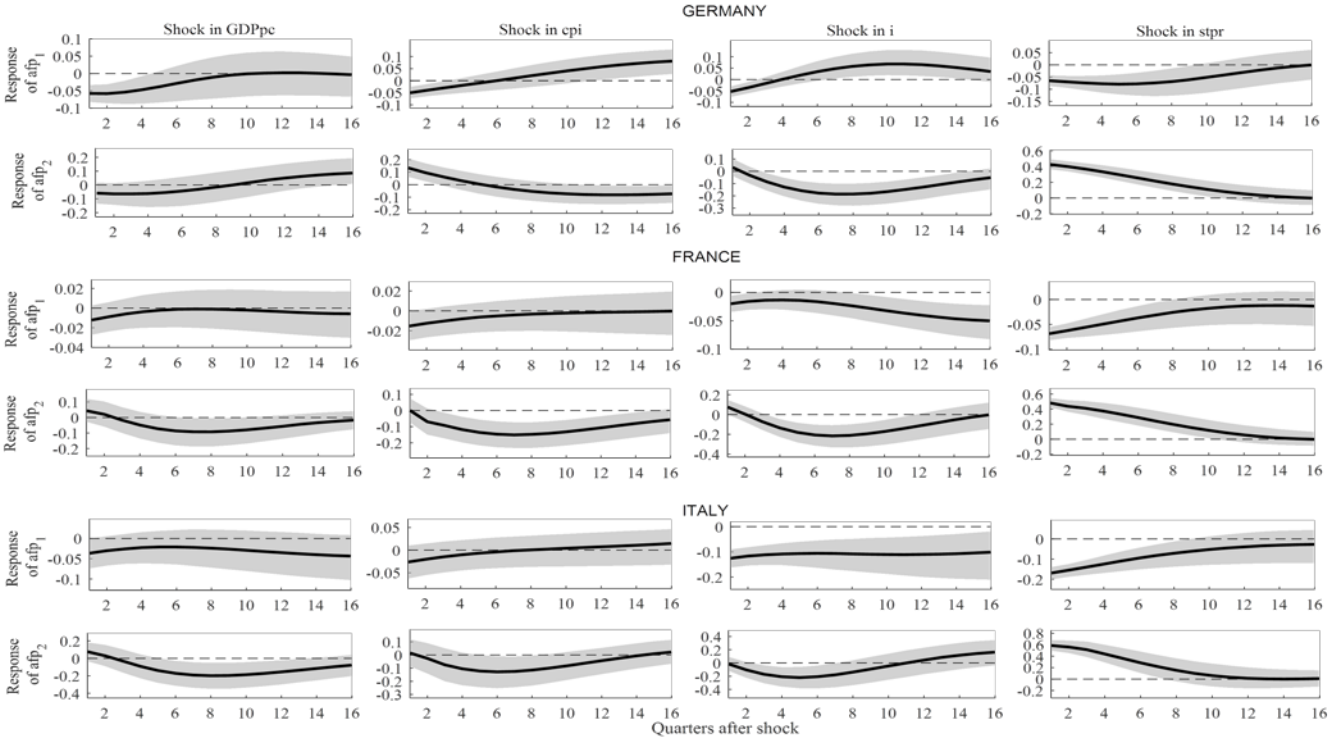
Overall, the results suggest a role of household expectations as well as macroeconomic and financial markets developments in the household financial portfolio decisions. Likewise, the results reveal that household expectations are not only relevant for consumption and macroeconomic dynamics (Barsky, and Sims, 2012; Leduc and Sill, 2013) but for financial assets portfolio decisions as well, corroborating the findings of Malmendier and Nagel (2016), Vellekoop and Wiederholt (2019), Roth and Wohlfahrt (2019), Hilliard et al. (2019), Giglio et al. (2019), amongst others.

