**RESEARCH PAPER**

# Financial Literacy and Risk Protection During the Covid-19 Pandemic

**Giuseppe Bertola[1]** · **Anna Lo Prete[2]**

## Abstract

This study documents that competent access to financial markets can smooth consumption in the face of idiosyncratic income shocks. Using household-level data on financial literacy and financial resilience in Italy during the first phase of the Covid-19 pandemic, we find that financial literacy and financial asset ownership both influenced consumption changes in theoretically sensible ways. The results are robust in specifications controlling for several socio-demographic characteristics, saving choices, public transfers, and to different estimation methods.

**Keywords** Risk sharing · Financial literacy · Financial assets · Public subsidies · Covid-19

**JEL Classification** D14 · D52 · G53

## 1 Introduction

The outbreak of the Covid-19 pandemic changed the social and economic life of billions of people around the world. After the detection of the first cases of coronavirus infection in December 2019 in China, the virus spread rapidly on a global scale. The World Health Organization (WHO) declared it a "public health emergency of international concern" on 30 January 2020 and a "pandemic" on 11 March 2020 The emergency officially ended more than three years after, on 5 May 2023, having

✉ Anna Lo Prete
anna.loprete@unito.it

Giuseppe Bertola
giuseppe.bertola@unito.it

[1] CEPR, CESifo, University of Turin, Turin, Italy

[2] G53 Network, Center for Research on Pensions and Welfare Policies (CeRP), University of Turin, Lungo Dora Siena 100A, Turin, Italy

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recorded 276 million cases of coronavirus disease and more than 2 million deaths just in the European Region.

The pandemic and the unprecedented measures taken by governments to stem it triggered what the World Bank considered the largest economic crisis in more than a century (World Bank 2022). Unusually large and dispersed income changes had redistributive consequences (Adams-Prassl et al. 2020), hitting specific groups harder, as it was the case for lower income quintiles and ethnic minorities in the UK (Crossley et al. 2021). This motivated public transfer programs that aimed at smoothing their implications for consumption and that sometimes actually reversed them, as they did for instance in the Germany (Bruckmeier et al. 2021).

In this study we use household-level data on financial literacy and resilience in Italy during the first phase of the Covid-19 pandemic, to explore whether competent access to financial markets smoothed consumption in the face of idiosyncratic income shocks.

The analysis builds on a vast literature documenting that basic financial education is important to inform personal financial decisions. Elementary knowledge of interest rate, inflation, and risk diversification concepts, called "financial literacy" by Lusardi and Mitchell (2011), is sensibly related to better saving, investment, and retirement decisions (van Rooij et al. 2011; Jappelli and Padula 2013; Lusardi and Mitchell 2023). Financially literate individuals also have a higher understanding of the trade-off behind individual and social choices, turn out more often at national elections, and are less likely to punish a government who enacted a pension reform (Fornero and Lo Prete 2023). Conversely, lack of financial literacy prevents competent use of complex financial markets and is associated with higher income and wealth inequality (Lo Prete 2018; Jonker and Kosse 2020).

The implications of financial literacy for household consumption have been inspected by Jappelli and Padula (2017), who show that consumption growth is faster for financially sophisticated Italian households, as it should be if financial competence makes it possible to earn higher returns on savings. However, Dinkova et al. (2021) analyzing Dutch household data find that financial literacy is positively related to the level of food consumption but not to its growth in regressions that do not control for income changes. We point out that, when some individuals do not access financial markets and those who access them are not competent enough to know how to use them appropriately, aggregate shocks that impact individual incomes differently can be associated with idiosyncratic welfare effects through poor diversification or random mistakes.

Our work also contributes to existing studies on the financial literacy and resilience of Italian households during the Covid-19 pandemic. Poor financial literacy was associated with a higher probability of high debt burdens and of not being able to face an unexpected expense (Bottazzi and Oggero 2023), and the non-negligible share of respondents who preferred guessing when answering to basic questions on financial literacy instead of admitting ignorance had lower financial resilience (Bertola and Lo Prete 2024). Here, we relate financial competence to consumption and income changes, rather than to financial fragility levels in a specific year, and document that the consumption implications of the Covid-19 pandemic were related to financial competence and to financial asset ownership.

The data we use come from a large survey on financial literacy and resilience of Italian households collected starting in 2020 on a yearly basis by the Italian Committee of Financial Education in collaboration with Doxa. To analyze household behavior in 2020 we mainly use information from the first wave, which provides data on the economic situation of Italian households before and after the outburst of the Covid-19 pandemic (Doxa 2020), and additional information on asset holdings before the outburst of the Covid-19 pandemic and on financial literacy available for about 80% of the households in the second wave of the survey (Doxa 2021).

Our empirical approach is inspired by standard models of consumption risk sharing. If financial markets were perfect and complete, an aggregate shock would change all welfare levels in perfectly correlated ways, and in cross-section data there would be no reason for consumption changes systematically to depend on income changes at the individual level (Arrow and Debreu 1954; Bertola et al. 2006). In reality, of course, markets are incomplete, and an extensive empirical literature documents that consumption responds to relative income shocks in individual panel data (Altonji and Siow 1987) as well as in data aggregated at the country or regional level (Lewis 1996; Asdrubali and Kim 2008; Obstfeld and Rogoff 2001; Lo Prete 2016). We test whether consumption risk depends on financial literacy and financial asset ownership, which can both influence consumption changes alongside observable household characteristics, saving choices, and public transfers.

