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# Household financial choices: A study on the role of financial literacy, trust, and regulations

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# Abstract

The purpose of the study is to understand the factor that influence households' financial choices in Italy, using cross-sectional data using the survey on Household Income & Wealth and Financial literacy of Italian adults' survey published by bank of Italy in 2020.

A literature review has been curried to study the current trend in pension plans, the different types of pensions and the difference in implementation of those type in OECD countries.

This study investigates financial literacy and related financial behaviors using a regression modeling approach. The independent variables, including age, gender, working status, education, income, geographical area, population size, and the relationship with the highest earner in the household, are examined in relation to financial literacy.

Furthermore, the second and the third regression models investigates the relationship between market participation and the number of financial products owned respectively using the independent variables which age, gender, education, income, geographical area, financial literacy, professional advice, and the relationship with the highest earner in the household are used to predict market participation.

Finally, the study seeks to assess the relationship between perceived financial knowledge and actual financial knowledge scores using a regression model, the independent variables of this model are age, gender, education, income, geographical area, financial literacy, professional advice, and the relationship with the highest earner in the household as independent variables to predict perceived knowledge.

The findings of the study will give insights into the determinants of market participation, holding of financial products and financial literacy, which can contribute to the development of policy and educational programs to improve financial literacy and households' financial decision-making.

# Acknowledgement

I would like to express my deepest gratitude and heartfelt appreciation to my esteemed professor Riccardo Calcagno for his unwavering dedication, invaluable guidance, and support throughout this journey.

I would also like to extend my heartfelt thanks to my parent, extended family and loved ones for their love, patience, and unwavering supports throughout this demanding academic endeavor. Furthermore, I am grateful to my fellow colleagues and classmates who took this journey alongside me during this master's program. Our collaboration and exchange of ideas have enriched my learning experience and made this academic pursuit more rewarding.

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# Contents

# TABLE OF FIGURE

# 1. Introduction

Since the early 1990s, the Italian pension system has been going through a reform process aimed at improving its long-term sustainability and redressing its main problems. The reform has increased individual responsibility for their financial own wellbeing and having control over their retirement.

In 1995, the transition from a Defined Benefit system to a Defined Contribution started. The benefit in Defined Contribution pensions determines according to payroll taxes contributed during the entire working career and to the worker's retirement age, individual can also participate in a privately manage pension in which she/he can decide the time and size of contribution.

This new situation is taking place at a time when technological progress, financial innovations, and increasing market integration which made financial products more complex. It raises questions about households' readiness, financial knowledge, attitude regarding savings, long-term planning, and ability to deal with complex financial decisions. These decisions have substantial effects on the financial well-being of individuals, households, and the economy in general.

The data published by (Bank of Italy, 2020) shows that most individual lack the fundamental financial knowledge and skills necessary to construct a financial portfolio that optimize the return on investment given the financial goal, it is necessary for those individual to delegate those responsibilities to financial advisors and institutions. These delegations require interpersonal and institutional trust in the financial systems.

Households' market participation is a major contributor to financial inequality. According to the survey of households' wealth and income 2020, the concentration of financial assets

ownership has increased between 2016 and 2020. The bottom half of households in terms of net wealth held only 7 percent of total gross financial wealth, while the richest 3 percent of households owned nearly 50 percent of financial assets. driven by higher savings for the more affluent households and a greater allocation of their portfolios to financial assets benefiting from positive market trends over the four-year period. While the lowest 20 percent of households allocate 95% of their financial wealth to deposit accounts.

Nowadays households are faced with many factors influencing their financial decisions, ranging recent economic events, such as the global financial crisis to wars and the COVID-19 pandemic which have had a significant impact on the financial behavior of households and their attitudes toward risk and saving.

Understanding Italian households' financial decisions is crucial for policymakers, researchers, and individuals. It provides insight into the factors that influence the financial behavior of households, their level of financial literacy, their access to financial services, and the condition of the economy. In addition, analyzing the financial decisions made by Italian households can help identify challenges and opportunities in the financial sector and guide policymakers in the development of policies that promote financial inclusion, economic growth, and stability.

## 2. financial literacy and its components

Financial literacy is defined as the knowledge, skills and behaviors that are required to make informed and effective money management, investing, and financial planning decisions. It is a necessary life skill that enables individuals to better understand, manage and plan their finances and accomplish their financial goals.

Financial literacy is important for many reasons. It enables individuals to make informed financial decisions, such as selecting appropriate investment opportunities, understanding the trade-off between risks and returns, planning for retirement, and effectively managing debt. This can result in improved financial outcomes, including increased savings, reduced debt levels, and greater return on investment.

Financial literacy is essential for financial well-being, skills such as financial planning are important to prepare for retirement. A lack of financial literacy can contribute to poor retirement planning and inadequate retirement savings, which can result in financial hardship in old age. Additionally , financial literacy is necessary for individuals to avoid financial fraud and schemes. Individuals who are financially literate have a better ability to recognize and avoid frauds and are less likely to fall victim to financial deception. Furthermore, financial literacy has greater economic advantages. Individuals who are financially literate are more likely to partake in the formal financial system, which can stimulate economic growth and development. Financial literacy may additionally contribute to decreasing income inequality by empowering individuals to make educated financial decisions and enhance their financial well-being.

Many studies have shown that a person's ability to comprehend and implement fundamental financial and economic principles is crucial for achieving an adequate level of economic welfare. Several studies, including those by Lusardi and Mitchell (2011) and Lusardi and Mitchell (2014), have highlighted this factor. Financially literate individuals are better equipped to take advantage of the opportunities presented by an advanced financial system while also managing risks responsibly.

According to a comprehensive definition by (OECD, 2011) financial literacy is the awareness, knowledge, skills, attitude, and behaviors required to make sensible financial decisions and ultimately attain individual financial wellbeing The International Network for Financial Education (INFE) has developed a questionnaire that measures three aspects of financial literacy: knowledge, behaviors, and attitudes. It has been extensively adopted globally. The knowledge component seeks to evaluate the candidate's understanding of key concepts, which are necessary for making sensible financial decisions. The knowledge is founded on the three topics that have become standard in the literature on financial literacy (Lusardi and Mitchell, 2011): comprehending simple and compound interest, inflation, and the advantages of portfolio diversification.

Consumers' actions and behavior have an important effect on financial situation and well-being; as well as having the greatest impact on the financial literacy score as calculated according to the OECD/INFE methodology. Specifically, the behavior index is based on queries assessing whether individuals manage their family's financial resources by saving and long-term planning, make considered purchases and track their cash flow (OECD/INEF,2020).

Financial attitudes evaluate how personal characteristics such as preferences, beliefs, and non-cognitive skills contribute to the individual's financial well-being. According to INFE's methodology, this component is intended to measure attitudes toward precautionary saving and towards the future in general (OECD/INEF,2020).

## Financial literacy of adults in Italy

Surveys on the financial literacy and competence of Italian adults (IACOFI) published in 2020 shows that the majority of respondents are more knowledgeable about topics such as inflation and equities than subjects such as interest compounding and diversification, the average score of financial knowledge is 3.84 out of 7 indicating that many individuals lack fundamental financial knowledge.

*Figure 1 components of financial literacy by geographical area*

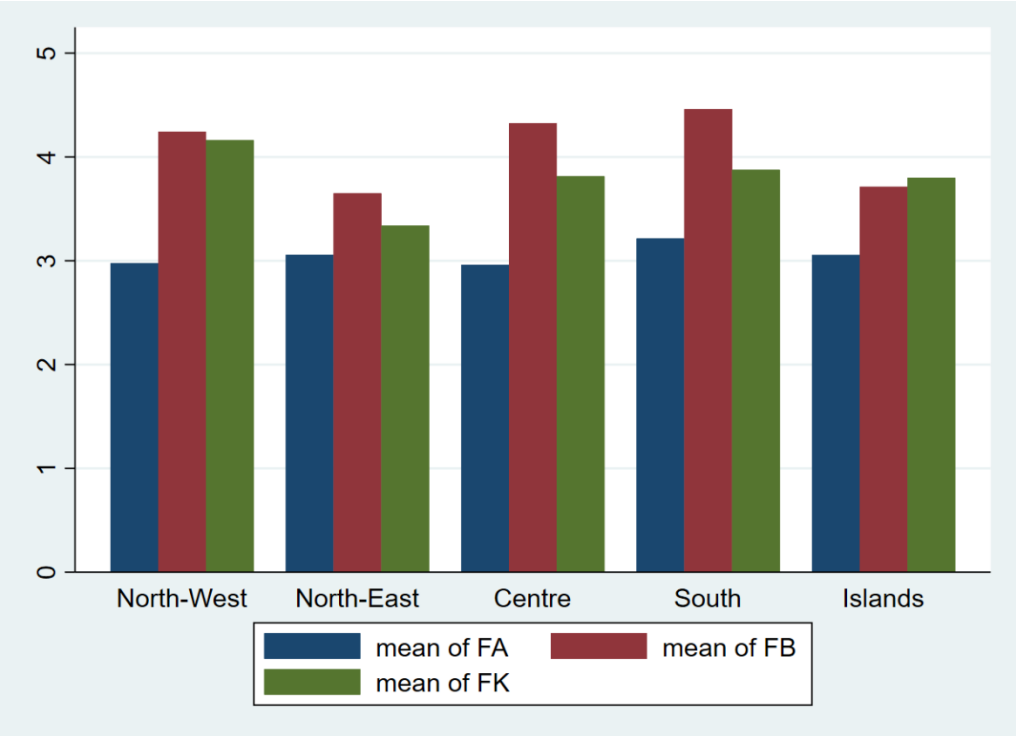

Figure [1] source: data sources: surveys on the financial literacy and competence of Italian adults (IACOFI) 2020

The study by (Fornero, 2011) reported a regional difference in financial literacy between residents of the North-Centre and the South, with the North-West having higher literacy levels. Greater financial literacy considerably increases the likelihood of participation in a pension fund in terms of retirement planning. Important economic and social indicators, such as employment rates, per capita income, and average levels of education, reflect the disparity between the northern and southern regions of Italy. And it also found a found a strong correlation between financial literacy in Italy and the logarithm of per capita GDP, the employment rate, and the proportion of employees working in small firms (up to 50 employees), controlling for socio-demographic characteristics of households.

*Figure 2 financial literacy's averages by geographical area*

```
. tabstat FK FA FB FL [aweight = wght], by(area5)

Summary statistics: mean
  by categories of: area5 (AREA)
```

| area5 | FK | FA | FB | FL |
|---|---|---|---|---|
| North-West | 4.433702 | 2.908738 | 4.430842 | 11.77328 |
| North-Eest | 3.315101 | 3.11942 | 3.487015 | 9.921536 |
| Centre | 4.075865 | 2.986914 | 4.481981 | 11.54476 |
| Souths | 3.808441 | 3.190972 | 4.515466 | 11.51488 |
| Islands | 3.716897 | 3.076821 | 3.602527 | 10.39624 |
| Total | 3.923844 | 3.0483 | 4.187232 | 11.15938 |

Figure [ 2] data sources: surveys on the financial literacy and competence of Italian adults (IACOFI), 2020

Financial behavior score is measured on scale from 0 to 9, Italians received a score of 4.2, which is lower than the G20 average of 5.4. The OECD set an objective of 6 out of 9 for financial behavior. Less than 30% of Italian respondents met the minimal objective score in comparison with the G20 average which is 52% (OECD/INEF,2020).

Financial attitude score is measured on a scale 0 – 5, the average score in Italy is 3 out of 5 which is in line with the objective of the OECD. The responses to the three questions regarding attitude scores follow a similar pattern: 40% of Italian respondents have a positive saving orientation (they disagree that spending is more gratifying than saving for the future), 21% disagree that "money is there to be spent," and 37% disagree that "they tend to live in the moment." The respective average percentages for the G20 are 43%, 29%, and 48%. (OECD/INEF,2020).

Italian households have a reduced propensity to borrow, with only 15% of adults experiencing a situation where their family income was insufficient to cover their living expenditures, causing them to borrow money in the past year.