The results have several important implications. They illustrate that expectations are an important determinant of saving and portfolio decisions: when expectations of households are shocked, the financial portfolio rebalancing occurs, which – if the shocks are large enough – may affect the stability of financial markets. Central bank authorities thus are advised to closely monitor and study expectations of households (Boivin, 2011; Cœuré, 2019), since monetary policy can affect expectations of households and their economic behavior (see Coibon et al., 2020 and references therein) and the importance of this ″expectations″ channel of monetary policy has increased during the zero lower bound era (Duca et al., 2018; Coibon et al., 2020, Asshoff et al., 2020). Households form different types of expectations and the results of the study show that each type may differently impact the portfolio

decisions of households. Furthermore, we observe cross-country heterogeneity in household portfolio responses to innovations in expectations, macroeconomic and financial market shocks[13], implying that a common monetary policy in the monetary union that would aim to influence household expectations would have to consider this heterogeneity. Last, but not least, the results may be relevant for the financial industry, as they illustrate how clients respond to different shocks, and thus, can help them to better anticipate household portfolio decisions in the case of larger expectations shocks.

[13] The cross-country heterogeneity in responses to shock could be due to cultural, institutional or economic policy factors (see Guiso et al. (2003), Guiso and Sodini (2013), and Arrondel et al. (2016)), but this is not the subject of the present research.

Figure 5 Country Responses of the Shares of Safe and Risky Assets in Relation to the Total Value of Financial Assets of Households to Macroeconomic and Financial Market Shocks



Notes: The impulse response of afp_{1t} and afp_{2t} to a positive one standard deviation shock in variables $GDPpc_t$, cpi_t, i_t, and $stpr_t$ over the 16 quarter horizon from the shock are drawn. They are computed from the results of model (1) with the following variables: cex_{4t},$GDPpc_t$, cpi_t, i_t, $stpr_t$, and afp_{mt}.

Source: Author´s own calculations.

5. Robustness of the Results

The robustness of the results presented in Figures 3 and 4 are tested to alternative Cholesky specification of the shocks. While in the literature there is a strong consensus on the ordering of macroeconomic and financial variables in the VAR model, the ordering of the variable of household expectations (or consumer confidence) is not unanimous. For instance, Abildgren et al. (2018), in identifying consumer confidence shocks by Cholesky identification scheme, order the variable last. Barsky and Sims (2012) also test the sensitivity of impulse responses to such ordering of the variable. The alternative specification of VAR model (1) is thus the one with the following order of variables: $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{mt}, cex_{kt}. By placing the household expectations variable last, we assume that households, when forming their expectations, have a perfect information of the contemporary development of other variables in the VAR system. By this sensitivity analysis we implicitly examine whether expectations by itself contain information (in shocks to which households adjust composition of their financial portfolio) not included in other variables of model (1) (Barsky and Sims, 2012). If we find significant impulse responses, this indicates that the variable of household expectations contains some ″original″ information (or ″news″) not conveyed to households by other variables in the model (see Barksy and Sims, 2012). If we find that impulse responses are not significant, this indicates that expectations are no news but merely ″mirror″ the information contained in other (macroeconomic and financial) variables of the VAR model (ibidem).

The impulse responses are presented in Figures A2 and A3 in Appendix, part 4. In general, we find that several (approximately ½ of) impulse responses are sensitive to alternative ordering of variables. This is true especially for the impulse responses of afp_{2t}, the share of risky assets in relation to the total financial assets value of households in the country, that now become statistically insignificant: for instance the response afp_{2t} to the shocks in the financial situation of the household expectations (cex_{1t}) and the general macroeconomic situation expectations (cex_{2t}). This implies that a particular type of household expectations may contain no new relevant information for household portfolio rebalancing decision that is not already conveyed by information in other variables of the VAR model. Another finding is that impulse responses for Italy are the least impacted by the alternative Cholesky specification of the shocks, which further affirms the cross-country heterogeneity of financial portfolio decision responses of households to different shocks. The later also implies that information in expectations variable, as measured by the European Commission, may be more relevant for household portfolio decision-making in Italy than in other sampled countries.

All in all, the robustness exercise results demonstrate that the impulse response may be sensitive to the specific ordering of the expectations variable in the Cholesky identification of the shocks. Given the already discussed characteristics of the household expectation measurement by the European Commission (2020a,b) – expectations are measured for the period over the next 12 months – we conclude that the results presented in Figure 3 and 4 are the relevant.