In the data we inspect, consumption decreased more strongly for financially illiterate respondents and for those who had lower financial asset holdings. The baseline result that financial competence and financial assets smoothed household consumption changes is confirmed in consumption-change regressions that include a large set of socio-demographic control variables, in regressions that account for precautionary motives, and in regressions that instrument income changes with ex-post government subsidies and with survey responses indicating whether income sufficed for monthly expenses before the pandemic. Controlling for observable characteristics and for endogeneity, consumption changes were least negative for respondents who had financial assets and who were also financially literate, suggesting that financial competence matters to portfolio choices.

The remainder of this article is organized as follows. Section 2 presents the empirical model of consumption risk sharing we use to isolate the associations of interest. Sections 3 describes the dataset and the main variables used in the empirical analysis. Section 4 presents the main results. Section 5 includes additional results and discusses econometric issues. Section 6 concludes.

## 2 Estimation Strategy

To inspect how financial competence shapes consumption reactions to income shocks in realistically imperfect markets, our empirical approach builds on a standard test of consumption risk sharing. We explore if the implications of the pandemic for individual consumption were heterogeneous depending on financial competence and financial

asset ownership. In regressions in the form

$$\Delta C_i = \alpha + \beta \Delta Y_i + \gamma F L_i + \delta F A_i + X_i \rho + \varepsilon_i, \tag{1}$$

if financial markets were perfect and complete, consumption reactions $\Delta C_i$ to income shocks $\Delta Y_i$ would be equal across households: the $\beta$ coefficient that relates individual consumption reactions $\Delta C_i$ to individual income changes $\Delta Y_i$ in cross-section estimates of model (1) would be zero, and the intercept $\alpha$ would capture the common response of consumption to aggregate shocks to current and future income (Bertola et al. 2006).

In reality, of course, markets are incomplete and do not allow to smooth consumption perfectly. A vast empirical literature documents that $\beta$ is significantly positive, i.e. consumption responds to idiosyncratic income shocks, in individual and in aggregated panel data (Altonji and Siow 1987; Lewis 1996; Asdrubali and Kim 2008; Obstfeld and Rogoff 2001; Lo Prete 2016).

If a larger portion of idiosyncratic risk is shared by households with better financial competence and more financial assets, we expect the coefficients of individual financial literacy $F L_i$ and financial asset holdings $F A_i$ to have positive signs in regressions that explain consumption changes during the early stages of the pandemic, when income and consumption declined broadly but less strongly for households with better access to financial markets. In the last section of the article, we will also explore a different functional form for the consumption-smoothing implications of financial competence and financial asset by adding to the specification their interaction. Additional regressions will also include various linear forms $X_i \rho$ to control for socio-demographic characteristics that may be relevant for consumption changes.

To estimate model (1) we will use OLS methods that are easier to interpret, and we will compare the OLS estimates with ordered logit estimates for the baseline model as an additional robustness check to account for the fact that the consumption indicator on the left-hand side is only available in categorical form.

## 3 Data and Measurement

This article uses data from a large survey that the Italian Financial Education Committee collected in collaboration with Doxa on a yearly basis starting in 2020. The questionnaires include information on the financial situation of Italian households, their financial resilience, and their level of financial literacy, and were administered through online interviews to the member of the household, aged 18 or more, in charge of its economic and financial decisions.

The first wave, including about 5.000 interviews conducted in May–June 2020, focuses on the financial situation of Italian households before and after the start of the Covid-19 pandemic, and offers a rare opportunity to study consumption risk-sharing and financial literacy in the first phase of the pandemic (Doxa 2020). The second survey was administered in 2021 to the same households and, as much as possible, to the same respondent in each household to build a panel, obtaining a redemption rate equal to 80.4%. This means that it successfully reached 4.027 respondents who

also participated in the first wave, offering some longitudinal information. The sample was then completed including 984 new subjects (19.6%) chosen to match the socio-demographic characteristics of the missing ones (Doxa 2021). We will use information on the 4.027 subjects who participated in both surveys only and, to rule out the possibility that the person in charge of the economic and financial decision in the household might in principle not be the same in the 2020 and in the 2021 waves, we investigated response patterns across the two waves and find that the age, gender, education, and other socio-demographic information coincide perfectly, fostering confidence that the respondent in each household is the same.

We perform cross-sectional analyses using indicators of consumption, income, and socio-demographic characteristics built using information from the 2020 wave; indicators of financial asset holdings built using the refined information about asset ownership in 2019 available in the 2021 wave; and measures of financial literacy built exploiting the repeated-survey structure of the data. To improve the representativeness of the sample, all the data are weighted for municipality size, region, age, education, presence of children, income, and employment status (Doxa 2020).

### 3.1 Construction of the Main Variables

Table 1 shows summary statistics for all the variables we include in the baseline model and in its extensions. Additional information is available in the data appendix, which reports a description of all the variables in section A, and the exact wording of the questions we use to construct the main variables we include in the baseline regressions in section B. The main variables are defined as follows.

We build a discrete "consumption reaction" variable that takes value $+1$ if food consumption increased since the start of the Covid-19 emergency with respect to its usual level, zero if it remained stable, $-1$ if it decreased. The mean and standard deviation of this variable, in Table 1, result from consumption increases reported by 19% of the respondents, decreases reported by 34% of the respondents, and consumption stability reported by the rest.

We relate consumption reactions to an equally a discrete "income shock" variable that takes value $+1$ if income increased in 2020 with respect to before the start of the Covid-19 emergency, zero if it did not change, $-1$ if it decreased. This indicator's statistics in Table 1 result from a decline in family income reported by 45% of the respondents, an increase reported by a few (2%), and family income stability reported by the rest.

