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# Household Finance and Portfolio Allocation in Italy: An Empirical Analysis

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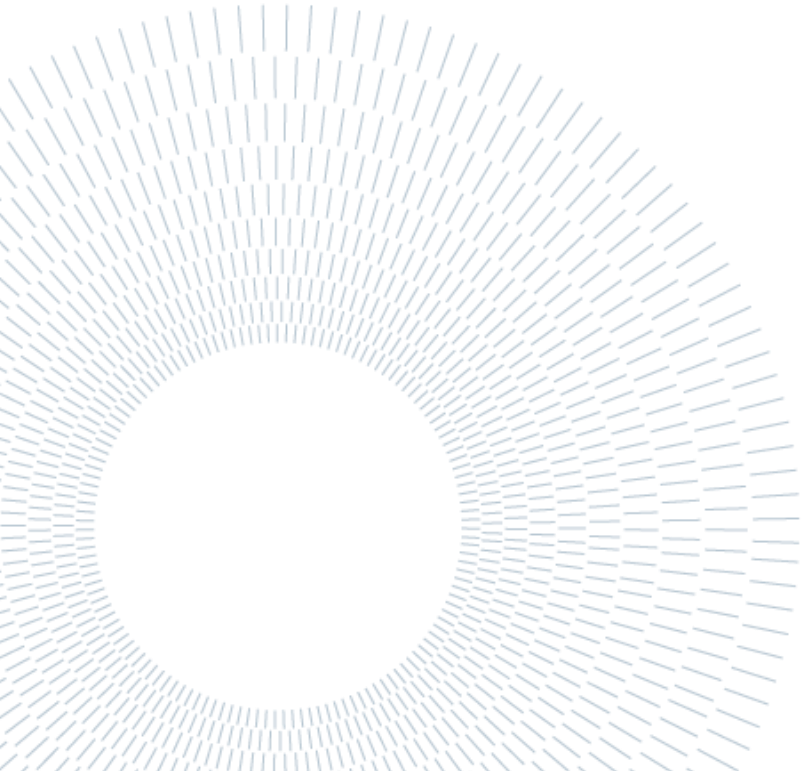

# Abstract

This thesis analyses household finance and portfolio allocation in Italy, focusing on the impact of wealth, education, and financial democratization. Using data from the Bank of Italy's Survey on Household Income and Wealth (SHIW), the study examines how Italian households allocate their wealth across financial and real assets. The findings confirm that real estate plays a dominant role in household portfolios across all wealth levels, including wealthier households, who, despite greater diversification, continue to allocate a significant share of their wealth to property. While wealth remains the primary determinant of asset allocation, the role of education appears to be more limited, with its impact on portfolio choices being weaker than that of wealth. The study also investigates the effects of financial democratization—driven by the rise of exchange-traded funds (ETFs) and digital investment platforms—on household investment behavior. The results suggest that, despite increased accessibility to financial markets, there has been little evidence of a substantial shift toward financial assets, particularly among lower-wealth households. These findings highlight the persistence of traditional investment patterns in Italy and provide insights into the structural factors limiting broader participation in financial markets.

**Keywords:** Household finance, portfolio allocation, real estate, education, financial democratization, Italian households, empirical analysis.

# Abstract in italiano

Questa tesi analizza la finanza delle famiglie e l'allocazione del portafoglio in Italia, con particolare attenzione all'impatto della ricchezza, dell'istruzione e della democratizzazione finanziaria. Utilizzando i dati dell'Indagine sui Bilanci delle Famiglie Italiane (SHIW) della Banca d'Italia, lo studio esamina come le famiglie italiane distribuiscono la loro ricchezza tra attività finanziarie e reali. I risultati confermano che il settore immobiliare riveste un ruolo predominante nei portafogli delle famiglie italiane, indipendentemente dal livello di ricchezza. Anche tra le famiglie più abbienti, sebbene sia presente una maggiore diversificazione, una quota significativa della ricchezza continua a essere investita nel mercato immobiliare. Sebbene la ricchezza sia il principale determinante delle scelte di allocazione, il ruolo dell'istruzione appare più limitato, con un impatto meno significativo rispetto a quello della ricchezza. La tesi indaga inoltre gli effetti della democratizzazione finanziaria, favorita dalla diffusione degli ETF e delle piattaforme di investimento digitali, sul comportamento di investimento delle famiglie. I risultati suggeriscono che, nonostante una maggiore accessibilità ai mercati finanziari, non vi siano prove di un cambiamento sostanziale nell'allocazione della ricchezza verso attività finanziarie, in particolare tra le famiglie meno abbienti. Questi risultati evidenziano la persistenza di schemi di investimento tradizionali in Italia e forniscono spunti sulle barriere strutturali che limitano una più ampia partecipazione ai mercati finanziari.

**Parole chiave:** Finanza delle famiglie, allocazione del portafoglio, mercato immobiliare, istruzione, democratizzazione finanziaria, famiglie italiane, analisi empirica.

# Contents

# 1 Introduction

## 1.1. Context and Motivation

### Importance of Household Finance in Economic Decision-Making

Household finance plays a fundamental role in shaping economic decision-making at both micro and macroeconomic levels. At the individual level, households make crucial financial choices regarding savings, investments, borrowing, and consumption. These decisions determine their long-term financial stability, their ability to accumulate wealth, and their resilience to economic shocks. Poor financial decision-making can lead to excessive debt, insufficient retirement savings, or vulnerability to economic downturns, impacting overall well-being [1].

Despite its importance, household finance has historically received less attention compared to corporate or public finance. Traditional economic models often assumed households made rational financial decisions, neglecting the complexities of individual behavior, which also depends on variables such as financial literacy, and institutional constraints. It was only in recent decades, particularly following the influential work of Campbell [1] and Calvet, Campbell, and Sodini[2], that household finance emerged as a distinct field. These studies highlighted significant heterogeneity in financial decision-making across income and education levels, showing that many households fail to optimize their portfolios due to lack of financial knowledge or access to investment opportunities.

At the macroeconomic level, household financial behavior influences broader economic trends. Aggregate consumption, a major driver of GDP, is directly linked to household income, wealth, and financial management. Similarly, household investment decisions affect financial markets, as participation in stocks, bonds, or mutual funds contributes to market liquidity and stability[3]. The 2008 financial crisis illustrated the dangers of excessive household debt and poor financial decisions, reinforcing the need for further research in this area. However, household behavior was only one contributing factor, as the crisis also exposed deeper issues within the banking sector, including misaligned incentives and poor risk management. Lenders, driven by short-term profits, extended credit irresponsibly, while financial institutions underestimated systemic risks—factors that exacerbated the crisis. Education and financial literacy play a critical role in household finance, affecting how individuals allocate their wealth across different asset classes. Higher financial knowledge tends to result in better diversification, more optimal risk-taking, and improved long-term financial outcomes[4]. Moreover, technological advancements and financial democratization—such as the rise of exchange-traded funds (ETFs) and digital

banking—have reshaped household finance by providing wider access to investment opportunities [5].

Understanding household finance is crucial for policymakers aiming to design effective financial regulations, promote economic stability, and enhance financial inclusion. By studying household financial behavior, researchers and governments can develop strategies to improve financial well-being, reduce inequality, and foster sustainable economic growth.

## Key Trends in Portfolio Allocation and the Role of Financial Democratization

Household portfolio allocation has evolved significantly over the past few decades, driven by changes in financial markets, economic conditions, and investor behavior. Traditionally, households primarily allocated their wealth to real assets, such as real estate, while financial assets were concentrated in bank deposits and government bonds, reflecting risk aversion and limited access to diversified investment instruments[3]. However, financial liberalization, technological advancements, and regulatory changes have expanded household investment opportunities, leading to a gradual shift towards more diversified financial portfolios [6].

One major trend is the increasing participation of households in equity markets. Historically, stock market participation was concentrated among wealthier and more financially literate individuals [7], but financial democratization has lowered entry barriers through the development of low-cost investment products such as exchange-traded funds (ETFs) and robo-advisors [8], [9], [10]. These innovations have provided small investors with access to diversified portfolios that were once available only to institutional or high-net-worth individuals. As a result, financial assets—especially equities and mutual funds—have gained importance in household balance sheets, reducing reliance on traditional low-yielding assets [5].

The role of financial literacy and education remains a critical determinant of portfolio choices. Research shows that financially educated households tend to hold more diversified portfolios, take on more risk appropriately, and achieve better long-term returns [4]. However, significant disparities remain, with lower-income and less-educated households still exhibiting conservative investment behavior and lower financial market participation [3].

Financial democratization has also influenced portfolio allocation across different wealth groups. The post-2010 period, characterized by increased digitalization and the rise of passive investment strategies, has led to a potential convergence in investment behaviors. While wealthier households continue to have higher exposure to equities and alternative assets, middle-class and lower-income households have gained better access to financial markets through online trading platforms and low-cost index funds [8][8], [9], [10]. This shift suggests that the barriers to entry

traditionally associated with investing are diminishing, though gaps in financial knowledge and risk tolerance persist.

Despite these advancements, challenges remain. Many households still exhibit a preference for liquidity and capital preservation, favouring deposits over riskier assets even when higher returns are attainable in the long run [11]. Moreover, economic crises, such as the 2008 financial crash and the COVID-19 pandemic, have reinforced risk aversion among certain demographic groups, slowing the adoption of more diversified portfolio strategies [12].

Understanding these trends is essential for policymakers and financial institutions aiming to enhance household financial decision-making. Encouraging financial education, improving access to investment tools, and ensuring transparency in financial markets are key steps toward fostering a more inclusive and efficient financial system.

## Research Questions and Objectives of the Thesis

This thesis aims to contribute to the field of household finance by analyzing how wealth, education, and financial democratization influence household portfolio allocation in Italy. Existing literature has extensively documented differences in financial decision-making based on wealth and financial literacy, highlighting the role of market access, risk tolerance, and investment sophistication in shaping portfolio choices. Notably, Guiso and Jappelli (2000) [13] provide a detailed account of Italian household portfolios and their evolution, examining factors such as asset diversification and the propensity to invest in risky assets. Additionally, Bottazzi and Oggero (2024) [14] explore the relationship between financial literacy and financial resilience among Italian households, shedding light on how financial knowledge impacts investment behaviors. However, the impact of financial democratization—particularly the increased availability of low-cost investment products such as ETFs and the rise of digital trading platforms—on household investment behavior remains an evolving area of research [8], [9], [10].

The primary objective of this thesis is to bridge the gap between theoretical and empirical research by comparing existing findings with new evidence derived from the Bank of Italy's *Survey on Household Income and Wealth (SHIW)*. Specifically, the study will investigate:

1. The relationship between wealth and asset allocation: How does asset allocation vary across different wealth deciles? Prior research indicates that wealthier households tend to hold more diversified portfolios and allocate more funds to risky assets such as equities [5], [11]. This analysis will test whether this pattern holds within the Italian context.

2. The impact of education on investment choices: Given the well-established link between financial literacy and investment sophistication [4], how does education influence the share of financial and real assets in household portfolios? This study will explore whether more educated households allocate wealth more efficiently.
3. The interaction between wealth and education in portfolio selection: Does financial literacy mitigate the effects of lower wealth on investment choices? This question is particularly relevant given that previous studies suggest financially educated but lower-wealth households may exhibit investment behaviors similar to wealthier individuals[7].
4. Changes in household portfolio allocation post-2010: The last decade has seen significant advancements in financial technology and product availability. This section will assess whether the rise of ETFs and online investment platforms has led to a convergence in portfolio allocation across wealth classes, potentially reducing historical disparities in investment behavior [8], [9], [10]. By regressing portfolio shares across wealth groups before and after 2010, the study will evaluate whether lower-income households have increased their exposure to financial assets in response to financial democratization.

To address these questions, the thesis will employ econometric analysis using regression models on SHIW data. The primary estimation technique will be a panel fixed effect model, which allows for panel data analysis. The different fixed effect models were run applying time-varying survey weights. However, since the time-varying weights could not be applied to the post estimation diagnostic tests, such that the Hausman and the heteroskedasticity test, the regressions included in the thesis use only time invariant sampling weights.