6. Conclusions

Portfolio composition decisions are part of a household's savings decisions. This paper investigated asset allocation data for Germany, France, and Italy over the period of 2000q1-2019q3 and analyzed how households respond to expectations, macroeconomic, and financial market shocks. We found that in Germany and France a positive shock to the financial situation of the household expectations and to the general economic situation expectations result in an increase in the risky asset share and a reduction in the safe asset share in relation to the total value of financial assets of households. This is not so in Italy, where the safe asset share can increase. The positive shock to consumer prices level expectations results in a reduction of risky and safe assets in all countries, implying that the rebalancing of the portfolio is towards medium risky assets. A positive shock to country unemployment expectations is associated with a reduction in the risky assets share over the medium term across all countries. A division between Germany and France, on the one hand, and Italy, on the other, is observed in the safe assets share response. In the former, the safe asset share increases, in the latter it decreases. The household financial portfolio effects of income, price level, deposit rate and stock price shocks were also documented and compared.

The results may be important for the central banks and for the financial industry. The former need to monitor and study household expectations to design more effective monetary policy; the later should monitor household expectations to better anticipate financial portfolio rebalancing when household expectations are shocked.

APPENDIX

PART 1

Table A1 Determination of the Optimal Lag of VAR Model (1) with the Variables cex_{kt}, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{1t} for Germany

		cex_{1t}	cex_{2t}	cex_{3t}	cex_{4t}
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.12	0.1	0.11
Lag 1	LD	2	2	2	2
	EVT	200	300	200	300
	DIC	-1138.75	-963.39	-921.45	-912.28
	AR	0.9	0.9	0.9	0.9
	OT	0.09	0.11	0.1	0.1
Lag 2	LD	1	1	1	1.2
	EVT	200	300	300	300
	DIC	-1123.85	-952.2	-918.91	-899.42
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.1	0.1	0.1
Lag 3	LD	1.2	1	1	1.4
	EVT	300	400	300	400
	DIC	-1113.64	-935.86	-908.76	-885.74
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.1	0.1	0.1
Lag 4	LD	1.2	1.2	1	1.4
	EVT	400	400	400	500
	DIC	-1108.46	-923.45	-895.62	-874.36

Notes: The table presents the estimated parameters of the Bayesian VAR model (1) at lags 1 to 4, computed by the search algorithm proposed by Dieppe et al. (2018) and implemented in their BEAR toolbox. AR = autoregressive coefficient, OT = overall tightness, LG = lag decay, EVT = exogenous variable tightness, DIC = DIC statistics. The interval values for the parameters that entered the algorithm were between 0.5 and 1 for AR, 0.05 and 0.2 for OT, 1 and 2 for LD, and 100 and 1000 for EVT. The lag of model (1) was selected that minimizes the DIC statistics.

Source: Author´s own calculations.

Table A2 Determination of the Optimal Lag of VAR Model (1) with the Variables cex_{kt}, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{2t} for Germany

		cex_{1t}	cex_{2t}	cex_{3t}	cex_{4t}
	AR	0.9	0.9	0.9	0.9
	OT	0.07	0.1	0.07	0.09
Lag 1	LD	2	2	2	2
	EVT	300	300	300	300
	DIC	-984.31	-813.48	-763.57	-760.06
	AR	0.9	0.9	0.9	0.9
	OT	0.07	0.1	0.08	0.09
Lag 2	LD	1	1	1	1
	EVT	300	300	300	400
	DIC	-973.43	-809.03	-763.92	-756.72
	AR	0.9	0.9	0.9	0.9
	OT	0.09	0.1	0.09	0.09
Lag 3	LD	1	1	1	1
	EVT	300	300	300	400
	DIC	-972.17	-795.65	-762.07	-745.59
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.1	0.09	0.09
Lag 4	LD	1	1.2	1	1
	EVT	300	300	300	400
	DIC	-973.24	-783.31	-750.35	-734.20

Notes: The notes from Table A1 apply.

Source: Author´s own calculations.