*Figure 3 financial literacy scores by level of education*

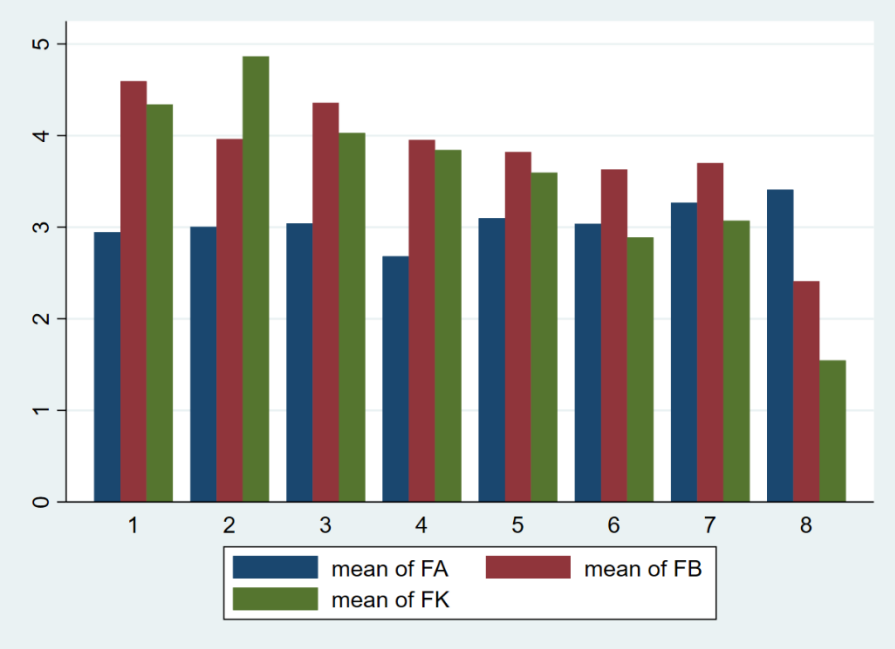


Figure [3] data sources: surveys on the financial literacy and competence of Italian adults (IACOFI), 2020

There is gender gap in Italy, men have higher financial knowledge and behaviors scores, (Hasler, 2017) made a comparison between financial literacy in Italy and G20 countries, the study found that among the G20, Italy has the largest gender gap in financial literacy, at 15%; 45% of

Italian men are financially literate, whereas only 30% of women are. As a result, Italian women tend to engage less with financial services and institutions than men compared to women in the other major advanced economies (Canada, France, Germany, Japan, the United Kingdom, and the United States). For example, 83% of Italian women have their own or a joint account at a bank, or another type of formal financial institution, whereas the percentage among men stands at 92% (Hasler, 2017).

*Figure 4 financial literacy average scores by gender*

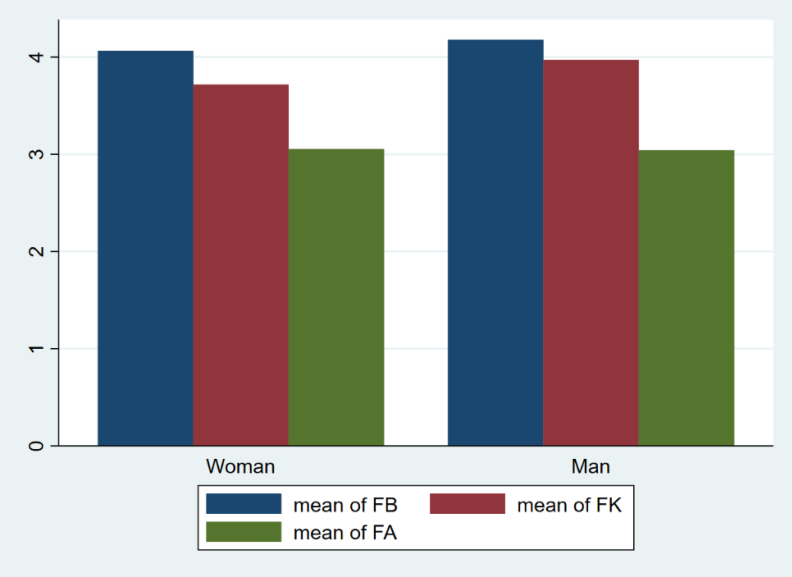


Figure [4] data sources: surveys on the financial literacy and competence of Italian adults (IACOFI).

# 3. Trust and its determinants

## Definition of trust

The concept of "Trust" can be interpreted differently depending on its context. In one context, trust may refer to the result of a society in which non-legal mechanisms compel individuals to act cooperatively. In small communities with complex relationships, for instance, individuals tend to keep their word out of fear of being stigmatized by the community (Spagnolo, 1999).

Trust can be classified to rational trust and moralistic trust, the study (Hardin, 2004) had defined rational trust as trust in terms of a specific trusting relationship of the type A trusts B to do X, emphasizing the strategic nature of trust. Hardin focuses on the idea of “encapsulated interest”: in this formulation, trust happens when the person or institution to be trusted has an incentive to be trustworthy because they internalize the interests of the person doing the trusting. The main alternative to a rational notion of trust is the concept of moralistic trust. (Uslaner, 2008) argues that trust is inherited through socialization rather than acquired. In this sense, trust is still an expectation about how others will behave, but it is not a strategic expectation. Trust is not grounded in the view that the person to be trusted encapsulates the interests of the person doing the trusting but is rather a general attitude based on the life experiences and cultural background of the person doing the trusting.

The OECD guideline on measuring trust classifies trust into three categories interpersonal, institutional, and political trust. trust is dynamic and subject to change over time. This implies that decision-makers can modify their expectations over time and that these parameters can be replaced by various trustees, behaviors, and real-world contexts. (De Jager, 2017) Trust is determined by three factors: (i) the characteristics of the person who trusts, (ii) the context in which the trust relationship is established and maintained, and (iii) the characteristics of the subject in whom trust is placed.

## Trust in financial institutions

One of most important aftermaths of the 2008 financial crisis is the decline of trust in public and private institutions in most OECD countries, especially those most severely affected by the crisis. To address these issues the OECD Council held a meeting in 2013, the result of this meeting was a two-year initiative aimed at providing methodological, empirical, and practical guidance to OECD governments to restore people's trust in public institutions.

A study by (Walti, 2012) shows that the decision-maker's perception of the financial institution's risk influences their propensity to trust. The study represented the relationship between citizens and economic institutions using agent-principal paradigm, in which citizens are the principal and financial institutions (such as banks) are the agents. If the principal loses the initial confidence placed in the agent, for whatever cause, they may decide to switch agents. This loss of confidence can result in a bank run in the worst-case scenario for the banking system. Consequently, the study by (van der Cruijsen, 2020) shows it is essential for the banking system and financial institutions to continually acquire and maintain the trust of households. Without their trust, not only would these institutions fail to endure, but it would also be detrimental to the economy by reducing the amount of capital available for productive purposes.

A study by (Ammari, 2023) investigated the impact of the pandemic on individuals' trust in the Italian banking system The study revealed a causal relationship between financial literacy,

individual perceptions of the COVID-19 pandemic, and high/low trust in financial institutions using a Fuzzy-set qualitative comparative method. The perception of a potential conspiracy played a significant role in determining the level of trust in institutions during the COVID-19 pandemic, even though respondent demographics varied.

Additionally, the study revealed that financial literacy is a necessary but insufficient condition for attaining high levels of trust. As demonstrated by (Guiso,2008) and other studies on the relationship between trust and the financial system, it is crucial for financial market participants to comprehend the factors that affect the level of confidence in the banking system during a non-financial crisis.

## Trust and market participation rate

The decision to invest in the stock market requires not only an evaluation of the risk-return relationship based on available data, but also faith in the data's veracity and the system's overall impartiality. Instances such as Enron, FTX, and AIG can not only affect the expected payoffs, but also undermine the underlying confidence in the system delivering those payoffs. Individuals with higher levels of trust are more likely to engage in investment activities, as trust has been identified as a significant factor in predicting stock market participation (Georgarakos, 2011). Participation in the stock market refers to the degree to which individuals invest in equities, bonds, or other financial instruments. Education, income, sociability, and wealth can all influence a person's decision to invest in the stock market.

The study by (van Der Cruijsen, 2021) argues that individuals with greater financial knowledge are more likely to have greater trust in financial institutions, which in turn influences their financial behaviors positively. Using data from the 2012 National Financial Capability Study (NFCS), the study examines the relationship between financial knowledge, trust in financial institutions, and financial behaviors such as saving and investing. Individuals with greater financial knowledge tend to have greater trust in financial institutions, resulting in positive financial behaviors. In addition, the study demonstrates that factors such as age, education, income, and exposure with financial products can influence a person's financial literacy and trust in financial

institutions. The conclusion of the study is that promoting financial literacy can play a role in cultivating trust in financial institutions and positive financial behaviors.

Numerous studies have investigated the relationship between trust and market participation rates in relation to financial contracts. The study by (Guiso, 2000) analyzed the risk aversion behaviors of households and formulated three primary hypotheses. First, only investors with adequate levels of trust will invest in the stock market. Second, a risk-averse individual will invest in equities if the anticipated return exceeds the risk-free rate in the absence of participation costs. A lack of trust can reduce expected returns, prompting an individual to invest in less hazardous instruments. Lastly, the optimal allocation of a person's portfolio to hazardous assets increases as their confidence in the financial system grows. When participation costs exist, higher participation costs result in a lower deception probability threshold that initiates nonparticipation. The study also considers optimism's effects. (Luigi Guiso, 2008) demonstrates that generalized trust in others has a significant impact on Dutch households' stock market participation. Customers of a prominent Italian bank exhibit comparable levels of confidence in bank representatives and brokers.

## Trust and financial advice.

Financial information and the ability to comprehend it are essential portfolio allocation. And because not all investors possess the requisite skills or knowledge to administer their portfolio, it is necessary for them to delegate those responsibilities to professionals, delegation require trust.

According to the survey data published by the supervisory authority for the Italian financial products market (CONSOB, 2020) 40% of respondents do not trust financial actors. While 25% of individuals have a high level of trust in financial actors. It also shows that individuals trust their own financial service providers more than other financial actors.

*Figure 5 Trust in financial actors*

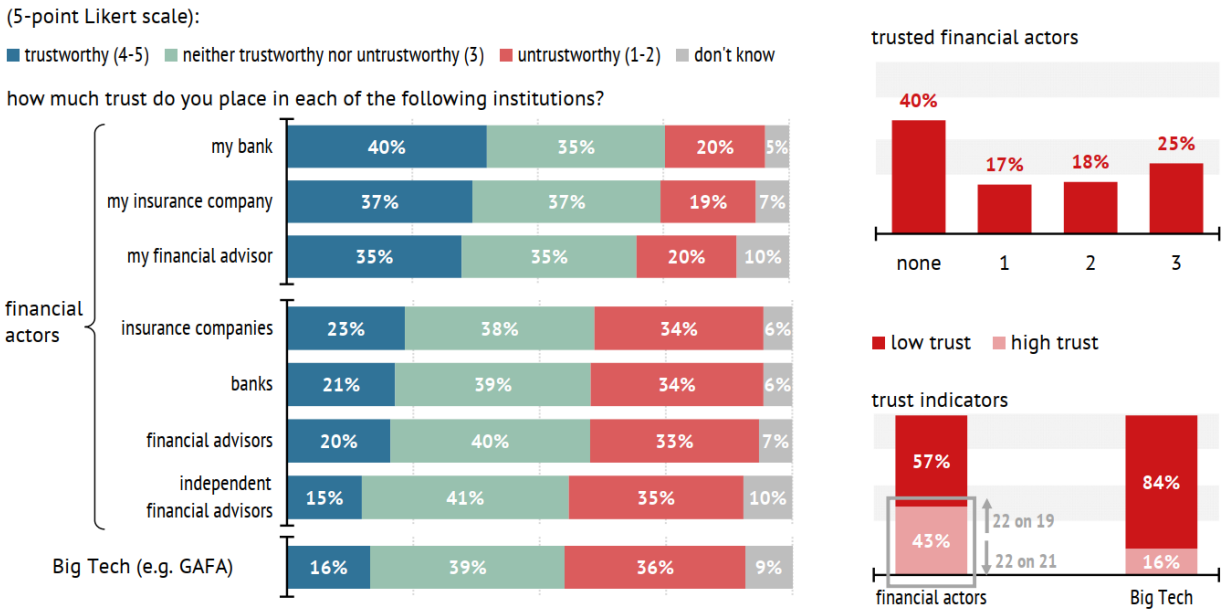


Figure [5] source: (CONSOB, 2022)

The aim of the MiFID II regulation has been introduced to strengthen the supervisory and regulatory framework for markets in financial instruments to promote trust, transparency, investors' protection and improve the functioning of the internal market in financial instruments.

## 4. Pensions Plans

In recent years, there has been a consistent transition from defined benefits to defined contribution pension schemes. To make informed decisions about their retirement, individuals require high-quality information about these pension systems. According to (Mitchell ,1988), a lack of pension knowledge is problematic because employees may save or consume less than optimally and may even retire earlier than they would if they had greater pension knowledge. The acquisition of such knowledge is closely related to information accessibility and dependent on the costs and benefits of information collection.

There are two distinct types of basic pensions: residence-based benefits and benefits restricted to those who have made contributions throughout their careers. Unrelated to career earnings, the benefit level may vary based on the number of years of residence or contributions. Eight OECD nations provide prospective retirees with residence-based basic pensions, while Norway and Sweden are replacing theirs with targeted schemes involving means testing. There are contribution-based basic pensions in nine OECD countries.

The qualification for specified programs requires specific residence requirements, the benefit amount is based on other sources of income and possibly assets. Consequently, pensioners with lesser incomes receive greater benefits than those with higher wealth. While all countries have this form of general safety net, only those countries where full-time employees with very low earnings (30% of the average) would be eligible are indicated. This is applicable to eight OECD countries, both now and in the future.