The findings from this research will contribute to the ongoing discussion on financial inclusion and household investment behavior. By analyzing whether financial democratization has effectively reduced gaps in portfolio allocation, the study will offer insights for policymakers and financial institutions aiming to improve household financial well-being.

## 1.2. Contribution of the Thesis

### How this research builds on existing literature

The study of household finance has gained traction in recent years, with foundational research highlighting the role of wealth, education, and financial literacy in shaping investment behavior [1], [3]. However, gaps remain in understanding how financial democratization—particularly the rise of low-cost investment products and digital trading platforms—has influenced household portfolio choices across different wealth groups. This thesis builds on existing literature by extending these discussions with

new empirical evidence drawn from the *Survey on Household Income and Wealth (SHIW)* provided by the Bank of Italy.

Previous studies have established that wealthier households exhibit greater portfolio diversification and higher allocations to risky assets, such as equities, while lower-income households tend to favor safer, more liquid investments [5], [11]. Similarly, financial literacy has been shown to be a key determinant of investment sophistication, with financially educated households more likely to participate in markets and optimize asset allocation [4], [7]. This thesis contributes to these discussions by empirically testing how the interaction between wealth and education influences investment choices in Italy, complementing prior findings from international contexts.

Additionally, while prior research has examined financial sophistication and participation [2], [6], there has been limited investigation into how financial democratization has altered investment patterns over time. By analyzing household portfolio allocation pre- and post-2010, this study assesses whether financial innovations—such as ETFs, online trading platforms, and robo-advisors—have led to greater market participation among lower-wealth households[8], [9], [10]. This is particularly relevant given the ongoing debate on whether these tools have truly enhanced financial inclusion or merely reinforced existing wealth disparities.

Methodologically, this thesis builds on prior empirical work by employing regression models to quantify the relationship between asset allocation, wealth, and education. While many studies have used cross-sectional or panel data approaches, this research incorporates time-varying factors to capture shifts in household investment behavior. By using panel data regression techniques that account for both individual household effects and time-specific variations, this study ensures robustness in capturing the relationship between asset allocation, wealth, and education. The use of the SHIW dataset ensures that the sample used in this analysis is representative of Italian households.

In summary, this thesis expands upon the existing body of knowledge by providing updated, Italy-specific empirical insights into household portfolio allocation. It bridges theoretical and practical perspectives, offering a more comprehensive understanding of how financial literacy, wealth, and democratization collectively shape financial decision-making. The findings will inform both academic discourse and policy discussions on financial inclusion and investor behavior.

## Use of Bank of Italy's SHIW data for empirical insights

This thesis leverages the *Survey on Household Income and Wealth (SHIW)*, a nationally representative dataset provided by the Bank of Italy, to analyze how Italian households allocate their financial and real assets. The SHIW was initiated in the 1960s to collect data on household income and savings, but over time, its scope has expanded to include wealth, investment behavior, and financial decision-making [1]. Today, the survey provides one of the most comprehensive micro-level datasets on

Italian households, covering approximately 7,000 households (16,000 individuals) across 300 municipalities.

The SHIW data is particularly valuable for this research because of its panel component, which allows for tracking households over time and analyzing long-term trends in portfolio allocation. Since 2008, the survey has also been part of the Eurosystem's *Household Finance and Consumption Survey* (HFCS), ensuring methodological consistency with other European studies. Furthermore, the dataset is used in international projects for harmonizing income and wealth data, such as the *Luxembourg Income Study* and *Luxembourg Wealth Study*, making it a reliable source for cross-country comparisons [15].

This study uses SHIW data to examine how Italian households allocate wealth across different asset classes—total financial assets, deposits, government bonds, other financial assets, real assets, and real estate. The analysis explores how these allocations correlate with key household characteristics, including wealth, education, and their interaction. Additionally, this research investigates whether portfolio allocation patterns have changed after 2010, following the rise of ETFs and digital investment platforms, to assess whether financial democratization has altered household investment behavior [8], [9], [10].

A key advantage of the use of the SHIW dataset is the fact that allows to provide insights into structural shifts in household finance, distinguishing between temporary fluctuations and long-term behavioral changes. By applying panel data regression models, this study ensures robustness in identifying persistent investment trends and evaluating whether financial democratization has contributed to narrowing the gap in portfolio allocation between wealthier and less wealthy households [12].

In summary, the use of SHIW data enables this thesis to provide Italy-specific empirical evidence on household finance. By leveraging this rich dataset, the research contributes to the broader literature on household investment behavior, financial inclusion, and the impact of financial democratization on wealth distribution.

## Relevance of Analyzing Post-2010 Effects on Household Finance

The post-2010 period marks a pivotal phase in household finance due to several macroeconomic and technological shifts. Understanding these changes is essential for capturing how financial democratization has affected household portfolios. Since 2010, the rise of low-cost investment vehicles, such as exchange-traded funds (ETFs), has made investing more accessible to households across the wealth spectrum [8], [9], [10]. The increasing use of digital platforms for investment and the growth of online financial literacy tools have democratized access to financial markets, challenging traditional notions of wealth management.

One key change post-2010 is the potential shift in asset allocation patterns among households, especially lower-wealth households. Before this period, wealthier households predominantly held higher-value financial assets like stocks, bonds, and real estate, while less affluent households tended to allocate a larger share of their wealth into low-yield, low-risk assets like bank deposits [7]. However, the increased availability of alternative investment options and financial education may have narrowed this gap, providing previously underserved households with opportunities to diversify their portfolios more similarly to wealthier households. This phenomenon is closely related to the broader concept of financial democratization, which has been gaining attention in the literature [8], [9], [10].

Additionally, the aftermath of the 2008 financial crisis led to shifts in household behavior, as many households became more risk-averse, while others sought out new investment opportunities to recover losses [12]. Post-2010, changes in macroeconomic conditions, including low-interest rates and quantitative easing measures by central banks, may have further altered household asset allocation, particularly in terms of investments in government bonds, real estate, and other financial assets. The ability to track these evolving trends using data from sources like the Bank of Italy's SHIW allows researchers to evaluate whether wealthier households remain dominant in sophisticated financial investments or if democratization has led to broader participation in such investments.

# 2 Literature Review

## 2.1. Overview of Household Finance Research

### Campbell (2006) and His Contributions to the Field

Campbell's 2006 seminal paper, "Household Finance," [1] represents a major milestone in the development of the household finance field. The study addresses several critical challenges that households face when making financial decisions, offering valuable insights into the complexities of household behavior that were previously underexplored in traditional financial theory. One of the key contributions of Campbell's work is his emphasis on the fact that households are not homogeneous actors; instead, they exhibit diverse financial behaviors due to differences in wealth, education, and financial literacy. This is particularly relevant in understanding why some households invest effectively, while others make significant mistakes.

## Two Challenges of Household Finance

Campbell (2006) [1] outlines two key challenges that make household finance particularly difficult to analyze: the difficulty of measuring household behavior and the constraints households face that are not captured by traditional economic models.

### Measurement in Household Finance

Understanding household financial behavior requires high-quality data, yet obtaining it is challenging due to financial privacy, reporting biases, and portfolio complexity. Researchers rely on various data sources, each with strengths and limitations.

The Survey of Consumer Finances (SCF) is widely used for studying U.S. households. It provides a detailed snapshot of wealth and oversamples high-net-worth individuals, making it valuable for analyzing asset allocation. However, it lacks granular data on individual assets, relies on self-reported information, and does not track households over time, limiting its ability to capture financial decision-making dynamics.

To overcome these limitations, researchers turn to administrative datasets, with Sweden's government tax records standing out. Unlike the SCF, Sweden's data come from mandatory filings, covering the entire population with precise, disaggregated wealth and income information. Crucially, it follows households over time, enabling studies on financial sophistication, risk-taking, and responses to economic shocks.

Other sources provide complementary insights. Brokerage records [16], [17] offer transaction-level detail on stock trading behavior but do not represent total household wealth. National share registers, such as Finland's, track all stock transactions but exclude mutual funds and real estate. Tax records, including U.S. estate tax data, provide insights into wealth distribution but only for the very rich.

Each dataset balances scope, detail, and accuracy differently. Surveys offer breadth but suffer from self-reporting biases, while administrative records provide precision but may lack behavioral insights. Combining these sources enhances our understanding of household finance, with emerging big data and digital records promising even greater advances in future research.

## Models

Modeling household finance behavior is complex due to numerous real-world constraints that standard financial theories often overlook. Unlike traditional models, which assume a single-period framework, households must plan over their entire lifetime, balancing investment risks, labor income uncertainty, borrowing constraints, and tax implications.

A fundamental challenge is accounting for changing investment opportunities. [18], [19] framework highlights that long-term investors must hedge against both wealth shocks and fluctuations in expected returns. However, this model is difficult to implement empirically. Simplified versions focus on specific risks, such as interest rates [20] or the equity premium [21], but these assumptions may not capture the full range of investment dynamics.

Another difficulty arises from deviations between theoretical predictions and real-world financial behavior. For example, mean-variance portfolio theory suggests all risky assets should be held in fixed proportions, yet financial planners advise conservative investors to hold more bonds than stocks. [20] explain this by showing that bonds hedge interest rate risk, a factor ignored in basic models. Similarly, the distinction between real and nominal returns is often underappreciated—if inflation is persistent, nominal bonds become highly risky, contrary to traditional assumptions.

Human capital further complicates modeling. Unlike financial assets, labor income is non-tradable, and its risk characteristics are debated. If labor income is stable and uncorrelated with the market, it acts like a safe asset, encouraging stock investment [22]. However, if labor income risk correlates with equity returns [23] or becomes more volatile during downturns [24], it discourages risky investments. Moreover, households with flexible labor supply, such as the ability to work longer hours or delay retirement, may take on more financial risk [25].

Housing is another challenge. It is a long-term asset that provides consumption benefits but is illiquid, limiting financial flexibility. Homeownership may deter risk-taking because adjusting housing consumption in response to shocks is costly [26]. At the same time, housing provides collateral for borrowing, shaping financial decisions in ways traditional models do not always capture.

Mortgage choice illustrates the difficulty of modelling household finance decisions. For example, while financial theory suggests adjustable-rate mortgages (ARMs) should be safer because they avoid price fluctuations, financial planners often view them as risky. [27] resolve this paradox by showing that ARMs expose households to rising borrowing costs and potential liquidity constraints, making fixed-rate mortgages (FRMs) preferable for risk-averse or borrowing-constrained households.

Taxation adds another layer of complexity. Capital gains taxes, tax-favored retirement accounts, and mortgage interest deductions create incentives that shape household financial behavior but are difficult to incorporate into standard models. These distortions suggest that financial advice must go beyond simple optimization strategies.

Given these challenges, models of household finance should account for real-world frictions, borrowing constraints, and behavioral deviations from textbook predictions. Without doing so, they risk misrepresenting how households actually manage their finances.

## Participation and Asset Allocation

Households allocate their assets across different categories such as money market instruments, bonds, equities, and real estate in varying proportions. However, a critical first question is: How many households actually participate in these markets? Once participation is established, the next concern is how households distribute their assets across these classes. This allocation varies significantly with household characteristics such as age, wealth, income, and risk attitudes. Fortunately, these questions can be explored without requiring overly detailed data on individual asset holdings, mitigating some of the data challenges discussed earlier.

## Wealth Distribution and Market Participation

Following previous studies [6], an analysis of the 2001 Survey of Consumer Finances (SCF)[1] reveals the structure of household wealth allocation. In the analysis, it's presented the cross-sectional wealth distribution, which includes financial and nonfinancial assets but excludes defined benefit pensions and human capital. The median U.S. household in 2001 had financial assets worth only $35,000, total assets of $135,000, and a net worth of $86,000. A striking feature of the data is the extreme skewness of wealth distribution. Households in the top percentiles hold disproportionately large shares of aggregate wealth, which complicates the interpretation of economy-wide financial trends. From a policy and household finance perspective, understanding the behavior of the median household is crucial, as aggregate statistics are heavily influenced by a relatively small number of high-net-worth individuals.

