ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

ARCHIVIO ISTITUZIONALE
DELLA RICERCA

Alma Mater Studiorum Università di Bologna
Archivio istituzionale della ricerca

Adult financial literacy and households' financial assets: the role of bank information policies

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

*Published Version:*
Fort, M., Manaresi, F., Trucchi, S. (2016). Adult financial literacy and households' financial assets: the role of bank information policies. ECONOMIC POLICY, 31(88), 743-782 [10.1093/epolic/eiw012].

*Availability:*
This version is available at: https://hdl.handle.net/11585/572065 since: 2021-03-01

*Published:*
DOI: http://doi.org/10.1093/epolic/eiw012

*Terms of use:*

Some rights reserved. The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (https://cris.unibo.it/).
When citing, please refer to the published version.

(Article begins on next page)

12 October 2024

This is a pre-copyedited, author-produced version of an article accepted for publication in *Economic Policy* following peer review.

Fort, M. Manaresi, F. and Trucchi, S. (2016) "Adult financial literacy and households' financial assets: the role of bank information policies" Economic Policy, 31, pp. 743 – 782.

The version of record (i.e. the final published version of the article) is available online at: https://doi.org/10.1093/epolic/eiw012

This item was downloaded from IRIS Università di Bologna (https://cris.unibo.it/)

Rights / License:
The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

# Adult Financial Literacy and Households' Financial Assets: The Role of Bank Information Policies

Margherita Fort* Francesco Manaresi† Serena Trucchi‡

August 26, 2016

**Abstract**

We investigate the role of bank information policies in fostering the accumulation of financial knowledge. Exploiting the exogenous variability induced by the presence of a consortium of banks in Italy (*PattiChiari*), we find that these policies are effective for a small subsample of the population (5-10%) and lead to an increase in financial literacy by about 10%, on average. Compliance is highest among low-educated respondents older than 60 years. We use these policies as an instrumental variable to estimate the effect of financial literacy on financial assets. We find that one standard deviation increase in financial literacy determines an increase in household financial assets by 35% of a standard deviation (8,000 euros). Effects are heterogeneous in the population and highest among elderly low-educated households.

*Key words*: Bank Information Policies; Financial Assets; Financial Literacy; Instrumental Variables.

*JEL*: D14; G11.

*Università di Bologna, CESifo and IZA. Email address: margherita.fort@unibo.it

†Banca d'Italia. Email address: francesco.manaresi@bancaditalia.it.

‡University College London. Email address: s.trucchi@ucl.ac.uk

# 1 Introduction

Both in Europe and in the US, there is evidence of low levels of financial literacy and a limited knowledge of basic economic concepts, like inflation or interest compounding (Jappelli, 2010; Lusardi and Mitchell, 2011c, 2014). Lack of financial literacy and the misperception of crucial economic factors may lead individuals to make suboptimal investment choices and, thus, reduce individual wealth and welfare. For this reason, actions to promote financial literacy in the population have been implemented in a growing number of countries (see OECD (2013a) for a review). These interventions mainly rely on the role of formal, financial education in schools or at the work place.[1]

In this paper we study a different channel that may improve financial literacy, which has been almost neglected by the literature: bank information policies. To assess their effectiveness, we exploit a peculiar feature of the Italian banking system, namely, the existence of a consortium of banks, *PattiChiari*, which has the aim of enhancing banking transparency. Banks that entered the *PattiChiari* Consortium had to provide to their customers information materials on basic economic concepts (e.g., about compound interests, fixed/flexible interest rates, the calculation of debt repayment instalments, etc.) and more transparent information on current account expenditures. These activities are in line with the OECD (2013b) suggestions for improving the effectiveness of financial literacy programmes, as the informative material was provided on a regular basis in a format and location that are easy to access (i.e., on the internet and/or at the local bank branch). We argue that these information policies reduce the cost of acquiring (basic) financial knowledge for customers without imposing any additional burden in terms of time, effort or resources to them. We investigate to what extent information policies improve financial literacy. Evidence on absence of self-selection of clients into *PattiChiari* banks allows us to overcome one of the main issues in the evaluation of voluntary financial education programmes (OECD, 2013a) and to interpret our findings as causal.

Our results suggest that bank information policies significantly affect the level of financial literacy for a small sub-sample of the population (5-10%), being particularly effective on households whose head is 60+ and low educated. The level of financial literacy is 10% higher, on average, among *PattiChiari* clients than among non-*PattiChiari* clients, and this effect corresponds to about one-

[1] There is an open debate about the effectiveness of alternative financial education programmes on financial literacy and financial behaviour (Lusardi and Mitchell, 2014; Willis, 2011). Robust and reliable empirical evidence on the evaluation of their effects is still limited, and this motivates some skepticism on the role played by financial education in improving financial knowledge and household financial welfare (Willis, 2011).

fourth of a standard deviation of our measure of financial literacy. This result adds to the literature aimed at evaluating the effectiveness of alternative interventions on financial literacy (Fernandes et al., 2014; Lusardi and Mitchell, 2014). Even though information policies may represent an alternative way to improve financial knowledge, the limited number of people affected suggests that they should be targeted towards individuals in this subsample: the low-educated elderly. Since the positive impact of financial knowledge on financial assets turns out to be the highest in this subsample, a targeted intervention might also be effective in increasing financial wealth, as we discuss in the conclusions.

A second contribution of this paper is to provide a new instrumental-variable strategy to assess the effect of financial literacy on financial assets, which exploits bank information policies for identification. Even if the association between financial literacy and several economic decisions (risk diversification, debt exposure and retirement planning) has been widely documented, evidence about the strength of the causal relationship between these factors is recent and still limited. Most studies report that regression correlations provide a lower bound of the true effect, but estimates of this bias vary substantially. Unobserved heterogeneity, simultaneity (Jappelli and Padula, 2013b) and measurement error (van Rooij et al., 2011) plague empirical results and are difficult to address. In line with previous analyses, we show that the causal effect of financial literacy on financial assets is underestimated by OLS correlation. We find that a one standard deviation increase in financial literacy leads to an increase of household financial assets of around 8,000 euros (35% of a standard deviation in financial assets). The effect of financial knowledge on financial assets is mainly driven by households whose head is 60+ and low-educated. Moreover, the OLS bias turns out to be the largest in this subsample, for which measurement error in financial literacy is likely to be larger. We offer some insights about the channels through which this effect takes place, showing that households with higher financial literacy are more prone to participate in the stock market (Christelis et al., 2010; van Rooij et al., 2011, 2012) and, possibly, to hold a more-diversified portfolio. Conversely, we do not find evidence of a stronger attitude to plan for retirement (Lusardi and Mitchell, 2011a) or of a higher saving rate. Lack of adequate data prevents us from examining the effect of financial literacy on the quality of financial decisions.

We refer to financial literacy as a broad concept that concerns basic economic notions of which individuals should have some understanding when making even simple, day-to-day financial decisions and which helps them to evaluate future scenarios (Lusardi and Mitchell, 2007b). To measure

financial literacy, we follow previous literature (see, for instance, Fornero and Monticone (2011) and Lusardi and Mitchell (2007a)), and we rely on simple questions that have the characteristics pointed out by Lusardi and Mitchell (2011c), i.e., simplicity, relevance, brevity and capacity to differentiate. We show our indicator to capture one latent construct, which is labelled financial literacy.

The strategy used in this paper hinges on two main assumptions: the absence of self-selection of, respectively, individuals as clients of a *PattiChiari* bank and banks into the *PattiChiari* Consortium. We extensively discuss them in the paper. Results are robust to a number of falsification checks regarding potential sorting of customers or banks. Moreover, first-stage statistics show that the instrumental variable we use is not weak (Staiger and Stock, 1997).

The paper is organized as follows. We start by reviewing the related literature, mainly focusing on empirical contributions (Section 2). We then describe the main features of the *PattiChiari* Consortium and services provided by banks in the Consortium to their clients, highlighting the channels through which these services may foster financial literacy (Section 3). We present the data used to perform our analysis in Section 4. Section 5 illustrates our empirical approach and discusses the hypothesis at the core of the identification strategy. We present our main findings in Section 6, and we analyse the channels driving the estimated effects and their heterogeneity along household characteristics in Section 7. In Section 8, we provide evidence that estimated effects are not driven by self-selection of clients into *PattiChiari* banks, while in Section 9, we show that selection of banks into the Consortium does not explain our results either. For the sake of brevity, we report additional robustness checks only in an online Appendix. Section 10 discusses policy implications and concludes.

## 2 Related Literature

Our paper relates to the literature that analyses interventions aimed at fostering financial literacy. In two recent reviews, Lusardi and Mitchell (2014) and Hastings et al. (2013) point out the shortage of rigorous evaluations of the effectiveness of financial education programmes. Selective participation into programmes, non-random attrition and measurement issues related to financial literacy and financial behaviour undermine identification of causal effect of financial literacy programmes.

Recent papers that tackle these issues provide mixed results about the impact of financial education programmes on financial knowledge and behaviours. The meta-analysis in Fernandes et al.

(2014) documents a weak effect of interventions on the improvement of financial literacy. On the contrary, Luehrmann et al. (2015) and Bruhn et al. (2013) show high school education programmes to affect both financial literacy and saving behaviour. In a different context, Gibson and Zia (2012) study how financial literacy training turns out to increase financial knowledge and information-seeking behaviour of migrants, reducing the use of more expensive remittance products. Cole et al. (2011) find financial education to increase financial literacy in developing countries (India and Indonesia), with small and heterogeneous effects on economic behaviour (namely the probability of opening a bank account). Similarly, information on social security benefits in the US improve workers' knowledge without significantly affecting their financial decisions (Mastrobuoni, 2011). With respect to these studies, we show that bank information policies shape both financial literacy and financial assets, albeit, they are effective on a small subsample of the population.

From a different perspective, literature in economics and behavioural finance suggests that the difficulty of processing complex information may hamper financial decision making and that the latter can be improved by providing decision makers with better quality information (Altman, 2012; Garcia, 2013). According to OECD guidelines (OECD, 2013a), effective financial education programs should: (i) offer material in formats and locations that are *easy to access*; (ii) help consumers to *simplify financial decisions*, for instance, breaking them into intermediate steps or providing *rules-of-thumb* or problem-solving strategies; (iii) increase saliency by providing participants with *regular reminders* or tools to track and visualize individual progress. The bank information policies we consider in the paper are in line with these suggestions.

Our paper also relates to the literature that investigates the causal effect of financial literacy on financial outcomes. Jappelli and Padula (2013b) and Lusardi et al. (2011) provide a theoretical framework to analyse the investment in financial literacy and its impact on wealth in the context of inter-temporal utility maximization. These models highlight that financial literacy and wealth are simultaneously determined and that the incentives to invest in financial literacy may depend on the level of wealth, raising the potential endogeneity issue of financial literacy in the wealth equation.[2] Recent papers tackle this endogeneity problem, pursuing instrumental variable strategies for identification. Finding an exogenous source of variability in this setting is difficult and most of the identification strategies adopted in observational studies so far are not free from criticism (see

[2]Lusardi and Mitchell (2011a) show that the instrumental variable estimate of the impact of wealth on financial literacy is not statistically significant. They interpret this finding to support the absence of reverse causality in their data.

