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Educating the uninformed:

Connecting financial literacy and risky asset participation

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Abstract

In this thesis, we analyse the correlation of financial literacy on the likelihood to participate and the share of wealth allocated in risky financial assets. Our dataset is the Norwegian population. An individual is financially literate when possessing a completed education or holding an occupation within the field of economics. Our main finding is that financial literacy positively correlates with both likelihood to participate and allocation in risky financial assets. We conduct additional analysis to investigate the effect of financial literacy in different wealth and age groups. Additionally, to illustrate economic significance, we show two rudimentary examples. Finally, we find financial literacy to be robust to a battery of robustness checks. The implications of our results suggest that enhancing financial literacy may contribute to balance the wealth distribution and should be considered when designing curriculums.

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1. Introduction

In this thesis, we delve into the impact of financial literacy on households' participation in risky financial assets with the intention of addressing our two-part research question:

Does financial literacy correlate with the likelihood to participate, and the share of total wealth allocated in risky financial assets?

As financial markets grow in complexity and the range of financial instruments expand, understanding household finance becomes increasingly vital, both for society and individuals. This field studies how households manage decisions related to borrowing, saving and resource allocation. A significant portion of the field focuses on participation in risky financial assets, due to its historical link to wealth enhancement and potential for consumption smoothing (Campbell, 2006). Despite the benefits, several studies indicate relatively low participation among household. Gomes & Michaelides (2005), Campbell (2006), van Rooij et al. (2011) and Guiso & Sodini (2013) suggests factors such as life cycle, costs of entry, lack of financial literacy and behavioral biases that deter the individual from participating.

Guiso et al. (2008), van Rooij et al. (2011), Chu et al. (2017) and Cupák (2020) study the direct impact of financial literacy on the likelihood to participate. All of them utilize a survey-based approach hinged on three questions referred to as "the big three" (Lusardi & Mitchell, 2011). Contributions exploring the actual volume of wealth allocated to risky financial assets are few and far apart. However, Khan et al. (2021) study this effect through the survey-based approach. The studies of Calvet et al. (2007), Cardak & Wilkins (2009) and Cupák et al. (2020, 2022) are closely related. Common for the majority of the contributions is that none exceed observation counts by the thousands. Based on the literature there seems to be a gap on how financial literacy directly influences the volume of total wealth allocated to risky financial assets.

We provide an analysis on the properties of individual financial literacy using 10 years of population data from Norway's administrative records. Our measure of financial literacy is based on whether the individuals has completed education or hold an occupation within the field of economics. To analyse our two-part research question, we examine whether financial literacy correlates with the likelihood to participate through logistic regression. Subsequently,

through the least-squares framework, we pan-in on individuals holding risky financial assets to estimate whether financial literacy correlates with allocation of wealth. For both likelihood and allocation, we conduct additional analysis to investigate the correlation of financial literacy in different wealth and age groups. Finally, we check whether our analysis is robust to common methodological concerns and alternative model specifications by conducting a series of robustness checks.

Our main finding is that financial literacy positively correlates with both likelihood to participate and allocation in risky financial assets. Within age groups, financial literacy correlates similarly with the likelihood to participate. However, correlation between financial literacy and allocation increases as individuals age. With respect to likelihood, financial literacy correlates the most with the bottom 25^{th} and top 1^{st} wealth percentiles. Regarding the correlation between financial literacy and allocation in wealth percentiles, our results differ with time. In most recent years, the correlation is descending as wealth increases, while in earlier years this pattern is less evident.

This thesis contributes to the literature in three folds; First, our main contribution is that we address the gap in the literature on financial literacy's influence on the volume of wealth allocated in risky financial assets. We achieve this by utilizing individual-level data on education and occupation, a more precise measure of financial literacy than Calvet et al. (2007). Second, we capture the presence of financial literacy differently from the survey-based approach by exploiting the data on occupation and education. Third, we study the effect of financial literacy in different wealth and age groups, a relationship not covered by literature to this date. Moreover, our full population is more accurate, as it does not suffer from sampling and self-reported numbers.

The rest of the thesis proceeds as follows. Chapter 2 provides a review of the household finance literature on the stock marked participation puzzle, asset allocation decisions and investment behaviour. Chapter 3 describes our dataset and the methodology we use to investigate our research question. Chapter 4 presents and discusses the results of our analyses. Chapter 5 summarizes the contribution and implications of our thesis.

2. Literature review & Hypothesis development

2.1 Household Finance

Household finance studies the pivotal decision-making agents in the financial markets. As the end owners of any asset, their decisions carry substantial influence. The literature encompasses both normative and positive research, touching upon topics like credit-, borrowing-, debt-, retirement- and savings behaviour, asset allocation, financial literacy and financial stability in households. Furthermore, it investigates the role of demographic and cultural factors such as wealth, education, norms, behaviour and family in shaping financial outcomes (Campbell, 2006).