## Participation Across Asset Classes

The analysis [1] continues illustrating the participation to different assets markets by wealth percentile. Households with low wealth, typically in the bottom quartile, tend to hold only liquid assets and vehicles, with limited participation in real estate. Standard financial theory suggests that participation in risky financial markets should yield positive expected returns, and so every household should have at least a minimum exposure to them. However, fixed participation costs—such as brokerage fees, financial advisory costs, or even the time needed to acquire investment knowledge—can deter lower-wealth households.

As wealth increases, more households participate in equity markets, though participation remains incomplete even among wealthier households. [28] and [29] emphasize that limited participation challenges traditional financial models. For instance, at the 80th wealth percentile, the average household holds $200,000 in financial assets, yet nearly 20% have no public equity exposure. Furthermore, private

business ownership plays a major role in asset allocation among wealthier households. [30] show that private business owners hold nearly 40% of total net worth despite representing less than 10% of households. The substitution effect between public and private equity is evident: at the 80th percentile, almost 10% of households hold neither private business assets nor public equity, reinforcing the view that private business ownership explains much of the variation in public equity participation.

## Demographic Influences on Asset Allocation

Beyond wealth, demographic factors such as income, education, race, and self-reported risk tolerance significantly influence household asset allocation. However, a fundamental identification problem arises when trying to disentangle age, time, and cohort effects. As [31] note, a household's age, birth year, and time period effects are mathematically collinear, making separate identification difficult.

Studies suggest that both time and age effects are relevant. Age effects arise because older households have shorter investment horizons and lower human wealth relative to financial wealth. Meanwhile, time effects reflect changing market conditions, such as fluctuating risks and returns on assets. Cohort effects—linked to historical experiences of different generations—are more difficult to quantify but may still influence financial behavior.

Logit regressions from the 2001 SCF reveal the impact of demographic characteristics on participation in public equity and private business ownership. Education plays a critical role: more educated households are significantly more likely to invest in public equities. Similarly, white households tend to have higher participation rates in both public and private equity. Self-employment strongly correlates with business ownership, while poor health reduces the likelihood of participating in risky asset markets.

## Behavioral Explanations for Market Nonparticipation

Standard financial theory suggests that all households should invest at least some portion of their wealth in equities given a positive expected equity premium. The reality of widespread nonparticipation suggests the presence of significant frictions. One potential explanation is a lack of awareness. [13] found that over 35% of Italian households were unaware of stock investments. Though the proportion is likely lower in the U.S., some level of informational asymmetry persists.

Fixed costs of market entry also matter. These could include explicit financial costs (e.g., trading fees) and implicit costs such as tax complexities or psychological barriers. [32] argues that these costs explain the observed positive correlation between wealth

and participation. Households may also be deterred from investing due to behavioral biases, such as mistrust of financial institutions or fear of losses. [33] demonstrate that households with weaker social networks are less likely to own stocks, while[34] find that distrust in financial institutions negatively correlates with equity market participation.

Finally, background risks—such as business ownership or health-related uncertainties—can significantly shape investment behavior. Self-employed individuals or business owners, for instance, may perceive their private business assets as sufficient exposure to equity risk, reducing their incentive to invest in public markets.

### Conclusion

Household asset allocation is shaped by a complex interplay of wealth, demographics, and behavioral factors. Wealthier households are more likely to participate in financial markets, yet even among them, participation is partial due to private business ownership and other factors. Education emerges as a critical determinant of financial participation and diversification. Limited stock market participation remains a puzzle for financial theory, suggesting that fixed costs, psychological barriers, and background risks play crucial roles in shaping household investment decisions. Future research should further explore how these frictions evolve over time and how policy interventions—such as financial education programs—could enhance participation and improve household financial welfare.

## 2.2 Diversification and the Role of Education

The topic of household finance delves into how households structure their investment portfolios, with a focus on diversification across wealth classes, causes, and effects. Research reveals that household portfolio construction varies significantly across different wealth classes, largely due to access to resources, financial literacy, and risk preferences. One of the key findings is that many households tend to hold a limited number of individual stocks [1]. For example, U.S. households typically hold just a handful of individual stocks directly, with the median number of stocks being two before the dotcom bubble financial crisis and three thereafter. This limited stockholding is less risky for those who diversify indirectly through mutual funds or retirement accounts, showing that direct individual stockholdings might not substantially affect household portfolio risk in the broader context of diversified portfolios[1].

Local bias in investment choices is another noteworthy factor, especially among lower-income households. Research consistently shows that individual investors tend to favor local stocks, which may be linked to familiarity and regional bias [35]. This bias is observed both in domestic versus foreign investments and in regional versus non-regional stocks. Wealthier households, with more access to diversified investment vehicles, tend to mitigate these biases. For instance, high-income investors exhibit less local bias, leading to greater international diversification, and generally, better portfolio performance.

The concentration of stock holdings within employer stocks, particularly in 401(k) accounts, is another common theme in household portfolio construction[36]. Many households might exhibit a strong preference for investing in their employer's stock, for example driven by past performance, which can increase risk exposure. The tendency to favor employer stock highlights the broader issue of underdiversification, especially for households with limited financial knowledge.

Brokerage accounts further demonstrate how household portfolio construction diverges [16]. Discount brokerage customers, who tend to be more actively involved in equity trading, often display behavioral biases such as the disposition effect — selling winners too early and holding onto losers. This behavior might be more pronounced in households with a higher level of optimism or perceived financial comfort.

The literature also highlights significant heterogeneity in household portfolio construction [37]. Financially sophisticated and wealthier households often have better diversified and more efficient portfolios. They are less likely to exhibit biases like local favoritism and typically engage in better diversification strategies. Conversely, households with limited resources or financial knowledge tend to suffer from greater underdiversification, which results in higher risks and lower overall returns.

In summary, household finance research reveals that the diversification of household portfolios is heavily influenced by wealth class, with wealthier and more financially literate households generally demonstrating better diversification strategies. However, local biases, concentration in employer stocks, and behavioral biases still play significant roles in portfolio construction across wealth classes, affecting household risk exposure and returns. These patterns are critical for understanding the causes of wealth disparity and the impact of financial literacy on investment outcomes.

## Household Mortgage Decision

As mentioned above, another important aspect, which influences asset allocation, is the role of housing and mortgage debt for typical households, but research on mortgage decisions from the household's perspective remains sparse. Most studies

focus on the financial instruments and pricing of mortgage-backed securities rather than the decision-making process at the household level [27].

Mortgages mainly come in two forms: Fixed-Rate Mortgages (FRMs) and Adjustable-Rate Mortgages (ARMs). From 1985 to 2005, FRMs predominated in the U.S., making up 72% of newly issued mortgages. FRMs have a longer life span, typically 30 years, and allow for refinancing at the borrower's discretion. ARMs, which have rates that fluctuate, tend to be favored when FRM rates increase. However, despite periods when the ARM-FRM spread widens, homeowners do not always shift to ARMs, indicating that factors beyond the spread, like interest rate expectations, play a significant role in mortgage choice. Interestingly, households sometimes seem to irrationally assume that long-term interest rates will revert to the mean [1], [27] .

Choosing the optimal mortgage is a complex process involving real interest rate risk, inflation risk, and borrowing constraints. A typical model might not fully explain the time-series variation in mortgage choice. While an ARM would be more attractive during high spreads or when interest rates are expected to decline, the data suggest that some households act under the belief that long-term interest rates will revert to their previous levels, which might not be the case.

Refinancing plays an important role for homeowners, particularly when interest rates decline. The option allows for reducing monthly payments or increasing debt without raising monthly payments, a practice known as home equity extraction. Refinancing, however, incurs a significant one-time cost, making it optimal only when the spread between the existing and current mortgage rates is large enough to offset these costs. Despite substantial refinancing incentives in recent years, many households continue to pay higher mortgage rates, possibly due to financial inertia or lack of awareness.

A deeper look into refinancing patterns reveals that more sophisticated, financially secure households—those with higher education, better income, and higher home values—are more likely to refinance. These households may also be less likely to move, which would reduce the need for refinancing. On the other hand, those with low creditworthiness or insufficient home equity are less likely to refinance, as they face greater barriers [38].

Despite substantial incentives to refinance, a significant portion of households fail to do so, which could be attributed to both economic constraints and behavioral factors such as financial illiteracy or failure to act upon available opportunities. This suggests that slow refinancing may reflect an investment mistake rather than a rational decision.

### Equilibrium in Retail Financial Markets

Household financial optimization is complex, and many households make mistakes, especially when it comes to refinancing fixed-rate mortgages (FRMs). Surprisingly, they sometimes opt for financial products that reward sophisticated decision-making

and constant monitoring, whereas simpler, less mistake-prone contracts could be offered. Economists have recommended inflation-adjusted mortgages and automatic refinancing to reduce consumer costs. However, financial innovation in retail markets is slow, and various countries adopt different mortgage types due to the inertia of standard contracts and the difficulty of reaching unsophisticated households.

Unsophisticated households might tend to use standard financial contracts, and financial innovators struggle to reach them. The absence of effective patent protection for new financial products also limits innovation. Financial products often involve cross-subsidies from naive to sophisticated households, with sophisticated consumers benefiting from pooling with less informed ones. This creates a challenge for introducing new products, as sophisticated households may resist switching to a new product that eliminates the cross-subsidy.

When a new financial product, such as an automatically refinancing mortgage, is introduced, sophisticated households may switch only if the new product offers a significant social gain. However, advertising new products to sophisticated households can be costly. Therefore, reducing the fraction of naive households through financial education might encourage adoption and innovation by making advertising more effective and reducing cross-subsidies.

While financial education can help, it might not always make it worthwhile for innovators to invest in reaching naive households. Moreover, misleading products with hidden costs may still prevail, benefiting from the cross-subsidies provided by naive consumers. Public policy could help by promoting financial education, regulating predatory lending, and encouraging the development of beneficial financial products through subsidies or tax incentives. Disclosure requirements and default options could also reduce investment mistakes and influence consumer behavior.

## 2.3 Conclusion

Household finance research, as pioneered by Campbell, highlights the complexity of financial decision-making at the individual and household levels. Unlike traditional finance, which often assumes rational and homogeneous investors, household finance acknowledges the diversity of financial behaviors shaped by wealth, education, risk preferences, and institutional constraints. Campbell's work lays the foundation for understanding these differences and the challenges households face in optimizing their financial well-being.

One of the most striking insights from Campbell's research is that households do not always act in ways predicted by standard financial theory. Many households fail to participate in financial markets despite the benefits of diversification and risk-adjusted returns. Participation costs—both explicit, such as brokerage fees, and

implicit, such as financial literacy barriers—limit access to investment opportunities, particularly among lower-wealth households. Even among participants, asset allocation varies significantly, with wealthier and more financially sophisticated households achieving better diversification. Behavioral biases, such as local investment preferences, reluctance to sell losing assets, and overinvestment in employer stock, further complicate optimal portfolio choices.

Housing and mortgage decisions also play a central role in household finance. Campbell highlights how households often struggle with complex mortgage products, leading to suboptimal choices such as failing to refinance or misjudging the risks of adjustable-rate mortgages (ARMs). While financial theory suggests that mortgage choice should be dictated by interest rate expectations and borrowing constraints, real-world behavior deviates from these predictions. Many households exhibit financial inertia, failing to refinance even when doing so would result in significant cost savings. These inefficiencies underscore the need for better financial education and policy interventions to help households navigate major financial decisions.

Beyond individual decision-making, Campbell's research also explores the structure of retail financial markets [1], [2], [7], [20], [27]. Households interact with financial institutions that design products to cater to varying levels of financial sophistication. Sophisticated households benefit from competitive markets, while less financially literate households often bear higher costs due to hidden fees, predatory lending practices, and suboptimal financial choices. The persistence of these market frictions suggests that financial regulation and consumer protection policies are essential for ensuring equitable access to financial services.