Table A3 Determination of the Optimal Lag of VAR Model (1) with the *Variables* cex_{kt}, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{1t} for France

		cex_{1t}	cex_{2t}	cex_{3t}	cex_{4t}
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.1	0.1	0.12
Lag 1	LD	2	2	2	2
	EVT	400	500	500	500
	DIC	-1325.89	-1162.94	-1158.97	-1135.44
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.1	0.1	0.14
Lag 2	LD	1	1	1	1
	EVT	500	600	600	500
	DIC	-1331.47	-1168.86	-1161.31	-1144.15
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.11	0.1	0.12
Lag 3	LD	1	1	1	1.2
	EVT	600	600	600	600
	DIC	-1324.11	-1167.94	-1156.28	-1129.60
	AR	0.9	0.9	0.9	0.8
	OT	0.1	0.12	0.12	0.17
Lag 4	LD	1	1	1	1.4
	EVT	700	600	600	600
	DIC	-1313.15	-1166.91	-1156.77	-1141.0

Notes: The notes from Table A1 apply.

Source: Author´s own calculations.

Table A4 Determination of the Optimal Lag of VAR Model (1) with the Variables cex_{kt}, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{2t} for France

		cex_{1t}	cex_{2t}	cex_{3t}	cex_{4t}
	AR	0.9	0.9	0.9	0.8
	OT	0.1	0.1	0.11	0.15
Lag 1	LD	2	2	2	2
	EVT	400	400	400	400
	DIC	-1111.50	-944.57	-943.04	-924.81
	AR	0.9	0.9	0.9	0.8
	OT	0.11	0.13	0.11	0.16
Lag 2	LD	1	1	1	1
	EVT	500	400	500	400
	DIC	-1113.62	-957.77	-942.42	-931.13
	AR	0.9	0.9	0.9	0.8
	OT	0.11	0.12	0.1	0.17
Lag 3	LD	1	1	1.4	1.2
	EVT	500	500	600	500
	DIC	-1105.13	-949.32	-931.13	-923.67
	AR	0.9	0.8	0.9	0.8
	OT	0.12	0.14	0.1	0.17
Lag 4	LD	1	1	1	1.2
	EVT	500	500	600	500
	DIC	-1099.97	-957.85	-924.43	-921.25

Notes: The notes from Table A1 apply.

Source: Author´s own calculations.

Table A5 Determination of the Optimal Lag of VAR model (1) with the Variables cex_{kt}, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{1t} for Italy

		cex_{1t}	cex_{2t}	cex_{3t}	cex_{4t}
	AR	0.9	0.9	0.9	0.9
	OT	0.09	0.1	0.13	0.09
Lag 1	LD	2	2	2	2
	EVT	700	700	600	700
	DIC	-1156.58	-953.93	-993.05	-960.84
	AR	0.9	0.9	0.9	0.9
	OT	0.09	0.12	0.12	0.09
Lag 2	LD	1	1	1	1
	EVT	800	600	800	800
	DIC	-1153.12	-963.16	-988.98	-958.78
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.12	0.13	0.1
Lag 3	LD	1	1	1.2	1
	EVT	800	700	700	900
	DIC	-1148.25	-958.99	-983.55	-960.47
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.13	0.13	0.1
Lag 4	LD	1	1	1.2	1
	EVT	700	700	800	900
	DIC	-1138.51	954.38	-972.07	-952.30

Notes: The notes from Table A1 apply.

Source: Author´s own calculations.

Table A6 Determination of the Optimal Lag of VAR Model (1) with the Variables cex_{kt}, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{2t} for Italy

		cex_{1t}	cex_{2t}	cex_{3t}	cex_{4t}
	AR	0.9	0.9	0.9	0.9
	OT	0.08	0.09	0.1	0.09
Lag 1	LD	2	2	2	2
	EVT	700	600	600	700
	DIC	-984.19	-781.39	-814.05	-797.07
	AR	0.9	0.9	0.9	0.9
	OT	0.09	0.11	0.1	0.1
Lag 2	LD	1	1	1	1
	EVT	800	700	700	700
	DIC	-985.13	-791.65	-814.84	-802.34
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.15	0.1	0.13
Lag 3	LD	1	1	1.2	1
	EVT	800	600	800	700
	DIC	-989.12	-807.24	-811.02	-821.07
	AR	0.9	0.9	0.9	0.9
	OT	0.1	0.12	0.1	0.14
Lag 4	LD	1	1	1.2	1
	EVT	700	700	700	500
	DIC	-983.34	-797.58	-804.59	-816.68

Notes: The notes from Table A1 apply.