Several puzzles remain unsolved in the literature, such as the equity premium-, co-holding- & stock market participation puzzles (Mehra & Prescott, 1985; Molesworth St Aubyn, 2022). Relevant to our thesis is the stock market participation puzzle, which refers to the low participation rate of households in the stock market, despite the potential for high returns (Campbell & Viceira, 2001; Norges Bank Investment Management (NBIM), 2016; Damodaran, 2021). Central within the literature is to question the underlying factors influencing participation, as it at first glance could seem like the households are not incentivised enough to participate (Haliassos & Bertaut, 1995; Campbell, 2006).

2.2 The stock market participation puzzle

The stock market participation puzzle has gained significant attention in the literature. Researchers propose various reasons to explain why many households refrain from investing in the stock market. Some focus on classical behavioural-finance oriented factors such as risk aversion, present bias, endowment, overconfidence, and more (Barber & Odean, 2002; Hastings & Mitchell, 2020). For instance, households prefer the security of less volatile investments even when it comes at a lower return (Guiso et al., 2008). They may also exhibit myopia due to a present bias instead of committing to savings or consumption-smoothing (Haliassos & Michaelides, 2003; Cartwright, 2014).

Others suggest the lack of financial literacy may deter participation. Financial markets and investment products may be perceived too complex or risky (van Rooij et al., 2011). Additionally, fixed costs of entry, including transaction costs and market frictions, have

received notable attention as factors potentially discouraging households from investing in the asset class. These fixed costs of entry are alluded to the opportunity cost of the effort, often referred to as the information fee, and the tangible costs, such as brokerage fees and taxes (Haliassos & Bertaut, 1995; Vissing-Jørgensen, 2002; Haliassos & Michaelides, 2003). Another point of interest is wealth and wealth constraints. Research has found that lower wealth individuals may not have sufficient funds to invest in the stock market (Campbell, 2006; Fagereng et al., 2019). Research also suggests that the necessary consumption-smoothing effect attainable through the stock market may be attained through different means (Haliassos & Michaelides, 2003; Fagereng et al., 2020).

At the forefront of this strand lies contributions which deviate from the step-by-step trend by introducing several novel explanatory variables and jointly estimating the effect of them (Brock & Mirman, 1972; Aiyagari, 1994; Dynan et al., 2002; Calvet et al., 2009; van Rooij et al., 2011; Jappelli & Padula, 2013; Yogo, 2016; Lusardi et al., 2017; Fagereng et al., 2019; Lusardi & Mitchell, 2023). Through this approach, Kaustia et al. (2023) suggests that there exists evidence of a hierarchical model of "participation drivers". In addition, they find evidence that "low-level" factors, such as wealth, must be at a sufficient level before "high-level" factors start to matter. Variables related to values and attitude ("high level") are more prominent in high regulatory countries and among the wealthy. Further, they find that institutions clearly matter, as institutional factors account for about a third of the explained variance in their model. Traditional individual-level variables capture about half, and less than one fifth is explained by the modern behavioural-oriented variables introduced by the former literature (Kaustia et al., 2023).

2.3 Asset allocation decisions

Asset allocation decisions revolve around how households distribute their wealth across asset classes, from risky assets like stocks and funds, to safer assets like bonds and cash. Several factors have been identified to influence this process. Demographic factors intuitively matter. For an instance, younger households may allocate more to risky assets due to a longer investment horizon (Bertaut & Starr-McCluer, 2000; Campbell, 2006; Guiso & Sodini, 2013). The inherent risk tolerance of the individual is also pivotal to determine allocation. Entities with higher risk tolerance are more likely to invest a greater share of their total wealth in risky

assets (Malmendier & Nagel, 2011; Fagereng et al., 2017). Financial literacy has been found to affect allocation decisions. Financially literate households are better equipped to understand the risks and benefits of the different asset classes, and therefore more likely to invest in risky financial assets (Lusardi & Mitchell, 2007; Calvet et al., 2009; van Rooij et al., 2011; Lusardi et al., 2017; Bianchi, 2018; Hastings & Mitchell, 2020). Finally, past experiences may affect allocation decisions, particularly for those who has experienced the financial crisis (Malmendier & Nagel, 2011).

2.4 Investment behaviour

Jappeli & Padula (2013) introduces a theoretical framework where financial literacy is integrated in an intertemporal consumption model; as financial literacy should be considered a trait that may be equally accumulated as other forms of human capital. Additionally, they find that improving math skills at an early life-stage eventually raises the household's financial literacy and thereafter the rate of their wealth accumulation (Jappelli & Padula, 2015). Calvet et al. (2009) and Fagereng et al. (2020) solidifies the heterogeneity associated with household financials. More notably they find that wealthier, larger and educated households are less prone to making financial mistakes.