## Implications for Italian Households

While Campbell's analysis is rooted in U.S. household finance, many of the insights extend to other economies, including Italy. Italian households face unique financial challenges due to differences in financial market participation, wealth distribution, and institutional structures. Stock market participation in Italy remains lower than in Anglo-Saxon economies, with a significant portion of household wealth concentrated in real estate and bank deposits rather than equities [13]. Financial literacy levels are also relatively low, which may explain limited participation in riskier financial assets [14].

# 3 Data and Methodology

## 3.1. Description of the Dataset

### Bank of Italy's Survey on Household Income and Wealth (SHIW).

To analyze the asset allocation of Italian households, this work utilizes the Survey on Household Income and Wealth (SHIW) conducted by the Bank of Italy. As mentioned in the introduction, the SHIW is one of the most comprehensive sources of microdata on Italian households' financial behavior, including income, consumption, and wealth composition. Over time, the survey has expanded to cover household portfolios, investment preferences, and financial literacy [15].

The SHIW is conducted on a biennial basis, covering approximately 7,000–8,000 households (16,000 individuals) across 300 Italian municipalities. It also contributes to international research projects, such as the Luxembourg Wealth Study and [39]. The dataset allows for an in-depth analysis of Italian households' portfolio composition, following the approach of [1], who used the Survey of Consumer Finances (SCF) to examine U.S. households' investment behavior. The version of the dataset that was used in this framework covers a time span that starts in 1989 and finishes in 2022.

Asset Allocation Categories

The wealth variables analyzed in this study are constructed by aggregating different asset categories. The wealth variables in this study are constructed as follows:

Total Financial Assets are the sum of:

1. Deposits (checking and savings accounts)
2. Government Bonds (household investments in government debt)
3. Other Financial Assets (stocks, mutual funds, pensions, and other investments)

**Total Financial Assets=Deposits+Government Bonds+Other Financial Assets**

Real Assets include:

1. Real Estate (residential and commercial properties)
2. Business Wealth (privately owned businesses, included in real assets but not as a separate variable)
3. Other Tangible Assets

**Real Assets=Real Estate+Business Wealth+Other Tangible Assets**

Gross Wealth represents total household resources:

**Gross Wealth=Total Financial Assets+Real Assets**

The dataset enables the estimation of portfolio shares for each asset class, allowing for a comparison with findings from other countries and datasets, such as the SCF for the U.S. [1] and similar studies in Europe[7].

Table 1 - Descriptive statistics of Assets of Italian households, in millions of Euros – Source: SHIW

presents the descriptive statistics for the variables analyzed, offering an overview of household wealth distribution.

| Variable | Mean | Median | Standard deviation | Number of observations | Min | Max |
|---|---|---|---|---|---|---|
| Gross Wealth | 0.216 | 0.126 | 0.479 | 0.116 | 0 | 341 |
| Financial Assets | 0.0275 | 0.0068 | 0.169 | 0.116 | 0 | 130 |
| Deposits | 0.0135 | 0.005 | 0.0633 | 0.116 | 0 | 19.8 |
| Government Bonds | 0.00318 | 0 | 0.0238 | 0.116 | 0 | 13.4 |
| Other Financial Assets | 0.00967 | 0 | 0.139 | 0.116 | 0 | 123 |
| Real Assets | 0.188 | 0.11 | 0.400 | 0.116 | 0 | 211 |
| Real Estate | 0.165 | 0.103 | 0.286 | 0.116 | 0 | 19.4 |
| Educational level | Categorical variable with six educational levels | | | 0.116 | 1 | 6 |

Table 1 - Descriptive statistics of Assets of Italian households, in millions of Euros – Source: SHIW

Gross Wealth, which represents the total value of financial and real assets, has a mean of approximately €215,647.

Within Financial Assets, the average household holds around €27,452, but the distribution is highly skewed, as shown by the much lower median of €6,759. Deposits are the most common financial asset, with a mean of €13,510. Government Bonds and Other Financial Assets display even greater disparities, as their medians are zero, indicating that a large share of households does not hold these assets.

Real Assets make up the largest portion of household wealth, with an average value of €188,173. Real Estate, the primary component of real assets, has a mean of €164,889, highlighting the significance of property ownership in household portfolios. Business wealth, though not separately detailed, is also included within real assets.

The large differences between means and medians across all asset categories suggest that wealth is heavily concentrated among a small fraction of households. Moreover, the high standard deviations, particularly for financial assets and real estate, further confirm the presence of strong wealth disparities.

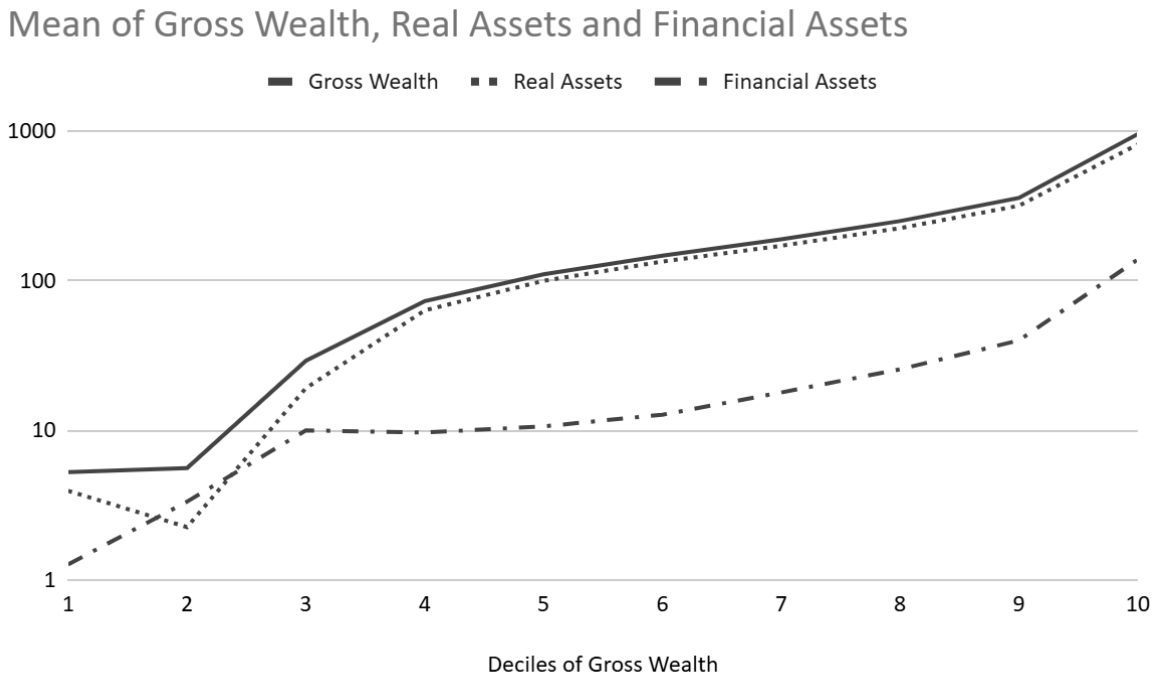


Figure 1 - Mean of Gross Wealth, Real Assets and Financial Assets (in thousands of euro) across deciles of gross wealth – Source: own elaboration over SHIW

Strengths and Limitations of the SHIW for Asset Allocation Analysis

Strengths

The SHIW provides a long time series of household financial behavior, making it a valuable tool for studying wealth accumulation and portfolio composition. Its panel component, introduced in 1989, allows for tracking changes in asset allocation over time. The survey's design ensures representativeness of the Italian population, making it a crucial resource for policy analysis and financial research [5].

#### 3.1.1.1. Limitations

Despite its strengths, the SHIW has several limitations that must be considered:

Biennial frequency: The survey is not conducted annually, limiting the ability to analyze short-term fluctuations in asset allocation.

Missing data points: The 2018 wave is absent, which implies that there is a four-year gap between 2016 and 2020. This is particularly important because this work tries to analyze the impact of the emergence of new investment opportunities after the 2010, therefore the absence of the last wave before the covid-influenced years is surely noteworthy. Moreover, there is a three-year gap (1995–1998) in the time series. Despite this being less important of the 2018 missing year, this additional gap is still relevant to be highlighted.

Underrepresentation of top wealth: As with most household surveys, the SHIW is likely to underestimate the wealth at the top of the distribution, particularly for the top 1%. This issue has been highlighted in recent literature, which suggests integrating fiscal data to correct for this bias [40]. Nevertheless, the use of this data is still very much relevant for analyzing distributive issues in households finance, as the main goal of this work is to investigate the entire distribution, without a specific focus on the ultra-wealthy households. Still, when interpreting the results, it must be taken into account that the coefficients of the highest decile of the distribution might be downward biased due to the underrepresentation of the ultra-wealthy households in surveys.

## 3.2. Empirical Strategy

### Regression models used

#### Panel regressions

To analyze the relationship between household wealth, education, and asset allocation, this study employs panel regressions. The panel data techniques allow us to control for unobserved heterogeneity and capture the evolution of household portfolio choices over time [6].

A panel regression model accounts for variations within and between households, mitigating the risk of omitted variable bias by controlling for individual-specific characteristics that do not change over time. The key advantage of using a panel structure, rather than cross-sectional regressions, is that it allows to take into account all the time invariant individual level characteristics that might influence the asset allocation, when estimating the wealth and education influence on household financial choices.

Panel data estimation can be conducted using fixed effects (FE) or random effects (RE) models. The general form of the baseline panel regression is:

$$y_{it} = \alpha + \beta X_{it} + u_i + \epsilon_{it}$$

where:

- $y_{it}$ represents the **share of a given asset class** in household i's portfolio at time t,
- $X_{it}$ includes explanatory variables such as **household wealth, education, and interaction terms**,
- $u_i$ represents **household-specific unobserved heterogeneity**,
- $\epsilon_{it}$ is the **idiosyncratic error term**.

In the panel data literature, there are two different classes of models which can be used to estimate a regression: **fixed effects (FE)** and **random effects (RE)** models. The two models differ in the way they treat the $u_i$, the household-specific unobserved characteristics. In fact, on one hand, random effect models assume that those characteristics are not correlated with the dependent and independent variables of the model. They treat the individual-level heterogeneity as a randomly distributed variable; therefore, they are typically computed through a Generalized Least Square estimation. The GLS estimation corrects the standard OLS estimation by taking into account a known structure of heteroskedasticity or autocorrelation in the error terms of the estimation[41]. In the case of RE model, the GLS takes into account the fact that the error term of the model features a series of randomly distributed individual-level characteristics[42].

On the other hand, the Fixed Effects model assumes that individual level characteristics are not random and that they can be correlated with the other variables of the model. There are typically two ways to estimate a FE model. The first one is through the so-called LSDV, Least Squares Dummy Variable, estimator, which captures the individual characteristics by inserting one dummy variable for each individual of the dataset. The second one is through the so-called within-estimator, which transforms the variables of the model by demeaning them and then performs a standard OLS regression. These two estimators compute the same coefficients, so they lead to the same results [42].

### Diagnostics

In order to select which of the two specifications is the preferred one, the literature typically uses the **Hausman test** [43]**.**

In general, the FE model is preferred when unobserved household characteristics (in the case of this work, they can be variables such as financial literacy or risk aversion) are **correlated** with explanatory variables, whereas the RE model is efficient if these factors are uncorrelated. The Hausman test exploits the fact that, if the random effects model is appropriate, meaning that the individual-specific effects are uncorrelated with the explanatory variables, both the fixed effects and random effects estimators are consistent, but the random effects estimator is more efficient, while if the fixed effects specification is the correct one, therefore if individual characteristics are correlated with the explanatory variables, then the random effect model leads to biased estimations. Therefore, the test is based on the fact that the estimations of the two models must be similar, if RE is the correct specification. In fact, Mathematically, the Hausman test compares the difference in coefficients between the FE and RE models.