Minimum pensions can refer either to the minimum entitlements under a particular contributory plan or to the total minimum entitlements across all plans. Currently, sixteen OECD nations have minimum pension schemes, while Chile and Italy are phasing out theirs. In the majority of nations, pensions are the only source of income taken into account when calculating the value of benefits. Minimum pensions either establish a minimum for total lifetime entitlements, which may increase over time, or establish a minimum for total lifetime benefits.

Public pay-as-you-go programs in 20 OECD countries provide pensions to prospective retirees based on the number of years of contributions, accrual rates, and pensionable earnings. In eight additional nations, DB plans are available to current retirees but not to new employees. In two OECD countries (the Netherlands and Switzerland), private occupational DB plans are obligatory or quasi-obligatory. In five OECD countries, point systems are in place, including the French occupational programs administered by social partners under public supervision, as well as the Estonian, German, Lithuanian, and Slovak public schemes. In point-based systems, employees accrue pension points based on their earnings, which are multiplied by a pension-point value at retirement to determine the regular pension payment.

In five OECD countries (Italy, Latvia, Norway, Poland, and Sweden), notional defined contribution (NDC) schemes form the foundation of the pension system. In addition, the minor supplementary component of the Greek pension system follows the NDC model. Similar to funded defined contribution (FDC) plans, these are pay-as-you-go public schemes with individual accounts that apply a notional rate of return to contributions. However, account balances only exist on the records of the managing institution. Upon retirement, the accumulated notional capital is converted into a monthly pension using a formula based on life expectancy (OECD,2019).

Future retirees are required to participate in funded defined contribution (FDC) plans in 12 OECD countries. In these plans, contributions are deposited into individual accounts, and the accumulated contributions and investment returns are typically converted into a monthly pension upon retirement. In Denmark and Sweden, in addition to lesser mandatory public plans, there are quasi-mandatory occupational FDC plans (OECD,2019).

*Figure 6 classification of pension systems*

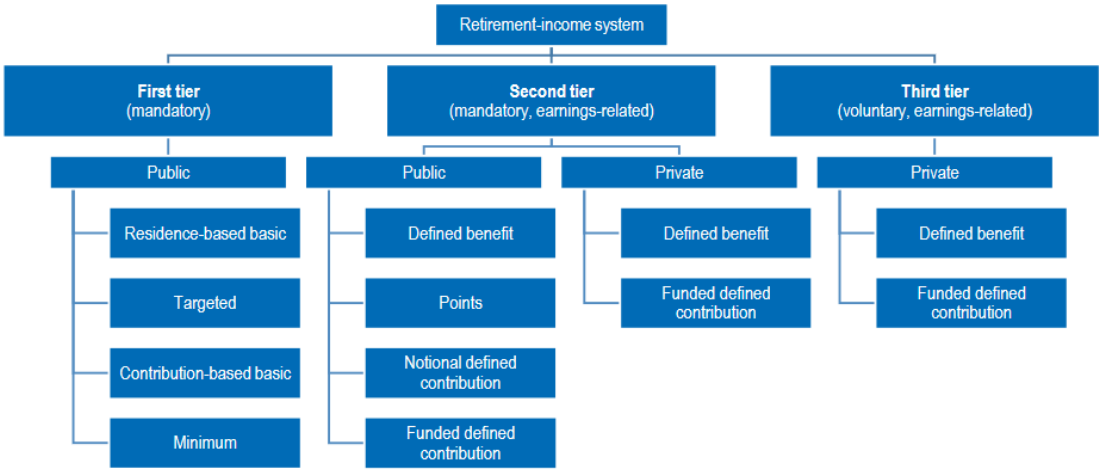


Figure [6] source: (OECD,2019)

*Figure 7 pensions system by country*

| | First tier | | | | | Second tier | | First tier | | | | | Second tier | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Residence-based | | Contribution-based | | | | | Residence-based | | Contribution-based | | | | |
| | Basic | Targeted | Basic | Minimum | Public | Private | | Basic | Targeted | Basic | Minimum | Public | Private | |
| Panel A. Latest legislation (applying to future retirees entering the labour market in 2018 at age 22) | | | | | | | | | | | | | | |
| Australia | | ✔ | | | | FDC | Mexico | ✔ | | | ✔ | | | FDC |
| Austria | | | | ✔ | DB | | Netherlands | ✔ | | | | | | DB [q] |
| Belgium | | | | ✔ | DB | | New Zealand | ✔ | | | | | | |
| Canada | ✔ | ✔ | | | DB | | Norway | | ✔ | | | NDC | | FDC |
| Chile | | ✔ | | | | FDC | Poland | | | | ✔ | NDC | | |
| Colombia | | | | ✔ | DB | FDC | Portugal | | | | ✔ | DB | | |
| Costa Rica | | | | | DB | FDC | Slovak Republic | | | | ✔ | Points | | |
| Czech Republic | | | ✔ | ✔ | DB | | Slovenia | | | | ✔ | DB | | |
| Denmark | ✔ | ✔ | | | FDC | FDC [q] | Spain | | | | ✔ | DB | | |
| Estonia | | | ✔ | | Points | | Sweden | | ✔ | | | NDC + FDC | | FDC [q] |
| Finland | | ✔ | | | DB | | Switzerland | | | | ✔ | DB | | DB |
| France | | | | ✔ | DB + Points | | Turkey | | | | ✔ | DB | | |
| Germany | | | | | Points | | United Kingdom | | | ✔ | | | | FDC [q] |
| Greece | ✔ | | | | DB + NDC | | United States | | | | | DB | | |
| Hungary | | | | ✔ | DB | | | | | | | | | |
| Iceland | ✔ | ✔ | | | | FDC [q] | | | | | | | | |
| Ireland | | | ✔ | | | | Argentina | | | ✔ | ✔ | DB | | |
| Israel | ✔ | | ✔ | | | FDC | Brazil | | | | ✔ | DB | | |
| Italy | | | | | NDC | | China | | | | ✔ | NDC + FDC | | |
| Japan | | | ✔ | | DB | | India | | | | ✔ | DB + FDC | | |
| Korea | | | ✔ | | DB | | Indonesia | | | | ✔ | DB + FDC | | |
| Latvia | | | | ✔ | NDC + FDC | | Russian Federation | | | ✔ | | Points | | FDC |
| Lithuania | | | ✔ | | Points | | Saudi Arabia | | | | ✔ | DB | | |
| Luxembourg | | | ✔ | ✔ | DB | | South Africa | | ✔ | | | | | |
| Panel B. Current legislation where different from Panel A (applying to new retirees in 2020)* | | | | | | | | | | | | | | |
| Chile | | ✔ | | ✔ | DB | FDC | Mexico | | | | ✔ | DB | | |
| Estonia | | | ✔ | | DB/Points | FDC | Norway | ✔ | ✔ | | | DB | | FDC |
| Italy | | | | ✔ | DB + NDC | | Poland | | | | ✔ | DB/NDC | | |
| Latvia | | | | ✔ | DB/NDC + FDC | | United Kingdom | | | ✔ | | DB | | |

Figure [6] source: (OECD,2019)

According to the study published by (the European Parliament,2014) pension systems are typically comprised of three pillars. The "first pillar" consists of state-provided public annuities, which are typically financed through social insurance contributions or general tax revenues. The "second pillar" consists of occupational retirement plans, which are private supplementary plans tied to employment relationships and fully funded (defined contribution) systems. They are funded through mandatory payroll deductions. The "third pillar" is made up of personal pensions, which are voluntary supplementary plans represented by pre-funded private voluntary supplementary plans in which contributions are invested in an individual account administered by a pension fund or financial institution.

The report by OECD published in 2019 shows that the majority of European countries also provide a minimum guaranteed pension, which is typically based on need and seeks to provide all retirees with a minimum level of support. In countries such as the United Kingdom, Ireland, the Netherlands, and Denmark, however, everyone receives a fixed minimum pension.

In most countries, pension schemes are administered by the government. The replacement rate, which represents the percentage of a worker's pre-retirement monthly income received monthly after retirement, is a crucial indicator of a pension plan. Recent evidence suggests that theoretical net replacement rates from mandatory schemes range from nearly 30% in Lithuania and the United Kingdom to nearly 90% in countries such as Austria, Italy, and Portugal (OECD, 2019).

There are two primary categories of pension information: fundamental accounting information, which provides essential pension plan details, and forward-looking information, which helps individuals comprehend the potential returns and relative risks associated with pension plans.

Prior studies that have noted the relationship between financial literacy and financial knowledge, (Lusardi, 2018) shown that individuals with low financial literacy frequently fail to plan for retirement, even when they are approaching retirement age. This finding is significant because it casts light on the reasons why some individuals enter retirement with little wealth, highlighting the importance of developing retirement plans to ensure retirement security. The study

by (Billari,2017) assessed a low-cost online financial and demographic literacy program implemented by Italy's largest industrial pension fund. The program not only increased participants' financial markets and financial planning knowledge, but also encouraged them to seek out additional resources. After the intervention, the positive effects of the program persisted for several months.

One of the most significant current discussions is the effects current transition towards defined contribution pension plans, in which benefits are tied to contributions made, individuals are incentivized to defer retirement as the result is higher pension levels. However, these incentives are only effective if employees are given sufficient information about the pension system (Chlon-Dominiczak, 2009).

The study by (Chan and Stevens,2008) Used self-reported, employer-reported, and administrative data, discovered that only individuals who correctly perceive the incentive to delay retirement respond to pension incentives, whereas misinformed individuals respond based on their inaccurate perception of pension information. Those who are aware of the notion that they can increase their pension wealth by delaying retirement are less likely to retire. This finding partially contradicts subsequent research indicating that employees' responsiveness to Social Security incentives does not increase after receiving information via public statements. One possible explanation is that additional information is only beneficial for employees without health problems or liquidity constraints. (Mastrobuoni, 2011) Richer and healthier individuals are more likely to search out information.

## The Italian pension systems

The Italian pension system consists of obligatory statutory pension system, voluntary private and completely funded pension schemes that are accessible to individuals and organizations. The system accumulates contributions based on the rate of return associated with real GDP growth. At retirement, the accumulated capital is converted into an annuity, taking average life expectancy into account. This system is governed by the Pension Funds Supervision Commission, and pension benefit statements must include annuities based on standard macroeconomic scenarios to provide pension projections. Annually, the Italian Social Security Institute (INPS) updates employees on the status of their pensions. Since 2016, employees in the private sector and self-employed individuals have the ability to control information such as the retirement date and predicted replacement rate, and they can simulate a variety of scenarios based on their career trajectories (Debets, 2018).

Italy introduced notional defined contribution (NDC) pensions in 1995, to address challenges posed by fast population ageing. The Italian NDC system adjusts benefits to life expectancy and economic growth. Due to a long transition, the scheme will be fully effective only around 2040.

In the last few years more retirement options have been introduced, between 2019 and 2021, Quota 100 has allowed people with 38 years of contributions to retire at age 62 which is 5 years below the statutory retirement age. without fully adjusting benefits actuarially. In the draft Budget law for 2022, this early retirement option has been prolonged for 2022 while tightening the age condition to 64 (Quota 102).

Quota 100 has made it easier to access pensions as retiring below the statutory retirement age previously required a contribution record of 42.8 years for men and 41.8 years for women.

There is an early retirement option at age 64 with 20 years of contribution. But it has substantially lower benefits because benefits are fully based on NDC rules.

while retiring at statutory retirement age or Quota 100/Quota 102 will give the individual both of NDC and defined benefit pensions which is higher than those based only on NDC rules. Italy extended also other temporary early retirement options which were supposed to expire in 2020. This includes the option to retire at age 63 with 30 years of contributions for people

unemployed, disabled or giving care, or after 36 years for people in arduous occupations. A similar extension to retire up to seven years before the statutory retirement age was granted to workers in companies undergoing restructuring.

## Income and income distribution

The survey on Household Income and Wealth (SHIW) published in 2020 reported real annual household income, adjusted for taxes and social contributions, was approximately 3 percent higher in 2020 compared to. but it remained 12 percent below the 2006 level prior to the global financial crisis. The increase in average household income between 2016 and 2020 was driven by higher payroll earnings and extraordinary measures implemented in 2020 to mitigate the financial impact of the pandemic, also contributed to the growth of the aggregate income. Alternatively, investment and self-employment income decreased modestly, primarily due to a decline in the number of households receiving such income, which was mitigated by a minor rise in their average value (bank of Italy,2020).

Equivalized income is defined as a measure that allows the comparison of the income levels for different households on a standardized basis. It is commonly used to assess the relative economic well-being of households and to account for differences in the cost of living among households of varying sizes. Equivalized income adjusts the total household income by dividing it by an equivalence scale that reflects the needs and consumption patterns of different household compositions. This allows for a more accurate comparison of income levels across households with varying sizes and compositions. Considering equivalized income, the median income increased by 3.7% compared to four years prior. This confirms a recovery trend that began in 2014 following a protracted decline that began in 2006 (bank of Italy,2020).