Source: Author´s own calculations.

PART 2

Table A7 Determination of the Optimal Lag of VAR Model (1) with the Variables ex_comp_t, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{1t}

		Germany	*France*	*Italy*
	AR	0.9	0.9	0.9
	OT	0.12	0.1	0.1
Lag 1	LD	2	2	2
	EVT	400	500	800
	DIC	-1109.55	-1309.22	-1081.38
	AR	0.9	0.9	0.9
	OT	0.11	0.11	0.1
Lag 2	LD	1	1	1
	EVT	500	500	800
	DIC	-1100.11	-1320.02	-1078.89
	AR	0.9	0.9	0.9
	OT	0.11	0.11	0.11
Lag 3	LD	1	1	1
	EVT	500	600	900
	DIC	-1085.15	-1313.59	-1077.89
	AR	0.9	0.9	0.9
	OT	0.1	0.13	0.12
Lag 4	LD	1	1	1
	EVT	500	600	800
	DIC	-1074.08	-1305.89	-1071.68

Notes: ex_comp_t is a composite variable of expectations, calculated as an arithmetic mean of the variables cex_{1t}, cex_{2t}, and cex_{3t}. Other notes from Table A1 apply.

Source: Author´s own calculations.

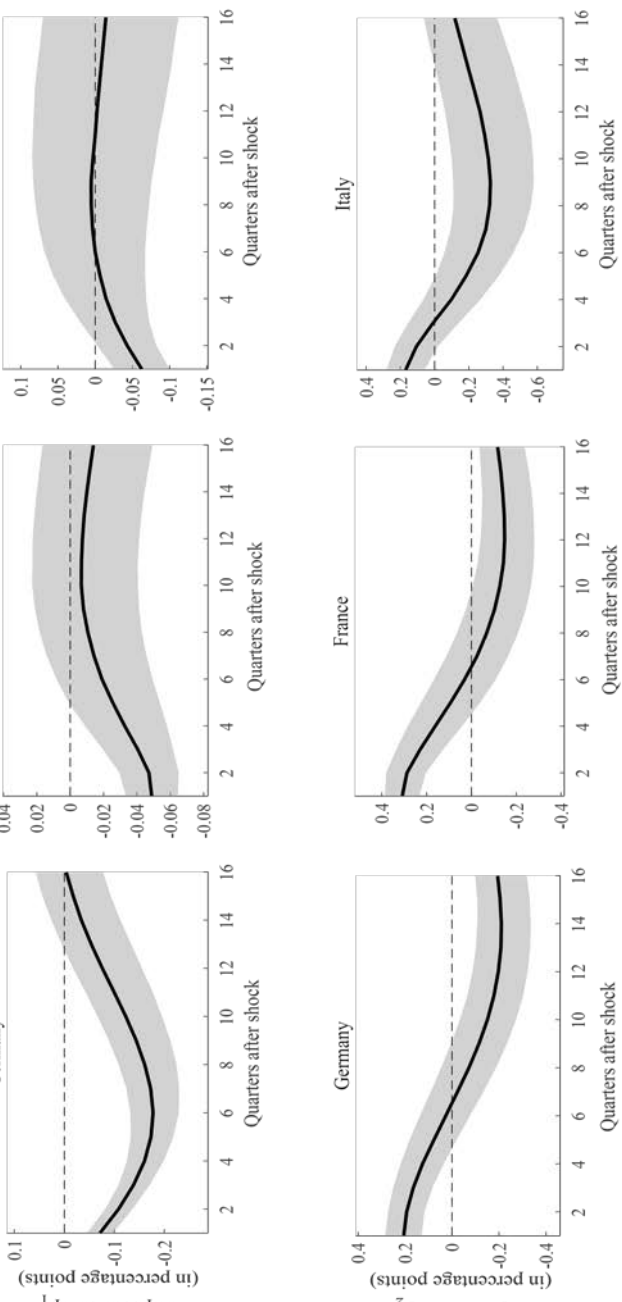
Table A8 Determination of the Optimal Lag of VAR Model (1) with the Variables ex_comp_t, $GDPpc_t$, cpi_t, i_t, $stpr_t$, afp_{2t}