Another important aspect which must be taken into account when performing a panel regression estimation, is heteroskedasticity.

On one hand, as mentioned before in the Random Effect model description, the implementation of a Random Effect model assumes that the individual characteristics are a form of heteroskedasticity, and they are typically treated through a GLS. On the other hand, as shown below in section 4.1 (Table 3), following the results of the Hausman test, this work implements a Fixed Effect estimation.

However, heteroskedasticity could still affect the estimation of a panel model regardless of the individual time unobservable characteristics. Technically, heteroskedasticity refers to the situation where the variance of the error terms is not constant across observations. This can be related to different sources and would lead to inefficient estimation and unreliable confidence intervals.

One way to test the presence of heteroskedasticity is through a Wald test [44], which tests the null hypothesis that there is no heteroskedasticity across the entities in the panel model.

If heteroskedasticity is detected, one solution which is often used in literature is the application of robust standard errors, typically the Huber-White sandwich estimators [42], that correct for both heteroskedasticity and autocorrelation. This adjustment ensures that hypothesis testing remains valid and robust.

In this work, these two important diagnostics tests (Hausman and Heteroskedasticity tests) were conducted. The results, which are shown in detail in section 4.1 (Table 4), lead to the use of Fixed effects models and the application of the heteroskedasticity

robust sandwich estimators, ensuring the statistical validity of the different model specifications presented below.

# 4 Regression: Specifications and Hypotheses

We estimate the following **four key panel regressions** to assess the determinants of asset allocation:

## 4.1. Wealth and Asset Allocation

This regression examines whether wealthier households allocate a greater share of their portfolio to risky assets (e.g., equities and bonds), consistent with theories of portfolio diversification [1]. As mentioned above, prior research finds that higher wealth levels correlate with greater stock market participation due to lower background risk [11].

$$Y_{ait} = \alpha_i + \alpha_t + \sum_{d=1}^{10} \delta_d D_d + \varepsilon$$

Where

$Y_{ait}$ = shares of different types of assets out of total gross wealth

$\alpha_i$ = individual fixed effects

$\alpha_t$ = time fixed effects

$D_d$ = dummy indicating membership in an income decile

In this model the coefficients $\delta_d$ are the relevant ones, as they indicate the effect on the share of gross wealth invested in a particular asset of being a member of the income decile *d*.

In regression analysis, particularly when using categorical variables, it is necessary to select a baseline category to avoid the issue of perfect multicollinearity. Perfect multicollinearity is a situation in which one or more explanatory variables in a regression model are a linear combination of the others. This creates a redundancy in the model, making it impossible to compute an estimation of each coefficient. Specifically, in the presence of perfect multicollinearity, the matrix of independent variables (design matrix) becomes singular, meaning that its inverse cannot be computed, which prevents the estimation of the regression coefficients [45].

As mentioned before, a source of perfect multicollinearity arises when categorical variables are included in a regression without selecting a reference category. In the case of a categorical variable with k levels, including all k dummy variables in the regression would cause perfect multicollinearity because each category is fully determined by the others. This is often referred to as the dummy variable trap.

To avoid this issue, one category is omitted from the regression and serves as the baseline category [42]. The coefficients of the remaining dummy variables are then interpreted relative to this omitted category. In this study, wealth deciles are used as categorical variables, and the **fifth wealth decile is selected as the baseline**. This means that the estimated coefficients $\delta_d$ measure the percentage difference in the allocation to asset $Y_a$ for each decile compared to the fifth decile.

By using this approach, we ensure that the model remains **identifiable** and that the regression results are interpretable.

Results of the panel regression analysis

Table 2 contains the results of the regression model 1, outlined in the equation above. Since this model aims at capturing the effect of being part of a different wealth decile into the shares of different types of asset ownership out of total wealth, it features different dependent variables, as represented by the subscript a in the equation above. This implies that the model is run six times, featuring the following different asset shares: real assets, real estate assets, financial assets, deposits, public bonds and other financial assets.

Regression table 2 shows that households in the 1st decile exhibit a significant underallocation to real estate and real assets overall, in fact regression 1, which is the one with the share of real assets as a dependent variable, shows a negative and significant at 90% coefficient for the 1st decile dummy (-0.651*), similarly the regression 2, which is the one with the share of real estate assets as a dependent variable, shows another negative and significant coefficient (-0.185***). However, this does not imply a strong shift toward financial investments—rather, a larger portion of their wealth is tied up in tangible assets (such as vehicles or durable goods) and mainly deposits, as the coefficient for regression 4, which is the one with the share of deposits as a dependent variable, shows the biggest positive coefficient for the 2nd wealth decile (0.387***).

In contrast, the 2nd and 3rd deciles exhibit an interesting transition: they hold even fewer real assets than the 1st decile. In fact, in regression 1, which has the share of real assets as the dependent variable, their coefficients are 0.369* and -0.309***, respectively. However, this decline in real assets does not appear to be offset by a significant increase in real estate, bonds, or equities, raising questions about how these households allocate their wealth. Instead, their shift seems primarily associated with an increase in deposits, as indicated by regression 4, where the coefficients are +0.387*

for the 2nd decile and +0.269* for the 3rd. This pattern suggests a greater ability to save but also a preference for liquidity over investment.

Starting from the 6th decile, households' wealth status is progressively increasingly correlated their exposure to real estate (+0.0353* in the 6th decile, +0.0416*** in the 8th). Meanwhile, their reliance on cash deposits declines steadily, signalling a transition toward long-term asset accumulation.

By the 10th decile, there is a clear preference for financial market participation. While deposits continue to decrease (-0.0343***), allocations to other financial assets (mostly equities) rise (+0.00996***), reflecting increased engagement in stocks, funds, and other sophisticated investment vehicles.

Looking at Regression (5), which examines the share of public bonds, the coefficients are initially negative, suggesting that lower-wealth households allocate a smaller portion of their total wealth to government bonds. However, from the 5th decile onward, no coefficients remain statistically significant, implying that, beyond a certain wealth threshold, the proportion of wealth held in public bonds remains relatively stable across deciles. This could indicate that, while bond ownership varies in the lower part of the distribution, it converges to a more uniform share as wealth increases.

Therefore, results in table 2 show that the households' wealth has a strong and significant impact over the investments allocation. The effects are different when considering different assets and they are not linear, as the coefficients of the different deciles show.

| VARIABLES | (1) Share Real Assets | (2) Share Real Estate | (3) Share Financial Assets | (4) Share Deposit | (5) Share Public Bonds | (6) Share Other Financial Assets |
|---|---|---|---|---|---|---|
| Wealth 1st decile | -0.185*** | -0.651*** | 0.176*** | 0.199*** | -0.0188*** | -0.00531** |
| | (0.00972) | (0.00860) | (0.00969) | (0.00935) | (0.00238) | (0.00246) |
| Wealth 2nd decile | -0.369*** | -0.618*** | 0.368*** | 0.387*** | -0.0184*** | -0.00268 |
| | (0.00808) | (0.00779) | (0.00806) | (0.00762) | (0.00263) | (0.00272) |
| Wealth 3rd decile | -0.309*** | -0.414*** | 0.309*** | 0.269*** | 0.0197*** | 0.0174*** |
| | (0.00709) | (0.00789) | (0.00709) | (0.00648) | (0.00263) | (0.00296) |
| Wealth 4th decile | -0.0684*** | -0.0917*** | 0.0684*** | 0.0470*** | 0.0103*** | 0.0102*** |
| | (0.00420) | (0.00492) | (0.00420) | (0.00335) | (0.00174) | (0.00187) |
| Wealth 6th decile | 0.0258*** | 0.0353*** | -0.0258*** | -0.0191*** | -0.00145 | -0.00519*** |
| | (0.00279) | (0.00336) | (0.00279) | (0.00227) | (0.00118) | (0.00126) |
| Wealth 7th decile | 0.0332*** | 0.0416*** | -0.0333*** | -0.0255*** | -0.00239* | -0.00496*** |
| | (0.00322) | (0.00388) | (0.00322) | (0.00250) | (0.00133) | (0.00150) |
| Wealth 8th decile | 0.0342*** | 0.0416*** | -0.0341*** | -0.0294*** | -0.00259* | -0.00212 |
| | (0.00358) | (0.00433) | (0.00358) | (0.00276) | (0.00142) | (0.00169) |
| Wealth 9th decile | 0.0351*** | 0.0313*** | -0.0351*** | -0.0335*** | -0.00207 | 0.000603 |
| | (0.00412) | (0.00502) | (0.00412) | (0.00314) | (0.00162) | (0.00198) |
| Wealth 10th decile | 0.0245*** | -0.00791 | -0.0246*** | -0.0343*** | -0.00160 | 0.00996*** |
| | (0.00520) | (0.00645) | (0.00520) | (0.00406) | (0.00188) | (0.00250) |
| Observations | 116,382 | 116,382 | 116,382 | 116,382 | 116,382 | 116,382 |
| R-squared | 0.182 | 0.397 | 0.184 | 0.194 | 0.029 | 0.016 |
| Observations | 63,552 | 63,552 | 63,552 | 63,552 | 63,552 | 63,552 |
| Model | FE | FE | FE | FE | FE | FE |
| Time FE | YES | YES | YES | YES | YES | YES |
| Outliers | Excluded | Excluded | Excluded | Excluded | Excluded | Excluded |
| Std Error | Robust | Robust | Robust | Robust | Robust | Robust |

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 2 - Regression Table of model 1

| Dependent Variable | Chi2 Statistics | P-value |
|---|---|---|
| Real Assets Share | 1550.73661 | 0 |
| Real Estate Share | 2683.635118 | 0 |
| Financial Assets Share | 1594.528882 | 0 |
| Deposits Share | 1475.794869 | 0 |
| Public Bonds Share | 184.0295654 | 0 |
| Other Financial Assets Share | 469.3560515 | 0 |

Table 3 - Hausman test of regression model 1

P-value machine precision: 10E-16

Table 3 shows the results of the Hausman test for the regressions of model 1. The test strongly rejects the null hypothesis (p-value = 0) for all dependent variables, indicating that the fixed effects model is preferred over the random effects model. This suggests that unobserved individual heterogeneity is correlated with the explanatory variables, making fixed effects the appropriate specification for the analysis.

| Dependent Variable | Wald test Statistics | P-value |
|---|---|---|
| Real Assets Share | 1228191094 | 0 |
| Real Estate Share | 1122519766 | 0 |
| Financial Assets Share | 1553409569 | 0 |
| Deposits Share | 2551772483 | 0 |
| Public Bonds Share | 2403915701 | 0 |
| Other Financial Assets Share | 1053712163 | 0 |

Table 4 - Heteroskedasticity test of regression model 1

P-value machine precision 10E-16

Table 4 shows the results of the heteroskedasticity test, which strongly rejects the null hypothesis of homoskedasticity for all dependent variables (p-value = 0), indicating the presence of heteroskedasticity in the regression models. To address this issue, robust standard errors have been applied to ensure valid inference.

## 4.2. Post-2010 Wealth and Asset Allocation: The Rise of ETFs and Financial Democratization

This regression tests whether the relationship between wealth and asset allocation changed after 2010, coinciding with the rise of ETFs, robo-advisors, and financial democratization[8], [9], [10]. If financial innovations have lowered barriers to entry for retail investors, we expect the wealth effect on equity allocation to be weaker post-2010.

$$Y_{ait} = \alpha_i + \alpha_t + \sum_{d=1}^{10} \delta_d D_d + \sum_{d=1}^{10} \delta_{dpost} D_d D_{post2010} + \varepsilon$$

Where

$Y_{ait}$ = shares of different types of assets

$\alpha_i$ = individual fixed effects

$\alpha_t$ = time fixed effects

$D_d$ = dummy variable indicating membership in an income decile

$D_{post2010}$= dummy variable that equals 1 if the observation is from 2010 or a later year.