Lusardi and Mitchell, 2014, for a detailed discussion of the instruments proposed in the literature). These papers can be grouped into three broad categories. A first group of papers exploits as instruments pre-labour market endowment of financial knowledge (Disney and Gathergood, 2011; Jappelli and Padula, 2013b; van Rooij et al., 2012). However, van Rooij et al. (2012) are skeptical about the validity of the exclusion restriction for the instrumental variable they use, and they discuss the issue at length in the paper, adding a rich set of controls to their baseline specification. Other studies hinge on the idea that the respondent's financial literacy is influenced by financial knowledge of peers or reference groups (Alessie et al., 2011; Bucher-Koenen and Lusardi, 2011; Fornero and Monticone, 2011; Jappelli and Padula, 2013a; Klapper et al., 2013; Klapper and Panos, 2011; van Rooij et al., 2012). The assumption that lies behind this identification strategy is that the respondent cannot influence the peers' experience significantly, i.e., there is no "reflection problem" (Manski, 1993). An alternative instrumental variable strategy is proposed by Lusardi and Mitchell (2011b). They take advantage of the fact that several US states mandated high school financial education in the past and exploit the exogenous variation in financial literacy induced by the exposure to the mandate to identify the effect of financial literacy.

Our paper does not belong to any of these categories and proposes a new strategy to identify the causal effect of financial literacy on household wealth that exploits, for the first time, the role of bank information policies in fostering household financial knowledge. Starting from the assumption that acquiring financial knowledge is a costly process (Jappelli and Padula, 2013b), we argue that bank information policies, undertaken by a specific subset of Italian banks, may decrease the cost of acquiring financial literacy without imposing additional burden to the client in terms of time, effort or resources. We exploit this exogenous source of variation in the cost of acquiring financial knowledge to investigate the effect of financial literacy on financial assets. As pointed out by Lusardi and Mitchell (2014), most studies find that the OLS estimate of the impact of financial literacy is biased downward, but the estimates differ a lot across papers, and the magnitude of the bias varies largely in the literature. The instrumental variable estimates range from three times larger than the corresponding OLS estimates (Jappelli and Padula, 2013b; van Rooij et al., 2012) to thirteen times larger than OLS (Bucher-Koenen and Lusardi, 2011). Our findings confirm the downward bias of the OLS estimate, showing that the causal effect is four times larger.

Financial literacy affects financial assets through different channels (Lusardi and Mitchell, 2007a). Whatever is the most relevant channel, all point towards financial literacy being positively

correlated with financial assets. First, it shapes portfolio management by improving the understanding of the risk associated with different assets, fostering stock market participation (Christelis et al., 2010; van Rooij et al., 2011, 2012) and increasing returns yielded by a specific financial product (as shown by Deuflhard et al., 2015, for saving accounts). Moreover, financial literacy may reduce underestimation of compounding effects (Jappelli and Padula, 2013b). Finally, as a result of increased financial knowledge, individuals may make more-accurate or less-biased predictions and improve their understanding of pension and tax schemes, thus reflecting a better ability to make optimal choices.[3]

Guiso and Viviano (2015) investigate whether financial literacy affects the *quality* of choices, namely the ability to dismiss a dominated alternative. Financial knowledge turns out to increase the ability to avoid financial mistakes and to make autonomous decisions about portfolio management, albeit, the estimated effect is small. Even though we lack adequate data to make a similar assessment, evidence that literate individuals hold more diversified portfolios is consistent with *better* portfolio management. Our evidence is, however, only suggestive.

# 3 The *PattiChiari* Consortium

The *PattiChiari* Consortium was created in 2003 by a group of banks, with the support of the Italian Banking Association (Associazione Bancaria Italiana: ABI, henceforth). By 2010, 98 banks were members of it, corresponding to around 64% of all bank branches in the Italian territory. All except one of the 70 banks we consider in the paper (see Section 9 for more details) joined the consortium in 2003; one (*Cassa di risparmio della provincia di Chieti*) joined in 2004. In some regions (Trentino-Alto Adige and Calabria) there are few *PattiChiari* branches, while in other regions (Piedmont and Sardinia) more than 80% of branches belong to a *PattiChiari* bank. The share of *PattiChiari* branches is, however, homogeneous across broader geographical areas: about 63% in northern Italy, 67% in central Italy and 64% in southern Italy.

The Consortium develops actions aimed at fostering bank transparency and improving financial literacy among citizens.[4] A bank that joins the Consortium has to introduce a set of "Quality

[3] A better ability to understand current (less-generous, defined contribution) pension rules and to anticipate a reduction in the value of social security wealth may increase savings necessary to sustain an adequate level of consumption during retirement (Lusardi and Mitchell, 2007a).

[4] It has implemented a set of formal financial literacy programmes in Italian schools and, starting from 2012, in workplaces and cultural and charitable associations.

Commitments" (so called "Impegni per la qualità"). They are aimed at improving transparency in the relation between bank and clients and, thus, do not have any goal of advertising specific financial products or promoting any specific behaviour, economic choice or investment in any asset. In the period we analyse (year 2010), these commitments refer to information about mortgage and debt and to comparability of current accounts. In what follows, we present these two commitments in detail.

**Information about mortgage and debt.** Every month *PattiChiari* banks send by mail a mortgage statement to their clients. This statement includes information on total and residual amounts of debt, interest rates, the residual number of instalments and reminder information about penalties. In addition, a 24-page booklet is available in each *PattiChiari* branch. The booklet covers several topics related to mortgages and provides definitions of more-general economic concepts.[5] It includes examples about the calculation of interest rates and instalments and provides several remarks.[6] An example of its content is the following remark (our translation from Italian): "WARNING: With a lower mortgage payment the duration of the mortgage increases. Therefore, the total amount of interest paid on the mortgage will be higher, because the number of instalments increases".

**Comparability of current accounts.** Costs, interest rates and general contract conditions of bank accounts vary both across and within banks. For instance, one bank may offer up to 12 different bank accounts tailored to a specific type of customer (e.g., household, retired, younger than 18). The *PattiChiari* Consortium provides a search engine that allows the direct comparison of specific characteristics of bank accounts across different banks, as well as the information on the location of bank branches. Thanks to the provision of detailed information on interest rates, we expect households to become more aware about how current accounts work and more accustomed to concepts like interest rate compounding.

The "Quality Commitments" described above are in line with the OECD suggestions to improve the effectiveness of education programmes (OECD, 2013b). Indeed, they provide informative ma-

[5] More specifically, it refers to mortgage portability, substitution or renegotiation, mortgage resolution and redemption. It gives a definition for amortization plan, mortgage resolution, Euribor (Euro Interbank Offered Rate), IRS (Interest Rate Swap), Eurirs (Euro Interest Rate Swap), fixed-rate, adjustable-rate and mixed-rate mortgages, TAEG (synthetic indicator of the cost of the mortgage), portability, instalment, spread, renegotiation and subrogation.

[6] A copy of the booklet, available in Italian only, can be downloaded from the URL https://web.archive.org/web/20111030200724/http://www.pattichiari.it/dotAsset/12557.pdf

terial on a regular basis (costumers receive the mortgage statement every month) in format and locations that are easy to access (mail, bank branch and websites). These interventions are designed to simplify costumers' decision problems, providing definitions and synthesis of *basic* and *simple* information about relevant economic concepts, such as amortization plans and interest-rate compounding, sometimes through examples. These concepts are closely related to the standard questions used to measure financial literacy in the literature and in our paper (see Appendix A in the online Appendix for the exact wording of the questions used to measure financial literacy). "Quality Commitments" are not directly related to the provision of formal financial advice and do not typically take this form. However, they can indirectly impact the probability of consulting an advisor and delegating the portfolio-choice management if it depends on financial literacy (Calcagno and Monticone, 2015).

**Why Do Banks Join the *PattiChiari* Consortium?** Application to the *PattiChiari* Consortium is decided at the bank level, and it involves all the branches in the Italian territory. Any bank can apply to be a member of the Consortium, provided that it undertakes the "Quality Commitments". The *PattiChiari* board of directors evaluates applications. If a member bank does not meet the requirements, it can be fined and excluded from the Consortium.[7] The Consortium, based in Rome at the ABI's headquarters, develops projects that are implemented by each *PattiChiari* bank.

There is no fee for entering the Consortium, yet the bank has to incur administrative costs in order to comply with the "Quality Commitments". Menu costs make the commitment regarding the comparability between current accounts the most demanding task for member banks. In particular, significant menu costs have to be incurred in order to adjust the offer of bank accounts to the standards (allowing their comparability across banks). High entry costs may partly explain the large share of *PattiChiari* partners among large banks (see Section 9). Concerning the advantages of entering the *PattiChiari* Consortium, banks improve the quality of supplied services and customer satisfaction and, in turn, benefit from advertising provided by the Consortium.[8] Descriptive statis-

[7] After considering all mergers and acquisitions among banks over the relevant period, we find that only 1.5% of households in our baseline sample remained with a bank that changed affiliation with the *PattiChiari* Consortium. In all these cases, these banks exited the Consortium after belonging to it for a period between 6 months and 5 years.

[8] Informative advertising can benefit both the firm that makes the investment (in our application a bank belonging to the *PattiChiari* Consortium) and its competitors, through an increase in savings, stock market participation and the demand for financial services in general (Hastings et al., 2013). Free-riding problems may induce under-provision of informative advertising. In our case, however, the fact that over 60% of all bank branches belong to the Consortium,

tics of bank characteristics, and their heterogeneity between *PattiChiari* banks and non-*PattiChiari* banks are discussed in Section 9.

# 4 Data

The empirical analysis is based on the Bank of Italy's Survey on Household Income and Wealth (SHIW), a biannual survey that collects detailed information on household income, savings and portfolios from a nationally representative sample of Italian households.

Households' financial assets are defined as the sum of deposits, securities and commercial credits at the end of the reference year (2010 for the baseline analysis).[9] Several covariates (age, gender, education) refer to the household head, defined as the household member who is responsible for economic and financial decision. We observe financial literacy of the household head only. Our baseline empirical analysis is based on the 2010 wave, because it includes both questions about the reasons for choosing the bank (available only in this year) and questions to measure financial literacy. In Section B.3 of the online Appendix (table B.4), we check the validity of the results in a larger sample that also includes 2006 and 2008 waves: results are fully consistent.

The set of questions on financial literacy is included since 2006 varies slightly across waves. In the 2010 wave, respondents are asked three questions related to portfolio diversification, the risk associated to fixed or adjustable interest rate and the effect of inflation.[10] Questions about diversification and inflation are similar to the ones devised for the US Health and Retirement Study (HRS henceforth) (Lusardi and Mitchell, 2011a), while knowledge of mortgage-repayment mechanisms is not considered in the HRS. All these questions follow the principles of simplicity, relevance, brevity and capacity to differentiate identified by Lusardi and Mitchell (2011c). Table 1 shows that in 2010 almost three out of four respondents answered correctly to the question on inflation; the percentage of correct answers to the question on mortgages and portfolio diversification is, respectively, 64% and 55%. On average, respondents answered correctly to fewer than two questions, and one respon-

according to ABI data, should mitigate the incentive to free-ride.

[9] More precisely, assets include, along with bank accounts, Italian government securities, bonds and Italian investment funds, Italian shares and equities, managed portfolios, foreign securities and a residual category. Commercial credits include (i) credits of the household's members with relatives or friends not living with the household and (ii) trade credits to costumers of respondents who are self-employed, members of a profession, individual entrepreneurs or employed in a family business.

[10] See Section A in the online Appendix for the exact wording of the questions and details on differences across waves.

dent out of three correctly answered all questions. We measure financial literacy with the number of questions correctly answered by the household head. We present evidence corroborating the assumption that our indicators measure just one latent construct, that we name financial literacy (as in van Rooij et al., 2011). In Section A in the online Appendix, we show that our baseline results are confirmed when we measure financial literacy with this latent construct instead of measuring it as the number of correct answers out of three questions as we do in the baseline regression in the paper. Moreover, our results are robust to the use of different measures of financial literacy (see Section 6).