As regards financial competence, our preferred measure of "financial literacy" is a dummy variable set to unity for respondents who answer correctly the "big three" questions that evaluate knowledge of interest rates, inflation, and risk diversification (Lusardi and Mitchell 2011) both in 2020 and in 2021. We also consider a "financial literacy in 2020" dummy, which as discussed in Bertola and Lo Prete (2024) is more likely to misclassify as literate individuals who are reluctant to admit their ignorance, answer randomly, and happen to guess the correct answer: in Table 1, the percentage of respondents who answer correctly to the "big three" questions in both 2020 and 2021 is much lower (32%) than that of those who did so in 2020 (45%). The table also

**Table 1** Descriptive statistics

|  | Obs. | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|
| *Panel A. Consumption and income* | | | | | |
| Consumption reaction | 4027 | 0.15 | 0.71 | − 1 | 1 |
| Income shock | 4027 | − 0.43 | 0.53 | − 1 | 1 |
| *Panel B. Financial literacy* | | | | | |
| Financial literacy (in 2020 and 2021) | 4027 | 0.32 | 0.47 | 0 | 1 |
| Financial literacy in 2020 | 4027 | 0.45 | 0.50 | 0 | 1 |
| Number of correct answers in 2020 | 4027 | 2.06 | 1.02 | 0 | 3 |
| Number of correct answers in 2020 and 2021 | 4027 | 1.69 | 1.13 | 0 | 3 |
| Financial literacy in 2020 (plus compounding) | 4027 | 0.33 | 0.47 | 0 | 1 |
| Financial literacy in 2020 and 2021 (plus compounding) | 4027 | 0.22 | 0.41 | 0 | 1 |
| *Panel C. Financial assets* | | | | | |
| Financial assets | 4027 | 0.25 | 0.43 | 0 | 1 |
| Pension funds | 4027 | 0.09 | 0.29 | 0 | 1 |
| Insurance policies | 4027 | 0.10 | 0.30 | 0 | 1 |
| Stocks and bonds | 4027 | 0.18 | 0.38 | 0 | 1 |
| Cryptos | 4027 | 0.05 | 0.22 | 0 | 1 |
| *Panel D. Demographic, education, gender information* | | | | | |
| Age 18–34 | 4027 | 0.07 | 0.26 | 0 | 1 |
| Age 35–44 | 4027 | 0.20 | 0.40 | 0 | 1 |
| Age 45–64 | 4027 | 0.45 | 0.50 | 0 | 1 |
| Age 65 + (reference category) | 4027 | 0.27 | 0.45 | 0 | 1 |
| Less than college | 4027 | 0.81 | 0.40 | 0 | 1 |
| College Degree | 4027 | 0.16 | 0.37 | 0 | 1 |
| Post-graduate degree | 4027 | 0.03 | 0.18 | 0 | 1 |
| Female | 4027 | 0.35 | 0.48 | 0 | 1 |
| Male (reference category) | 4027 | 0.65 | 0.48 | 0 | 1 |
| *Panel E. Occupational status* | | | | | |
| White collar (reference category) | 4027 | 0.43 | 0.49 | 0 | 1 |
| Self-employed | 4027 | 0.16 | 0.37 | 0 | 1 |
| Blue collar | 4027 | 0.11 | 0.32 | 0 | 1 |
| Retired | 4027 | 0.25 | 0.44 | 0 | 1 |
| Other | 4027 | 0.02 | 0.14 | 0 | 1 |
| Unemployed | 4027 | 0.02 | 0.16 | 0 | 1 |
| *Panel F. Household's characteristics and area* | | | | | |

**Table 1** (continued)

| | Obs. | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|
| Income level (in thousand euro) | 4027 | 2.00 | 1.00 | 0.4 | 4.5 |
| Minors | 4027 | 0.28 | 0.45 | 0 | 1 |
| North-West (reference category) | 4027 | 0.27 | 0.44 | 0 | 1 |
| North-East | 4027 | 0.19 | 0.40 | 0 | 1 |
| Centre | 4027 | 0.20 | 0.40 | 0 | 1 |
| South | 4027 | 0.23 | 0.42 | 0 | 1 |
| Islands | 4027 | 0.11 | 0.31 | 0 | 1 |
| *Panel G. Saving behavior, fiscal policy, financial distress* | | | | | |
| Precaution | 4027 | 0.33 | 0.47 | 0 | 1 |
| Temporary | 4027 | 0.29 | 0.45 | 0 | 1 |
| Red zone | 4027 | 0.22 | 0.41 | 0 | 1 |
| New subsidy | 4027 | 0.19 | 0.40 | 0 | 1 |
| Difficulty to make ends meet in 2019 | 4027 | − 0.18 | 0.49 | − 1 | 1 |

The table reports information on the weighted sample

reports summary statistics for other indicators of financial literacy, defined in detail and used in the section to follow in a battery of robustness checks.

To measure financial asset ownership, we build a "financial assets" dummy variable which takes value one for the respondents who owned in 2019 one or more of pension funds, insurance policies, stocks and bonds, cryptos, and we discuss the role of assets by category as a robustness check. In Table 1, data on average stock market participation indicate that 25% of respondents owned at least one financial asset in 2019 and that, considering each class of assets separately, 9% of respondents owned pension funds, 10% insurance policies, 18% stocks and bonds, and 5% cryptos.

# 4 Baseline Results

Table 2 reports OLS estimates for the baseline specification, which estimates the role played by income shocks, financial literacy, and financial asset ownership as determinants of consumption changes during the first phase of the Covid-19 pandemic. In column 1, income shocks are very significantly related to consumption reactions across households, which unsurprisingly denies that risk is shared perfectly. Financial literacy and financial asset ownership in column 2 and column 3 have positive coefficients when included separately, and each significantly smooths consumption reactions also when they are both included in column 4.