*Figure 8 mean households income over time.*

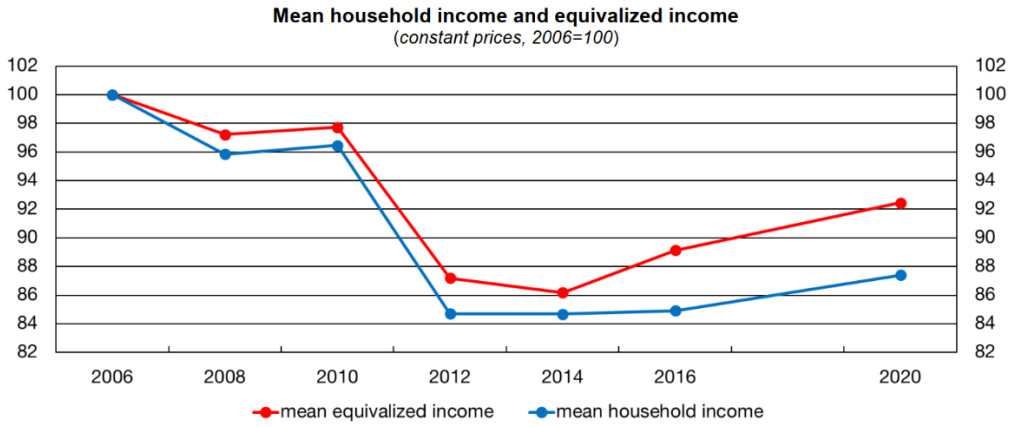


Figure [8] source: The Survey on Household Income and Wealth (SHIW), bank of Italy, 2020

The growth in real equivalized income was not, however, evenly distributed across socioeconomic and demographic categories. The mean values of the first and last quintiles of the equivalized income distribution increased substantially more than those of the intermediate quintiles over the observed four-year period. The significant rise in the first income quintile is attributable to social transfers. Despite the decline in self-employment income, the mean equivalized income of households with self-employed primary producers increased.

*Figure 9 change in mean equivalized income by households' type.*

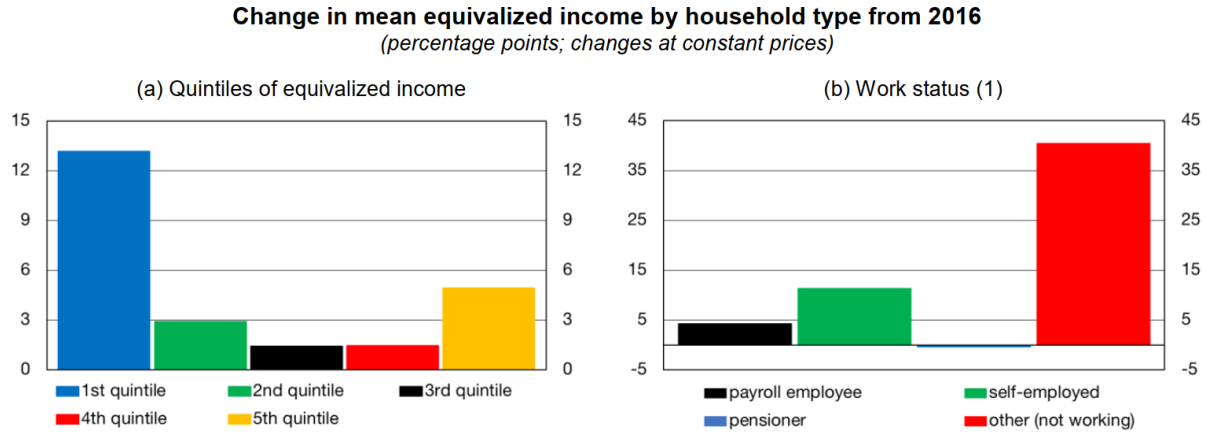


Figure [8] source: The Survey on Household Income and Wealth (SHIW), bank of Italy, 2020

## Financial assets

The survey on Household Income and Wealth (SHIW) published in 2020 shows that 91 percent of households held financial products ‘including saving and deposit accounts’, showing an increase of around 7 percentage points since 2016. This growth can be attributed to a rise in the number of households with at least one deposit account, driven by the adoption of cashless payment systems.

The concentration of financial assets ownership has increased between 2016 and 2020. The bottom half of households in terms of net wealth held only 7 percent of total gross financial wealth, while the richest 3 percent of households owned nearly 50 percent of financial assets. driven by higher savings for the more affluent households and a greater allocation of their portfolios to financial assets benefiting from positive market trends over the four-year period.

The data published by bank of Italy had divided the population into 5 equal quintiles based on income distribution each representing 20% of the population. The first quintile (Q1) represents the lowest 20% of income earners, and the fifth quintile (Q5) represents the highest 20% of income earners. The differences in financial wealth ownership can be attributed to varying portfolio compositions. The poorest quintile of households primarily held deposit accounts, while Italian government securities, private-sector bonds, and managed investments gradually became more prevalent across the middle net wealth classes. The wealthiest 20 percent of households were more likely to directly own equity shares and entrust a significant portion of their financial assets to investment professionals (bank of Italy, 2020).

*Figure 10 breakdown of financial assets by quintile*

**Breakdown of financial assets by net wealth distribution quintile**

*(per cent)*

| | Share of financial assets | Per cent | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Deposits (1) | Managed investment schemes (2) | Equity shares and participating interests | Private-sector bonds (3) | Government securities (4) | Securities issued abroad (5) | Other (6) | Total financial wealth |
| **Quintile of net wealth** | | | | | | | | | |
| 1st quintile | 1.4 | 92.5 | 2.7 | 0.4 | 2.0 | 1.3 | 1.2 | 0.0 | 100.0 |
| 2nd quintile | 3.1 | 82.1 | 12.0 | 1.6 | 1.6 | 2.6 | 0.0 | 0.1 | 100.0 |
| 3rd quintile | 5.3 | 78.9 | 10.0 | 1.7 | 2.1 | 5.4 | 1.3 | 0.5 | 100.0 |
| 4th quintile | 11.9 | 64.3 | 14.5 | 4.3 | 7.4 | 7.9 | 0.4 | 1.2 | 100.0 |
| 5th quintile | 78.2 | 38.3 | 39.1 | 7.7 | 6.5 | 4.9 | 2.1 | 1.4 | 100.0 |
| **Total** | **100.0** | **45.6** | **33.3** | **6.7** | **6.1** | **5.2** | **1.8** | **1.3** | **100.0** |

Figure [10]: source: The Survey on Household Income and Wealth (SHIW), 2020

The report from the supervisory authority for the Italian financial products market (CONSOB, 2022) shows the return of retail investors has declined sharply in 2022. The one-year moving average of nominal gross monthly returns of a stylized retail portfolio such as deposits, equities, mutual funds, and bonds decrease from +0.8% in December 2021 to -0.1% in September 2022.

## Real state

The survey on Household Income and Wealth (SHIW) published in 2020 shows that 77% of Italian households will own their primary domicile, and 33% will also own additional properties. Only 3% of households possessed properties in addition to their primary residence. The percentage of younger households in which the primary income earner was 45 or younger that owned their primary residence increased to 55.7% from 52.6% in 2016, indicating a narrowing disparity with the rest of the population.

The value of households' primary residences, whether owned or rented, was estimated to be approximately €1,800 per square meter, based on the assessments provided by households. In larger municipalities, notably in the Central and Northern regions of Italy, prices per square meter exceeded €3,000.

15 percent of Italian households will reside in rented accommodation by the end of 2020, with an average monthly rent of approximately €370, representing slightly more than a fifth of their average income. Over a third of tenant households had rental payments that exceeded thirty percent of their disposable income, and only thirteen percent reported being more than ninety days delinquent. In 2020, about 3 percent of homeowners had mortgage payments that exceeded 30 percent of their income. In 2020, less than one in ten households allocated more than 30 percent of their income to rent or mortgage payments for their primary residence (bank of Italy, 2020).

## 5. Italian households' investments

Asset allocation is the decision on how much of the investment portfolio to place in each of the broad asset classes (i.e., cash, fixed-interest securities, property, equities). There is no optimal financial portfolio that suits every household's goals. It defers depending on multiple factors, such as risk tolerance, investment goals, time horizon, liquidity needs and individual preference.

Risk perception and understanding are key factors in investment decisions. According to the expected utility theory, individual seek to maximize their own utility, individuals are rational, and it is possible for them to objectively measure an investment's risk according to their individual preferences as well as access to relevant information.

However, as the research on behavioral finance demonstrates, people's perceptions of risk are rarely in line with objective measurements. (Slovic, 2000) noted that risk is inherently subjective, context-dependent, and prone to a measurement process depending on assumptions and judgments. Furthermore, people conceptualize risk in various ways and may employ several risk metrics, including more than one at once.

Prospect Theory was offered as an alternative to Expected Utility Theory, on which asset allocation models are based. It is based on the understanding that investors are averse to loss and not to risk, as rational belief asserts. Choice is explained by the assignment of values to gains and losses and considering probabilities rather than basing it on absolute wealth levels and providing an explanation for behavior that sometimes contradicts Expected Utility Theory and rational believes.

According to data published (CONSOB,2020) shown in Figure 10 more than 70% of people who prefer to own more bonds than stocks believe the former to have lower risk than the latter, compared to 41% of people who want to hold more stocks. Notably, over half of interviewees who said they had a balanced portfolio couldn't order bonds and stocks according to potential risk.

The figures on the right-hand side show a breakdown of preferences for investing in stocks and bonds. according to responses to the question, “How risky do you rate the following investment options?” The first two columns of the figure on the right-hand side shows that more than 40% of individuals who have the same level of preferences towards stocks and bonds answered “do not know” to the questions about their perceived risks of bonds and stocks.

*Figure 11 comparisons of perceived risks of stocks and bonds*

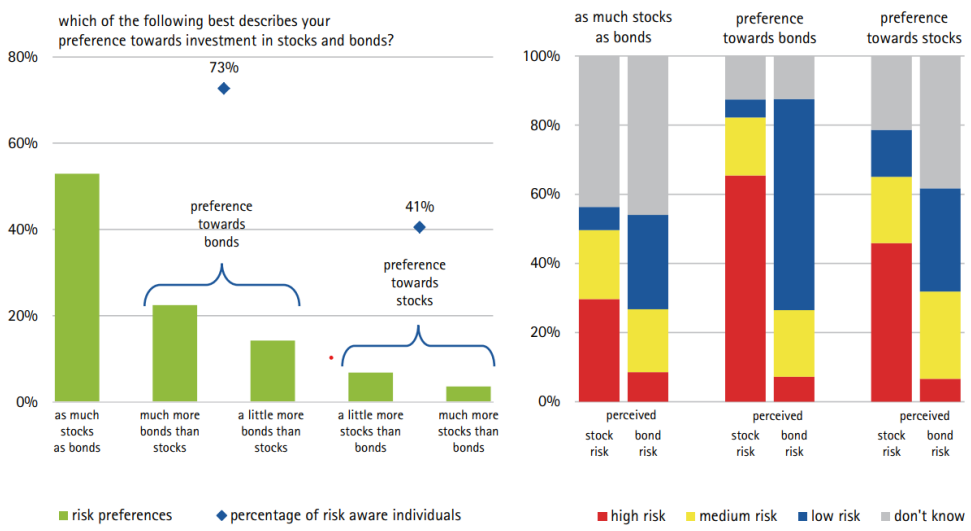


Figure 10 source:(CONSOB,2020)

According to (CFA, 2023) Financial risks are those that arise from activity in the financial markets, financial risks consist of market risk, credit risk, and liquidity risk. Market risk arises from movements in stock prices, interest rates, exchange rates, and assets prices. Credit risk is the risk that the counterparty will meet their contractual obligation, Liquidity risk is the risk that the owner will not be able to sell their assets without lowering it below a fundamental value, due to degradation in market conditions or the lack of market participants. Figure [12] below shows the difference between perceived and actual knowledge of financial risks.