		Germany	*France*	*Italy*
Lag 1	AR	0.9	0.9	0.9
	OT	0.1	0.11	0.09
	LD	2	2	2
	EVT	300	400	700
	DIC	-953.15	-1093.42	-911.41
Lag 2	AR	0.9	0.9	0.9
	OT	0.1	0.13	0.1
	LD	1	1	1
	EVT	400	500	800
	DIC	-952.88	-1104.65	-915.09
Lag 3	AR	0.9	0.9	0.9
	OT	0.1	0.12	0.1
	LD	1	1	1
	EVT	400	500	800
	DIC	-940.46	-1092.54	-915.20
Lag 4	AR	0.9	0.9	0.9
	OT	0.1	0.11	0.1
	LD	1	1	1
	EVT	300	600	800
	DIC	-932.97	-1076.68	-909.23

Notes: ex_comp_t is a composite variable of expectations, calculated as an arithmetic mean of the variables cex_{1t}, cex_{2t}, and cex_{3t}. Other notes from Table A1 apply.

Source: Author´s own calculations.

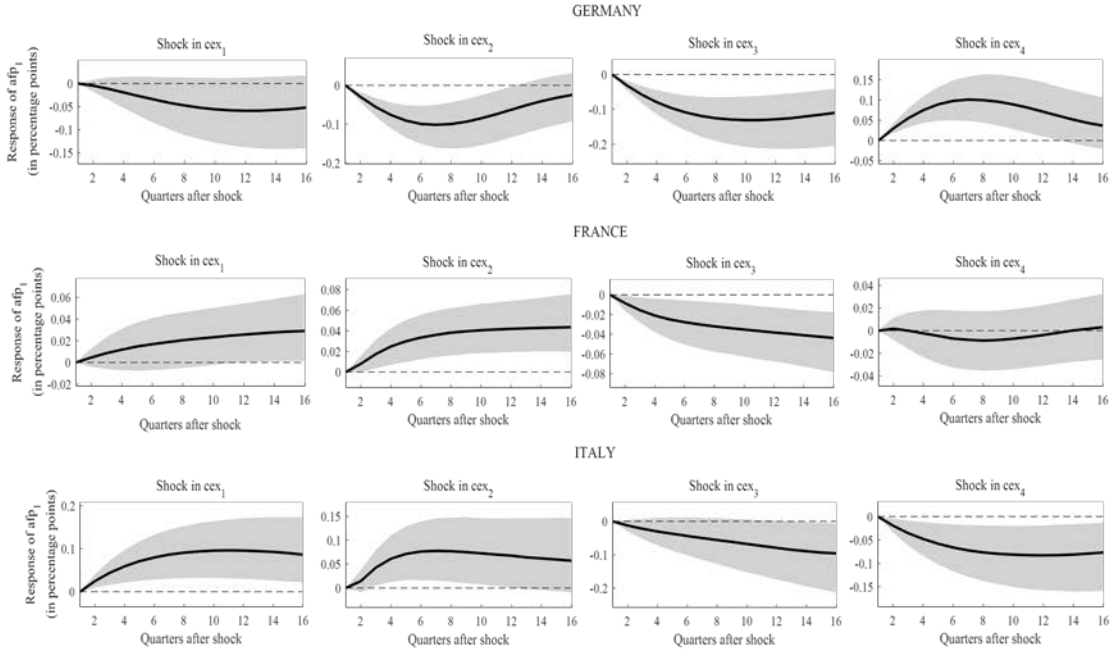
Figure A1 Country Responses of the Share of Safe Assets (afp_{1t}) and Risky Assets (afp_{2t}) in Relation to the Total Value of Financial Assets of Households to the Overall Household Expectations Shock



Notes: The impulse response of afp_{1t} and afp_{2t} to a positive one standard deviation shock in the composite (overall) household expectations (ex_comp_t) shock over the 16 quarter horizon from the shock are drawn. They are computed from the result of model (1) with the following order of variables: ex_comp_t, $GDPpc_t$, cpi_t, i_t, $stpr_t$, and afp_{mt}.

Source: Author´s own calculations.