We use information on the date of entrance and exit of each Italian banking group in the *PattiChiari* Consortium and the answers to questions about the banks used by the household to build an indicator of whether the household is a client of a bank that is part of the *PattiChiari* Consortium. Our baseline analysis focuses on households having at least one bank account. Households in the SHIW dataset report their "main" bank - as defined by the household head - and up to seven additional banks where they hold a current account. Answers can be chosen from a list of 87 financial institutions (encompassing more than 85% of total credit granted in Italy). If the bank is not listed among the possible answers, its name will be missing. For each household, we construct a dummy (*Patti*) that is equal to 1 if the main bank used by the respondent belongs to the Consortium at the beginning of 2010 and 0 if it does not; we exclude households who do not have any bank accounts or for which the name of the bank is missing. Descriptive statistics show 73% of respondents in our sample to be clients of a bank belonging to the *PattiChiari* Consortium (Table 1).

We include in the sample households whose head is aged 30 or above, because we want to exclude cases in which individuals may be still enrolled in full-time education (at the university) and thus not financially independent from the family of origin. After excluding from our sample outliers and respondents who do not report the reason for choosing the bank, the final sample size in our baseline regression (2010 wave data) is 4,865 observations (descriptive statistics are shown in Table 1).[11] For some complementary analysis, we merge this data with data from the 2002 SHIW wave: due to the rotating panel of the survey, only 1,027 households were interviewed in 2002 and 2010. Notably, no measure of financial literacy is available in the 2002 SHIW wave.

We collect information on bank branches active in Italy in 2010 from the SIOTEC database.

[11] We exclude the upper and lower 5% tail of the financial-assets distribution. Results are similar with 1% trimming. There are tied values, and we discuss this point in more detail in Section B.5 in the online Appendix.

This database, administered by the Bank of Italy, is based on compulsory information provided by each branch to the Supervisory Agency. The only financial institution excluded by SIOTEC is BancoPosta (the financial arm of the Italian post office), for which we obtained the number of branches from the notes to its 2010 balance-sheet.[12]

We use data from a nationally representative sample of *bank accounts* (the Survey on Bank Fees and Expenditures, SBFE hereafter) to check that the fees and costs charged by *PattiChiari* and non-*PattiChiari* banks are on average similar. This dataset, administered by the Bank of Italy's Banking and Financial Supervision Area, is currently the most comprehensive source of information on bank costs in Italy, and it collects information on fixed bank-account costs, debit/credit card fees, costs of bank transfers and withdrawals. We use the 2010 wave, and we rely on data on 6,717 current accounts surveyed in SBFE and belonging to banks present in the SHIW dataset. Note that the SBFE samples household's *bank accounts* rather than banks, bank branches or customers. This is a sensible choice, because each bank may offer several types of accounts, with different costs. The data at hand suggest that SBFE might oversample accounts of *PattiChiari* banks.

# 5 Empirical Strategy

We examine the effect of financial literacy on financial assets by considering the model:

$$w_{ip} = \beta_0 + \beta_1 fl_{ip} + X_{ip}\beta_2 + \gamma_p + \varepsilon_{ip}. \tag{1}$$

where $fl_{ip}$ is financial literacy of the head of household $i$ living in province $p$ in 2010; $w_{ip}$ is household's financial assets in 2010; $X_{ip}$ is a vector of individual-level observable characteristics.[13] $\gamma_p$ is a province fixed-effect (province effects are denoted by $\delta_p$ or $\mu_p$ in equations (2) and (3), respectively). The parameter of interest is $\beta_1$, which captures the effect of financial literacy on financial assets. OLS estimates of $\beta_1$ in equation (1) may be biased because of: (i) individual unobserved

[12] We were able to retrieve information on total assets in 2010 for 70 out of the 87 bank names presented in the questionnaire from the Supervisory Register of the Bank of Italy. For the remaining 17 banks, it was not possible to recover such information because of different reasons. In 14 cases, banks included in the questionnaire did not have an autonomous balance-sheet: e.g., Unicredit Banca and Unicredit Private Banking share the same balance-sheet data in our data sources; the Banca Popolare di Intra was part of VenetoBanca. Finally, for 3 banks, neither the Supervisory Register nor other sources, such as Bankscope, reported any information for year 2010.

[13] In the baseline specification, controls include gender of the household head, a second-order polynomial in age, years of education of the household head, household current-labour income, household size, marital status and size of the municipality (3 categories: 20,000-40,000; 40,000-500,000; more than 500,000 inhabitants).

heterogeneity (i.e., ability, patience or preferences) correlated with both financial literacy and the value of financial assets; (ii) reverse causality; (iii) measurement error. In the first case, the sign of the bias is theoretically ambiguous and depends on the sign of the correlation between $fl_{ip}$ and $\varepsilon_{ip}$ in equation (1). The theoretical arguments in Jappelli and Padula (2013b) suggest that reverse causality should lead to an upward bias in the estimate of $\beta_1$, since individual wealth may affect the incentive to increase financial education, both through a change in the opportunity-cost of time and through a change in the relative benefit from knowing how financial tools work.[14] Finally, measurement error in financial literacy may be substantial, because respondents may guess the answer at random, or they may misunderstand the question.[15] In these cases, OLS estimate may be biased downward (Jappelli and Padula, 2013b). Overall, these remarks suggest that: (i) OLS estimates may be biased, and (ii) the sign of the bias cannot be assessed theoretically, since it depends on the relevance of each of the channels described above.

To address the endogeneity issue, we pursue an instrumental variable approach, using the indicator for being a client of a *PattiChiari* bank as an instrument for financial literacy.[16] More precisely, the following linear model represents the first-stage equation for financial literacy in equation (1):

$$fl_{ip} = \alpha_0 + \alpha_1 Patti_{ip} + X_{ip}\alpha_2 + \delta_p + \nu_{ip} \tag{2}$$

where $Patti_{ip}$ is a dummy equal to 1 if the household is a client of a bank belonging to the *PattiChiari* Consortium. The estimate of the $\alpha_1$ coefficient captures the impact of information policies implemented by the *PattiChiari* Consortium on customers financial literacy.

Similarly, to estimate the effect of bank information policies on financial assets, we consider the equation:

$$w_{ip} = \theta_0 + \theta_1 Patti_{ip} + X_{ip}\theta_2 + \mu_p + \xi_{ip} \tag{3}$$

[14] Lusardi and Mitchell (2011a), however, present empirical results that suggest that reverse causality is not a relevant issue in American data (HRS).

[15] Evidence from the U.S. (Lusardi and Mitchell, 2009) and the Netherlands (van Rooij et al., 2011) suggests that survey data on this issue are sensitive to how the question is worded.

[16] In principle, we might rely on the panel component of our dataset and include household fixed effects in equation (1). There are three arguments against this choice. First, financial assets and financial literacy are both highly stable over the short time span we consider (2006-2010) in this application. Second, respondents may learn, or at least receive a stimulus to acquire knowledge, from previous interviews: the variation in correct answers may capture a retest effect rather than increases in financial literacy. This would affect estimates delivered by a fixed-effect identification approach, while it does not drive our results, as we show in the online Appendix, Section B. Third, using the longitudinal panel would cut sample size by half because of attrition and survey design. Furthermore, in case of reverse causality or measurement error, coefficients in equation (1) are biased, also when including fixed effects.

where the parameter $\theta_1$ captures the effect of being a client of a bank in the *PattiChiari* Consortium on financial assets. We expect $\alpha_1$ and $\theta_1$ to be statistically significant and positive, and we argue that the variable $Patti_{ip}$ is exogenous in both equations. Provided that $Patti_{ip}$ is exogenous in equation (2) and (3), OLS estimates of these parameters are consistent and have a causal interpretation. Instrumental variable estimate of coefficient $\beta_1$ in equation (1) measures the causal effect of financial literacy on assets, since it rests on consistent estimation of $\alpha_1$ and $\theta_1$ with OLS and an exclusion restriction (Angrist et al., 1996).

Let us discuss the rationale behind our identification strategy. Investing in financial literacy is costly for individuals, and the investment decision is made comparing marginal cost and marginal benefit (Jappelli and Padula, 2013b), where the latter may depend on financial wealth $w$ and individuals' characteristics $X$. We argue that the "Quality Commitments" undertaken by a *PattiChiari* bank *lower* the cost of acquiring financial education without directly affecting the benefits related to additional financial literacy. Thus, other things being equal, we expect *PattiChiari* clients to accumulate more financial literacy and end up with a higher stock of it. For this interpretation to be valid, the following three assumptions must be fulfilled. First, net of information policies, banks belonging to the *PattiChiari* Consortium, may not differ from other banks with respect to characteristics that may directly affect household financial assets (such as costs and fees charged, credit rationing, mortgage policies, etc.). Second, individuals must not self-select as clients of a specific bank according to its information policy. In other words, the choice of the bank must not depend on variables that, conditional on province (or municipality) of residence, directly affect financial literacy or wealth. Third, banks must not join the Consortium in order to attract clients that are wealthier or more financially literate. All these assumptions should hold within province in a given year, because all our regressions include province fixed effects. These three assumptions are partly testable on the basis of the data at hand and deserve a careful discussion. We discuss client selection in Section 8, while we focus on differences in observable characteristics of banks in Section 9. The evidence presented supports the validity of the assumptions above and, thus, the causal interpretation of our estimates.

# 6 Findings

Table 2 shows estimate results of the baseline specification, which includes, along with household covariates and province fixed effects, controls for motivations for choosing the bank.[17] The association between financial literacy and financial assets is positive (column OLS). One standard deviation increase in financial literacy (i.e., one more correct answer) is associated with an increase in financial assets by more than 2,000 euros (approximately 11% of the average financial-assets holdings in our baseline sample). As discussed in Section 5, this estimate is unlikely to reflect a causal relationship but represents an important benchmark for our analysis.

Moving to the first-stage results (column FS in Table 2), being a client of a *PattiChiari* bank leads an individual to give 0.24 additional correct answers, which is approximately one-fourth of a standard deviation of financial literacy, about 12% of the average number of correct answers given in the sample. The effect of bank information policies on financial literacy is sizeable compared to other explanatory variables in our regressions: the impact of being a client of a bank that belongs to the *PattiChiari* Consortium is comparable to the effect of increasing education by five years.[18] The F-test on excluded instruments is about 44, showing that, when we interpret this equation as the first stage of our IV strategy, the instrument is not weak.[19]

The instrumental variable estimates we present in the paper apply to the sub-population of *compliers* (Angrist et al., 1996), namely, individuals whose financial knowledge increases because of information policies carried out by banks. When both the instrumental variable (indicator for being a *PattiChiari* client) and the treatment variable (measure for financial literacy) are binary, the proportion of compliers can be estimated and corresponds to the first-stage estimate of the effect of the instrument on the endogenous regressor (Angrist et al., 1996). In Table 3, we consider four alternative measures for financial literacy, and we estimate the effect of being a *PattiChiari*

[17] Unless otherwise stated, estimated standard errors are robust to both heteroskedasticity and serial correlation at the province level, the largest level at which we have enough clusters (103) to obtain consistent estimates of the second moment of the estimator distribution.

[18] As discussed in Section 2, evidence on the causal impact of interventions on financial literacy is still limited. Assessing the effect of bank information policies relative to other interventions is, therefore, not straightforward. Klapper and Panos (2011) consider the role of newspapers in Russia and find that a 1% increase in their number raises average financial literacy in the population by nearly 4%. Comparatively, increasing the number of universities by 1% would increase financial literacy by 0.15%. Carpena et al. (2011) assess the effect of a video-based financial literacy programme in India, finding it increases financial awareness by about 8%. The relative size of the effect we find seems, thus, slightly larger than the one of previous information/training instruments in Russia and India. More recently, Luehrmann et al. (2015) studies the effect of a financial education programme for teenagers in Germany, finding it both significantly increases their financial knowledge and reduces their propensity to buy on impulse.