*Figure 12 comparison between actual and perceived knowledge about risks*

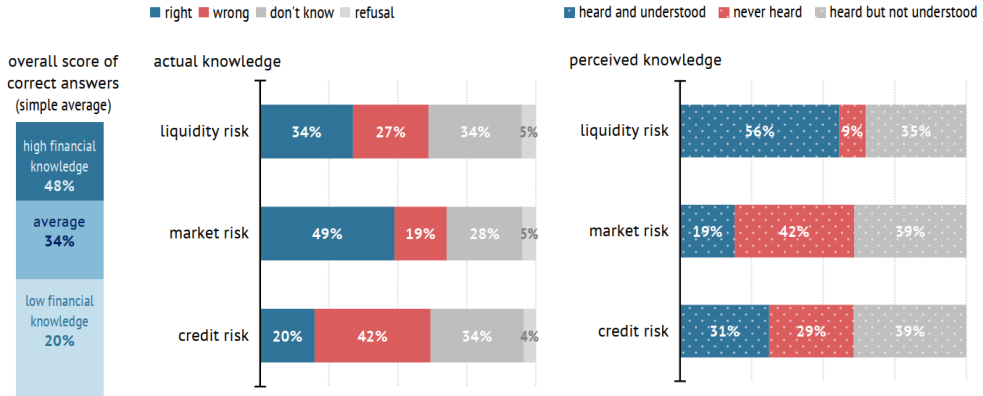


Figure 12 source: (CONSOB,2020)

The difference between actual and perceived knowledge can be attributed to overconfidence which can be defined as the investors' attitude to overstate the value of their private information (Guiso, 2006) it is well- documented bias in the psychology of decision-

making, according to (Christoph Merkle, 2017) the term overconfidence encompasses three distinct phenomena, the first is overestimation: People can be overconfident about their absolute ability or performance. They can overestimate their personal outcome; Overestimation is often demonstrated in performance judgments before or after experimental tasks in which participants respond to general knowledge questions.

Secondly, overreplacement is closely related to the better-than-average (BTA) effect, which describes the individual's tendency to view herself/himself as above average in relative comparisons within a group. Thirdly.  Over precision: Another type of overconfidence occurs in the estimation of unknown values, specifically in questions for ranges in which a value will fall with a certain probability. People usually show over precision and submit far too narrow intervals.

## Diversification

Diversification is a fundamental principle in asset allocation. It plays a major role in risk management and optimizing financial performance. it achieves those goals by reducing the impact of any individual stock, industry, and location. Portfolio diversification minimizes the risk related to investing in a single asset or asset class, Investors seek to reduce unsystematic risk by diversifying their investment. This is because various assets or asset classes frequently have different levels of risk and returns, and their values might be affected by different factors.

The main advantage of diversification is the reduction of portfolio's overall volatility is. The impact of negative price movements in one asset or market can be mitigated by positive price movements in other assets, investment in diversified portfolios which have low or negative correlations between its components can have a positive effect in lowering significant losses. The figure below shows the respondents' diversification knowledge. About a third of them select the rights answer.

*Figure 13 diversification*

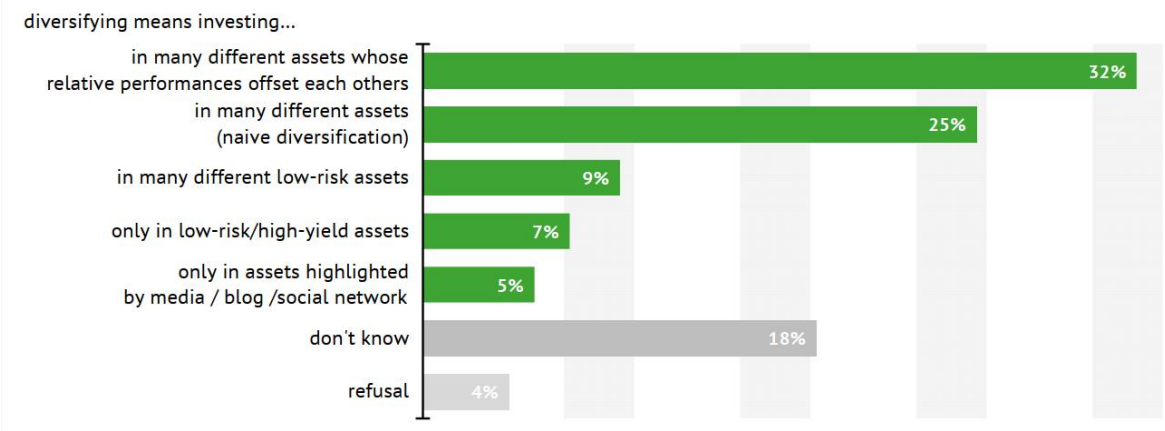


Figure 13 source: (CONSOB,2020)

## Financial portfolio of Italian households

The Report on financial investments of Italian households published by (CONBOS, 2022) shows single asset holding by type of assets, more the half of all respondents who only has one financial asset (51%) have banks and postal savings. The figure also shows that the majority (95%) of individuals with financial wealth less than 50 thousand euros own just one financial asset, this share drops to 18 percent of individuals with financial wealth higher than 50 thousand euros. 53% of have two financial assets. And less than 11% of them own more than 3 financial assets.

Figure 14 also shows that about a third of high financial knowledge individuals own just one financial asset, this percentage increases to 50% for individuals with low financial knowledge. The percentage of individuals who own more than three financial assets is 10% and 6% respectively.

*Figure 14 types of financial assets owned by Italian households.*

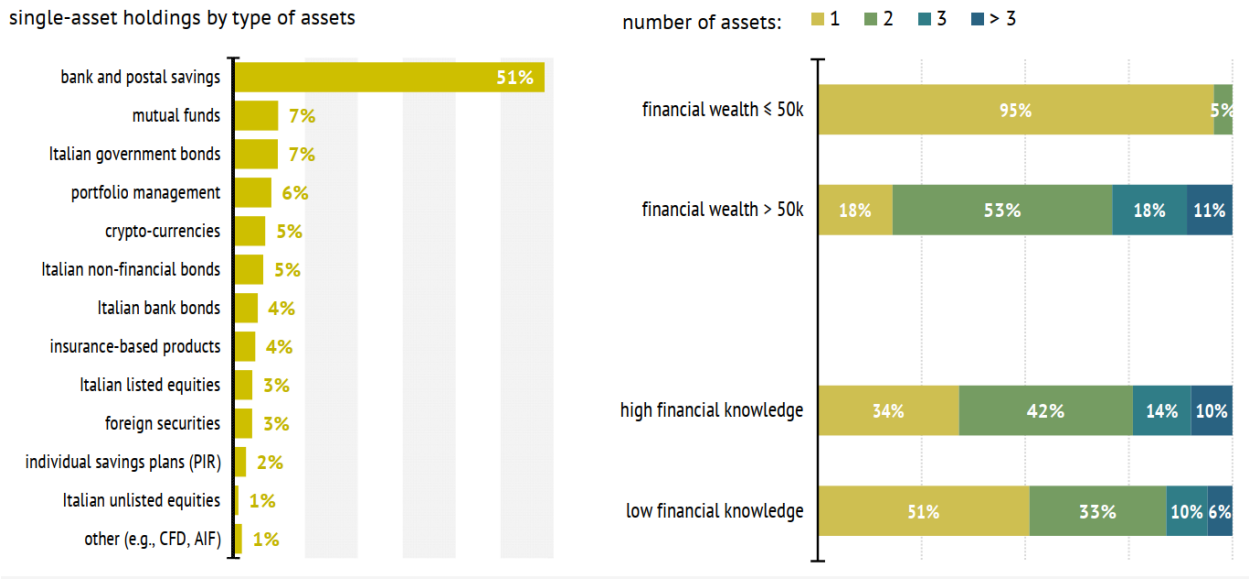


Figure 14 source: (CONSOB,2022)

Figure 15 shows the holding of Italian government securities and other financial assets by the geographical area. The data from bank of Italy 2020 shows increase in market participation over time but it also shows the disparity between the percentage of households who holds other financial assets in the north and the south and islands, the difference is increasing over time form 7.3 percentage points in 1978 to 23.3 percentages in the second quarter of 2020.

*Figure 15 holdings of financial assets over time*

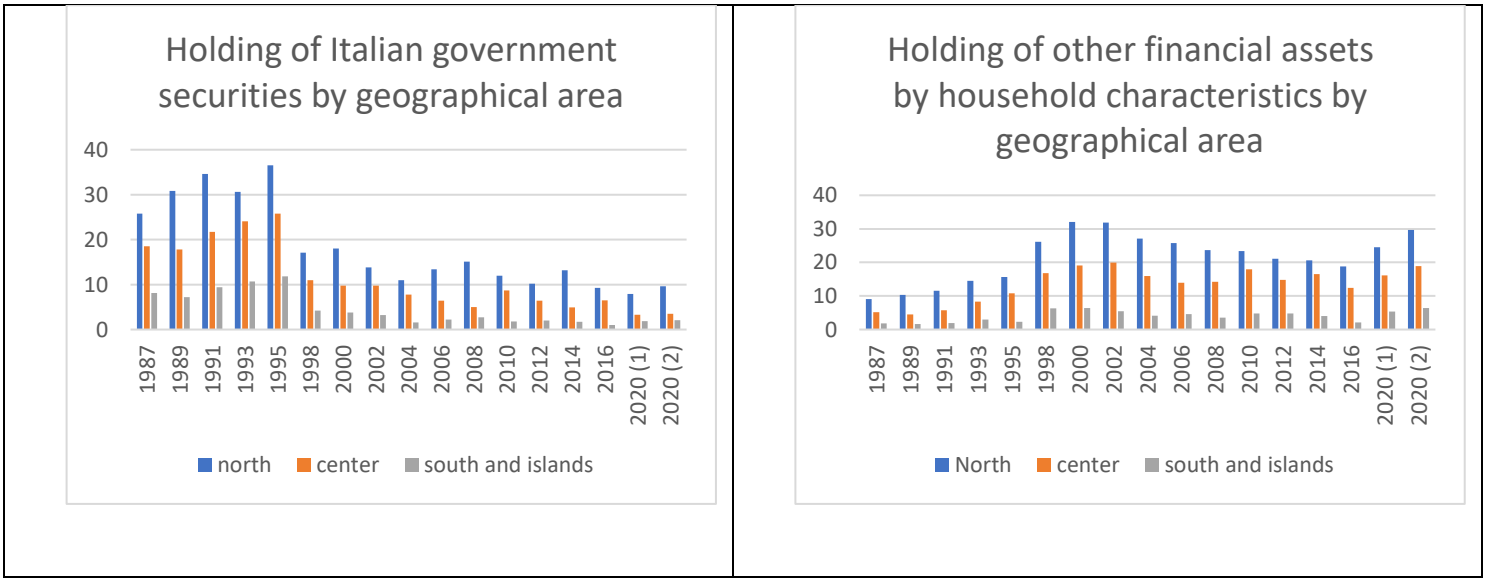


Figure 15 data source: (Survey on Household Income and Wealth,2020)

## Investment strategies

Report on financial investments of Italian households (CONBOS, 2020) has four investment strategies 'Self-managed' refers to people making their own financial decisions, informal advice' refers to people involving their family, friends, or coworkers to make financial decisions; 'informal advice by experts' refers to seeking advice from family, friends, or coworkers in the financial sector; 'professional support' refers to people who rely on investment advice or support from bank staff or who delegate to a portfolio manager.

Investors report using several investment strategies more frequently in 2020 compared to 2019. The use of professional support has also greatly increased over the year period, rising from 30% to around 41%, while self-managed investments have decreased from 40% to roughly 29%. The use of informal advice has increased as well, with family members, friends, and coworkers being the sources of the advice because they are considered trustworthy and well-informed.

*Figure 16 investments strategies*

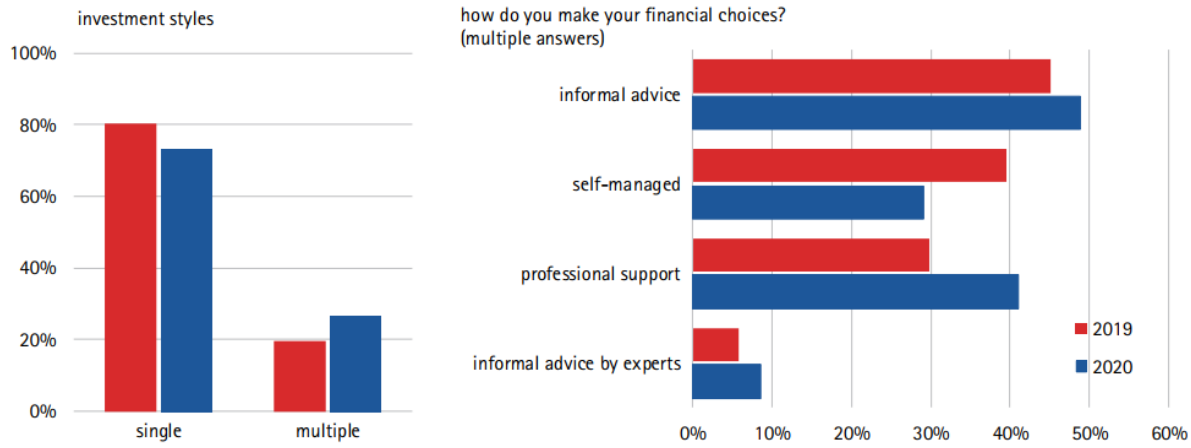


Figure 16 source: (CONSOB,2020)

## Investment monitoring

Investment monitoring refers to the practice of tracking and evaluating investment portfolios to ensure alignment with investment goal, risk tolerance, and changing market trends. Investment monitoring is important to make informed decisions and take the necessary actions to achieve investment goals. It requires feedback to manage ongoing exposures to different types of risks, and to allocate resources to different investment opportunities to meet the current objectives. There are two important factors to be monitored, the first is the investor-objectives and circumstances and the other is economic and market trends.