Fagereng et al. (2019) studies wealth accumulation and find that saving rates are approximately constant across the wealth distribution, capital gains excluded. However, once capital gains are introduced, the rate increases sharply with wealth, resulting in wealthier households accumulating even more wealth. Reason being that wealthier households "save by holding", implying that they hold on to assets which experience persisent capital gains. The paper does not allude this behaviour to financial literacy, but it is plausibly a contributing factor (Campbell, 2006; Calvet et al., 2007, 2009).

Furthermore, van Rooij et al. (2011) find that it is not only whether an entity passes the "minimum" requirements to be considered financially literate that matters. In addition, higher levels of financial literacy significantly increase the likelihood of stock market participation, and that they are less prone to rely on informal advice from friends and family. They identify demographic variables such as age, education, gender, and income as variables influencing participation.

However, the direct impact of financial literacy on risky asset allocation and likelihood to participate is an emerging area of research with less contributions to this date. Prior research suggests that financially literate conduct more effective financial planning and to a greater extent incorporate retirement, bequest motives and better debt management (Lusardi & Mitchell, 2011; Lusardi & Tufano, 2015). Financial literacy is also associated with more diversified portfolios (Eymann & Börsch-Supan, 2002, Chapter 8; Abreu & Mendes, 2010; Hastings & Mitchell, 2020).

Through surveys in the Netherlands, research has shown a strong positive relationship between the likelihood of investing in stocks and financial literacy (van Rooij et al., 2011). Through the same Netherlands-based survey (DNB), Guiso et al. (2008) find that financial literacy influences trust, which in turn promotes participation in risky assets. Similarly, conducted in Australia, Cardak & Wilkins (2009) find a positive correlation between risky asset ratio and educational attainment. Conducted in Japan, Khan et al. (2021) find that financial literacy promotes allocation in risky assets, and Chu et al. (2017) in China, find that financially literate are more likely to participate. Cupák et al. (2020, 2022) find the same tendency in likelihood and allocation on a small sample in the U.S, however they only study in the context of total financial assets. Jappelli & Padula (2015) find through the SHARE survey that financial literacy affects the decision to participate in risky financial assets. Anyhow, their study only consists of individuals older than 50 who replied to the survey.

Notable is the contribution of Calvet et al. (2007). They find through a large sample in Sweden that wealth, income and education contribute to higher likelihood and allocation in risky financial assets. The data stems from Statistics Sweden, collected from firms, financial- and public institutions. Plausibly due to limitations in data, they only include a dummy whether an entity holds any education post high school. Neither do they control for the entity's occupation, and they impute bank account balances for certain entities.

2.5 Hypothesis development

Theoretical household finance and empirics on the historical equity premium suggest that households should participate in risky financial assets. However, empirical findings regarding participation fail to illustrate a level consistent with what rational and optimal behaviour would anticipate. Several suggestions are made on how this deviation from "optimal behaviour" may be rectified. One feasible alternative is financial literacy which plausibly influences participation, by both raising the likelihood of holding the asset class and the relative volume of wealth allocated. We form our expectations and introduce two hypotheses to be tested.

Hypothesis 1: Financial literacy is positively correlated with the likelihood to participate in risky financial assets.

We expect a positive correlation between financial literacy and the likelihood to hold any amount of risky financial asset above the value zero.

Hypothesis 2: Financial literacy is positively correlated with the share of total wealth allocated in risky financial assets.

We expect a positive correlation between financial literacy and the amount of total wealth allocated in risky financial assets.

3. Data & Methodology

3.1 Data

In our analysis, we have utilized Microdata.no, a browser-based analytical platform developed collaboratively by the Norwegian Agency for Shared Services in Education (SiKT) and Research and Statistics Norway (SSB). The platform functions similarly to widely adopted software such as Stata. It allows for statistical analysis to be conducted through a command-line prompt, but crucially differentiates with a translation layer ensuring that the strict privacy regulations of Norway are never violated (Microdata.no, n.d.).

Through this service, we combine several Norwegian administrative registries maintained by Statistics Norway (SSB). This contains identifiers at the individual, household, family, and firm-level for the entire population of Norway. We build a cross-sectional dataset containing socioeconomic, tax, wealth, income, educational & occupational information for each individual throughout the period. All income and wealth-flows are measured yearly, and all assets are stated at the end of the year inferred market value unless otherwise stated.

For our analysis we use data for the period 2010 to 2020. Although the methodological approach prefers more, we are unable to load all years of data simultaneously due to a hard observation limit. It is essential to recognize that financial literacy does not accumulate instantaneously, but rather over time. Nevertheless, to minimize the possibility of randomness in our results we conduct analysis on four individual years: 2011, 2014, 2017 and 2020.