This specification features an interaction between the dummy identifying the post-2010 periods $D_{post2010}$ and the dummy identifying the income deciles $D_d$. The interaction of these two variables identifies the observations of the different wealth deciles after 2010. Therefore, the coefficients of these interaction terms, $\delta_{dpost}$ indicates the additional effects that the belonging to a specific wealth decile has in the post 2010 period, with respect to the overall effect on the share of a specific asset.

Table 5 presents the results of Regression Model 2, as specified in the equation above. This model assesses the impact of belonging to different wealth deciles on the shares of various asset types within total wealth. To capture potential shifts after 2010, interaction terms with $D_{post2010}$ are included. As explained in model 1, The dependent variable, represented by subscript a, varies across specifications, meaning the model is estimated six times—once for each of the following asset shares: real assets, real estate assets, financial assets, deposits, government bonds, and other financial assets.

| VARIABLES | (1) Share Real Assets | (2) Share Real Estate | (3) Share Financial Assets | (4) Share Deposit | (5) Share Public Bonds | (6) Share Other Financial Assets |
|---|---|---|---|---|---|---|
| Wealth 1st decile | -0.192*** | -0.650*** | 0.178*** | 0.198*** | -0.0177*** | -0.00604* |
| | (0.0136) | (0.0107) | (0.0135) | (0.0133) | (0.00305) | (0.00367) |
| Wealth 2nd decile | -0.381*** | -0.600*** | 0.380*** | 0.399*** | -0.0134*** | -0.00644 |
| | (0.0112) | (0.00997) | (0.0112) | (0.0108) | (0.00375) | (0.00408) |
| Wealth 3rd decile | -0.294*** | -0.387*** | 0.295*** | 0.243*** | 0.0289*** | 0.0189*** |
| | (0.00979) | (0.0106) | (0.00977) | (0.00929) | (0.00382) | (0.00443) |
| Wealth 4th decile | -0.0669*** | -0.0866*** | 0.0669*** | 0.0443*** | 0.0108*** | 0.0107*** |
| | (0.00618) | (0.00716) | (0.00617) | (0.00529) | (0.00252) | (0.00287) |
| Wealth 6th decile | 0.0311*** | 0.0362*** | -0.0310*** | -0.0234*** | -0.00258 | -0.00564*** |
| | (0.00512) | (0.00603) | (0.00512) | (0.00432) | (0.00201) | (0.00209) |
| Wealth 7th decile | 0.0368*** | 0.0422*** | -0.0366*** | -0.0257*** | -0.00286 | -0.00726*** |
| | (0.00529) | (0.00634) | (0.00528) | (0.00445) | (0.00205) | (0.00225) |
| Wealth 8th decile | 0.0408*** | 0.0510*** | -0.0405*** | -0.0331*** | -0.00362 | -0.00298 |
| | (0.00557) | (0.00661) | (0.00556) | (0.00465) | (0.00223) | (0.00242) |
| Wealth 9th decile | 0.0434*** | 0.0426*** | -0.0434*** | -0.0377*** | 7.68e-05 | -0.00496* |
| | (0.00603) | (0.00728) | (0.00603) | (0.00496) | (0.00216) | (0.00277) |
| Wealth 10th decile | 0.0306*** | -0.00515 | -0.0307*** | -0.0365*** | -0.000841 | 0.00372 |
| | (0.00698) | (0.00873) | (0.00697) | (0.00590) | (0.00233) | (0.00297) |
| Wealth 1st decile -post 2010 | -0.0196 | -0.0138 | 0.0321 | 0.0377* | 0.00291 | -0.00306 |
| | (0.0204) | (0.0146) | (0.0206) | (0.0203) | (0.00353) | (0.00481) |
| Wealth 2nd decile -post 2010 | -0.0170 | -0.0556*** | 0.0213 | 0.0254 | -0.00275 | -0.00157 |
| | (0.0161) | (0.0126) | (0.0161) | (0.0158) | (0.00461) | (0.00465) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Wealth 3rd decile -post 2010 | 0.0104 | -0.0154 | -0.0106 | 0.0241* | -0.0225*** | -0.0101* |
| | (0.0141) | (0.0151) | (0.0141) | (0.0135) | (0.00498) | (0.00559) |
| Wealth 4th decile -post 2010 | -0.000396 | -0.0174 | 0.000564 | 0.0118 | -0.00654** | -0.00515 |
| | (0.00946) | (0.0108) | (0.00946) | (0.00837) | (0.00318) | (0.00424) |
| Wealth 6th decile -post 2010 | -0.00129 | 0.00326 | 0.00128 | -0.00320 | 0.00218 | 0.00298 |
| | (0.00764) | (0.00889) | (0.00764) | (0.00657) | (0.00262) | (0.00346) |
| Wealth 7th decile -post 2010 | -0.00640 | -0.00559 | 0.00635 | -0.000880 | 0.00321 | 0.00308 |
| | (0.00772) | (0.00906) | (0.00772) | (0.00647) | (0.00262) | (0.00355) |
| Wealth 8th decile -post 2010 | -0.00194 | -0.0126 | 0.00187 | -0.00308 | 0.00314 | 0.000828 |
| | (0.00778) | (0.00922) | (0.00777) | (0.00647) | (0.00284) | (0.00407) |
| Wealth 9th decile -post 2010 | -0.00620 | -0.00688 | 0.00655 | 0.00109 | -0.00200 | 0.00753* |
| | (0.00800) | (0.00939) | (0.00800) | (0.00662) | (0.00257) | (0.00410) |
| Wealth 10th decile -post 2010 | 0.00435 | 0.00765 | -0.00421 | -0.0107 | 0.000300 | 0.00812* |
| | (0.00865) | (0.0104) | (0.00864) | (0.00705) | (0.00268) | (0.00425) |
| Observations | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 |
| R-squared | 0.749 | 0.868 | 0.748 | 0.743 | 0.492 | 0.554 |
| Model | FE | FE | FE | FE | FE | FE |
| Time FE | YES | YES | YES | YES | YES | YES |
| Outliers | Excluded | Excluded | Excluded | Excluded | Excluded | Excluded |
| Std Error | Robust | Robust | Robust | Robust | Robust | Robust |
| Sampling Weights | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5 - Results of regression model 2

The regression results indicate that while some shifts in wealth allocation across deciles have occurred after 2010, significant changes remain relatively limited.

In Regression (2), which has the share of real estate as the dependent variable, the coefficient for the 2nd decile is significantly negative, suggesting a reduction of approximately -5.56 percentage points ($p<0.01$) in real estate allocation, relative to the 5th decile, after 2010. This comes on top of the already significant negative coefficient in the non-interacted term, which signals a structurally lower allocation to real estate for this group even before 2010. However, this decline does not appear to be offset by a meaningful increase in other asset classes, leaving open questions about where these households reallocated their wealth.

For the 3rd decile, Regression (5), which examines the share of public bonds, shows a significantly negative coefficient, indicating a reduction in public bond holdings (-2.25 percentage points, $p<0.01$). Similarly, Regression (6), which focuses on "other financial assets," suggests a decrease of -1.01 percentage points ($p<0.1$), likely reflecting a decline in equity holdings. At the same time, the coefficient in Regression (4), which looks at deposit shares, is slightly positive (indicating an increase in 2.41 percentage points with respect to the baseline, with a 90% significance), potentially indicating a preference for liquidity or lower-risk assets rather than a broader portfolio reallocation.

The 4th decile exhibits a small but significant decline in public bond allocation (the coefficient can be interpreted as a decrease of 0.65 percentage points, with a 95% of significance) in Regression (5), which could suggest a reduced demand for safer assets in this segment. However, as with other lower deciles, the overall pattern remains difficult to interpret definitively, as there is no clear compensatory increase in other asset categories.

For higher wealth deciles, the coefficients in most regressions are not statistically significant, suggesting that wealth allocation patterns remained relatively stable post-2010. The only notable exception is found in Regression (6), where the coefficients for the 9th and 10th deciles are slightly positive (which can be interpreted as an increase of 0.75 and 0.81 percentage points, respectively, with a 90% significance). This might indicate a modest increase in riskier financial assets, such as equities, but given the weak significance level, this shift should be interpreted with caution.

Overall, the majority of the interaction coefficients between post-2010 and wealth deciles are not statistically significant, implying that, for most deciles, wealth allocation patterns did not undergo major shifts after 2010.

Moreover, the general decrease in bonds allocation and small increase in equities for richer households could be more the effect of QE policies through the 2010s decade than the effect of “financial democratization”. It is not possible to disentangle the combine effects of these two facts, within the current regression framework. While

this research topic goes beyond the scope of this work, it could represent an interesting subject to be investigate in further research.

As robustness check, the same regression model is run using 2008 and 2012 as cutoff dates, instead of 2012. The results of these two additional specifications, which are shown in the annex tables A1 and A2, are very similar to the ones shown in table 5. This finding confirms that the results shown in table 5 does not depend on the specific time cutoff considered (2010) but are a rather persistent result. These robustness checks further confirms the intuition that the financial investment choices of the Italian households seems not to have changed much in recent times, despite the emergence of instruments, such as the ETF and robo-advisors, which could help to change the asset choices of the poorer households.

## 4.3. Education and Asset Allocation

This regression examines whether more educated households allocate a greater share of their portfolio to risky assets. Education is a key determinant of financial sophistication and risk-taking behavior [7]. Households with higher education levels are expected to hold less wealth in deposits and allocate more toward equities and bonds, reflecting better knowledge of financial markets [4].

$$Y_{ait} = \alpha_i + \alpha_t + \sum_{e=1}^{6} \delta_e S_e + \varepsilon$$

Where

$Y_{ait}$ = shares of different types of asset

$\alpha_i$ = individual fixed effects

$\alpha_t$ = time fixed effects

$S_e$ = dummy variable indicating membership in an education class

e = education level (identified as the highest among the household members one)

- 1 = No formal education
- 2 = Primary school
- 3 = Middle school
- 4 = High school
- 5 = Bachelor's degree
- 6 = Postgraduate (Master's or PhD)

Table 6 presents the results of Regression Model 3, as specified in the equation above. This model examines the relationship between education level and the shares of different asset types within total wealth. The categorical variables $S_e$ capture the effect

of belonging to different educational groups. As indicated by the subscript a in the dependent variable, the model is estimated six times, once for each asset share: real assets, real estate assets, financial assets, deposits, government bonds, and other financial assets.

In this specification the coefficients $\delta_e$, which are the ones of the educational level dummies, are the ones that identify the effect that having a specific educational level has on the shares of investment in a specific asset. These coefficients are the ones of interest for this analysis.

As for the wealth decile dummies, the inclusion of all the educational level dummies would cause perfect multicollinearity. Therefore, the dummy for the 3rd educational level is omitted as that category serves as the baseline one.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| VARIABLES | Share Real Assets | Share Real Estate | Share Financial Assets | Share Deposit | Share Public Bonds | Share Other Financial Assets |
| 1st Education class | -0.0273* | -0.0355** | 0.0253 | 0.0250 | 0.00189 | -0.000346 |
| | (0.0165) | (0.0176) | (0.0163) | (0.0161) | (0.00330) | (0.00203) |
| 2nd Education Class | -0.00564 | -0.0144 | 0.00416 | 0.00249 | -0.00102 | 0.00309 |
| | (0.00919) | (0.00989) | (0.00912) | (0.00876) | (0.00259) | (0.00192) |
| 4th Education Class | -0.0225** | -0.0245** | 0.0211* | 0.0146 | 0.00390 | 0.00149 |
| | (0.0112) | (0.0122) | (0.0111) | (0.0108) | (0.00326) | (0.00263) |
| 5th Education Class | -0.0190 | -0.0247 | 0.0168 | 0.0123 | 0.00436 | -0.00154 |
| | (0.0158) | (0.0189) | (0.0159) | (0.0153) | (0.00370) | (0.00375) |
| 6th Education Class | 0.00188 | 0.00539 | -0.00408 | -0.0197 | 0.0117 | 0.00174 |
| | (0.0244) | (0.0284) | (0.0243) | (0.0221) | (0.00927) | (0.0122) |
| Observations | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 |
| R-squared | 0.691 | 0.781 | 0.690 | 0.678 | 0.484 | 0.551 |
| Model | FE | FE | FE | FE | FE | FE |
| Time FE | YES | YES | YES | YES | YES | YES |
| Outliers | Excluded | Excluded | Excluded | Excluded | Excluded | Excluded |
| Std Error | Robust | Robust | Robust | Robust | Robust | Robust |
| Sampling Weights | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6 - Results of regression model 3

The results of the regression analyzing the relationship between education level and asset allocation reveal weaker statistical significance compared to the wealth deciles, analyzed in the previous two regression models. Many coefficients are not significant, indicating that education level alone may have a less pronounced impact on asset allocation compared to wealth.