[19] Staiger and Stock (1997) indicate a rule of thumb suggesting that the F-statistic should be greater than 10 to rule out weak identification problems.

client on each of these binary indicators: these are also alternative estimates of the proportion of compliers in the population. We report the baseline result in the bottom panel. The first alternative indicator is a dummy equal to 1 if all three questions have been answered correctly; we then consider three indicators capturing correct answers to each question, separately. Being a *PattiChiari* client is strongly correlated with all these indicators, leading to an increase that ranges between 11% and 14% of the average financial literacy (see Table 1), depending on the definition. These estimated coefficients suggest that the *compliers* represent a small fraction of our sample, ranging between 5% and 10% of the population.

Financial assets of households that have the main current account in a *PattiChiari* bank are 1,900 euros higher than clients of other banks, roughly 10% of the average value of assets in our sample (column ITT in Table 2). The resulting instrumental variable estimate of the causal effect of financial literacy on financial assets (column IV of Table 2) is larger than suggested by OLS estimation. On average, a one-standard deviation increase in financial literacy (i.e., an additional correct answer provided, about a 50% increase with respect to the average financial literacy), conditional on other covariates, increases household assets by 8,000 euros, approximately 35% of a standard deviation in financial assets. Thus, in line with findings by Lusardi and Mitchell (2011b), the causal effect of financial literacy is around four times higher than suggested by the corresponding correlation. This effect, however, applies to the sub-population of individuals whose knowledge of financial instruments increases because of the information policies of the *PattiChiari* banks and cannot be generalized to the average sample household without further assumptions (Angrist, 2004).

The downward bias in the OLS estimate can be explained by a negative correlation between financial literacy and the error term in the financial assets equation and by the presence of substantial measurement error in financial literacy. First, individual, specific unobservables may be negatively correlated with financial literacy and positively associated with financial assets (or vice versa). For instance, wealthy individuals may have a higher opportunity cost of time and/or expect a greater return, in absolute terms, yielded by professional portfolio management. They may, therefore, reduce their investment in financial literacy and delegate portfolio-management decisions to a professional advisor, who is able to generate larger returns. This would lead to a downward bias in the OLS estimate. Second, the indicator(s) for financial literacy may suffer from measurement error, since the respondent may misunderstand the survey questions or pick the answer randomly. This argument is consistent with evidence on the sensitivity of answers to financial literacy questions, documented

by Lusardi and Mitchell (2009) for the US and by van Rooij et al. (2011) for the Netherlands.

We check the robustness of our findings to several falsification checks, which are reported and discussed in Section B in the online Appendix. In particular, we explore: (i) the role of retest effects and the timing of the effect of bank information policies and financial literacy; (ii) the role of trust in institutions; (iii) the sensitivity of our results to sample selection and the functional form. Our results turn out to be robust to all these checks.

We consider alternative measures of being a *PattiChiari* client, based on all the current accounts held, and measure whether the household is a client of at least one *PattiChiari* bank. Estimate results, reported in the online Appendix (Table C-1), show that our findings are robust to the use of these alternative indicators. Results turn out to be robust also to the inclusion of municipality-fixed effects (see Table C-2 in the online Appendix).

# 7 Mechanisms and Heterogeneity

Financial literacy can affect wealth through many different channels.[20] With the data at hand, we can analyse three potentially relevant mechanisms that may drive the positive effect measured in the aggregate. First, we investigate to what extent portfolio composition depends on financial literacy of the respondent (Christelis et al., 2010; van Rooij et al., 2011, 2012). Second, we examine whether literate respondents are more prone to plan for retirement (Alessie et al., 2011; Lusardi and Mitchell, 2008), which, in turn, may enhance saving. Finally, we focus on the relation between financial literacy and saving behaviour.

Looking at portfolio composition, we exploit information about assets held by SHIW respondents, and we examine to what extent the probability of holding equities, mutual funds and government bonds differs, according to financial literacy. We also consider a binary indicator of household participation to the stock market, either directly or through a mutual fund. To analyse the role of retirement planning, we use answers to the following question (not asked to retirees): "Have you ever thought about how to arrange for your household's support when you retire?" Saving rate is defined as the ratio between savings and income.

[20] We refer to Jappelli and Padula (2013b) (note 5) and Lusardi et al. (2011) for a discussion of the links between financial literacy and financial wealth. Relevant channels relate to expectations (literate individuals may be more accurate and/or less biased), preferences (financial literacy may ease the understanding of risk and reducing 'direct risk aversion'), perceptions (financial literacy may reduce underestimation of compounding effects), diversification and the cost charged on loans or mutual funds.

Results reported in Table 4 suggest that financial literacy leads to an increase in stock market participation and to a more diversified portfolio. While lack of availability of more detailed data on portfolio management prevents us to examine the effect of financial literacy on the *quality* of financial decisions, as in Guiso and Viviano (2015), our results are consistent with financial literacy to promote a better portfolio management, in terms of diversification and stock market participation. Financially literate respondents holding a more-efficient and diversified portfolio may contribute to explain the positive effect of financial knowledge on financial assets. This channel may be particularly relevant in Italy, a country characterized by relatively low participation rates in the stock market (Bottazzi et al., 2013).

Turning to planning for retirement and saving rate, while the estimated coefficient is positive, we fail to detect a significant causal effect of financial literacy on both outcomes. This finding may reflect the fact that Italy is characterized by a generous pension system, compared to other countries, and relatively high saving rates. Undersaving to meet retirement target in Italy might thus be a less-relevant issue with respect to other countries.

To shed more light on the heterogeneity of the impact of bank information policies and on the effect of financial literacy on financial assets, we estimate our baseline model across age and education groups. The results are shown in Table 5. The first and the second panels report estimates for, respectively, low- and high-educated respondents; the third and fourth panels consider, respectively, the young and the elderly, and the bottom panel refers to the subgroup of low-educated individuals aged 60+. The effect of financial literacy on financial assets is the largest for low-educated and old respondents (the IV coefficient is 12.6 in the bottom panel). This finding is consistent with returns of financial literacy that are decreasing in education.[21] In addition, individuals aged 60+ are expected to be wealthier than the young and, in turn, to gain more from their financial knowledge. The bias in the OLS estimate is the highest when 60+ and low-educated respondents are considered. The determinants of the bias described above are, thus, more relevant in this subsample. First, education is expected to be negatively correlated with the probability of choosing the answer at random or not understanding the questions. Moreover, the elderly may be less focused when answering the questionnaire and, thus, more subject to measurement error. Second, 60+

[21] This latter result is in line with the results by Cole et al. (2011), showing, in a different context, a significant impact of financial literacy (on the demand for current accounts in India and Indonesia) only for those with limited education or financial literacy.

and low-educated households may be more likely to delegate their portfolio's management rather than investing in their financial knowledge, further increasing the bias in the OLS estimate of the effect of financial literacy on assets. Turning to the effectiveness of bank information policies, they significantly foster financial knowledge in all the subgroups we consider, but the magnitude of their effect is substantially greater for low-educated respondents and for those aged 60+.

# 8 Evidence Against Self-Selection of Households into *PattiChiari* Banks

In this section, we discuss evidence supporting absence of self-selection of households into *PattiChiari* or non-*PattiChiari* banks, which lies behind the validity of our identification strategy.[22]

**Why do households become customers of *PattiChiari* (or non-*PattiChiari*) banks?**
We start by exploring the determinants of a household's bank choices, collected in SHIW through the following question: "Why did you choose [the bank you use more often] when you and your household first began using it?" We group available alternatives into three categories: (1) convenience, i.e., convenience to home/work, respondent's employer's bank (or respondent's business's bank); (2) financial/economic reasons, i.e., favourable interest rates, speed of transaction execution, range of services, low fees for services, possibility of online banking; (3) bank type, i.e., it is a well-known/important bank, staff courtesy. The main reason for choosing a bank turns out to be related to convenience, which is the only determinant for 63% of *PattiChiari* clients and for 67% of other respondents. Financial conditions are the only determinant for less than 15% of the respondents in both groups. We interpret this evidence as follows: the preferred financial offerings may be readily available, and consumers typically decide their bank, depending on the one that is more conveniently located to them. In other words, the constraint on financial services is not binding, and it is satisfied by the abundance of options; hence, individuals choose on the basis of their second (binding) constraint, namely convenience. Reasons for choosing the bank are included in the set of control variables in our baseline specification (Table 2), but results are confirmed when we omit these controls (see Table C-3 in the online Appendix).

[22] It is worth emphasizing that all the results are net of province (or municipality) fixed effects: we are, thus, exploiting only the within-province variability of the instrument for identification.

Banks join the *PattiChiari* Consortium to advertise their commitment to transparency (see Section 3). Our identification strategy hinges on the assumption that the effectiveness of advertisement does not depend on financial literacy or wealth. While we cannot test this assumption directly, due to lack of relevant data, we document that individuals do not self-select as a client of a specific bank according to their wealth, as illustrated in the next paragraph.

**Reverse causality: Are wealthier clients more likely to become *PattiChiari* clients?** In order to document absence of self-selection of clients according to their wealth, we exploit the panel component of the SHIW dataset to retrieve information on household financial assets in 2002, i.e., *before* the *PattiChiari* Consortium was created. First, we perform a "placebo" test, regressing 2002 assets on being a *PattiChiari* client in 2010. We fail to find a significant correlation between being such a client in 2010 and 2002 assets.[23] Second, in order to control for "pre-treatment" differences in the asset endowment, we estimate the baseline specification by including financial assets in 2002 among the control variables (see Table C-4 in the online Appendix). Results are robust to the inclusion of this additional regressor.

Third, we control for the level of financial assets in 2002 and test whether assets of *Patti-Chiari* and non-*Patti-Chiari* clients grew differently over the periods 2002-2006, 2002-2008 and 2002-2010. Results are reported in Table 6, where we standardize growth rates to ease interpretation and comparison of the different effects. The results are in line with the main findings in Table 2: OLS underestimates the effect of financial literacy on growth of financial assets; the causal effect of financial assets is positive and as large as about 15% of a standard deviation. Looking at heterogeneity across years (Table C-5 in the online Appendix), the effect of financial literacy turns out to be positive and significant in all years, and about 4% of a standard deviation smaller in 2008 (the year after the fall in stock market prices, documented by Bottazzi et al. (2013)), with respect to 2006 and 2010.

We also explore whether there are differences in pre-treatment (2002) financial assets among individuals who switch between *PattiChiari* and non-*PattiChiari* banks between 2006 and 2008 or between 2008 and 2010 (details of this exercise are discussed in Section B.2 in the online Appendix). We do not find any statistical difference in financial assets in 2002 between clients who remained with *PattiChiari* banks, and those who cease to be clients of a *PattiChiari* or non-*PattiChiari* bank.

[23] The coefficient associated to the *PattiChiari* dummy in this test regression is 12.663 with a standard error of 13.847.

We interpret this finding as evidence that there is no selection of clients into *PattiChiari* banks.

Finally, we check the robustness of our results to the inclusion of variables that are possibly correlated with both financial assets and financial literacy/*PattiChiari* indicator, namely the number of bank accounts and homeownership. Estimate results illustrated in the online Appendix (bottom panel of Table B.6 and Table C-6, respectively) further support the validity of our findings.

**A matching estimator**

We also estimate the effects of being a client of a *PattiChiari* bank on financial literacy and financial assets using a matching estimator, based on propensity score matching, and we replicate the baseline regression analysis of the paper on the sample where we observe clients of *PattiChiari* and non-*PattiChiari* banks that have similar probability to be a *PattiChiari* client, based on observables. We start estimating the propensity score through a logit model, where the dependent variable is the probability of being a *PattiChiari* client in 2010.[24] We perform radius matching with caliper 0.005, with replacement, matching each treated individual with two controls: observations of *PattiChiari* clients are used only once, while observations in the control group (non-*PattiChiari* clients) may be used in several matches. A graphical representation of the common support is depicted in Figure C-1 in the online Appendix. Notably, most observations are on the common support (99.3%), and we are not able to match only 0.007% of the households (36 out of 4,865) with a very high propensity score. Table 7 reports results of instrumental variable regression on the common support. Specifications based on Table 2 and the ones that achieve covariate balancing are shown in, respectively, the upper and bottom panel. Our results turn out to be robust.