These baseline OLS estimates are in line with theoretical considerations and can be interpreted easily, if roughly. For a household that experiences a decline of income, consumption change is on average 0.15 more negative if the person in charge of the economic and financial decisions in the household is neither financially literate nor

**Table 2** Risk protection, financial literacy, and financial assets

| Dependent variable | Consumption reaction (1) | Consumption reaction (2) | Consumption reaction (3) | Consumption reaction (4) |
|---|---|---|---|---|
| Income shock | 0.15*** (0.04) | 0.14*** (0.04) | 0.15*** (0.04) | 0.15*** (0.04) |
| Financial literacy | | 0.09** (0.04) | | 0.09** (0.04) |
| Financial assets | | | 0.09** (0.04) | 0.08* (0.04) |
| R squared | 0.01 | 0.02 | 0.02 | 0.02 |
| Observations | 4027 | 4027 | 4027 | 4027 |

The table reports OLS estimates. All specifications use sample weights and include a constant (not reported). Robust standard errors are in parentheses. Significant at * 10%, ** 5%, *** 1%

**Table 3** Ordered logit estimates

| Dependent variable | Consumption reaction (1) | Consumption reaction (2) | Consumption reaction (3) | Consumption reaction (4) |
|---|---|---|---|---|
| Income shock | 1.41*** (0.14) | 1.41*** (0.14) | 1.42*** (0.14) | 1.41*** (0.14) |
| Financial literacy | | 1.30** (0.15) | | 1.28** (0.14) |
| Financial assets | | | 1.28** (0.16) | 1.26** (0.15) |
| Pseudo R squared | 0.00 | 0.01 | 0.01 | 0.01 |
| Observations | 4027 | 4027 | 4027 | 4027 |

The table reports odds ratios from ordered logit regressions. All specifications use sample weights and include a constant (not reported). Robust standard errors are in parentheses. Significant at * 10%, ** 5%, *** 1%

a financial asset holder, but just about zero if it is both, because the sum of 0.09 and 0.08 is slightly larger than 0.15.

Before proceeding to check the robustness of these findings, substituting or adding indicators to the baseline specification in column 4 of Table 2, we report in Table 3 estimates from an ordered logit version of that OLS specification. This empirical exercise yields the same pattern of signs and significance levels of the results in Table 2. For brevity, we do not report ordered logit estimates for the regressions to follow, which convey the same message of the OLS estimates we report and discuss.

## 4.1 Financial Literacy Indicators

Table 4 reports estimates of specifications using different indicators of financial literacy and provides evidence supporting the choice of using additional information on financial literacy from two waves to build indicators that can remove at least part of the clutter due to random answers to survey questions (Bertola and Lo Prete 2024).

**Table 4** Indicators of financial literacy

| Dependent variable: consumption reaction | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Income shock | 0.15*** | 0.15*** | 0.15*** | 0.15*** | 0.15*** |
| | (0.04) | (0.04) | (0.04) | (0.04) | (0.04) |
| Financial assets | 0.08* | 0.09** | 0.09** | 0.09** | 0.08* |
| | (0.04) | (0.04) | (0.04) | (0.04) | (0.04) |
| Financial literacy in 2020 | 0.07* | | | | |
| | (0.04) | | | | |
| Number of correct answers in 2020 | | 0.03 | | | |
| | | (0.02) | | | |
| Number of correct answers in 2020 and 2021 | | | 0.04* | | |
| | | | (0.02) | | |
| Financial literacy in 2020 (plus compounding) | | | | 0.05 | |
| | | | | (0.04) | |
| Financial literacy in 2020 and 2021 (plus compounding) | | | | | 0.09** |
| | | | | | (0.05) |
| R squared | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Observations | 4027 | 4027 | 4027 | 4027 | 4027 |

The table reports OLS estimates. All specifications use sample weights and include a constant (not reported). Robust standard errors are in parentheses. Significant at * 10%, ** 5%, *** 1%

In column 1, we code financially literate those who answer correctly to the "big three" questions on interest rate, inflation, and risk diversification using information only from the 2020 questionnaire. This standard indicator of financial literacy attracts a positive and significant coefficient but is less precisely estimated than our preferred one.

Next, we consider indicators of financial literacy that measure it by the number of correct answers. One uses information from the 2020 wave of the survey only and is not significantly associated with consumption reactions in column 2. The other indicator, constructed using information from the 2020 and 2021 waves of the survey, precisely estimates the association of interest in column 3.

The regressions in columns 4 and 5 of Table 4 include indicators of financial literacy that address measurement errors by testing cross-question consistency on knowledge of interest rates. The zero-one indicator of financial literacy in column 4 codes literate only respondents who answer correctly to the "big three" questions plus a fourth question on interest compounding in 2020, while the indicator in column 5 considers information on the same cross-question consistency in both 2020 and 2021. The results document that financial literacy is significantly related to consumption changes only when information is refined by considering if the answer to the same question is correct in 2020 and one year after.

## 4.2 Financial Assets by Category

Exploiting information available in the 2021 wave of the Doxa survey, we provide evidence on the role of asset ownership by category in shaping consumption reactions to income shocks.

In column 1 of Table 5, pension funds are associated with more positive consumption changes. Results on insurance policies, in column 2, and on stocks and bonds, in column 3, confirm the role of financial assets as buffers, at standard significance levels. Conversely, in column 4 ownership of crypto currencies is not associated with consumption changes.