The Report on financial investments of Italian households 2022 shows that 85% of Italian investors monitor their investments, about 50% of them do it more than twice a year and 11% more often than usual during periods of high market volatility. 45% of advised investors monitor their investment with their advisor (CONSOB,2020).

*Figure 17 investment monitoring*

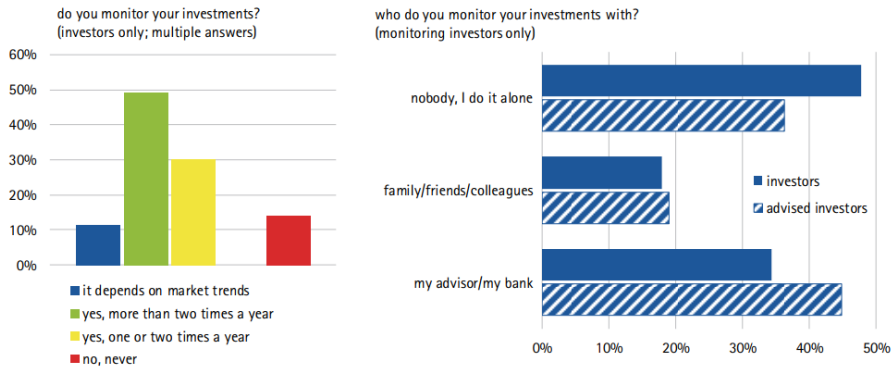


Figure 16 source: (CONSOB,2020)

## Time horizon

Time horizon most often refers to the time associated with an investment objective. It has been classified into short term, medium and long-term time horizons. A time horizon over 10 years is usually considered as a long term. 63% of respondents find it difficult to save for goals too far in time and only 28% have an investment horizon of more than five years. About two thirds of the interviewees prefer to opt for short- to medium term goals. (CONSOB,2020)

*Figure 18 time horizon*

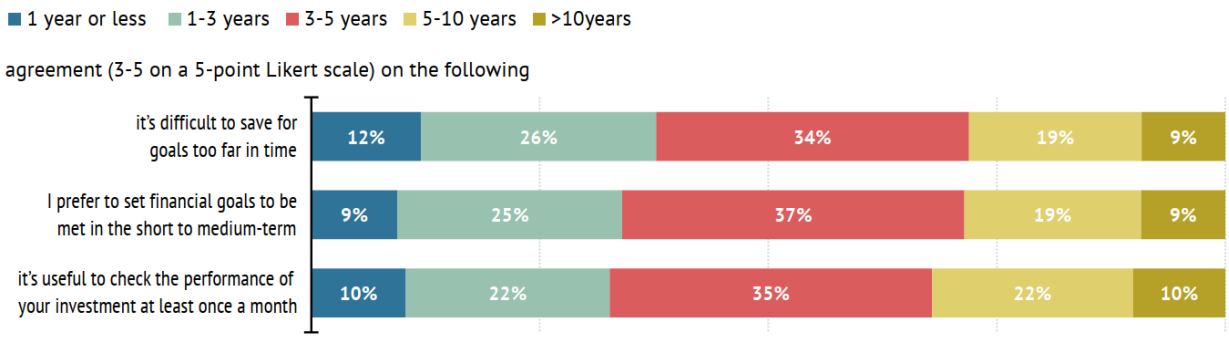


Figure 19 source: (CONSOB,2020)

# 6. Methodology

## Data sources

According to a comprehensive definition, financial literacy is the awareness, knowledge, skills, attitude, and behavior required to make sensible financial decisions and ultimately attain individual financial wellbeing (OECD, 2011). The International Network for Financial Education (INFE) designed a questionnaire that measures knowledge, behavior, and attitudes in relation to financial literacy.

The objective of the financial knowledge section is to evaluate the individual's understanding of basic concepts that are necessary for making sensible financial decisions. Knowledge is based on the three topics that have become standard in the literature on financial literacy (Lusardi and Mitchell, 2011): an understanding of simple and compound interest, inflation, and the advantages of portfolio diversification.

Financial behaviors score measures how common behaviors are within the population that often indicate a greater ability to manage financial resources properly. Specifically, the behavior index is based on queries assessing whether individuals manage their family's financial resources by creating a budget, are able to pay their obligations and utilities without difficulty and gather information prior to making investments.

The attitudes component seeks to assess, in addition to actual knowledge and behavior, personal characteristics such as preferences, beliefs, and non-cognitive skills that are likely to affect an individual's well-being. This component is intended, according to the INFE methodology, to capture attitudes toward precautionary saving and the long term in general. The sum of these three components determines the overall level of financial literacy, which ranges from 1 to 21: a maximum of 7 points is for financial knowledge, 9 from behavior, and 5 from financial attitudes. According to OECD methodology, there are no penalties for incorrect answers, so 'don't know' and 'refused' are regarded the same as incorrect responses.

The OECD-INFE methodology is the result of a multidisciplinary contribution, reflects the experiences of policymakers, and seeks to comprehensively measure the level of financial literacy. Even though this methodology is a useful instrument for policymakers, some modifications could enhance cross-country comparability and reduce inconsistencies with conventional consumer theory, as will be discussed in greater detail below.

## Survey of households' wealth and income

In the 1960s, the Survey on Household Income and Wealth (SHIW) was launched to collect information about the incomes and savings of Italian households. The scope of the survey has expanded over the years to include wealth and other aspects of the economic and financial behavior of households, such as payment methods. The sample used in the most recent surveys consists of approximately 7,000 households (16,000 people) distributed across approximately 300 Italian municipalities.

The survey in 2020 included 6,239 households and 15,198 individuals. 2,986 of the 6,239 households are panel families, i.e., they were also interviewed in the previous survey (or surveys preceding ones), while 3,253 are families who were interviewed for the first time in the current investigation. The traditional sampling design used for the 2020 survey was modified in part from the 1989 edition. The new design enhances the accuracy of economic estimators but makes comparisons with previous surveys more difficult.

## Variables

1. Age, previous literature has shown that there is a humped shape relationship between financial literacy and Age. In the database Age is stored using the numerical variable called qd7.
2. Gender is a categorical variable, 0 indicate the respondent is female, 0 indicate the respondent is male, Gender is stored using the numerical variable called qd1.

3. Education is a categorical variable, there are 8 educational levels, the highest one is university degree and the lowest is Attended elementary school but did not complete. It is stored under the variable edu, it takes a value between 1-8.

4. Income is a categorical variable, there are 15 income levels, the respondents have to select their income categories, the lowest category is up to Up to E. 439, and the highest category is more than E. 3,875,00, Income is stored using the categorical variable called reddito.

5. Geographical area is categorical data, the respondent must indicate whether he lives in north-west, north-east, center, south or the islands. It is stored in a categorical variable called AREA5.

7. Town population size is a categorical variable, the respondents must indicate the number of inhabitants in their city, the smallest population category is up to 3000 inhabitants, and the highest is more than 500,000 inhabitants. Town population size is stored using the categorical variable called pop_com.

8. Working status is a categorical variable, the respondent must indicate whether she/he is self-employed, employed, homemaker, unemployed, retired or a student. It is stored using the variable qd10.

9. The highest income earner, the respondent must indicate whether she/he is the highest income or her/his relationship with the highest income earner. It is stored in a categorical variable called CAPOFAM.

9. Financial literacy is the sum of financial knowledge score, financial attitude score and financial behaviors score, it takes the value between 1-21. It is stored in the variable FL.

10. Number of financial products, it indicates the different types of financial product like shares and stocks, bonds and mutual funds. It is stored in a variable called n_financial_products.

11. Market participation is a binary variable, 0 indicates that the respondent does not own any publicly traded investment. It is stored in a variable called market participation.

12. The variable wght is used to store the analytical weight of the survey.

13. Professional advice is a binary variable indicating whether the respondent financial decisions are most influenced by the recommendations of an independent professional advisor. It is stored in a variable called qprodb1_2.

## Data analysis

## Ordinal logistic regression

Ordinal logistic regression or ordinal regression is used to predict an ordinal dependent variable based on one or more independent variables. ordinal logistic regression could be used to predict financial literacy groups, which is the ordinal dependent variable measure on the 5-point Likert scale given above, based on some independent variables such as the respondent's gender or degree of study, etc. Ordinal regression will allow us to determine (if any) of our independent variables have a statistically significant impact on our dependent variable.

For categorical independent variables (e.g., "level of education"), we can interpret the odds that one "group" (e.g., university degree) has a higher or lower score on our dependent. For continuous independent variables, we can interpret the relationship between a one-unit increase or decrease in that variable and the probability of our dependent variable having a higher or lower value (e.g., "Age").

Assumptions

1. The dependent variable is measured on an ordinal scale. Both financial literacy score and financial literacy classification are ordinal variables. Financial literacy score has a value between 0 and 21. While there are four classifications based on financial literacy.
2. Independent variables are either continuous, categorical, or ordinal.
3. No Multi-collinearity which means independent variables are highly correlated with each other. A brief description of Spearman and Kendall's Correlations test has been added to the annex.
4. Proportional Odds - i.e., that each independent variable has an identical effect at each cumulative split of the ordinal dependent variable. I checked for Proportional Odds, that each independent variable has an identical effect at each cumulative split of the ordinal dependent variable, the assumption was true.

After the test above, all the four assumptions of ordered logit model are met, I used the variables genders, level of education, level of income, whether the individual own his house, the region where the households reside and the population size in his/her city/village to predict the dependent variables.

## OLS Regression

Ordinary least squares regression, sometimes known as OLS regression, is a statistical method for modelling the relationship between a dependent variable and one or more independent variables. it assumes a linear relationship between a continuous and independent variable.

OLS regression is used to predict the financial literacy score using gender, level of education and other variables. The goal is to determine if any of the independent variables have a statistically significant influence on the dependent variable.

OLS regression analyzes and interprets the effects of the independent variables (such as university degree) on the financial literacy score for categorical independent variables (e.g., "level of education"). It provides insights into the odds of one group having a higher or lower score compared to a reference group. With continuous independent variables (like "age"), OLS regression enables us to understand the relationship between a one-unit rise or decrease in that variable and the likelihood that the dependent variable (in this example, financial literacy score) will have a higher or lower value.

Assumptions:

1. Linearity: It is assumed that the relationship between the dependent and independent variables is linear.
2. Independence: It is assumed that each observation in the dataset is independent of every other observation.
3. Homoscedasticity: Across all levels of the independent variables, the error variance is constant.
4. Normality: Errors have a normal distribution and have a meaning of zero.

These assumptions must be satisfied for OLS regression to provide accurate prediction of the regression coefficients and valid statistical inferences. It is crucial to test these presumptions and, if they are incorrect, to think about appropriate corrective actions or different regression methods. OLS regression is a useful technique for examining the correlation between independent variables and a continuous dependent variable, such as financial literacy levels.

## Bootstraps weights

Tibshirani had introduced the bootstrap method in 1979. It is a statistical technique that uses resampling to estimate the sample distribution of a statistic. It is employed to approximate the mean, variance, calculate p-values, and establish confidence intervals for estimators. The original

sample from the population under study is resampled K times with replacement using computational power. The statistic of interest is computed and stored for each iteration, resulting in K values that can be used to measure dispersion. "An Introduction to the Bootstrap" by (Tibshirani ,1993) contains additional information about the bootstrap.

Stata has been used to bootstrap with 1000 replications, with age, gender and the region of the individual are used as stratification variables. This method looked for to maintain the crucial characteristics of both area probability and list samples. According to (Kennickell, 1996), each bootstrap sample is associated with a set of weights that were calculated using the same methods as the primary weight development.

# 7. Results

1. **Financial literacy** Age, gender, working status, education, income, geographical area, population size and the relationship with the highest earner in the household have been used to predict financial literacy.

   It results below show that the regression model has an R-squared value of 0.1539 and adjusted R-squared value of 0.1506.

*Figure 19 A regression model predicting financial literacy.*

```
. regress FL qd1 qd7 qd10 capofam edu reddito area5 pop_com [aweight = wght]
(sum of wgt is 50,680,412.000252)
```

| Source | SS | df | MS | Number of obs | = | 2,036 |
|---|---|---|---|---|---|---|
| | | | | F(8, 2027) | = | 46.09 |
| Model | 3596.0164 | 8 | 449.502049 | Prob > F | = | 0.0000 |
| Residual | 19770.3839 | 2,027 | 9.75351945 | R-squared | = | 0.1539 |
| | | | | Adj R-squared | = | 0.1506 |
| Total | 23366.4003 | 2,035 | 11.4822606 | Root MSE | = | 3.1231 |

| FL | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| qd1 | -.0971742 | .1564704 | -0.62 | 0.535 | -.4040339 | .2096854 |
| qd7 | .0131783 | .0054505 | 2.42 | 0.016 | .002489 | .0238675 |
| qd10 | -.0884696 | .0344637 | -2.57 | 0.010 | -.1560576 | -.0208815 |
| capofam | -.7233035 | .1285932 | -5.62 | 0.000 | -.9754922 | -.4711148 |
| edu | -.2418415 | .0488154 | -4.95 | 0.000 | -.337575 | -.1461079 |
| reddito | .3521607 | .0282044 | 12.49 | 0.000 | .296848 | .4074734 |
| area5 | .2323753 | .0543435 | 4.28 | 0.000 | .1258002 | .3389503 |
| pop_com | -.3918496 | .0639872 | -6.12 | 0.000 | -.5173372 | -.266362 |
| _cons | 9.488801 | .5895479 | 16.10 | 0.000 | 8.332619 | 10.64498 |

Figure 18 : A regression model predicting financial literacy

F-test has been carried out to test the joint null hypothesis, to test the coefficient of all independent variable equal to zero, F-test statistic is calculated as 46.16, and it has 8 degrees of freedom in the numerator and 2027 degrees of freedom in the denominator.