[24]The balancing property is satisfied after controlling for demographics of the household head (age, age squared, gender, years of education, marital status) and household characteristics (number of household members, household labour income), municipality population size (inhabitants), province fixed effects, reasons for choosing the main bank and some interactions between those controls. More specifically, in addition to the levels of the listed variables, we include interactions between: household head gender and marital status; household head marital status and municipality size; family size and municipality size; household head gender and municipality size; household head age and municipality size; family size and household labour income; household head marital status and household labour income. See Table C-7 in the online Appendix.

# 9 Evidence Against Self-Selection of Banks into the *PattiChiari* Consortium

In this Section, we present empirical evidence supporting the absence of self-selection of banks into the *PattiChiari* Consortium. We start by analysing to which extent banks differ, according to costs and credit policies. Table 8 illustrates costs of bank accounts charged by banks belonging or not to the *PattiChiari* Consortium. Differences in costs and fees are generally not statistically significant, the only exception being average debit card fees that are slightly larger (about 3 euros per year) for non-*PattiChiari* banks. Our main results are unaffected by the inclusion of these costs among the control variables (see the upper panel of Table C-8 in the online Appendix). To check whether banks that belong to the *PattiChiari* Consortium differ from other banks with respect to credit rationing, we exploit information about liquidity constraints provided by SHIW. We do not find evidence of any correlation between being a *PattiChiari* client and being liquidity constrained, which may signal differences in credit rationing, at standard significance levels.[25]

In principle, large and small banks may differ with respect to their policies about investment or client relations, in their ability to attract clients and in other unobservables that may affect customers' wealth or financial literacy. Therefore, we examine to which extent banks belonging or not to the *PattiChiari* Consortium are different according to their size. To this purpose, Table 9 ranks banks according to their total assets and provides their number of branches and *PattiChiari* status: 49 out of the 70 banks listed (70%) belong to the *PattiChiari* Consortium (names of *PattiChiari* banks are underlined). The following two columns in Table 9 report the decile of the empirical distribution of total assets and of the number of branches to which each bank belongs. Among the top-ten banks, both in terms of assets and in terms of number of branches, there are 9 *PattiChiari* banks and 1 non-*PattiChiari*. Yet, apart from the top-sized banks, the rest of the distribution is much more mixed. Within the sub-sample of small banks, *PattiChiari* and non-*PattiChiari* banks are evenly distributed over both measures: among banks with below-median assets, there are 20 *PattiChiari* and 15 non-*PattiChiari* banks; among banks with below-median numbers of branches,

[25] Following Jappelli et al. (1998), we consider a household to be "liquidity constrained" if it either (a) applied to a bank or a financial company to ask for loan or mortgages and the application was rejected, or (b) considered the possibility to apply but did not, thinking that the application would have been rejected. At average values of the covariates, the marginal effect of being a *PattiChiari* client on the probability of being liquidity constrained is -0.005 with a standard error of 0.007. The model controls for province fixed effects, municipality size and individual observable characteristics (quadratic polynomial in age, gender, marital status, household size, education, family labour income and reason for choosing the main bank).

there are 17 non-*PattiChiari* and 18 *PattiChiari* banks.[26] We test for statistical differences in the mean of these variables by *PattiChiari* status in Table C-9 in the online Appendix. The difference is not statistically significant.

To check whether different characteristics between *PattiChiari* and non-*PattiChiari* banks drive our results, we perform three different exercises. First, we examine the role of top-sized *PattiChiari* banks. To explore this issue, we proceed by ordering all *PattiChiari* banks in terms of their size, and by iteratively dropping an increasing number of banks, ranging from 1 to 20. Results are stable and comparable to those in Table 2 (see Table C-10 and Table C-11 in the online Appendix). Second, we consider a subsample of banks, where the overall size distribution for *PattiChiari* and non-*PattiChiari* banks is similar and the share of *PattiChiari* and non-*PattiChiari* banks are evenly distributed. Thus, we replicate our baseline results using data of clients of small or large banks only (Table C-12 in the online Appendix). Finally, we test for the robustness of our results by including assets and number of branches among the covariates (bottom panel of Table C-8 in the online Appendix). To sum up, our core results seem not to be driven by the potential correlation between bank size and *PattiChiari* status.

# 10 Concluding remarks

The interests by scholars and policymakers, in Europe and in the US, on the determinants of financial literacy and on the link between financial literacy and wealth, has been constantly increasing in the last years. Institutions, such as the OECD, the US Treasury Department and the European Commission, have expressed the need for improved financial knowledge, emphasizing the role of formal financial education in schools or at the workplace. However, whether these programmes affect financial knowledge and financial decisions, and who are the reacting individuals are still controversial issues. Most interventions are held at school or in the workplace and involve young individuals.

In this paper, we posit the novel question: do bank information policies actually increase financial literacy and, in turn, household financial wealth? To answer this question, we identify a group of Italian banks, the *PattiChiari* Consortium, which provide their customers with information about *simple* economic concepts. We find that bank information policies are effective in improving finan-

[26] The Wilcoxon rank-sum test of assets and number of branches by *PattiChiari* status among small banks largely fails to reject the null that the distributions are the same (p-values equal 0.79 and 0.82, respectively).

cial literacy and influencing financial decisions for a small fraction of individuals in the population and mostly so for the 60+ and low educated. These results should be interpreted in light of the type of intervention that we study. The provision of simple and basic economic concepts is likely to be more relevant for individuals who are less exposed to other sources of financial information, such as economic newspapers or the web. When we consider compliance, the effectiveness of information policies is limited (5-10% of the population). These policies are the most effective for consumers who may profit more from them, suggesting positive selection on gains.

We use information policies as an instrument to identify the causal effect of financial literacy on assets. On average, one standard deviation increase in financial literacy leads to an 8,000 euros increase in financial assets. This effect is largely underestimated by simple correlations, which suggest about a 2,000 euros increase. We show that the effect of financial literacy on financial assets operates through changes in portfolio management and diversification, and it is driven by a large impact on the small sub-sample of $60^+$ and low-educated respondents. While we cannot assess whether financial knowledge is associated with an improvement in the quality of investment decisions, increased portfolio diversification in our case-study may be possibly interpreted as intrinsically *better*, given Italy's historically low rates of stock market participation. In a different setting, where households already diversify portfolios, the improvement in the quality of financial decisions related to an increase of financial knowledge may not lead to such large effects (see Guiso and Viviano (2015)).

The impact on financial assets is remarkable, if compared with other studies of financial education programmes that typically find small or no effects on financial decisions. Our estimate of this effect, however, refers to the small subsample of the population whose financial literacy is affected by information policies. The less educated and elderly are those who react more to the policy. Our results are consistent with returns to financial education being decreasing in education, and older households under-investing financial endowments accumulated over their lifetime. Two other features of the intervention we consider may contribute to explaining the magnitude of the estimated effect of financial literacy. First, individuals who receive information from banks are treated for a rather long period of time (i.e., about 9 years, the average length of the relation between client and bank), while financial education programs typically last for some months. Second, individuals receive financial education in a setting where this information is relevant. Indeed, it is mostly through banks that households make their financial decisions, such as saving and diversifying their portfolio

of investments. The magnitude of the bias of OLS estimates that we find is in line with previous literature. This is partly due to heterogeneity in the effects of financial literacy on financial assets and partly due to measurement error, suggesting that there is room to improve the way financial literacy is measured.

Taken together, our analyses show that bank information policies are relevant in fostering financial literacy of a small subsample of individuals who are, however, those who benefit more from increased financial literacy. This points towards more-focused interventions. On the one hand, it illustrates how financial education may be taught in different settings, which may be potentially more salient than schools or workplaces. On the other hand, it indicates that targeting individuals who respond more to information policies might be important to improve programme effectiveness as well as the impact on individual wealth.[27] We show that low-educated adults (specifically, those aged 60+) are most responsive to bank information policies and benefit more from higher financial literacy. Standard financial education programmes typically neglect adults, and this might be one reason for the limited impact. Documenting whether this is the case and what drives participation in these programmes might be an area for future research highly relevant for the design of future interventions.

## Acknowledgements

We acknowledge the financial support of MIUR- FIRB 2008 project RBFR089QQC-003-J31J10000060001. We would like to thank N. Fuchs-Schündeln and the other Editors, three anonymous referees and all participants of the $63^{rd}$ Panel Meeting of Economic Policy for comments and advices. Our gratitude goes also to E. Battistin, R. Bottazzi, T. Bucher-Koenen, E. Carletti, M. Cervellati, M. Giofré, M. Hurd, T. Kuchler, P. Legrenzi, B. Luppi, M. Padula, G. Pasini, H. Paule-Paludkiewicz, E. Rettore, E. Sette, M. Wakefield, F. Waldinger, Y. Winter and participants to the BoMoPaV Economics Meeting in Padua, the Netspar International Pension Workshop in Paris, the SAVE-PHF Conference in Munich, the CERP Annual Conference on Financial Literacy, Saving and Retirement in an Ageing Society, the European Association of Labour Economists (EALE) Annual conference in Bonn, Munich Center for the Economics of Aging (MEA) and seminars at the University of Bologna and at the Johannes Kepler University of Linz for useful comments on an earlier version

[27] Notice, however, that these individuals may be those who have higher levels of financial assets, relative to the average individual in the population. As such, these interventions will not necessarily reduce inequality in wealth.

of this work. We thank the Bank of Italy Banking and Financial Supervision Area (notably, P. Franchini and A. Scognamiglio) for kindly providing data on bank account costs. We are indebted with the *PattiChiari* Consortium (notably, V. Panna and L. Napoleoni) for the data provided and for intriguing discussions about their initiatives. The views here expressed are those of the authors and do not necessarily reflect those of the Bank of Italy. The usual disclaimer applies.

## References


Alessie, R., van Rooij, M., Lusardi, A., 2011. Financial Literacy and Retirement Preparation in the Netherlands. Journal of Pension Economics and Finance 10 (4), 527–545.

Altman, M., 2012. Implications of Behavioural Economics For Financial Literacy and Public Policy. Journal of Socio-Economics 41 (5), 677–690.

Angrist, J., 2004. Treatment Effect Heterogeneity in Theory and Practice. The Economic Journal 114 (494), C52–C83.

Angrist, J. D., Imbens, G. W., Rubin, D. B., 1996. Identification of Causal Effects Using Instrumental Variables. Journal of the American Statistical Association 91 (434), 444–455.

Bottazzi, R., Trucchi, S., Wakefield, M., 2013. Wealth effects and the consumption of italian households in the great recession. Working Papers 13/21, IFS.

Bruhn, M., de Souza Leao, L., Legovini, A., Marchetti, R., Zia, B., 2013. The impact of high school financial education : experimental evidence from Brazil. Policy Research Working Paper Series 6723, The World Bank.

Bucher-Koenen, T., Lusardi, A., 2011. Financial Literacy and Retirement Planning in Germany. Journal of Pension Economics and Finance 10 (4), 565–584.

Calcagno, R., Monticone, C., 2015. Financial Literacy and the Demand for Financial Advice. Journal of Banking and Finance 50, 363–380.

Carpena, F., Cole, S., Shapiro, J., Zia, B., 2011. Unpacking the Causal Chain of Financial Literacy. Policy Research Working Paper 5798, World Bank.

Christelis, D., Jappelli, T., Padula, M., 2010. Cognitive Abilities and Portfolio Choice. European Economic Review 54 (1), 18–38.