The translation layer in Microdata functions as a “intermediary” between the end-user and the data reviewed. One may never view any characteristics on a sample of less than 1000 observations. Furthermore, data cannot be downloaded and can only be analysed through the platform. Outputs are offered in standardized formats in which some information may be suppressed to preserve anonymity, i.e. the intercept in complex logistic regression models. The translation layer also applies winzorization, a technique used to transform outliers. Microdata uses 2% winzorization, implying that any numerical variable at the 1% top and bottom of a distribution becomes censored. While this mitigates the influence of extreme values in the dataset, it prevents the ability to back-trace individuals in situations of few and unique data points. The final measure the translation layer employs is randomized noise when

displaying counts and sums of numerical variables. Counts are adjusted with a stochastic noise ranging (-5/+5%), and the sums are proportionally adjusted so that the averages remain unaffected. The translation layer will continuously apply these measures “on the fly” or alternatively, abort an operation if it senses that any single privacy rule is violated (Pedersen, 2023, pp. 187–190).

Importantly, we must address the term risky financial assets. The literature typically defines risky financial assets to strictly include risky asset classes. Due to a limitation in the data available, our measure encompasses stocks, bonds, money-market funds, and other securities. This implies that the term should be interpreted as “risky financial assets relative to deposits”. Ultimately, these assets are still considered risky because their value is susceptible to systematic as well as unsystematic risk factors.

3.1.1 Definition of population

We study individuals aged 18-67, registered with a social security number and permanently residing in Norway. The reason we delineate to this age interval is to capture those who are of working age in Norway. However, we emphasize that we have not omitted individuals currently not considered as a part of the labour force. The result is a rich population close to 3 million individuals for each of our sampled years. One strength of our dataset is that it is unabridged beyond these considerations.

This population is adequate for our analysis as it encompasses individuals through different economic life stages. This includes periods of establishment, career development, mating as well as the transition to retirement. We explore the likelihood to participate in risky financial assets using an unconditional population. Regarding the share of wealth allocated in risky financial assets, we condition on individuals holding any value in risky financial assets greater than zero.

Table 1 displays the descriptive statistics for the unconditional population and the conditional population for year 2020. Attached in Appendix A, a complete descriptive statistic including percentiles are presented for each population in all years.

Table 1: Descriptive statistics

Panel A: demographic characteristics. **Panel B:** wealth distribution. **Panel C:** income flow. **Panel D**: asset participation. The fractions display the proportion of the population holding the respective asset class (Panel D).

	Unconditional population			Conditional population		
Year 2020	Mean	Std.Dev.	Median	Mean	Std.Dev.	Median
			Panel A: Demographics			
Age [18-67]	41.64	14.27	42.00	43.44	13.46	44.00
Gender [1/0]	51 %	0.50	1.00	55 %	0.50	1.00
Married [1/0]	35 %	0.48	0.00	40 %	0.49	0.00
Household size	2.76	1.33	3.00	2.73	1.31	3.00
No. children <18	0.65	0.94	0.00	0.67	0.95	0.00
Parents educ [1/0]	32 %	0.47	0.00	35 %	0.48	0.00
Resident status [1/0]	100 %	0.00	1.00	100 %	0.00	1.00
Financial literacy [1/0] (a) ∪ (b)	6 %	0.23	0.00	8 %	0.28	0.00
Business prof [1/0] (a)	4 %	0.19	0.00	6 %	0.23	0.00
Business educ [1/0] (b)	3 %	0.17	0.00	5 %	0.21	0.00
			Panel B: Wealth components (NOK 1000s)			
Fin. Wealth (1) = (1a) + (1b)	544	1 319	146	921	2 232	275
Safe assets (1a)	253	446	92	324	541	134
Risky fin. Assets (1b)	275	1 070	5	577	1 978	57
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	2 424	2 726	2 030	3 270	3 036	2 810
Primary housing (2a)	1 571	1 731	1 380	2 068	1 827	1 960
Secondary housing (2b)	163	649	0	253	853	0
Taxable real capital (2c)	674	883	482	932	1 066	668
Total wealth (3) = (1) + (2)	3 015	3 569	2 330	4 247	4 486	3 290
Total Debt (4)	1 088	1 457	358	1 437	1 652	898
Net Wealth (5) = (3) - (4)	1 920	3 169	911	2 798	4 143	1 800
			Panel C: Income components (NOK 1000s)			
Income from profession (a)	424	353	437	516	381	521
Income from safe assets (b)	2	5	0	3	6	1
Income from risky fin. Assets (c)	6	25	0	10	41	0
Net income forest/agri/fish/catch (d)	17	95	0	29	137	0
Net fix. Prop. Gains (e)	-5	42	0	-13	89	0
Interest payments on debt	29	40	12	37	44	25
Total income (a) + (b) + (c) + (d) + (e)	451	376	452	557	418	538
			Panel D: Participation rates			
Fraction with safe assets [1/0]	100 %			100 %		
Fraction with risky financial assets [1/0]	56 %			100 %		
Fraction with forest/agri/fish/catch [1/0]	8 %			11 %		
Fraction with primary housing [1/0]	58 %			72 %		
Fraction with secondary housing [1/0]	8 %			11 %		
Fraction with some debt [1/0]	82 %			87 %		
Fraction with student debt [1/0]	30 %			31 %		
Safe assets / total wealth	32 %	0.40	0.09	18 %	0.27	0.05
Risky financial assets / total wealth	7 %	0.16	0.00	12 %	0.21	0.03
Prim. Housing / total wealth	38 %	0.34	0.46	45 %	0.32	0.60
Sec. Housing / total wealth	2 %	0.09	0.00	3 %	0.10	0.00
Fix.prop etc. / total wealth	20 %	0.20	0.19	21 %	0.15	0.20
Leverage, all debt / total wealth	810 %	45.47	0.36	90 %	2.59	0.35
Ratio, interest p. on debt / all debt	5 %	0.16	0.02	4 %	0.11	0.02
Observations		2 813 780			1 587 369	