For individuals with no formal education (category 1), there is a weakly significant negative effect on real asset and real estate allocation, suggesting a lower propensity to invest in tangible assets. At the same time, there is no significant increase in

financial wealth allocation, indicating that these individuals might hold more liquidity rather than diversifying into financial instruments.

For those with a high school diploma (category 4), there is a modest but statistically significant reduction in real asset and real estate holdings, coupled with a slight increase in financial wealth allocation ($p < 0.1$). However, the effect on deposits and bonds is not significant, suggesting that any shift toward financial assets is limited.

Higher education levels (categories 5 and 6, university and postgraduate degrees) do not show strong statistical significance for any asset class. The lack of significance suggests that once a certain level of financial literacy is achieved, additional education does not strongly influence portfolio composition.

The overall pattern indicates that while education might influence investment choices to some extent, it is not as strong a determinant as wealth. This aligns with existing literature suggesting that wealth constraints often play a more decisive role in shaping household financial behavior than education alone.

However, it is important to acknowledge that the few significant effects observed could be the result of spurious correlation. On average, individuals with lower education levels tend to earn less, particularly those with very low levels of education. In contrast, after a certain threshold of education, higher levels of education may not always show the same direct correlation with wealth.

The relationship between wealth and education will be explored deeper with the last model.

The weak significance of education in determining asset allocation also aligns with prior research indicating a missing link between formal education and financial literacy among Italian households. Studies such as [4] highlight that even highly educated individuals may lack essential financial knowledge, leading to suboptimal investment decisions. In Italy, financial literacy levels remain relatively low compared to other developed economies, with many households displaying limited understanding of diversification and risk management [3]. This gap could explain why higher education does not necessarily translate into more sophisticated asset allocation strategies, reinforcing the idea that financial knowledge, rather than formal schooling alone, is a key determinant of investment behavior.

An interesting extension to this analysis would be to run this model with a variable capturing directly financial literacy, instead of education, in order to check the financial literacy channel directly. However, since there is no such variable in the SHIW dataset, this goes beyond the scope of this work.

## 4.4. Wealth, Education, and Asset Allocation

This specification tests for complementary effects between wealth and education. Prior research suggests that wealthy and financially literate households are better at diversifying portfolios, reducing exposure to low-return assets [3].

$$Y_{ait} = \alpha_i + \alpha_t + \sum_{e=1}^{6} \delta_e S_e + \beta W_{it} + \varepsilon$$

$Y_a$ = shares of different types of asset

$\alpha_i$ = individual fixed effects

$\alpha_t$ = time fixed effects

$S_e$ = Dummy indicating membership in an education class

e = education level (identified as the highest among the household members one)

- 1 = No formal education
- 2 = Primary school
- 3 = Middle school
- 4 = High school
- 5 = Bachelor's degree
- 6 = Postgraduate (Master's or PhD)

$W$= gross wealth of the individual

Table 7 presents the results of Regression Model 4, as specified in the equation above. This model examines the relationship between education level and the shares of different asset types within total wealth, while also accounting for the role of individual wealth. The inclusion of the wealth as a regressor allows us to test for complementary effects between wealth and education in determining asset allocation. As indicated by subscript a in the dependent variable and as done in the previous regression models, the model is estimated six times, once for each asset share: real assets, real estate assets, financial assets, deposits, government bonds, and other financial assets.

In this specification, as in the previous one, the coefficients $\delta_e$, which are the ones of the educational level dummies, are the ones that identifies the effect that having a specific educational level has on the shares of investment in a specific assets. These coefficients, together with $\beta$, are the ones of interest for this analysis.

This regression includes both education level (studio dummies) and household wealth (gross_w) as explanatory variables, allowing us to compare their effects on asset allocation.

The coefficient on gross_w is significant at the 99% level for all asset classes, indicating that household wealth has a strong influence on portfolio composition.

Specifically, higher wealth is associated with a larger share of real assets (real estate + other tangible assets) and a smaller share of financial wealth, particularly deposits. These results are expected and in line with the literature on the topic.

The coefficients are very small in absolute terms (due to the wealth variable being expressed in monetary terms, and hence being very large, see table 1 and 7, while the dependent variable is expressed in percentages), but the fact that they are all highly significant suggests a robust effect.

Compared to the previous regression (which only included education), the education coefficients remain similar but slightly lose significance, particularly at higher education levels.

For example, the effect of having at least a high school diploma (4) remains significant for real assets and financial wealth, but other education levels become less relevant.

This suggests that once we control for wealth, education still matters but is less important in explaining asset allocation, confirming the intuition explained in the previous paragraph.

Comparison with the Previous Model (Only Education):

In the previous model, education had a stronger role in explaining asset allocation, with more significant coefficients.

As mentioned above, the inclusion of wealth as a regressor causes the significance of education to decline. This, means that part of the effect previously attributed to education was actually reflecting wealth differences, which means that the regression model 3 might suffer from omitted variable bias.

However, education still have a statistically significant correlation with the shares of wealth allocated into real estate (negative effect for lower education levels, regression 2) and financial wealth (positive for higher education, regression 3). On one hand this means that it still have a role in determining the financial investment choices of the households, on the other hand, this results suggests that, as mentioned when commenting the results of model 3, it would be better to include a variable which directly captures the financial literacy of the households member, instead of the educational level.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| VARIABLES | Share Real Assets | Share Real Estate | Share Financial Assets | Share Deposit | Share Public Bonds | Share Other Financial Assets |
| 1st Education class | -0.0266 | -0.0348** | 0.0246 | 0.0242 | 0.00189 | -0.000323 |
| | (0.0165) | (0.0175) | (0.0163) | (00160) | (0.00330) | (0.00203) |
| 2nd Education Class | -0.00622 | -0.0150 | 0.00474 | 0.00313 | -0.00102 | 0.00307 |
| | (0.00917) | (0.00987) | (0.00910) | (0.00872) | (0.00259) | (0.00192) |
| 4th Education Class | -0.0238** | -0.0258** | 0.0224** | 0.0160 | 0.00391 | 0.00145 |
| | (0.0112) | (0.0122) | (0.0111) | (0.0107) | (0.00326) | (0.00263) |
| 5th Education Class | -0.0220 | -0.0275 | 0.0198 | 0.0156 | 0.00437 | -0.00164 |
| | (0.0158) | (0.0188) | (0.0158) | (0.0152) | (0.00370) | (0.00375) |
| 6th Education Class | -0.00544 | -0.00163 | 0.00321 | -0.0116 | 0.0117 | 0.00150 |
| | (0.0243) | (0.0283) | (0.0243) | (0.0222) | (0.00927) | (0.0122) |
| Gross Wealth | 4.83e-08*** | 4.63e-08*** | -4.81e-08*** | -5.31e-08*** | -1.96e-10 | 1.59e-09 |
| | (9.86e-09) | (1.51e-08) | (9.85e-09) | (1.09e-08) | (8.21e-10) | (1.50e-09) |
| Observations | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 |
| R-squared | 0.693 | 0.782 | 0.691 | 0.680 | 0.484 | 0.551 |
| Model | FE | FE | FE | FE | FE | FE |
| Time FE | YES | YES | YES | YES | YES | YES |
| Outliers | Excluded | Excluded | Excluded | Excluded | Excluded | Excluded |
| Std Error | Robust | Robust | Robust | Robust | Robust | Robust |
| Sampling Weights | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7 -Results of regression model 4

# 5 Conclusions and discussion

This study examines how wealth and education shape asset allocation among Italian households, revealing persistent structural patterns. The results confirm the predominance of real estate in Italian portfolios [13], the lower participation in stock markets compared to the U.S. [4], and the historically significant role of government bonds, shaped by fiscal policy and financial crises [12].

Lower-wealth households allocate significantly less to real estate and financial assets, favoring liquidity in the form of deposits. This pattern suggests both financial constraints and risk aversion [2] . Middle-wealth households gradually increase their real estate holdings, while the wealthiest deciles diversify more into equities and other financial instruments. However, beyond a certain wealth threshold, public bond allocation remains stable across deciles. Post-2010, changes in asset allocation appear limited, with only the 2nd decile showing a significant reduction in real estate holdings without reallocating wealth into other asset classes.

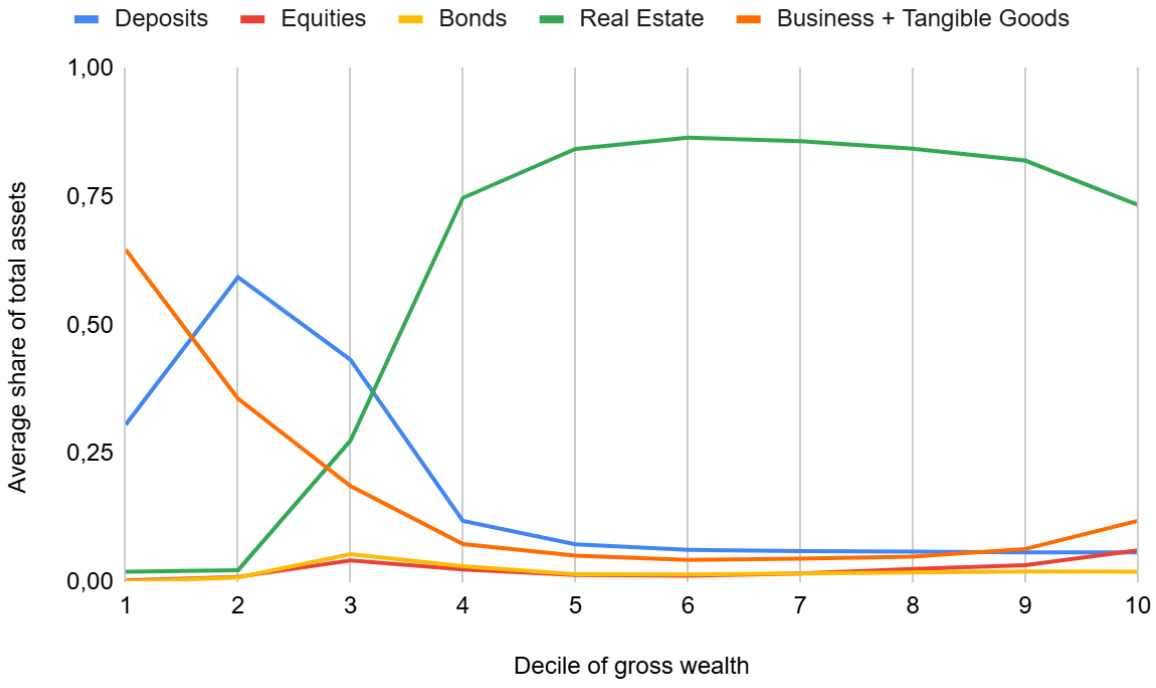


Figure 2 - Asset allocation across deciles of gross wealth

Compared to other countries, these results highlight the unique features of Italian household wealth. In the U.S., stock market participation is far higher across all wealth

levels [1], with middle-class households more actively investing in equities. In contrast, Italian households maintain a stronger preference for real estate, a pattern also observed in other Southern European economies [39]. This reflects not only cultural factors but also financial system differences—U.S. households benefit from deeper capital markets and more widespread retirement investment plans, whereas Italian households have historically relied on homeownership as a primary wealth-building strategy [6].