These estimates indicate that ownership of different assets is empirically relevant, possibly because they are more or less liquid and experienced different value declines, which makes them differently useful as consumption buffers. For instance, some asset categories, such as pension funds and insurance contracts, are less likely to imply wealth effects because their value is reported at long intervals, while that of ETF and mutual funds (which lost a lot of value in the Spring of 2020) is observed continuously. The liquidity of crypto currency markets is more difficult to determine (Brauneis et al. 2021) but, leaving to future work the task of exploring further the relationship between financial literacy and different asset categories, a possible explanation for their different empirical role can be that cryptos are especially attractive to young investors who are less financially competent and possibly more prone to gambling in this dataset and

**Table 5** Asset ownership by category

| Dependent variable: consumption reaction | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Income shock | 0.15*** | 0.15*** | 0.15*** | 0.14*** |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| Financial literacy | 0.08** | 0.09** | 0.09** | 0.09** |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| Pension funds | 0.12** | | | |
| | (0.06) | | | |
| Insurance policies | | 0.12* | | |
| | | (0.07) | | |
| Stocks and bonds | | | 0.08* | |
| | | | (0.05) | |
| Crypto | | | | 0.03 |
| | | | | (0.07) |
| R squared | 0.02 | 0.02 | 0.02 | 0.02 |
| Observations | 4027 | 4027 | 4027 | 4027 |

Note. The table reports OLS estimates. All specifications use sample weights and include a constant (not reported). Standard errors are in parentheses. Significant at * 10%, ** 5%, *** 1%

in previous research (Kumar 2009; Sousa et al. 2022; Balutel et al. 2023; Cascavilla 2024).

## 5 Additional Results

### 5.1 Socio-demographic Controls

The regressions reported in Table 6 include a variety of potentially relevant determinants of consumption changes, which can differ across households due to their socio-demographic characteristics in model (1). Reassuringly, the coefficients of financial literacy and financial asset ownership indicators are very similar in all these regressions to those of the more parsimonious specifications of Table 2.

In column 1, information on age, education, and gender indicates that consumption declined less for respondents aged between 35 and 44 years and respondents with at least a college degree, who may have experienced less severe income declines after the outburst of the Covid-19 pandemic. The significance of the female dummy indicates that consumption declines less for women and captures unobserved features of female respondents. They represent 44% of the respondents in households made up of single adults, and one third of the respondents in charge of the economic and financial decisions of households composed by two or more persons. The sub-sample under analysis selects these successful women who are likely to perform better than men in a country like Italy, where instead gender disparities in the labor market and in the informal care activities are huge and in need to be addressed (OECD 2023).[1]

In column 2 of Table 6, information on the professional status of the respondent indicates that those in blue-collar jobs and those unemployed experienced more negative household income declines, possibly reflecting sector-specific and occupation-specific factors, and that at least some of those who were unemployed when surveyed had become unemployed because of the pandemic.

In column 3, we include additional information on the household. The positive and significant coefficient of the income level may be due to its correlation with the size and persistence of the income declines across unobserved variables, such as the sector of occupation, which are in turn correlated with income levels. It can also be correlated with measurement errors in financial-asset ownership, as higher-income households are likely to own a larger amount of assets when the financial assets dummy takes value one. The presence of minors (or of invalids, in results not reported) in the household was not associated with consumption changes, while people living in the islands recorded more severe consumption declines, possibly because the discrete measure of income shocks hides more severe declines in regions with large tourism-related service sectors.

The F statistics that test the joint significance of the control variables groups, at the bottom of Table 6, indicate that their coefficients are always jointly significant, and even more so when they are all included in column 4, where collinearity reduces their individual significance.

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[1] To support of this argument empirically, results not reported indicate that the significance of the female dummy decreases below standard levels when an interaction term between gender and, for instance, education or gender and financial competence is included.

**Table 6** Socio-demographic control variables

| Dependent variable: consumption reaction | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Income shock | 0.16*** | 0.14*** | 0.14*** | 0.14*** |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| Financial literacy | 0.09** | 0.08** | 0.07* | 0.07* |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| Financial assets | 0.08* | 0.08* | 0.07* | 0.08* |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| *Age (ref.: 65 +)* | | | | |
| Age 18–34 | 0.02 | | | 0.11 |
| | (0.09) | | | (0.10) |
| Age 35–44 | 0.13** | | | 0.20** |
| | (0.06) | | | (0.08) |
| Age 45–64 | 0.02 | | | 0.08 |
| | (0.05) | | | (0.08) |
| *Education (ref.: no college degree)* | | | | |
| College degree | 0.07* | | | 0.03 |
| | (0.03) | | | (0.04) |
| Post-graduate degree | 0.10* | | | 0.06 |
| | (0.06) | | | (0.06) |
| *Gender (ref.: male)* | | | | |
| Female | 0.07* | | | 0.09* |
| | (0.04) | | | (0.04) |
| *Occupation (ref.: white collar)* | | | | |
| Self-employed | | − 0.09 | | − 0.06 |
| | | (0.06) | | (0.06) |
| Blue collar | | − 0.18*** | | − 0.11* |
| | | (0.07) | | (0.07) |
| Retired | | − 0.08 | | 0.04 |
| | | (0.05) | | (0.08) |
| Other | | 0.03 | | 0.05 |
| | | (0.11) | | (0.12) |
| Unemployed | | − 0.29** | | − 0.25** |
| | | (0.11) | | (0.11) |
| Income level | | | 0.05** | 0.05** |
| | | | (0.02) | (0.02) |
| Minors in the HH | | | 0.02 | − 0.01 |
| | | | (0.04) | (0.04) |
| *Area (ref.: North-West)* | | | | |
| North-East | | | − 0.06 | − 0.06 |
| | | | (0.06) | (0.06) |
| Centre | | | − 0.03 | − 0.03 |
| | | | (0.05) | (0.05) |
| South | | | 0.00 | 0.01 |
| | | | (0.06) | (0.06) |