3.1.2 Measure of financial literacy

FinLit is our variable determining whether an individual is financially literate or not. As previously mentioned, we define an individual as financially literate if they possess an education or hold an occupation within the field of economics. When generating the FinLit variable, we thoroughly reviewed the SSB's variables for educational grouping NUS2000 and occupational classification STYRK-08. The Norwegian standard for educational classification (NUS2000), developed by SSB in 1970, is a coding system used to classify educational activities by level and field. NUS combines Norwegian educational codes with those from the international educational standard (ISCED) (Statistics Norway, n.d.-a, 2016). Similarly, the classification for occupations, Norwegian standard for occupational classification (STYRK-08) is classified according to job tasks, competence level and specialization. This is based on the international standard for occupational classification, International Standard Classification of Occupations 2008 (ISCO-08) (Statistics Norway, n.d.-b).

Attached in Appendix B, follows a complete overview of educational and occupational codes that constitute our financial literacy variables. Due to an updated version of the STYRK-08 variable in 2015, some differences appear in the generating of FinLit in 2011 and 2014. However, by conducting a thorough review of the occupational codes, and only finding minor differences in the percentage of those holding an occupation over the four years, we do not view this as a concern. The difference may be reviewed in Appendix A.

3.1.3 Variable definition

Table 2 show the variables we use to conduct our analysis. The variables are sorted in four classes, and we provide a description for each. Following Table 2, we present the reasoning for our selection.