Cole, S., Sampson, T., Zia, B., 2011. Prices or knowledge? what drives demand for financial services in emerging markets? The Journal of Finance 66 (6), 1933–1967.

Deuflhard, F., Georgarakos, D., Inderst, R., 2015. Financial literacy and savings account returns. ECB Working Papers 1852, European Central Bank.

Disney, R., Gathergood, J., 2011. Financial Literacy and Indebtedness: New Evidence for UK consumers. Discussion papers, University of Nottingham, Centre for Finance, Credit and Macroeconomics (CFCM).

Fernandes, D., Lynch Jr, J. G., Netemeyer, R. G., 2014. Financial literacy, financial education, and downstream financial behaviors. Management Science 60 (8), 1861–1883.

Fornero, E., Monticone, C., 2011. Financial Literacy and Pension Plan Participation in Italy. Journal of Pension Economics and Finance 10 (4), 547–564.

Garcia, M., 2013. Financial Education and Behavioral Finance: New Insights Into The Role of Information in Financial Decisions. Journal of Economic Surveys 27 (2), 297–315.

Gibson, J. McKenzie, D., Zia, B., 2012. The impact of financial literacy training for migrants. World Bank Economic Review 28 (1), 130–161.

Guiso, L., Viviano, E., 2015. How Much Can Financial Literacy Help? Review of Finance 19 (4), 1347–1382.

Hastings, J. S., Madrian, B. C., Skimmyhorn, W. L., 2013. Financial Literacy, Financial Education, and Economic Outcomes. Annual Review of Economics, Annual Reviews 5 (1), 347–373.

Jappelli, T., 2010. Economic Literacy: An International Comparison. The Economic Journal 120 (548), F429–F451.

Jappelli, T., Padula, M., 2013a. Consumption Growth, the Interest Rate, and Financial Literacy. CSEF Working Papers 329, Centre for Studies in Economics and Finance (CSEF), University of Naples, Italy.

Jappelli, T., Padula, M., 2013b. Investment in Financial Literacy and Saving Decisions. Journal of Banking and Finance 37 (08), 2779–2792.

Jappelli, T., Pischke, J., Souleles, N., 1998. Testing for Liquidity Constraints in Euler Equations With Complementary Data Sources. Review of Economics and Statistics 80 (2), 251–262.

Klapper, L., Lusardi, A., Panos, G. A., 2013. Financial Literacy and its Consequences: Evidence from Russia During the Financial Crisis. Journal of Banking and Finance 37 (10), 3904–3923.

Klapper, L., Panos, G. A., 2011. Financial Literacy and Retirement Planning: the Russian case. Journal of Pension Economics and Finance 10 (4), 599–618.

Luehrmann, M., Serra-Garcia, M., Winter, J., 2015. Teaching teenagers in finance: Does it work? Journal of Banking and Finance 54, 160 – 174.

Lusardi, A., Michaud, P.-C., Mitchell, O. S., Sep. 2011. Optimal Financial Literacy and Saving for Retirement. Working papers, RAND Corporation Publications Department.

Lusardi, A., Mitchell, O. S., 2007a. Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth. Journal of Monetary Economics 54 (1), 205–224.

Lusardi, A., Mitchell, O. S., 2007b. Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education. Business Economics 42 (1), 35–44.

Lusardi, A., Mitchell, O. S., 2008. Planning and Financial Literacy: How Do Women Fare? American Economic Review 98 (2), 413–417.

Lusardi, A., Mitchell, O. S., 2009. How Ordinary Consumers Make Complex Economic Decisions: Financial Literacy and Retirement Readiness. NBER Working Papers 15350, National Bureau of Economic Research, Inc.

Lusardi, A., Mitchell, O. S., 2011a. Financial Literacy and Planning: Implications for Retirement Wellbeing. In: Lusardi, A., Mitchell, O. S. (Eds.), Financial Literacy: Implications for Retirement Security and the Financial Marketplace. Oxford: Oxford University Press.

Lusardi, A., Mitchell, O. S., 2011b. Financial Literacy and Retirement Planning in the United States. Journal of Pension Economics and Finance 10 (4), 509–525.

Lusardi, A., Mitchell, O. S., 2011c. Financial Literacy Around the World: An Overview. Journal of Pension Economics and Finance 10 (4), 497–508.

Lusardi, A., Mitchell, O. S., 2014. The Economic Importance of Financial Literacy: Theory and Evidence. Journal of Economic Literature 52 (1), 5–44.

Manski, C., 1993. Identification of Endogenous Social Effects: the Reflection Problem. The Review of Economic Studies 60 (3), 531–542.

Mastrobuoni, G., 2011. The Role of Information for Retirement Behavior: Evidence Based on the Stepwise Introdution of the Social Security Statement. Journal of Public Economics 95 (7-8), 913–925.

OECD, September 2013a. Evaluating Financial Education Programmes: Survey, Evidence, Policy Instruments and Guidance.

OECD, June 2013b. Improving Financial Education Effectiveness Through Behavioural Economics.

Staiger, D., Stock, J., 1997. Instrumental Variables Regression With Weak Instruments. Econometrica 65 (3), 557–586.

van Rooij, M., Lusardi, A., Alessie, R., 2011. Financial Literacy and Stock Market Participation. Journal of Financial Economics 101 (2), 449–478.

van Rooij, M., Lusardi, A., Alessie, R., 2012. Financial Literacy, Retirement Planning, and Household Wealth. The Economic Journal 122 (560), 449–478.

Willis, L. E., 2011. The Financial Education Fallancy. American Economic Review: Papers and Proceedings 101 (3), 429–434.

# Tables

Table 1: Descriptive Statistics.

| Variable | Mean | Std. Dev. | N |
|---|---|---|---|
| Financial literacy (number of correct answers out of three) | 1.93 | 0.98 | 4865 |
| Financial literacy, binary indicator 1(three out of three answers correct) | 0.34 | 0.47 | 4865 |
| Financial literacy, binary indicator 1(question on inflation correct) | 0.74 | 0.44 | 4865 |
| Financial literacy, binary indicator 1(question on loan correct) | 0.64 | 0.48 | 4865 |
| Financial literacy, binary indicator 1(question on portfolio diversification correct) | 0.55 | 0.5 | 4865 |
| Financial literacy (number of correct answers out of two present in 2006 & 2008) | 1.38 | 0.71 | 4865 |
| Instrumental variable, binary indicator 1(Household is *PattiChiari* client) (*patti*) | 0.73 | 0.45 | 4865 |
| Instrumental variable, binary indicator 1(Household is *PattiChiari* client) (*patti_atl*) | 0.75 | 0.43 | 4865 |
| Financial assets (thousands) | 19.4 | 22.4 | 4865 |
| Savings rate$^{+}$ | 0.17 | 0.27 | 4865 |
| Planning for retirement | 0.46 | 0.50 | 2653 |
| Ownership of equities and mutual funds | 0.12 | 0.32 | 4865 |
| Ownership of equities | 0.06 | 0.23 | 4865 |
| Ownership of mutual funds | 0.08 | 0.27 | 4865 |
| Ownership of government bonds | 0.11 | 0.32 | 4865 |
| Male household head | 0.56 | 0.50 | 4865 |
| Age | 59 | 14.9 | 4865 |
| Married | 0.64 | 0.48 | 4865 |
| Nb. hh components | 2.47 | 1.21 | 4865 |
| Years of education of the household head | 9.81 | 4.46 | 4865 |
| Household labor income | 26.3 | 16.3 | 4865 |
| Municipality 20.000-40.000 inh. | 0.26 | 0.44 | 4865 |
| Municipality 40.000-500.000 inh. | 0.44 | 0.50 | 4865 |
| Municipality 500.000+ inh. | 0.10 | 0.30 | 4865 |
| High trust$^{*}$ | 0.56 | 0.50 | 4865 |
| Length of relationship with the bank: less 2 years | 0.04 | 0.18 | 4757 |
| Length of relationship with the bank: 2-4 years | 0.07 | 0.26 | 4757 |
| Length of relationship with the bank: 5-10 years | 0.16 | 0.37 | 4757 |
| Length of relationship with the bank: more than 10 years | 0.73 | 0.45 | 4757 |
| Length of relationship with the bank$^{**}$: years | 9.03 | 2.30 | 4757 |
| Number of current accounts | 1.2 | 0.46 | 4865 |
| Homeownership | 0.74 | 0.44 | 4865 |
| **Motivations for choosing the main bank**$^{***}$ | | | |
| Only one reason: related to convenience | 0.54 | 0.50 | 4865 |
| Only one reason: related to financial/economic reason | 0.07 | 0.25 | 4865 |
| Only one reason: related to bank characteristics | 0.02 | 0.15 | 4865 |
| Two reasons: both related to convenience | 0.12 | 0.32 | 4865 |
| Two reasons: related to convenience & financial/economic reasons | 0.10 | 0.30 | 4865 |
| Two reasons: related to convenience & bank characteristics | 0.10 | 0.31 | 4865 |
| Two reasons: both related to financial/economic reasons | 0.03 | 0.16 | 4865 |
| Two reasons: financial/economic reasons & bank characteristics | 0.02 | 0.15 | 4865 |
| Two reasons: both related to bank characteristics | 0.00 | 0.05 | 4865 |
| **Sources of information**$^{****}$ | | | |
| Only intermediaries or experts | 0.657 | 0.475 | 1492 |
| Only press or websites | 0.016 | 0.126 | 1492 |
| Only friends, others, do not know | 0.26 | 0.439 | 1492 |

*Notes:* Unless otherwise stated all descriptive statistics refer to the 2010 estimation sample.
$^{+}$ Ratio between household savings and income, winsorized at 1%.
$^{*}$ Our measure of trust relies on the answer to the question "Do you trust your principal bank? Please assign a score of 1 to 10, where 1 means 'I don't trust it at all' and 10 means 'I trust it completely' and the intermediate scores serve to graduate your response". Respondents who trust their main bank are those who choose a value above the median of the distribution of answers (8).
$^{**}$ Recoded from the categorical variable collected in the survey: for each category we impute the mid-point.
$^{***}$ Each respondent can give at most two answers to the question on why the main bank is chosen. The 13 alternatives among which the respondent can choose are grouped into 3 broad categories: convenience (convenience to home/work, respondent's employer's bank (or respondent's business's bank)), financial/economic reasons (favourable interest rates, speed of transaction execution, range of services, low fees for services, possibility of online banking) and bank type (it is a well-known, important bank, staff courtesy). The figures show the percentage of respondents who choose only one alternative, two alternatives in the same group or two alternatives in different categories.
$^{****}$ Based on the question about the information source consulted before the current investments were performed. Available only for households who hold financial assets other than bank accounts. The figures show the average number of respondents who rely only on that specific source of financial information.