This pattern holds across all wealth levels for Italian households. Even in the 10th decile, real estate still represents, on average, 73% of total wealth, as shown in Figure 2. Additionally, deposits remain the second most significant asset class, even beyond the 4th decile, only being surpassed by real assets and barely by equity in the $10^{th}$ decile.

The role of government bonds is another key distinction. Italian households have traditionally invested in public debt, particularly in times of economic uncertainty [12], while bond market participation in countries like Germany or the U.S. is more institutionalized. This aligns with findings on how fiscal policy shapes household portfolios [11].

Education appears less influential than wealth in determining asset allocation. While lower education levels correlate with lower real estate holdings, this does not translate into increased financial market participation. Once wealth is accounted for, education coefficients lose significance, suggesting that financial constraints, rather than knowledge gaps, drive investment decisions [5]. This supports the argument that financial literacy—not just formal education—is crucial for market participation [4].

Overall, these findings reinforce the view that Italian households adopt a conservative investment approach, favoring tangible assets and liquidity over financial diversification. This structural conservatism, shaped by economic history, fiscal policies, and market access, continues to differentiate Italy from more equity-oriented financial systems like the U.S. and the U.K. [3].

# 6 Annex

| VARIABLES | (1) Share Real Assets | (2) Share Real Estate | (3) Share Financial Assets | (4) Share Deposit | (5) Share Public Bonds | (6) Share Other Financial Assets |
|---|---|---|---|---|---|---|
| Wealth 1st decile | -0.195*** | -0.655*** | 0.183*** | 0.203*** | -0.0168*** | -0.00633* |
| | (0.0131) | (0.0104) | (0.0130) | (0.0128) | (0.00286) | (0.00344) |
| Wealth 2nd decile | -0.384*** | -0.605*** | 0.383*** | 0.402*** | -0.0130*** | -0.00723* |
| | (0.0107) | (0.00955) | (0.0107) | (0.0103) | (0.00347) | (0.00380) |
| Wealth 3rd decile | -0.295*** | -0.390*** | 0.295*** | 0.247*** | 0.0272*** | 0.0179*** |
| | (0.00936) | (0.0102) | (0.00934) | (0.00889) | (0.00348) | (0.00412) |
| Wealth 4th decile | -0.0695*** | -0.0921*** | 0.0695*** | 0.0484*** | 0.0107*** | 0.00930*** |
| | (0.00590) | (0.00682) | (0.00589) | (0.00513) | (0.00231) | (0.00267) |
| Wealth 6th decile | 0.0304*** | 0.0363*** | -0.0304*** | -0.0226*** | -0.00232 | -0.00616*** |
| | (0.00477) | (0.00565) | (0.00477) | (0.00405) | (0.00182) | (0.00193) |
| Wealth 7th decile | 0.0357*** | 0.0420*** | -0.0356*** | -0.0256*** | -0.00234 | -0.00712*** |
| | (0.00498) | (0.00598) | (0.00497) | (0.00421) | (0.00190) | (0.00209) |
| Wealth 8th decile | 0.0391*** | 0.0491*** | -0.0389*** | -0.0327*** | -0.00274 | -0.00310 |
| | (0.00527) | (0.00627) | (0.00526) | (0.00441) | (0.00206) | (0.00230) |
| Wealth 9th decile | 0.0423*** | 0.0425*** | -0.0422*** | -0.0367*** | -0.000118 | -0.00458* |
| | (0.00572) | (0.00696) | (0.00571) | (0.00471) | (0.00201) | (0.00262) |
| Wealth 10th decile | 0.0303*** | -0.00419 | -0.0303*** | -0.0357*** | -0.000563 | 0.00325 |
| | (0.00672) | (0.00842) | (0.00671) | (0.00566) | (0.00219) | (0.00290) |
| Wealth 1st decile -post 2012 | -0.0138 | -0.00114 | 0.0218 | 0.0292 | 0.000658 | -0.00281 |
| | (0.0213) | (0.0151) | (0.0215) | (0.0212) | (0.00363) | (0.00503) |
| Wealth 2nd decile -post 2012 | -0.0135 | -0.0508*** | 0.0174 | 0.0205 | -0.00456 | 0.000307 |
| | (0.0170) | (0.0130) | (0.0170) | (0.0167) | (0.00453) | (0.00464) |
| Wealth 3rd decile -post 2012 | 0.0133 | -0.0105 | -0.0137 | 0.0184 | -0.0217*** | -0.00920 |
| | (0.0148) | (0.0159) | (0.0148) | (0.0142) | (0.00507) | (0.00566) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Wealth 4th decile -post 2012 | 0.00676 | -0.00503 | -0.00646 | 0.00260 | -0.00722** | -0.00227 |
| | (0.0100) | (0.0113) | (0.01000) | (0.00893) | (0.00322) | (0.00469) |
| Wealth 6th decile -post 2012 | 0.000354 | 0.00374 | -0.000250 | -0.00587 | 0.00179 | 0.00483 |
| | (0.00800) | (0.00922) | (0.00800) | (0.00691) | (0.00265) | (0.00369) |
| Wealth 7th decile -post 2012 | -0.00465 | -0.00639 | 0.00474 | -0.00105 | 0.00232 | 0.00316 |
| | (0.00809) | (0.00936) | (0.00809) | (0.00677) | (0.00269) | (0.00375) |
| Wealth 8th decile -post 2012 | 0.00217 | -0.00958 | -0.00211 | -0.00467 | 0.00122 | 0.00122 |
| | (0.00813) | (0.00959) | (0.00813) | (0.00676) | (0.00290) | (0.00437) |
| Wealth 9th decile -post 2012 | -0.00451 | -0.00832 | 0.00462 | -0.00126 | -0.00188 | 0.00776* |
| | (0.00842) | (0.00977) | (0.00842) | (0.00699) | (0.00268) | (0.00439) |
| Wealth 10th decile -post 2012 | 0.00570 | 0.00505 | -0.00544 | -0.0142* | -0.000578 | 0.0107** |
| | (0.00903) | (0.0107) | (0.00903) | (0.00730) | (0.00277) | (0.00459) |
| Observations | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 |
| R-squared | 0.749 | 0.868 | 0.748 | 0.743 | 0.491 | 0.554 |
| Model | FE | FE | FE | FE | FE | FE |
| Time FE | YES | YES | YES | YES | YES | YES |
| Outliers | Excluded | Excluded | Excluded | Excluded | Excluded | Excluded |
| Std Error | Robust | Robust | Robust | Robust | Robust | Robust |
| Sampling Weights | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A1 – Regression model 2 with 2012 as a cutoff time date

| VARIABLES | (1) Share Real Assets | (2) Share Real Estate | (3) Share Financial Assets | (4) Share Deposit | (5) Share Public Bonds | (6) Share Other Financial Assets |
|---|---|---|---|---|---|---|
| Wealth 1st decile | -0.188*** | -0.642*** | 0.178*** | 0.200*** | -0.0181*** | -0.00707* |
| | (0.0142) | (0.0111) | (0.0141) | (0.0138) | (0.00322) | (0.00388) |
| Wealth 2nd decile | -0.382*** | -0.593*** | 0.382*** | 0.401*** | -0.0129*** | -0.00626 |
| | (0.0117) | (0.0104) | (0.0117) | (0.0113) | (0.00419) | (0.00423) |
| Wealth 3rd decile | -0.295*** | -0.383*** | 0.296*** | 0.242*** | 0.0312*** | 0.0200*** |
| | (0.0104) | (0.0112) | (0.0104) | (0.00987) | (0.00420) | (0.00480) |
| Wealth 4th decile | -0.0700*** | -0.0919*** | 0.0700*** | 0.0467*** | 0.0123*** | 0.0102*** |
| | (0.00670) | (0.00769) | (0.00669) | (0.00567) | (0.00284) | (0.00318) |
| Wealth 6th decile | 0.0337*** | 0.0364*** | -0.0337*** | -0.0252*** | -0.00275 | -0.00603*** |
| | (0.00553) | (0.00651) | (0.00553) | (0.00462) | (0.00224) | (0.00228) |
| Wealth 7th decile | 0.0377*** | 0.0401*** | -0.0377*** | -0.0264*** | -0.00283 | -0.00731*** |
| | (0.00563) | (0.00674) | (0.00563) | (0.00462) | (0.00226) | (0.00245) |
| Wealth 8th decile | 0.0414*** | 0.0485*** | -0.0413*** | -0.0339*** | -0.00374 | -0.00230 |
| | (0.00596) | (0.00706) | (0.00595) | (0.00486) | (0.00244) | (0.00272) |
| Wealth 9th decile | 0.0466*** | 0.0425*** | -0.0468*** | -0.0410*** | -4.32e-05 | -0.00457 |
| | (0.00635) | (0.00770) | (0.00635) | (0.00512) | (0.00235) | (0.00298) |
| Wealth 10th decile | 0.0296*** | -0.0112 | -0.0299*** | -0.0374*** | -0.000833 | 0.00525* |
| | (0.00737) | (0.00919) | (0.00736) | (0.00616) | (0.00253) | (0.00314) |
| Wealth 1st decile -post 2008 | -0.0263 | -0.0324** | 0.0267 | 0.0274 | 0.00344 | -0.000160 |
| | (0.0196) | (0.0143) | (0.0196) | (0.0193) | (0.00363) | (0.00474) |
| Wealth 2nd decile - post 2008 | -0.0134 | -0.0629*** | 0.0124 | 0.0164 | -0.00358 | -0.00162 |
| | (0.0159) | (0.0125) | (0.0159) | (0.0156) | (0.00492) | (0.00488) |
| Wealth 3rd decile - post 2008 | 0.00956 | -0.0211 | -0.0120 | 0.0240* | -0.0240*** | -0.0107* |
| | (0.0139) | (0.0149) | (0.0139) | (0.0134) | (0.00509) | (0.00586) |
| Wealth 4th decile - post 2008 | 0.00582 | -0.00450 | -0.00591 | 0.00512 | -0.00853** | -0.00333 |
| | (0.00940) | (0.0107) | (0.00940) | (0.00833) | (0.00333) | (0.00427) |
| Wealth 6th decile - post 2008 | -0.00642 | 0.00247 | 0.00650 | 0.000794 | 0.00231 | 0.00336 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.00759) | (0.00885) | (0.00759) | (0.00651) | (0.00269) | (0.00341) |
| Wealth 7th decile - post 2008 | -0.00748 | -0.000700 | 0.00778 | 0.000606 | 0.00279 | 0.00275 |
| | (0.00765) | (0.00899) | (0.00765) | (0.00639) | (0.00272) | (0.00354) |
| Wealth 8th decile - post 2008 | -0.00298 | -0.00576 | 0.00324 | -0.00106 | 0.00305 | -0.000684 |
| | (0.00785) | (0.00924) | (0.00785) | (0.00642) | (0.00288) | (0.00421) |
| Wealth 9th decile - post 2008 | -0.0119 | -0.00539 | 0.0127 | 0.00787 | -0.00136 | 0.00555 |
| | (0.00798) | (0.00940) | (0.00797) | (0.00656) | (0.00264) | (0.00407) |
| Wealth 10th decile - post 2008 | 0.00589 | 0.0197* | -0.00523 | -0.00704 | 0.000379 | 0.00343 |
| | (0.00867) | (0.0104) | (0.00866) | (0.00708) | (0.00276) | (0.00422) |
| Observations | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 | 71,723 |
| R-squared | 0.749 | 0.868 | 0.748 | 0.743 | 0.492 | 0.554 |
| Model | FE | FE | FE | FE | FE | FE |
| Time FE | YES | YES | YES | YES | YES | YES |
| Outliers | Excluded | Excluded | Excluded | Excluded | Excluded | Excluded |
| Std Error | Robust | Robust | Robust | Robust | Robust | Robust |
| Sampling Weights | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A2 – Regression model 2 with 2008 as a cutoff time date

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