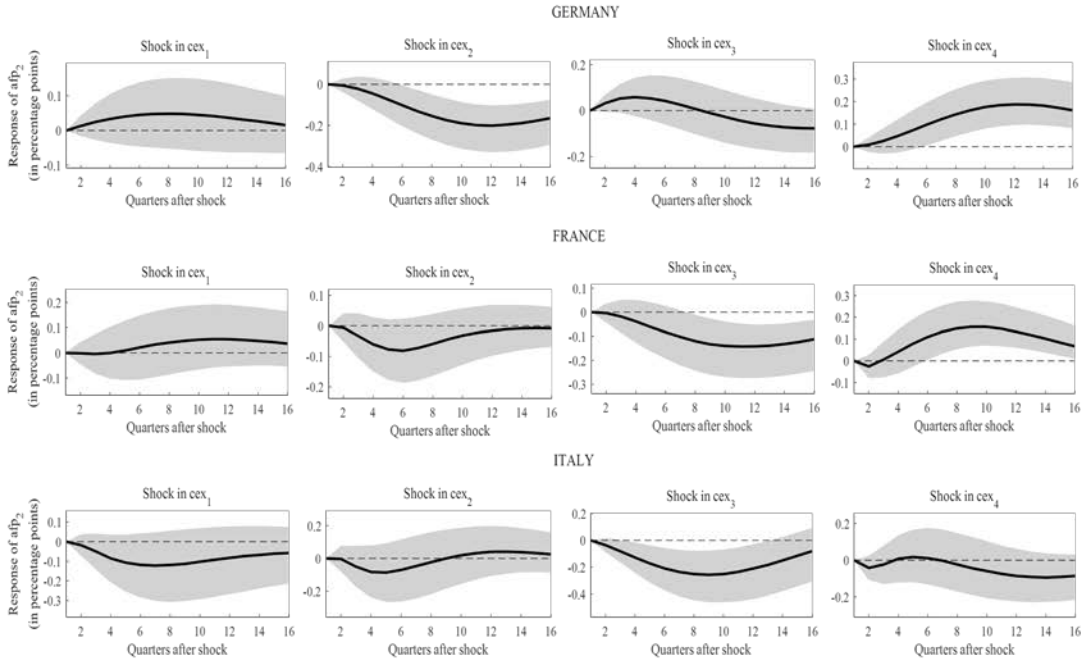
Figure A2 Country Responses of the Share of Safe Assets in Relation to the total Value of Financial Assets of Households (afp_{1t}) to a Specific Type of Household Expectations Shocks – Alternative Cholesky Specification



Notes: Impulse responses of afp_{1t} for Germany, France, and Italy are drawn to a one standard deviation positive shock to a specific type of household expectations: the financial situation of the household expectations (cex_{1t}), the general macroeconomic situation expectations (cex_{2t}), consumer prices level expectations (cex_{3t}), and country unemployment expectations (cex_{4t}), all over the course of the next 12 months. The impulse responses computed over the horizon of 16 quarters from the shock are based on the results of the VAR model (1), with the same lag structure as in the baseline model, and alternative Cholesky specification with respect to Figure 3, i.e. in the following order of variables: GDPpc_t, cpi_t, i_t, stpr_t, afp_{1t}, cex_{kt}.

Source: Author´s own calculations.

Figure A3 Country Responses of the Share of Risky Assets in Relation to the Total Value of Financial Assets of Households (afp_{2t}) to a Specific Type of Household Expectations Shocks – Alternative Cholesky Specification



Notes: Impulse responses of afp_{1t} for Germany, France, and Italy are drawn to a one standard deviation positive shock to a specific type of household expectations: the financial situation of the household expectations (cex_{1t}), the general macroeconomic situation expectations (cex_{2t}), consumer prices level expectations (cex_{3t}), and country unemployment expectations (cex_{4t}), all over the course of the next 12 months. The impulse responses computed over the horizon of 16 quarters from the shock are based on the results of the VAR model (1) and alternative specification with respect to Figure 4, i.e. in the following order of variables: GDPpc_t, cpi_t, i_t, stpr_t, afp_{2t}, cex_{kt}.

Source: Author´s own calculations.

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