**Table 6** (continued)

| Dependent variable: consumption reaction | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Islands | | | − 0.15* | − 0.13* |
| | | | (0.08) | (0.08) |
| Test of joint significance | 3.52 | 3.11 | 2.16 | 2.56 |
| | [0.00] | [0.01] | [0.04] | [0.00] |
| R squared | 0.03 | 0.03 | 0.03 | 0.02 |
| Observations | 4027 | 4027 | 4027 | 4027 |

The table reports OLS estimates. The reference categories are age 65 +, no college degree, male, white-collar, North-West. All specifications use sample weights and include a constant (not reported). Robust standard errors are in parentheses. Significant at * 10%, ** 5%, *** 1%

## 5.2 Savings

We use the admittedly limited information available in the data to code a dummy we label "precaution" that takes value one if the household had zero or negative savings before the outbreak of the pandemic in 2019 and accumulated positive savings in 2020, presumably (at given income changes) as a result of increased future income risk. Then, we code a "temporary" dummy to unity for respondents who reported experiencing an income decline since the start of the pandemic and expecting it to last one year or less, zero otherwise, which should be associated with consumption-smoothing dissaving. Finally, because an increase of savings may reflect reduced spending opportunities in lockdown, we also introduce a dummy for "red zone" provinces where in March 2020 the population was forced to stay at home (except for necessity, work, and health reasons) more strictly than in other areas. The regressions also include the complete set of control variables that in Table 6 are found to be jointly significant, but we report for brevity only the coefficients of interest, which would anyway be very similar in more parsimonious specifications.

In column 1 of Table 7, the estimated coefficients of the variables that measure stronger precautionary savings and perceived temporariness of income shocks are not significant but have the predicted sign: the consumption of households who increased savings decreased more strongly, and less strongly if the shock was perceived to be temporary.[2] Finding that the "red zone" dummy variable does not contribute to explaining consumption reactions supports our prior that food consumption changes are driven by permanent income expectations, precautionary motives, and liquidity constraints, but not by spending restrictions.

## 5.3 The Role of Public Policy and Measurement Errors

The last specifications we consider account for risk-sharing through the fiscal channel and, at the same time, aims at extracting a more informative signal from the discrete

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[2] In results not reported, we experimented also adding an interaction term between additional saving and the temporariness of the shock, finding that it has a positive but not significant coefficient.

**Table 7** Additional specifications

| Dependent variable | Consumption reaction | Income shock | Consumption reaction | Consumption reaction | Consumption reaction |
|---|---|---|---|---|---|
| Estimation | OLS | OLS | OLS | 2SLS | 2SLS |
| | (1) | (2) | (3) | (4) | (5) |
| Income shock | 0.18*** (0.04) | | 0.13*** (0.04) | 0.27** (0.11) | 0.27** (0.11) |
| Financial literacy | 0.08* (0.04) | 0.01 (0.03) | 0.07 (0.04) | 0.07* (0.04) | 0.03 (0.05) |
| Financial assets | 0.07* (0.04) | − 0.02 (0.03) | 0.08* (0.04) | 0.08* (0.04) | 0.02 (0.05) |
| Precaution | − 0.06 (0.04) | | | | |
| Temporary | 0.06 (0.06) | | | | |
| Red zone | − 0.07 (0.06) | | | | |
| New subsidy | | − 0.42*** (0.03) | − 0.05 (0.05) | | |
| Difficulty to make ends meet in 2019 | | − 0.12*** (0.03) | − 0.06 (0.04) | | |
| Fin. literacy × Fin. assets | | | | | 0.15* (0.09) |
| *Socio-demographic controls* | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hansen J statistic | | | | 0.82 [0.36] | 0.86 [0.35] |
| Olea Montiel-Pflueger effective F statistic | | | | 105.11 | 104.50 |
| Critical value (2SLS) | | | | 10.28 | 10.06 |
| Critical value (LIML) | | | | 22.47 | 22.36 |
| F statistic | | | | | 8.08 [0.04] |
| R squared | 0.05 | 0.18 | 0.05 | | |
| Observations | 4027 | 4027 | 4027 | 4027 | 4027 |

The table reports OLS estimates in columns from 1 to 3, and 2SLS estimates in columns 4 and 5. The Hansen J statistic tests for overidentifying restrictions under the null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation (Chi-square p-value in square brackets). The Olea Montiel-Pflueger effective F statistic tests the null hypothesis that the 2SLS and the LIML Nagar biases (Nagar 1959) exceeds 10% of the OLS bias under the assumption of conditional homoscedasticity and no serial correlation. The F statistic tests for the joint significance of financial literacy, financial assets, and their interaction (prob > F in square brackets). All specifications use sample weights and include the control variables listed in Table 6 and a constant (not reported). Standard errors are in parentheses. Significant at * 10%, ** 5%, *** 1%

variable we use to detect the direction of income shocks, which in principle can introduce measurement errors and possible spurious correlation with the equally rough indicator of consumption reactions.

During the Covid-19 pandemic risks were also shared through public policy measures: governments in Italy and elsewhere subsidized firms, maintained employment during lockdowns, and paid extraordinary public subsidies or granted tax holidays to individuals.[3] From the 2020 wave of the survey we know the percentage of households including at least one member who received for the first-time temporary redundancy subsidies (16%), unemployment benefits (2.5%), and basic income granted based on strict eligibility criteria and introduced in March 2019 (2%). Using information about ex-post compensation by the government, which was more likely to be paid if negative income shocks were large in absolute value, we construct a "new subsidy" variable that takes value one for these households, and zero otherwise, and we can start isolating the relevant portion of income-shock variation.