Table 2: Baseline regressions.

| | OLS | FS | ITT | IV |
|---|---|---|---|---|
| *Dependent variable:* | *Fin. assets* | *Fin. lit.* | *Fin. assets* | *Fin. assets* |
| **Financial literacy** | **2.231*** ** | | | **8.273*** ** |
| | **(0.630)** | | | **(2.979)** |
| **Client of *PattiChiari*** | | **0.235*** ** | **1.941*** ** | |
| | | **(0.035)** | **(0.723)** | |
| Age | 0.832*** | 0.054*** | 0.939*** | 0.494** |
| | (0.136) | (0.006) | (0.134) | (0.197) |
| Age squared | -0.005*** | -0.000*** | -0.006*** | -0.001 |
| | (0.001) | (0.000) | (0.001) | (0.002) |
| Male | 1.017 | 0.170*** | 1.347** | -0.063 |
| | (0.642) | (0.025) | (0.652) | (0.705) |
| Married | 2.479*** | 0.024 | 2.497*** | 2.295*** |
| | (0.625) | (0.037) | (0.645) | (0.596) |
| Nb. hh components | -1.501*** | 0.051*** | -1.391*** | -1.812*** |
| | (0.292) | (0.017) | (0.292) | (0.342) |
| Years education | 0.918*** | 0.045*** | 0.999*** | 0.626*** |
| | (0.095) | (0.004) | (0.091) | (0.178) |
| Municipality 20.000-40.000 inhabitants | 1.040 | 0.071 | 1.256 | 0.673 |
| | (1.415) | (0.070) | (1.456) | (1.388) |
| Municipality 40.000-500.000 inhabitants | 0.212 | -0.009 | 0.157 | 0.235 |
| | (1.086) | (0.088) | (1.114) | (1.173) |
| Municipality 500.000+ inhabitants | -0.308 | 0.151 | -0.027 | -1.275 |
| | (2.061) | (0.165) | (2.024) | (2.679) |
| Household labor income | 0.414*** | 0.000 | 0.413*** | 0.409*** |
| | (0.033) | (0.001) | (0.034) | (0.032) |
| Only one motivation: services | 1.126 | 0.092 | 1.647 | 0.887 |
| | (1.207) | (0.060) | (1.204) | (1.310) |
| Only one motivation: bank characteristics | 1.804 | -0.108 | 1.489 | 2.382 |
| | (1.870) | (0.067) | (1.847) | (1.970) |
| Two motivations: two convenience | 4.626*** | 0.056 | 4.774*** | 4.314*** |
| | (1.258) | (0.052) | (1.292) | (1.165) |
| Two motivations: convenience & financial conditions | 1.312 | 0.132* | 1.786 | 0.698 |
| | (1.155) | (0.069) | (1.173) | (1.208) |
| Two motivations: convenience & bank characteristics | 4.595*** | 0.067 | 4.665*** | 4.113*** |
| | (1.306) | (0.057) | (1.303) | (1.261) |
| Two motivations: two financial conditions | 2.818 | 0.184** | 3.470* | 1.949 |
| | (1.741) | (0.077) | (1.832) | (1.608) |
| Two motivations: financial conditions | 1.644 | 0.139 | 2.013 | 0.862 |
| & bank characteristics | (2.232) | (0.087) | (2.242) | (2.228) |
| Two motivations: two bank characteristics | 4.698 | 0.037 | 4.701 | 4.391 |
| | (3.831) | (0.172) | (3.869) | (3.844) |
| Province FE | Yes | Yes | Yes | Yes |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instruments | | | | 43.849 |

*Notes:* the table reports OLS, first-stage, intention-to-treat, and instrumental variable results of the model $w_{ip} = \tilde{\alpha} + \tilde{\beta} fl_{ip} + X_{ip}\tilde{\gamma} + \lambda_p + \varepsilon_{ip}$ where $w_{ip}$ is financial assets owned by household $i$, living in province $p$, in year 2010; $fl_{ip}$ is financial literacy of the household head, $X_{ip}$ is a vector of household controls (age, age squared, gender, marital status, years of education of the household head and number of household components, household labour income in 2010) and $\lambda_p$ is a province fixed effect. Financial literacy is instrumented with a dummy that takes the value 1 if the household's main bank belongs to the *PattiChiari* Consortium and 0 otherwise. Financial literacy is the number of correct answers out of the three questions asked in 2010. 2010 SHIW Data. Heteroskedasticity-robust standard errors clustered at the province level in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 3: Robustness: Different measures for financial literacy.

| | OLS | FS | ITT | IV |
|---|---|---|---|---|
| *Dependent variable:* | *Fin. assets* | *Fin. literacy* | *Fin. assets* | *Fin. assets* |
| **Number of answers correct out of 3** | | | | |
| Financial literacy (nb/3) | 2.231*** | | | 8.273*** |
| | (0.630) | | | (2.979) |
| Client of *PattiChiari* | | 0.235*** | 1.941*** | |
| | | (0.035) | (0.723) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 43.849 |
| **Binary indicator for 3 answers correct out of 3** | | | | |
| Financial literacy (3 correct) | 4.512*** | | | 43.378** |
| | (1.086) | | | (20.156) |
| Client of *PattiChiari* | | 0.045*** | 1.941*** | |
| | | (0.016) | (0.723) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 8.152 |
| **Binary indicator for inflation question correct** | | | | |
| Inflation correct | 1.921 | | | 19.096*** |
| | (1.204) | | | (7.315) |
| Client of *PattiChiari* | | 0.102*** | 1.941*** | |
| | | (0.019) | (0.723) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 29.128 |
| **Binary indicator for loan question correct** | | | | |
| Loan correct | 1.604** | | | 27.207** |
| | (0.798) | | | (10.831) |
| Client of *PattiChiari* | | 0.071*** | 1.941*** | |
| | | (0.013) | (0.723) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 28.297 |
| **Binary indicator for portfolio question correct** | | | | |
| Portfolio correct | 5.287*** | | | 31.491** |
| | (1.136) | | | (12.929) |
| Client of *PattiChiari* | | 0.062*** | 1.941*** | |
| | | (0.019) | (0.723) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 10.715 |

*Notes:* the table reports OLS, first-stage, intention-to-treat, and instrumental variable results of the model $w_{ip} = \widetilde{\alpha} + \widetilde{\beta} fl_{ip} + X_{ip}\widetilde{\gamma} + \lambda_p + \varepsilon_{ip}$ where $w_{ip}$ is financial assets owned by household $i$, living in province $p$, in year 2010; $fl_{ip}$ is financial literacy of the household head, $X_{ip}$ is a vector of household controls (age, age squared, gender, marital status, years of education of the household head and number of household components, household labour income in 2010) and $\lambda_p$ is a province fixed effect. Financial literacy is instrumented with a dummy that takes the value 1 if the household's main bank belongs to the *PattiChiari* Consortium and 0 otherwise. 2010 SHIW Data. Heteroskedasticity-robust standard errors clustered at the province level in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 4: Effect of Financial Literacy on Other Outcomes

| | OLS | FS | ITT | IV |
|---|---|---|---|---|
| *Dependent variable:* | *Fin. assets* | *Fin. literacy* | *Fin. assets* | *Fin. assets* |
| **Ownership of stock and funds** | | | | |
| Financial literacy | 0.019*** | | | 0.134*** |
| | (0.006) | | | (0.047) |
| Client of *PattiChiari* | | 0.235*** | 0.031*** | |
| | | (0.035) | (0.010) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 43.849 |
| **Ownership of equities** | | | | |
| Financial literacy | 0.006 | | | 0.026 |
| | (0.004) | | | (0.028) |
| Client of *PattiChiari* | | 0.235*** | 0.006 | |
| | | (0.035) | (0.007) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 43.849 |
| **Ownership of mutual funds** | | | | |
| Financial literacy | 0.016*** | | | 0.091* |
| | (0.005) | | | (0.047) |
| Client of *PattiChiari* | | 0.235*** | 0.021** | |
| | | (0.035) | (0.011) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 43.849 |
| **Ownership of government bonds** | | | | |
| Financial literacy | 0.028*** | | | 0.300*** |
| | (0.007) | | | (0.070) |
| Client of *PattiChiari* | | 0.235*** | 0.070*** | |
| | | (0.035) | (0.015) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 43.849 |
| **Retirement Planning** | | | | |
| Financial literacy | 0.039*** | | | 0.197 |
| | (0.014) | | | (0.122) |
| Client of *PattiChiari* | | 0.213*** | 0.042 | |
| | | (0.048) | (0.026) | |
| N. of observations | 2653 | 2653 | 2653 | 2653 |
| F-test on the excluded instr. | | | | 19.967 |
| **Saving rate** | | | | |
| Financial literacy | 0.002 | | | 0.023 |
| | (0.007) | | | (0.043) |
| Client of *PattiChiari* | | 0.235*** | 0.005 | |
| | | (0.035) | (0.010) | |
| N. of observations | 4865 | 4865 | 4865 | 4865 |
| F-test on the excluded instr. | | | | 43.849 |

*Notes:* The table reports OLS, first-stage, intention-to-treat, and instrumental variable results of the model $DV_{ip} = \tilde{\alpha} + \tilde{\beta} fl_{ip} + X_{ip}\tilde{\gamma} + \lambda_p + \varepsilon_{ip}$ where $DV_{ip}$ is a dependent variable measured for household $i$, living in province $p$, in year 2010; $fl_{ip}$ is financial literacy of the household head, $X_{ip}$ is a vector of household controls (as in the baseline specification of Table 2), and $\lambda_p$ is a province fixed effect. Financial literacy is instrumented with a dummy taking the value 1 if the household's main bank belongs to the *PattiChiari* Consortium and 0 otherwise. Financial literacy is the number of correct answers out of the three questions asked in 2010. 2010 SHIW Data. In the top four panels the dependent variable is a dummy equal to 1 if the household owns equities, mutual funds or government bonds; in the fifth panel is a dummy equal to 1 if the household head reports to have planned for retirement; in the bottom panel is the saving rate (ratio between savings and income, winsorized at 1%). Heteroskedasticity-robust standard errors clustered at the province level in parentheses.
$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Table 5: Heterogeneity in the Effect of Financial Literacy on Financial Assets.

| | OLS | FS | ITT | IV |
|---|---|---|---|---|
| *Dependent variable:* | *Fin. assets* | *Fin. literacy* | *Fin. assets* | *Fin. assets* |
| **Education <= median**[a] | | | | |
| Financial literacy | 1.985*** | | | 9.426** |
| | (0.628) | | | (3.747) |
| Client of *PattiChiari* | | 0.256*** | 2.412** | |
| | | (0.044) | (0.998) | |
| N. of observations | 2563 | 2563 | 2563 | 2563 |
| F-test on the excluded instr. | | | | 33.677 |
| **Education > median** | | | | |
| Financial literacy | 3.034*** | | | 7.333 |
| Client of *PattiChiari* | | 0.127*** | 0.928 | |
| | | (0.046) | (1.110) | |
| N. of observations | 2122 | 2122 | 2122 | 2122 |
| F-test on the excluded instr. | | | | 7.542 |
| **Age < 60**[b] | | | | |
| Financial literacy | 1.544** | | | 5.154 |
| | (0.769) | | | (6.261) |
| Client of *PattiChiari* | | 0.167*** | 0.860 | |
| | | (0.044) | (1.096) | |
| N. of observations | 2419 | 2419 | 2419 | 2419 |
| F-test on the excluded instr. | | | | 14.507 |
| **Age 60+** | | | | |
| Financial literacy | 2.665*** | | | 10.309** |
| | (0.709) | | | (4.032) |
| Client of *PattiChiari* | | 0.256*** | 2.635** | |
| | | (0.048) | (1.121) | |
| N. of observations | 2367 | 2367 | 2367 | 2367 |
| F-test on the excluded instr. | | | | 28.385 |
| **Low education, age 60+** | | | | |
| Financial literacy | 1.722** | | | 12.595** |
| | (0.808) | | | (5.153) |
| Client of *PattiChiari* | | 0.232*** | 2.918** | |
| | | (0.052) | (1.204) | |
| N. of observations | 1647 | 1647 | 1647 | 1647 |
| F-test on the excluded instr. | | | | 19.857 |

*Notes:* the table reports OLS, first-stage, intention-to-treat, and instrumental variable results of the model $w_{ip} = \widetilde{\alpha} + \widetilde{\beta} fl_{ip} + X_{ip}\widetilde{\gamma} + \lambda_p + \varepsilon_{ip}$ where $w_{ip}$ is financial assets owned by household $i$, living in province $p$, in year 2010; $fl_{ip}$ is financial literacy of the household head, $X_{ip}$ is a vector of household controls, and $\lambda_p$ is a province fixed effect. Financial literacy is instrumented with a dummy that takes the value 1 if the household's main bank belongs to the *PattiChiari* Consortium and 0 otherwise. Heteroskedasticity-robust standard errors clustered at the province level in parentheses.
$^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.
[a]: This group includes respondents with compulsory schooling (years of education lower or equal to 8).
[b]: 60 is the median age in our baseline sample.