The p-value associated with the F-test is reported as 0.0000. This p-value indicates the probability of observing an F-statistic as extreme as the one calculated, assuming that the null hypothesis is true.

This p-value provides strong evidence to reject the null hypothesis. Meaning, the joint effect of the Age, gender, working status, education, income, geographical area, population size and the relationship with the highest earner in the household on the financial literacy is statistically significant.

*Figure 20 F-Test for financial literacy model*

```
. test  qd1 qd7 edu FL qprod1b_2 reddito area5 capofam

 ( 1)  qd1 = 0
 ( 2)  qd7 = 0
 ( 3)  edu = 0
 ( 4)  FL = 0
 ( 5)  qprod1b_2 = 0
 ( 6)  reddito = 0
 ( 7)  area5 = 0
 ( 8)  capofam = 0

       F(  8,  2027) =  114.39
            Prob > F =    0.0000
```

Figure [19] F-Test for financial literacy model

The model's goodness of fit is evaluated using the F-test, indicating that the model is statistically significant ($F(8, 2027) = 46.09$, $p < 0.0001$). This suggests that the independent variables collectively have an impact on the dependent variable.

The R-squared value is 0.1539, indicating that approximately 15.39% of the variation in the dependent variable can be explained by the independent variables in the model. The adjusted R-squared value is slightly lower at 0.1506, adjusting for the degrees of freedom and sample size.

The coefficients for each independent variable estimate the magnitude and direction of their influence on the dependent variable. accompanied by standard errors (Std. Err.), t-statistics (t), p-values (P>|t|), and confidence intervals (Conf. Interval) at the 95% level.

The gender “qd1” is only non-statistically significant variable, it has a high p- value ($p = 0.535$), all the other variables “gender, working status, education, income, geographical area, population size and the relationship with the highest earner in the household” are statistically significant.

Age, Income, Geographical Area have positive coefficients, indicating positive relationship with financial literacy, while the independent variables working status, education, population size and the relationship with the highest earner in the household negative coefficients.

## 2. Market participation

Market participation is a binary variable, 0 indicates that the respondent does not own any publicly traded investment. Age, gender, education, income, geographical area, financial literacy, professional advice, and the relationship with the highest earner in the household have been used to predict market participation.

*Figure 21 A regression model predicting market participation.*

```
. logistic market_participation qd1 qd7 qd10 edu FL  reddito area5 capofam pop_com

Logistic regression                             Number of obs     =      2,036
                                                LR chi2(9)        =     401.56
                                                Prob > chi2       =     0.0000
Log likelihood = -545.64384                     Pseudo R2         =     0.2690

------------------------------------------------------------------------------
market_participation | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
---------------------+--------------------------------------------------------
                 qd1 |   .8978239   .1738466    -0.56   0.578     .6142881    1.312231
                 qd7 |   1.038345   .0083041     4.71   0.000     1.022197    1.054749
                qd10 |   .9039727   .0479239    -1.90   0.057     .8147588    1.002955
                 edu |   1.004727   .0582755     0.08   0.935     .8967618     1.12569
                  FL |   1.303124   .0361222     9.55   0.000     1.234214     1.37588
             reddito |   1.430706   .0724693     7.07   0.000     1.295491    1.580033
               area5 |    .746267   .0443526    -4.92   0.000     .6642096    .8384618
             capofam |    .600782   .1051275    -2.91   0.004     .4263536     .846572
             pop_com |   .9709045   .0706014    -0.41   0.685     .8419369    1.119627
               _cons |   .0000637   .0000592   -10.39   0.000     .0000103    .0003942
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.
```

Figure [20] : A regression model predicting market participation

F-test has been carried out to test the joint null hypothesis, to test the coefficient of all independent variable equal to zero, F-test statistic is calculated as 46.16, and it has 8 degrees of freedom in the numerator and 2027 degrees of freedom in the denominator.

The p-value associated with the F-test is reported as 0.0000. This p-value indicates the probability of observing an F-statistic as extreme as the one calculated, assuming that the null hypothesis is true.

This p-value provides strong evidence to reject the null hypothesis. Meaning, the joint effect of the Age, gender, education, income, geographical area, financial literacy, city population and the relationship with the highest earner in the household on the financial literacy is statistically significant.

*Figure 22 F-Test market participation model*

```
. test qd1 qd7 qd10 edu FL  reddito area5 capofam pop_com

 ( 1)  [market_participation]qd1 = 0
 ( 2)  [market_participation]qd7 = 0
 ( 3)  [market_participation]qd10 = 0
 ( 4)  [market_participation]edu = 0
 ( 5)  [market_participation]FL = 0
 ( 6)  [market_participation]reddito = 0
 ( 7)  [market_participation]area5 = 0
 ( 8)  [market_participation]capofam = 0
 ( 9)  [market_participation]pop_com = 0

           chi2(  9) =  240.47
         Prob > chi2 =    0.0000
```

Figure [21] : F-Test  market participation model

The model's log likelihood is -545.64384, indicating how well the model fits the data. A higher log likelihood value suggests a better fit. The Pseudo R2 value is 0.2690, indicating that approximately 26.90% of the variation in the outcome variable (market_participation) can be explained by the independent variables in the model.

The LR chi-square test shows that the overall model is statistically significant (chi2(9) = 401.56, $p < 0.0001$). This indicates that at least one of the independent variables has a significant impact on the probability of market participation

### 3. number of financial products

Number of financial products is a variable which indicates the different types of financial product like shares and stocks, bonds, and mutual funds owned by the respondent.

The independent variables, Age, gender, education, income, geographical area, financial literacy, professional advice, and the relationship with the highest earner in the household have been used to predict numbers of the financial products owned by the respondent.

*Figure 23 A regression model predicting number of financial products owned by the respondent*

```
. regress n_financial_products qd1 qd7 qd10 edu FL financial_advice reddito area5 capofam [aweight = wght]
(sum of wgt is 11,328,420.194591)

      Source |       SS           df       MS      Number of obs   =       385
-------------+----------------------------------   F(9, 375)       =     23.16
       Model |  68.2356183         9  7.58173536   Prob > F        =    0.0000
    Residual |  122.782829       375  .327420878   R-squared       =    0.3572
-------------+----------------------------------   Adj R-squared   =    0.3418
       Total |  191.018447       384  .497443873   Root MSE        =    .57221

------------------------------------------------------------------------------
n_financial_pr~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------------+------------------------------------------------------------
              qd1 |   .0676034   .0668013     1.01   0.312    -.0637486    .1989553
              qd7 |   .0110685   .0025602     4.32   0.000     .0060344    .0161027
             qd10 |  -.0122872   .0146103    -0.84   0.401    -.0410157    .0164413
              edu |  -.0248946   .0230032    -1.08   0.280    -.0701261    .0203369
               FL |   .0660916    .010203     6.48   0.000     .0460294    .0861538
 financial_advice |   .2369522    .061096     3.88   0.000     .1168184     .357086
          reddito |   .0300807   .0152057     1.98   0.049     .0001816    .0599799
            area5 |  -.1216979    .025383    -4.79   0.000    -.1716088   -.0717869
          capofam |    .015364   .0587787     0.26   0.794    -.1002132    .1309412
            _cons |  -1.051676   .2733673    -3.85   0.000    -1.589201   -.5141512
------------------------------------------------------------------------------
```

Figure [22] :A regression model predicting number of financial products owned by the respondent

F-test has been carried out to test the joint null hypothesis, to test the coefficient of all independent variable equal to zero, F-test statistic is calculated as 23.16, and it has 9 degrees of freedom in the numerator and 2027 degrees of freedom in the denominator.

The p-value associated with the F-test is reported as 0.0000. This p-value indicates the probability of observing an F-statistic as extreme as the one calculated, assuming that the null hypothesis is true.

This p-value provides strong evidence to reject the null hypothesis. Meaning, the joint effect of the Age, gender, education, income, geographical area, financial literacy, professional advice, and the relationship with the highest earner in the household on the financial literacy is statistically significant.

*Figure 24 F-Test for number of financial products models*

```
. test qd1 qd7 qd10 edu FL financial_advice reddito area5 capofam

 ( 1)  qd1 = 0
 ( 2)  qd7 = 0
 ( 3)  qd10 = 0
 ( 4)  edu = 0
 ( 5)  FL = 0
 ( 6)  financial_advice = 0
 ( 7)  reddito = 0
 ( 8)  area5 = 0
 ( 9)  capofam = 0

       F(  9,   375) =   23.16
            Prob > F =    0.0000
```

Figure [23]: F-Test for number of financial products model

The model's goodness of fit is assessed using the F-test, with an F-statistic of 20.80 and a p-value of less than 0.0001. This suggests that the model is statistically significant, indicating that the independent variables collectively have an impact on the dependent variable.

The R-squared value is 0.3574, indicating that approximately 35.74% of the variation in the dependent variable can be explained by the independent variables in the model. The adjusted R-squared value, accounting for the degrees of freedom and sample size, is slightly lower at 0.303.

The independent variables gender, working status, education, and the relationship with highest earner in the house are non-statistically significant variables.

4. **The Overconfidence models.**

The Overconfidence model has been constructed to predict the level of individual confidence based on their age, gender, level of education, the population of the city/village where they reside and their relationship with the highest income earner.

*Figure 25 Regression model predicting Overconfidence.*

```
. ologit qk1 FK qd1 qd10 edu capofam reddito pop_com casa if qk1 >1 & qk1 <=5 [aweight = wght]

(sum of wgt is 47,089,977.491305)
Iteration 0:   log likelihood =  -2313.369
Iteration 1:   log likelihood = -2084.9077
Iteration 2:   log likelihood = -2082.0201
Iteration 3:   log likelihood =  -2082.013
Iteration 4:   log likelihood =  -2082.013

Ordered logistic regression                     Number of obs     =      1,903
                                                LR chi2(8)        =     462.71
                                                Prob > chi2       =     0.0000
Log likelihood =  -2082.013                     Pseudo R2         =     0.1000

------------------------------------------------------------------------------
         qk1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          FK |  -.1514234   .0234451    -6.46   0.000     -.197375   -.1054719
         qd1 |  -.3756212   .0937395    -4.01   0.000    -.5593473   -.1918952
        qd10 |   .1173904   .0210795     5.57   0.000     .0760753    .1587054
         edu |   .2718011   .0294132     9.24   0.000     .2141522    .3294499
    capofam |   .3678557   .0646104     5.69   0.000     .2412217    .4944897
    reddito |  -.0827357   .0178936    -4.62   0.000    -.1178066   -.0476649
    pop_com |  -.1204602   .0413255    -2.91   0.004    -.2014566   -.0394638
       casa |   .2888961   .0516321     5.60   0.000      .187699    .3900931
-------------+----------------------------------------------------------------
      /cut1 |  -3.049184   .3658608                     -3.766258   -2.332109
      /cut2 |   .1197123   .3529474                     -.5720519    .8114765
      /cut3 |   1.396226   .3544357                      .7015453    2.090908
------------------------------------------------------------------------------
```

Figure [24] : Regression model predicting Overconfidence

The model's log likelihood is -2088.7712, indicating how well the model fits the data. A lower log likelihood value suggests a better fit. The Pseudo R2 value is 0.1014, indicating that approximately 10.14% of the variation in the dependent variable (qk1) can be explained by the independent variables in the model.

The LR chi-square test shows that the overall model is statistically significant (chi2(9) = 471.55, $p < 0.0001$). This indicates that at least one of the independent variables has a significant impact on the ordered categories of the dependent variable.

All Variable in this model are statistically significant, The coefficients represent the estimated effects of the independent variables on the log-odds of being in a higher category of the dependent variable. Financial knowledge, gender, income, and city population have negative coefficients, indicating a negative relationship with overconfidence. While education, whether the respondents

own their house and their relationship with the highest earner in the households has a positive relationship with over confidence. The first annex explains three type of goodness of fit measured which are commonly used with logistical ordered regression.

# Conclusions

The study investigates the factors influencing financial literacy, households market participation, the number of financial products owned by respondents and overconfidence level using regression model. The model included several independent variables such as age, gender, education, income, geographical area, financial literacy, professional advice, and the relationship with the highest earner in the household.