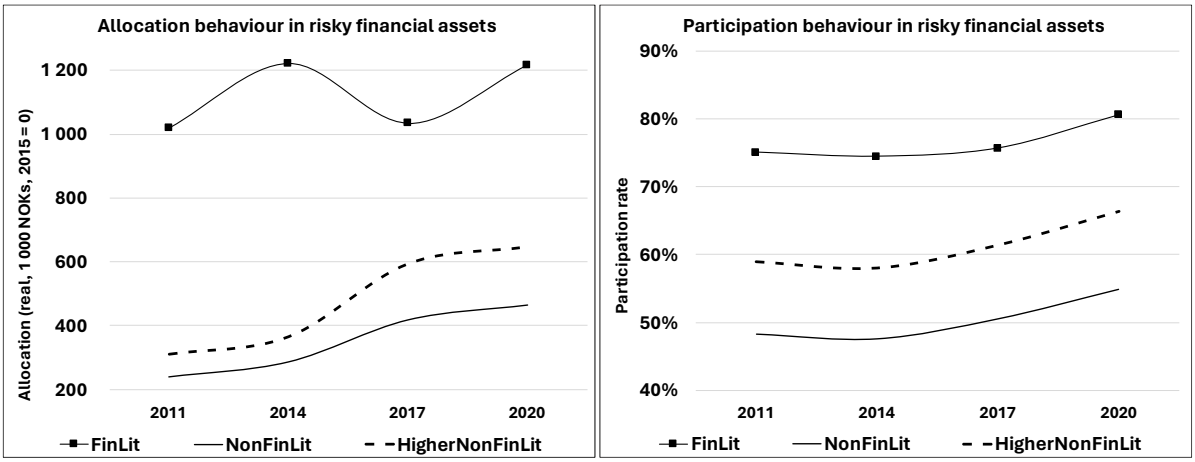
Table 2: Variable definition

Variable	Description
	Dependent variables
Likelihood of participating [1/0]	Dummy variable. Likelihood of participating = 1, represents risky financial assets > 0. Indicates that the entity participates in this asset class. Dependent variable in logit and probit regressions.
Ln Share of risky financial assets	Indicates the proportion of the entity's gross wealth that is allocated in risky financial assets. Dependent variable in OLS regressions. **
	Base controls
FinLit [1/0]	Dummy variable. FinLit = 1, represents that the entity is financially literate.
Age [18-67]	The age of the entity. Only entities of working age, 18-67 years. *
LnWealth	Indicates the entity's gross wealth. Includes safe assets, risky financial assets, primary housing, secondary housing, and taxable real capital. **, *
Gender [1/0]	Dummy variable indicating the entity's gender. Gender = 1 represents male.
Married [1/0]	Dummy variable indicating the entity's marital status. Married = 1 represents that the entity is married.
No. Child <18	Indicates the number of children under 18 years residing in the same household as the entity. *
ParentsEduc [1/0]	Dummy variable. Signals whether the entity's parents have more than three years of higher education or not. ParentsEduc = 1 represents that the entity's parents have higher education.
LnDebt	Indicates the entity's total debt. **, *
	Extended controls
Age brackets	The variable Age is divided into five equal brackets. The reference category is Age [18-27], with the remaining brackets being [28-37], [38-47], [48-57], and [58-67].
Wealth brackets	The variable Wealth is divided into five brackets based on percentiles. The reference category is Wealth [0-25), with the remaining brackets being [25-50), [50-75), [75-99), and [99-100].
	Variables for robustness checks
EduLit [1/0]	Entities who are deemed financially literate through achieved education.
ProfLit [1/0]	Entities who are deemed financially literate through their current occupation.
HigherEduProf [1/0]	Entities who hold an education of similar length to those FinLit and entities whose current occupation requires a similar-length education as FinLit. FinLit entities included.
HigherNonFinLit [1/0]	Entities who hold an education of similar length to those FinLit, and entities whose current occupation requires a similar-length education as FinLit. FinLit entities excluded.

* Indicates that the variable is centered to its mean for OLS. Denoted with subscript $_c$ in the OLS outputs.
** Indicates that the variable is log-transformed to normalize its distribution & reduce outlier impact.

Figure 1: Allocation & Participation in risky financial assets

FinLit captures entities deemed financially literate. NonFinLit pools all entities except financially literate. HigherNonFinLit pools all entities holding higher education, or an occupation typically requiring a similar-length education, except financially literate. The left chart displays NOK 1000s in real terms, 2015 = 0.



At first glance, the uncontrolled data shown in Figure 1 reveals that financial literacy seems to have impact on both allocation and the likelihood to participate in risky financial assets.

To properly analyse our two-part research question, we define two dependent variables. "Likelihood of participating", used in our logistic regression, is a dichotomic variable equal to 1 if the entity holds any value of risky financial assets greater than zero. This specification is appropriate for our model of choice. The question at hand may be clearly delineated; the decision to participate is inherently a "either in or out" question. Finally, the approach ensures comparability to existing papers studying the likelihood to participate in risky financial assets, as several of them utilize a similar format for their dependent variables (Guiso et al., 2008; Chu et al., 2017; Cupák et al., 2020; Calvet et al., 2007).

"Ln Share of risky financial assets", used in our least square regression, is a continuous variable created by dividing the entity's amount of risky financial assets over the entity's total wealth. The result is a ratio which captures the relative share of the entity's total wealth allocated in risky financial assets. Observing this measure of "relative stake", allows us to directly assess the intensity of engagement relative to the entity's total wealth, a more comparable measure across wealth levels. This relative measure is consistent with Khan et al. (2021).

As control variables, we utilize a battery of individual-level controls which research has found to influence individuals' decision to participate in risky financial assets (Haliassos & Bertaut, 1995; Guiso et al., 2003; Campbell, 2006). In all our models we refer to them as base controls.

Age may affect participation, as it has shown to affect cognitive abilities, which in turn affect decision-making (Christelis et al., 2010). To control for background risk, traditional literature accounts for this through income (Heaton & Lucas, 2000; Fagereng et al., 2016). However, our investigations found a strong correlation between income and wealth, making it infeasible to include both. We find it plausible that wealth to a greater extent serves a similar purpose to convey background risk (Bonaparte et al., 2014). After all, low wealth individuals not only suffer from low or variable income, but also been unable to accumulate wealth.

According to Barber & Odean (2001), genders are different in participation due to overconfidence. Lusardi & Mitchell (2008) find differences alluded to gender in long-term financial planning. Another control is whether the entity is married, as studies has shown that married individuals have an increased propensity to invest in risky assets (Bertocchi et al., 2011). An increase in household size plausibly affects the "wealth" available to each household member (Calvet & Sodini, 2014). We intuitively find the number of children in the household to be a better measure for an actual change in "available wealth" to the individual, due to the welfare system in place in Norway. Furthermore, we found household size to correlate strongly with number of children, which led us to only control for the number of children under 18.