The size of income shocks was also plausibly related to income levels before the outburst of the pandemic, for which the data do not provide a continuous measure. Thus, we use information on the degree to which income suffices for monthly expenses before the outburst of the Covid-19 pandemic. Households who found it difficult to make ends meet before the pandemic, maybe because they were working in low-wage service industries, are likely to have experienced severely negative income shocks when the pandemic hit. The variable "difficulty to make ends meet in 2019" takes value $+1$ if the income of the family covered expenses until the end of the month with great difficulty or difficulty, zero if it did with some difficulty or fairly easily, $-1$ if it did easily or very easily.

In column 2 of Table 7, the income shock was more likely to be negative for households that became subsidy recipients during the emergency, indicating that the subsidies only partly offset their large market income declines, and for households that previously found it hard to make ends meet. Because these variables are associated with the income shock variable, this regression is a possible first stage for two-stage least squares regressions where the income shock we measure may be correlated with the shocks in the error term. For these variables to be valid instruments, they should not be correlated with consumption changes only through income changes, and not directly. This identifying restriction is not easy to test, but it is comforting to see, in column 3, that the instrumental variable candidates are insignificant when included as explanatory variables for consumption change alongside the income-dummy.

In column 4, the instrumented income shock variable does attract a larger and more significant coefficient than in the OLS regressions of previous tables, suggesting that measurement issues are relevant and may be, at least partially, addressed by the instrumental variables. Consumption reactions depend on income shocks, financial literacy, and financial assets, as in previous models. The Hansen J statistic indicates that we cannot reject the null hypothesis that the instruments are valid, and the test

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[3] The scope of debt-financed redistribution was unprecedented: Covid-related additional spending and tax reductions in 2020 and 2021 amounted to about 16% of 2020 GDP on average in advanced economies, 25% in the US, and 10% in Italy (see the IMF Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic, available online at https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19 for definitions and details).

developed by Montiel Olea and Pflueger (2013) rejects the null hypothesis of weak instruments, as the large values of their effective F test statistic exceed both the two-stage least squares (2SLS) and the limited information maximum likelihood (LIML) 5% critical values.[4]

Finally, in column 5, instead of using a linear combination of the main effects of financial literacy and financial assets, we also consider their interaction, introducing a different functional form for the consumption-smoothing implications of financial competence and financial asset. The interaction term attracts a positive and significant coefficient, indicating that financial assets helped reduce consumption fluctuations for households who are financially literate. The p-value of each coefficient is equal to 0.53 for financial literacy, 0.61 for financial assets, and 0.09 for their interaction, indicating that the interaction term absorbs much of the significance of the main effects, which have the same sign and size as in previous tables but are less precisely estimated. The F statistics at the bottom of the table tests the joint significance of the three coefficients and rejects the hypothesis that the coefficients are zero at the 4% level.[5]

## 6 Concluding Remarks

The Covid-19 pandemic resulted in an unexpected aggregate shock and was associated with severe economic implications at the aggregate, individual and sectoral level (Ahmat et al. 2021). Even the smartest financial economist would not have hedged against a similar "black swan" unprecedented event. In this study, we document that competent access to financial markets smoothed household-level consumption in the face of the idiosyncratic component of the income shocks that families experienced during the first phase of the pandemic.

Information on financial literacy and resilience of Italian households indicate that financial markets quite sensibly turn out to have worked better for financially literate households: not only previous financial choices and economic conditions, but also financial literacy appears to have smoothed the negative consumption impact of the Covid-19 pandemic in Italy.

This result is robust across a variety of empirical specifications and contributes to the vast strand of studies providing evidence on the beneficial effect of financial education not only in terms of better saving and investment choices, but in terms of the resulting better consumption-risk sharing. Improving financial competence can ameliorate the welfare implications of negative aggregate shocks. For households that have become increasingly responsible for personal financial decisions and operate on financial markets that are more inclusive but also increasingly complex, financial literacy is needed to prevent poor choices. The Covid-19 pandemic hit harder less-advantaged groups, and arguably further strengthened the need for financial literacy (Fornero et al. 2021).

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[4] These statistics can only imperfectly test the relevance and exogeneity of the instruments and must be interpreted cautiously for the reasons discussed in Parente and Santos Silva (2012).

[5] In all regressions of the previous tables the interaction between financial literacy and financial assets attracts a positive coefficient that is jointly significant with the main effects of financial literacy and financial assets. We report it only in this specification, where it is individually significant.

# Data Appendix

## A. Description of the variables

See Table 8.

**Table 8** Variable description

| Variable name | Measurement | Survey wave |
| --- | --- | --- |
| Consumption reaction | Categorical variable, value + 1 if food consumption increased since the start of the Covid-19 emergency with respect to its usual level, zero if it remained stable, -1 if it decreased | 2020 |
| Income shock | Categorical variable that takes value + 1 if income increased in 2020 since the start of the Covid-19 emergency, zero if it did not change, -1 if it decreased | 2020 |
| Financial literacy | Dummy variable equal to one if the respondent answers correctly to the "big three" in 2020 and 2021, zero otherwise | 2020, 2021 |
| Financial literacy in 2020 | Dummy variable equal to one if the respondent answers correctly to the "big three" in 2020, zero otherwise | 2020 |
| Number of correct answers in 2020 | Count variable indicating the number of correct answers to the "big three" in 2020, zero otherwise | 2020 |
| Number of correct answers in 2020 and 2021 | Count variable indicating the number of correct answers to the "big three" in 2020 and 2021, zero otherwise | 2020, 2021 |
| Financial literacy in 2020 (plus compounding) | Dummy variable equal to one if the respondent answers correctly to the "big three" plus a question on interest compounding in 2020, zero otherwise | 2020 |
| Financial literacy in 2020 and 2021 (plus compounding) | Dummy variable equal to one if the respondent answers correctly to the "big three" plus a question on interest compounding in 2020 and 2021, zero otherwise | 2020, 2021 |
| Financial assets | Dummy variable equal to one if the respondent owns one or more of pension funds, insurance policies, stocks and bonds, cryptos in 2019, zero otherwise | 2021 |
| Pension funds | Dummy variable equal to one if the respondent owns pension funds in 2019, zero otherwise | 2021 |