Table 6: Effect of financial literacy on financial assets growth between 2002 and 2006 or 2008 or 2010.

| | OLS | FS | ITT | IV |
|---|---|---|---|---|
| *Dependent variable:* | Fin. ass. growth | Fin. lit. | Fin. ass. growth | Fin. ass. growth |
| Financial literacy | 0.020** | | | 0.160** |
| | (0.007) | | | (0.068) |
| Client of *PattiChiari* | | 0.133*** | 0.021** | |
| | | (0.027) | (0.009) | |
| N. of observations | 3181 | 3181 | 3181 | 3181 |
| F-test of excluded instruments | | | | 23.254 |

*Notes:* Each column reports estimates of a separate regression. OLS, ITT and IV columns are regression where the dependent variable is $\frac{(y_{itp}-y_{i2002p}-E[y_{itp}-y_{i2002p}])}{\sqrt{Var(y_{itp}-y_{i2002p})}}$, i.e. standardized growth in financial assets between 2002 and time $t$ for household $i$ in province $p$. FS columns are regressions where the dependent variable is financial literacy. All models include the same vector of household controls: age, age squared, gender, marital status and years of education of the household head; number of household components, household labour income, size of the municipality and financial assets in 2002. All models include year-specific province fixed effects. In IV columns, financial literacy is instrumented with a dummy that takes the value 1 if the household's main bank belongs to the *PattiChiari* Consortium and 0 otherwise. Financial literacy is the number of correct answers out of the two common across waves. SHIW repeated cross-section 2006-2010. Heteroskedasticity-robust standard errors clustered at the province level in parentheses.
$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Table 7: Propensity Score Matching: Estimates

| | OLS | FS | ITT | IV |
|---|---|---|---|---|
| *Dependent variable:* | *Fin. assets* | *Fin. lit.* | *Fin. assets* | *Fin. assets* |
| **Panel A : Baseline model on common support** | | | | |
| Financial literacy | 2.289*** | | | 8.550*** |
| | (0.629) | | | (3.005) |
| Client of *PattiChiari* | | 0.233*** | 1.996*** | |
| | | (0.036) | (0.724) | |
| F-test excluded instr. | | | | 43.216 |
| N. of observations | | 4829 | | |
| **Panel B: Propensity score model controls on common support** | | | | |
| Financial literacy | 2.180*** | | | 7.933*** |
| | (0.629) | | | (3.044) |
| Client of *PattiChiari* | | 0.221*** | 1.751** | |
| | | (0.035) | (0.695) | |
| F-test excluded instr. | | | | 38.917 |
| N. of observations | | 4829 | | |

*Notes:* Each column reports estimates of a separate regression. OLS, ITT and IV columns are regressions where the dependent variable is financial assets. FS columns are regressions where the dependent variable is financial literacy. All models include the same vector of household controls: age, age squared, gender, marital status and years of education of the household head; number of household components, household labour income, reasons for choosing the main bank and size of the municipality. All models include province fixed effects. In IV columns, financial literacy is instrumented with a dummy that takes the value 1 if the household's main bank belongs to the *PattiChiari* Consortium and 0 otherwise. SHIW 2010. Heteroskedasticity-robust standard errors clustered at the province level in parentheses.
$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Table 8: Bank Costs by *PattiChiari* Status - Year 2010 (euro)

| Type of Bank | Basic Account Fees | Debit Card Fees | Credit Card Fees | Avg. Cost Bank Transf. (desk) | Avg. Cost Bank Transf. (online) | Avg. Cost of Withdrawal (desk) | Avg. Cost of Withdrawal (ATM) | Obs |
|---|---|---|---|---|---|---|---|---|
| non-*Patti-Chiari* | 35.94 | 6.38 | 5.98 | 2.43 | 0.38 | 0.08 | 6.28 | 844 |
| | (27.6) | (5.31) | (15.59) | (7.00) | (2.16) | (0.70) | (21.77) | |
| *Patti-Chiari* | 36.11 | 3.32 | 5.72 | 2.23 | 0.70 | 0.26 | 6.02 | 5889 |
| | (37.23) | (6.19) | (12.92) | (7.16) | (3.67) | (2.14) | (20.03) | |
| Welch t-test stat. | 0.06 | -2.38 | -0.97 | 0.42 | 1.28 | 1.40 | -0.96 | |
| (p-value) | (0.95) | (0.02) | (0.33) | (0.67) | (0.20) | (0.16) | (0.34) | |

*Source:* Bank of Italy Survey on Bank Fees and Expenditures. *Notes:* an observation is an individual bank account. Due to confidentiality reasons, for each bank, only means and standard deviations of each variable has been provided, together with the number of bank accounts surveyed. The means and standard deviations provided in this table are, thus, combined assuming observations are independent between banks. The Welch t-test for equality of means between *PattiChiari* and non-*PattiChiari* banks assumes unequal standard deviations between the two groups. We report two-sided p-values.

Table 9: Bank Total Assets, Number of Branches, and *PattiChiari* status in 2010

| Bank Name | *PattiChiari* | Total Assets (mln) | No. of Branches | Decile by Assets | Decile by Branches |
|---|---|---|---|---|---|
| UniCredit | 1 | 929488 | 11266 | 10 | 10 |
| Intesa Sanpaolo | 1 | 658757 | 4060 | 10 | 10 |
| Banca Monte dei Paschi di Siena | 1 | 244279 | 4677 | 10 | 10 |
| Banca Nazionale del Lavoro | 1 | 98022 | 1847 | 10 | 10 |
| Banca Popolare del Mezzogiorno | 1 | 60515.92 | 174 | 10 | 4 |
| Banca popolare dell'Emilia Romagna | 1 | 58498 | 429 | 10 | 6 |
| Banca Popolare di Milano | 1 | 54053 | 703 | 10 | 8 |
| Cassa di Risparmio di Parma e Piacenza | 1 | 46339 | 1082 | 9 | 9 |
| BancoPosta | 0 | 43223.27 | 7700 | 9 | 10 |
| Banca Carige | 1 | 40010 | 807 | 9 | 9 |
| Banca Popolare di Vicenza | 1 | 35533 | 520 | 9 | 7 |
| Veneto Banca | 0 | 33057 | 335 | 9 | 6 |
| Cassa di Risparmio di Firenze | 1 | 31677 | 637 | 9 | 8 |
| Credito Emiliano | 1 | 29998 | 976 | 9 | 9 |
| Banca Popolare di Verona-S. Geminiano e S. Prospero | 1 | 29689 | 2153 | 8 | 10 |
| Banco di Napoli | 1 | 28153 | 2424 | 8 | 10 |
| Credito Valtellinese | 1 | 26761 | 164 | 8 | 3 |
| Banca Popolare di Sondrio | 0 | 26282 | 336 | 8 | 6 |
| Deutsche Bank | 1 | 24859 | 358 | 8 | 6 |
| Banca Popolare di Bergamo | 1 | 24456 | 957 | 8 | 9 |
| Banca delle Marche | 1 | 21486 | 501 | 8 | 7 |
| Cassa di Risparmio del Veneto | 1 | 19625 | 1000 | 7 | 9 |
| Banca Popolare di Lodi | 1 | 19556 | 1175 | 7 | 9 |
| Banco di Brescia | 1 | 17622 | 738 | 7 | 8 |
| Banca Popolare di Novara | 1 | 17075 | 1205 | 7 | 9 |
| Banco di Sardegna | 1 | 13930 | 550 | 7 | 7 |
| Unipol Banca | 0 | 12052 | 332 | 7 | 6 |
| Banca Mediolanum | 1 | 11622 | 6 | 7 | 1 |
| FinecoBank Banca | 1 | 11250 | 3 | 6 | 1 |
| Banca popolare dell'Etruria e del Lazio | 0 | 10903 | 304 | 6 | 5 |
| Cassa di risparmio in Bologna | 1 | 10161 | 596 | 6 | 8 |
| Banca Popolare Commercio e Industria | 1 | 10130 | 598 | 6 | 8 |
| Aletti and Co. | 0 | 9940 | 42 | 6 | 1 |
| Banca Carime | 1 | 9784 | 700 | 6 | 8 |
| Banca Fideuram | 1 | 9556 | 108 | 6 | 2 |
| Banca Popolare di Ancona | 1 | 9101 | 310 | 5 | 6 |
| Banca Popolare FriulAdria | 1 | 8501 | 313 | 5 | 6 |
| Cassa di Risparmio di Bolzano | 0 | 8210 | 198 | 5 | 5 |
| Banco di Desio e della Brianza | 0 | 8163 | 166 | 5 | 4 |
| Banca Regionale Europea | 1 | 8132 | 569 | 5 | 8 |
| Banca Sella | 1 | 7979 | 528 | 5 | 7 |
| Cassa di risparmio di Ferrara | 0 | 7573 | 170 | 5 | 4 |
| Banca Popolare di Bari | 0 | 7286 | 221 | 4 | 5 |
| Banca di Credito Cooperativo di Roma | 0 | 7259 | 152 | 4 | 3 |
| Cassa di risparmio di Asti | 0 | 6118 | 210 | 4 | 5 |
| Banca dell' Adriatico | 1 | 5613 | 463 | 4 | 7 |
| Cassa di risparmio della provincia di Teramo | 0 | 5489 | 187 | 4 | 4 |
| Banca Di Credito Sardo | 1 | 5401 | 117 | 4 | 2 |
| Banca Popolare dell'Alto Adige | 0 | 5248 | 140 | 4 | 3 |
| Banca della Campania | 1 | 5155 | 210 | 3 | 5 |
| Cassa dei Risparmi di Forli e della Romagna | 1 | 4769 | 171 | 3 | 4 |
| Banca Nuova | 1 | 4711 | 135 | 3 | 3 |
| Cassa di risparmio di Venezia | 1 | 4650 | 434 | 3 | 7 |
| Cassa di Risparimio di Rimini | 0 | 4551.51 | 179 | 3 | 4 |
| Cassa di Risparmio di Biella e Vercelli | 1 | 4523 | 211 | 3 | 5 |
| Banca Popolare di Puglia e Basilicata | 1 | 4460 | 191 | 3 | 5 |
| Banca Agricola Popolare di Ragusa | 0 | 4388 | 101 | 2 | 2 |
| Cassa di Risparmio del Friuli Venezia Giulia | 1 | 4300 | 447 | 2 | 7 |
| Credito Siciliano | 1 | 4059 | 157 | 2 | 3 |
| SpA-Generbanca | 1 | 3808 | 70 | 2 | 1 |
| Cassa di risparmio della provincia di Chieti | 1 | 3574 | 116 | 2 | 2 |
| Banca Popolare Pugliese | 1 | 3263 | 103 | 2 | 2 |
| Banca Popolare di Spoleto | 1 | 3029 | 165 | 2 | 4 |
| Banca Monte Parma | 0 | 3005 | 91 | 1 | 2 |
| Cassa di risparmio di San Miniato | 0 | 2986 | 132 | 1 | 2 |
| IW Bank | 0 | 2874 | 2 | 1 | 1 |
| Banca di Piacenza | 0 | 2793 | 62 | 1 | 1 |
| Allianz Bank | 0 | 2769 | 19 | 1 | 1 |
| Cassa di risparmio di Pistoia e della Lucchesia | 1 | 2515 | 145 | 1 | 3 |
| Cassa di risparmio della Spezia | 1 | 2055 | 152 | 1 | 3 |

*Notes:* data from Bankscope, Bank of Italy - SIOTEC database, and PattiChiari Consortium.