Moving on, we control for the parents' education level, as intergenerational knowledge- and behaviour transfer is a possible source of financial literacy (Knüpfer et al., 2017). Intuitively, debt reduces the net wealth available for participation, which in-turn, might deter the individual from participating (Cocco, 2005; Davis et al., 2006).

We conduct additional analysis by reintroducing the control variables age and wealth as categorical. To investigate the impact of financial literacy on the categories, we specify interaction terms respectively. The rationale for segmenting the variables rests on the classical life-cycle theory of Modigliani (2005), as well as the methodological reasoning to allow for the relationships to be non-linear. Categorizing age enables us to model the dynamics associated with financial literacy, such as change in risk tolerance, cognitive abilities and more (Cocco et al., 2005; Campbell, 2006; Agarwal et al., 2009; Fagereng et al., 2017; Catherine, 2022). By categorizing wealth, we may investigate how financial literacy influences across different wealth levels. Plausibly, the relationship is non-linear, as Guiso et al. (1996) makes it clear that different wealth levels are associated with a difference in investment behaviour. Carrol (1997) show directly that a liquidity constraint affects investment behaviour, and Vissing-Jørgensen (2002) show that the marginal propensity to invest may differ. Finally, behavioral biases, which affect investment decisions, may be different across wealth levels (Campbell, 2006).

Ultimately, these categorical controls allow us to better understand the heterogeneous effects of financial literacy on risky financial asset participation and allocation.

3.2 Methodology

In the following chapter we will describe the various quantitative methods used in our analysis. We have conducted a series of regressions, including logistic-, probit-, and ordinary least squares (OLS) regressions. We will explain each of these approaches in detail and justify their relevance for our analysis.

3.2.1 Logistic and Probit regression

Logit and Probit regressions are two non-linear regression models used to model the likelihood of an event as a combination of one or more independent variables. In ordinary logistic and probit regression, the dependent variable must be specified as a dichotomic outcome variable with two discrete outcomes [1/0]. The models predict the likelihood of the dependent variable holding the state = 1, i.e. that a given state is present (Stock & Watson, 2020, p. 398). The characteristics of these models make them particularly suitable to analyse the first part of our research question, addressing how financial literacy affects the likelihood to participate in risky financial assets. The participation can be defined as two discrete outcomes; The individual either participates, or not.

Logit and Probit models typically yield similar results, but key elements distinguish them, which explain why they might predict differently. While the logit model is based on a logistic cumulative distribution function, the probit model uses the standard normal cumulative distribution function (Stock & Watson, 2020, pp. 398, 403). We prefer to interpret logit models; thus, we display results from logit-regressions in Ch. 4. However, we have estimated and outputted the probit-equivalent models in Appendix C. (Wooldridge, 2012, pp. 589–595).

To further aid with interpretation, we output logit coefficients in odds-ratios, as they offer a substantial interpretation. When interpreting odds-ratios; Any coefficient-value above 1 implies that a one-unit increase in the independent variable, increases the likelihood of the dependent variable occurring. A coefficient value below 1 implies that a one-unit increase in the independent variable, reduces the likelihood of the dependent variable occurring. A coefficient equal to 1 implies that a one-unit increase in the independent variable has no impact on the likelihood of the dependent variable occurring, everything else held constant (Uberti, 2022).

To ensure consistent and unbiased estimates, logit and probit regressions rest on several critical assumptions. Most notably, both models assume linearity of the independent variables; that the logit and Z-scores are a linear function of the independent variables. Second, the dependent variable must be dichotomic with two discrete outcomes and have a large sample size. Third, the observations must be independent. Fourth, the independent variables cannot suffer of multicollinearity. In addition, comes several of the assumptions known from OLS (Stock & Watson, 2020, pp. 156–164). If these assumptions do not hold, then coefficients, standard errors (SEs) and confidence intervals are not trustworthy.

Marginal effects

Odds-ratios may still be tricky to interpret, as they are dependent on the baseline-odds of the event occurring (the "intercept") (Uberti, 2022). Furthermore, the model is multiplicative, which implies that if you multiply an odds with an odds-ratio less than one, the odds decrease (Uberti, 2022). To aid with interpretation, one may compute marginal effects. While a marginal effect is typically calculated on one single entity, it seems more reasonable in our case to calculate the average marginal effect over all values of X, as a "median entity" or a "mean" entity rarely exists and therefore only offers a technical interpretation of the effect. The mean marginal effect allows us to quantify the difference in probability on average, once the marginal effect has been computed for all values of X individually (Wooldridge, 2012, pp. 589–593).