**Table 8** (continued)

| Variable name | Measurement | Survey wave |
|---|---|---|
| Insurance policies | Dummy variable equal to one if the respondent owns insurance policies in 2019, zero otherwise | 2021 |
| Stocks and bonds | Dummy variable equal to one if the respondent owns stocks and bonds in 2019, zero otherwise | 2021 |
| Cryptos | Dummy variable equal to one if the respondent owns cryptos in 2019, zero otherwise | 2021 |
| Age 18–34 | Dummy variable equal to one if the respondent ages between 18 and 34 years, zero otherwise | 2020 |
| Age 35–44 | Dummy variable equal to one if the respondent ages between 35 and 44 years, zero otherwise | 2020 |
| Age 45–64 | Dummy variable equal to one if the respondent ages between 45 and 64 years, zero otherwise | 2020 |
| College Degree | Dummy variable equal to one if the respondent holds a college degree, zero otherwise | 2020 |
| Post-graduate Degree | Dummy variable equal to one if the respondent holds a post-graduate degree, zero otherwise | 2020 |
| Female | Dummy variable equal to one if the gender of the respondent is female, zero if the respondent is male | 2020 |
| Self-employed | Dummy variable equal to one if respondent is self-employed, zero otherwise | 2020 |
| Blue collar | Dummy variable equal to one if the respondent is a blue-collar, zero otherwise | 2020 |
| Retired | Dummy variable equal to one if the respondent is retired, zero otherwise | 2020 |
| Other | Dummy variable equal to one if the respondent is a student or a housewife, zero otherwise | 2020 |
| Unemployed | Dummy variable equal to one if the respondent is unemployed, zero otherwise | 2020 |
| Income level (in thousand euro) | Midpoint of the range of net monthly household income, in April 2020, chosen out of 15 ranges. For the 1st range the midpoint is set to 439 euros, for the 15th range to 4.500 euros | 2020 |

**Table 8** (continued)

| Variable name | Measurement | Survey wave |
|---|---|---|
| Minors | Dummy variable equal to one if there is at least one minor in the household, zero otherwise | 2020 |
| North-East | Dummy variable equal to one if the household resides in the North-East, zero otherwise | 2020 |
| Centre | Dummy variable equal to one if the household resides in the Centre, zero otherwise | 2020 |
| South | Dummy variable equal to one if the household resides in the South, zero otherwise | 2020 |
| Islands | Dummy variable equal to one if the household resides in the Islands, zero otherwise | 2020 |
| Precaution | Dummy variable equal to one if the household had positive savings in 2020 and no savings or negative savings in 2019, zero otherwise | 2020 |
| Temporary | Dummy variable equal to one if those who declared to have experienced an income decline since the start of the pandemic believed it would have lasted one year or below, zero otherwise | 2020 |
| Red zone | Dummy variable equal to one for provinces where in March 2020 the population was forced to stay at home more strictly than in other areas, zero otherwise | 2020 |
| New subsidy | Dummy variable equal to one if at least one member of the household who was not benefiting from public policies before the outburst of the Covid-19 pandemic was receiving redundancy payments, unemployment benefits, or basic income in 2020, zero otherwise | 2020 |
| Difficulty to make ends meet in 2019 | Categorical variable that takes value $+1$ if the income of the family covered expenses until the end of the month with great difficulty or difficulty, zero if it did with some difficulty or fairly easily, $-1$ if it did easily or very easily | 2020 |

## B. Translated text of survey questions and answers

*Consumption reaction* "Since the start of COVID emergency, how your family food consumption expenditure changed with respect to its usual level?" (a) increased a lot (b) increased (c) remained stable (d) decreased (e) decreased a lot

    *Income shock* "Think about all the sources of income your family has (labor, rental, capital income, etc.). Since the start of COVID emergency, your family income has:" (a) increased (b) remained stable (c) decreased

    *Understanding of interest rate* "Suppose you had €100 in a savings account that pays an interest rate of 2% per year and has no charges. After 5 years, how much do you think you would have in the account if you left the money to grow?" (a) more than €102 (b) exactly €102 (c) less than €102 (d) I do not know

    *Understanding of inflation* "Suppose you had €100 in a savings account that pays an interest rate of 1% per year and has no charges. Imagine that the inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?" (a) more than today (b) exactly the same (c) less than today (d) I do not know

    *Understanding of risk diversification* "Do you think that the following statement is true or false? 'Investing €1000 in stocks of a single company usually is less risky than investing €1000 in stocks of 10 different companies.'" (a) true (b) false (c) I do not know

    *Precaution* "Think about all the sources of income your family has (labor, rental, capital income, etc.). Before/Since the start of COVID emergency, can you tell me if your family" (a) has spent less than its income, making some savings (b) has spent all its income, without being able to save (c) has spent more than its income, and had to dissave or get into debt

    *Temporary* "[If you answered (a) or (b) to the previous question] do you think the income variation will:" (a) last long (b) last some years (c) last at least one year (d) last some months (e) I do not know

    *New subsidy* "One or more family members before the Covid emergency was/currently is a recipient of" (a) redundancy payments (b) unemployment benefits (c) severance pay (d) basic income (e) money from relatives or friends (f) scholarships or alimony payments g) rents, interest on assets, etc.

    *Difficulty to make ends meet* "Does the income of your family cover expenses until the end of the month?" (a) with great difficulty (b) with difficulty (c) with some difficulty (d) fairly easily (e) easily (f) very easily

## Declarations

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