The results showed that gender did not have a significant impact on the number of financial assets owned by respondents, their market participation, or financial literacy when considering other variables in the models. However, in the context of overconfidence, gender showed a significant effect, with females exhibiting lower levels of overconfidence compared to males. These findings suggest that while gender may not play a significant role in certain financial outcomes, it can have an influence on individuals' overconfidence in their financial knowledge and abilities.

Financial literacy was used as an independent variable predicting households market participations, the number of financial products owned by respondents and overconfidence level to understand its impact on different outcomes. it had a significant positive coefficient in the number of financial assets owned by respondents and market participation regression models. indicating that individuals with greater financial literacy are more likely to participate in the market. Furthermore, financial literacy had a significant negative coefficient in the model predicting overconfidence level, indicating that higher financial literacy is associated with lower levels of overconfidence.

The study also investigates the effect of seeking professional advice on market participation and predicting the number of financial assets owned by respondents, seeking professional advice had a significant positive coefficient on both models, this suggests that individuals who seek professional advice tend to own a greater number of financial assets. This indicates that seeking guidance from professionals provides individuals with valuable insights and knowledge to make informed financial decisions.

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# ANNEX

## Annex goodness of fit

The null hypothesis for tests of model fit is that the model is a suitable fit for the data. The alternative hypothesis is that there is a (non-specific) problem with fitness, which is commonly referred to as unfitness. A modest p-value is therefore an indication that the model is flawed.

## Pulkstenis-Robinson tests

The Pulkstenis-Robinson tests are model-fitting tests for ordinal logistic regression. They can accommodate models containing both continuous and categorical predictors. Observed covariate patterns are utilized to partition the data using only categorical covariates. Patterns of unobserved covariates are discarded. To avoid partitioning into an unmanageable number of covariable patterns, only categorical predictors are employed. Each subject's ordinal response score is calculated by adding the predicted probabilities for each outcome level multiplied by equally spaced integer weights.

## An ordinal version of the HL test

The ordinal HL test (Fagerland and Hosmer 2013, 2016) is based on the multinomial HL test (Fagerland, Hosmer, and Bofin 2008; Fagerland and Hosmer 2012), which in turn is based on the original (binary) HL test (Hosmer and Lemeshow 1980). In all three cases, one groups the observations according to model-predicted response probabilities, usually into g = 10 groups. Observed and estimated frequencies for each group in each response category can be tabulated in a g × c contingency table. The goodness-of-fit test is obtained by calculating the Pearson chi-squared statistic from the table. The binary, multinomial, and ordinal tests differ in the grouping strategy used

and the number of degrees of freedom for the chi-squared reference distribution. Here we give only the details of the ordinal test.

Lipsitz test

The Lipsitz test is a goodness of fit test for ordinal response logistic regression models. It involves binning the observed data into equally sized g groups based on an ordinal response score. This score is computed by summing the predicted probabilities of each subject for each outcome level multiplied by equally spaced integer weights. The user can specify the number of groups by assigning an integer value to g, which is 10 by default.I checked for goodness of fits using four tests, Pulkstenis-Robinson deviance, Pulkstenis-Robinson chi squared, Hosmer-Lemeshow and Lipsitz tests, all tests indicated good fits (above the 0.05 and 0.1 significance level).

Annex correlations

most variable showed weak correlations except one (the coefficient was 0.4 in this case) Kendall's is non-parametric meaning that it does not require the two variables to fall into a bell curve. Kendall's also does not require continuous data. Because it is based on the ranked values of each variable it will work with continuous data, but it can also be used with ordinal data. Ordinal data has a ranking, but the intervals between ranks are not necessarily consistent.

```
. ktau qd1 qd7 qd10 capofam edu reddito pop_com area5 market_participation n_financial_products
(obs=2036)
```

| | qd1 | qd7 | qd10 | capofam | edu | reddito | pop_com | area5 | market~n | n_fina~s |
|---|---|---|---|---|---|---|---|---|---|---|
| qd1 | 0.5002 | | | | | | | | | |
| qd7 | 0.0053 | 0.9835 | | | | | | | | |
| qd10 | -0.0108 | 0.2209 | 0.7544 | | | | | | | |
| capofam | -0.2289 | -0.2734 | 0.0589 | 0.5894 | | | | | | |
| edu | 0.0059 | 0.2730 | 0.2094 | -0.0771 | 0.7291 | | | | | |
| reddito | 0.0085 | -0.1059 | -0.1796 | 0.1236 | -0.2621 | 0.8875 | | | | |
| pop_com | -0.0123 | -0.0073 | -0.0388 | -0.0269 | -0.0794 | 0.0060 | 0.7166 | | | |
| area5 | -0.0063 | -0.0495 | 0.0105 | 0.0115 | 0.0969 | -0.2379 | 0.0142 | 0.7935 | | |
| market_par~n | 0.0049 | 0.0093 | -0.0238 | -0.0110 | -0.0266 | 0.0453 | -0.0007 | -0.0284 | 0.0970 | |
| n_financia~s | 0.0048 | 0.0090 | -0.0241 | -0.0108 | -0.0269 | 0.0455 | -0.0009 | -0.0286 | 0.0970 | 0.0979 |

Annex Stratification

Stata has been used to bootstrap with 1000 replications, with age, gender and the region of the individual are used as stratification variables in line with the information published by of Italy regarding the survey design. This method looked for to maintain the crucial characteristics of both area probability and list samples. According to (Kennickell ,1996), each bootstrap sample is

associated with a set of weights that were calculated using the same methods as the primary weight.

```
. bootstrap, reps(1000) strata(area5 qd1 qd7):  regress n_financial_products qd10 qd1 qd7 edu FL qprod1b_2 reddito area5 capofam
(running regress on estimation sample)

Bootstrap replications (1000)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..................................................   50
..................................................  100
..................................................  150
..................................................  200
..................................................  250
..................................................  300
..................................................  350
..................................................  400
..................................................  450
..................................................  500
..................................................  550
..................................................  600
..................................................  650
..................................................  700
..................................................  750
..................................................  800
..................................................  850
..................................................  900
..................................................  950
.................................................. 1000

Linear regression

Number of strata   =       629                  Number of obs     =      2,036
                                                Replications      =      1,000
                                                Wald chi2(9)      =     167.90
                                                Prob > chi2       =     0.0000
                                                R-squared         =     0.2127
                                                Adj R-squared     =     0.2092
                                                Root MSE          =     0.2628

------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
n_financia~s |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        qd10 |  -.0056415   .0019533    -2.89   0.004    -.0094698   -.0018132
         qd1 |  -.0009651   .0101523    -0.10   0.924    -.0208632    .0189331
         qd7 |     .00043   .0003727     1.15   0.249    -.0003004    .0011605
         edu |  -.0056384   .0035927    -1.57   0.117    -.0126799    .0014031
          FL |    .016616   .0018248     9.11   0.000     .0130394    .0201925
   qprod1b_2 |   .5096791   .0618958     8.23   0.000     .3883656    .6309926
     reddito |  -.0011293   .0013967    -0.81   0.419    -.0038668    .0016082
       area5 |  -.0106579   .0036653    -2.91   0.004    -.0178416   -.0034741
     capofam |   .0058643   .0083832     0.70   0.484    -.0105664    .0222951
       _cons |  -.0883191   .0319029    -2.77   0.006    -.1508476   -.0257907
------------------------------------------------------------------------------
```

```
. bootstrap, reps(1000) strata(area5 qd1 qd7): logistic market_participation qd10 qd1 qd7 edu FL qprod1b_2 reddito area5 capofam
(running logistic on estimation sample)

Bootstrap replications (1000)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..................................................    50
..................................................   100
..................................................   150
..................................................   200
..................................................   250
..................................................   300
..................................................   350
..................................................   400
..................................................   450
..................................................   500
..................................................   550
..................................................   600
..................................................   650
..................................................   700
..................................................   750
..................................................   800
..................................................   850
..................................................   900
..................................................   950
..................................................  1000

Logistic regression

Number of strata   =       629                  Number of obs     =      2,036
                                                Replications      =      1,000
                                                Wald chi2(9)      =     202.46
                                                Prob > chi2       =     0.0000
Log likelihood = -268.11995                     Pseudo R2         =     0.3471

------------------------------------------------------------------------------
             |               Observed   Bootstrap                         Normal-based
market_partic~n | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        qd10 |   .9056009   .0494829    -1.81   0.070      .813629    1.007969
         qd1 |   .9699028   .2455701    -0.12   0.904     .5904895    1.593105
         qd7 |   1.014089   .0096664     1.47   0.142     .9953188    1.033213
         edu |   .9717427   .0747089    -0.37   0.709     .8358142    1.129777
          FL |   1.445776   .0675908     7.89   0.000     1.319189    1.584511
    qprod1b_2 |   12.40648   3.219293     9.70   0.000     7.460614     20.6311
     reddito |   1.143574   .0739672     2.07   0.038     1.007414    1.298137
       area5 |   .7874368   .0575756    -3.27   0.001     .6823038    .9087693
     capofam |    .879497   .1899835    -0.59   0.552     .5759213    1.343092
       _cons |   .0000987   .0001362    -6.68   0.000     6.59e-06    .0014769
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.
```

```
. bootstrap, reps(1000) strata(area5 qd1 qd7): ologit qk1 FL qd1 qd10 edu capofam reddito pop_com casa if qk1 >1 & qk1 <=5
(running ologit on estimation sample)

Bootstrap replications (1000)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..................................................    50
..................................................   100
..................................................   150
..................................................   200
..................................................   250
..................................................   300
..................................................   350
..................................................   400
..................................................   450
..................................................   500
..................................................   550
..................................................   600
..................................................   650
..................................................   700
..................................................   750
..................................................   800
..................................................   850
..................................................   900
..................................................   950
..................................................  1000

Ordered logistic regression

Number of strata   =       614                  Number of obs     =      1,903
                                                Replications      =      1,000
                                                Wald chi2(8)      =     739.88
                                                Prob > chi2       =     0.0000
Log likelihood = -2069.7775                     Pseudo R2         =     0.1096

------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
         qk1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          FL |   -.122443   .0119016   -10.29   0.000    -.1457697   -.0991164
         qd1 |  -.3334049   .0757816    -4.40   0.000    -.4819341   -.1848756
        qd10 |   .0673203     .01766     3.81   0.000     .0327074    .1019332
         edu |   .3319889   .0249836    13.29   0.000     .2830219    .3809559
     capofam |   .3873105   .0528658     7.33   0.000     .2836955    .4909256
     reddito |  -.0864845   .0146272    -5.91   0.000    -.1151532   -.0578158
     pop_com |  -.0953917    .036436    -2.62   0.009    -.1668049   -.0239785
        casa |   .2249306   .0401582     5.60   0.000     .1462219    .3036392
-------------+----------------------------------------------------------------
       /cut1 |   -3.76158   .3367079                    -4.421515   -3.101645
       /cut2 |   -.648172   .3231519                    -1.281538   -.0148059
       /cut3 |   .5856617    .322869                    -.0471499    1.218473
------------------------------------------------------------------------------
```

```
. bootstrap, reps(1000) strata(area5 qd1 qd7): regress FL qd1 qd7 qd10 capofam edu reddito casa area5 pop_com
(running regress on estimation sample)

Bootstrap replications (1000)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..................................................    50
..................................................   100
..................................................   150
..................................................   200
..................................................   250
..................................................   300
..................................................   350
..................................................   400
..................................................   450
..................................................   500
..................................................   550
..................................................   600
..................................................   650
..................................................   700
..................................................   750
..................................................   800
..................................................   850
..................................................   900
..................................................   950
..................................................  1000

Linear regression

Number of strata   =       629                  Number of obs     =      2,036
                                                Replications      =      1,000
                                                Wald chi2(9)      =     617.84
                                                Prob > chi2       =     0.0000
                                                R-squared         =     0.1685
                                                Adj R-squared     =     0.1649
                                                Root MSE          =     3.1103

------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
          FL |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         qd1 |  -.0604269   .1277179    -0.47   0.636    -.3107494    .1898956
         qd7 |   .0133399   .0043673     3.05   0.002     .0047802    .0218997
        qd10 |  -.0572329   .0272757    -2.10   0.036    -.1106923   -.0037735
    capofam |   -.639273    .104165    -6.14   0.000    -.8434327   -.4351134
         edu |  -.3383999   .0409213    -8.27   0.000    -.4186042   -.2581956
     reddito |   .3632968   .0248507    14.62   0.000     .3145904    .4120033
        casa |  -.0904356   .0717281    -1.26   0.207    -.2310201    .0501489
       area5 |   .3006123   .0412929     7.28   0.000     .2196798    .3815449
     pop_com |  -.4372466   .0503585    -8.68   0.000    -.5359474   -.3385458
       _cons |    9.34411   .5637126    16.58   0.000     8.239253    10.44897
------------------------------------------------------------------------------
```