To interpret economic significance in our logistic models, the first ideal approach would be to compare the effect of financial literacy to the effect of the baseline scenario (Base odds; the likelihood of the base case occurring in the first place). However, the translation layer of Microdata suppresses the intercept of our logit outputs to retain anonymity. Thus, we are unable to comment on the economic significance through this approach. Rest assured; we comment on it through other means.

3.2.2 Ordinary least squared (OLS) regression

Ordinary least squares (OLS) regression has the objective of minimizing the sum of squared error between the predicted value in the model and the observed values of the dataset. The model allows us to examine the relationship between the dependent variable and the independent variables. The regression coefficients provide an estimate of both intensity and direction of the relationship between the dependent variable and the independent variables, as they are interpreted as the "outcome effect" in the dependent variable, given a one unit change in the independent variable, all other variables held constant.

As with probit and logit, several assumptions must hold for OLS to yield unbiased and consistent results (Stock & Watson, 2020, pp. 225–226). Given the Gauss-Markov theorem in a situation where the OLS assumptions hold and the error term is homoscedastic, the OLS estimator truly has the smallest variance of all conditionally unbiased estimators that are linear functions of Y_n(BLUE – Best linear conditionally unbiased estimator) (Stock & Watson, 2020, pp. 194–195). However, in our data, the error term is not always homoscedastic, which implies that we leave the framework where the OLS estimator is BLUE. We address this concern by estimating with White's heteroskedasticity-robust standard errors. Given our large sample size, we find that OLS is still a suitable estimator for the second part of our research question (Stock & Watson, 2020, pp. 208–210, 233–235).

Finally, we must address the interpretation of OLS coefficients in detail. In their most basic form, they represent the expected change in the dependent variable for a one-unit increase in the independent variable, holding all other variables constant. Depending on the format and coding of the variables, such as centering, squared terms, interactions, log-transforms, categorical variables, etc., one must exercise different procedures to ensure a substantively correct interpretation. For an instance, log-transformation may require relative interpretations rather than absolute changes. In our results, we emphasize contextual interpretations for each variable that we comment on (Stock & Watson, 2020, pp. 286–309; Wooldridge, 2012, pp. 72–76, 233–240, 590).

4. Results & Discussion

In this chapter, we present the results of our analysis and the implications they post for our hypothesises. We first present and discuss the results related to Hypothesis 1, whether financial literacy is positively correlated with participation in risky financial assets. We then depart our unconditional population, and study entities who hold any amount in risky financial assets. This part is relevant to Hypothesis 2, whether financial literacy is positively correlated with allocation of total wealth in risky financial assets. Finally, we present and discuss robustness and limitations.

4.1. Likelihood of participation – Logistic regression

The hypothesis at question is whether financial literacy is positively correlated with participation in risky financial assets (H1). The primary coefficient of interest is FinLit, and the dependent variable "Likelihood of participating" expresses the likelihood to participate in risky financial assets for financially literate.

4.1.1 Financial literacy and the participation in risky financial assets

In this chapter we present the base case of our logistic regression with its corresponding marginal effects. We then discuss the results and outline economic significance.
Our logit regression rests on the following specification,

(1) $$Pr(Likelihood\ of\ participating_i = 1) = \beta_0 + \beta\ FinLit_i + C_i'\delta_0 + u_i$$

Where "i" represents the index of the entities. C_i represents the battery of demographic characters (Ch. 3.1.2), δ_0 represents the vector of coefficients that show the influence of the demographic characteristics and u_i is the error term.

Table 3: Financial literacy and participation in risky financial assets

Estimated coefficients computed in odds-ratio. Column (1): baseline model controlling for age and wealth. Column (2): additional individual-level controls (Ch. 3.1.3). The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. The marginal effects displayed are computed through the method d(y)/d(x)) over all possible values of x. The value reported is the mean-value of all marginal effects computed. Standard Errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Likelihood of participating	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit [1/0]	2.099***	2.019***	1.887***	1.817***	1.869***	1.741***	1.886***	1.755***
	(0.014)	(0.014)	(0.012)	(0.012)	(0.011)	(0.010)	(0.011)	(0.010)
Age [18-67]	0.989***	0.993***	0.997***	1.001***	1.004***	1.009***	1.007***	1.012***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LnWealth	1.657***	1.615***	1.621***	1.576***	1.589***	1.534***	1.540***	1.492***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Gender [1/0]		1.340***		1.247***		1.148***		1.107***
		(0.004)		(0.003)		(0.003)		(0.003)
Married [1/0]		0.990***		0.970***		0.970***		1.007***
		(0.003)		(0.003)		(0.003)		(0.003)
No. Child <18		0.919***		0.943***		0.979***		0.993***
		(0.001)		(0.001)		(0.001)		(0.001)
ParentsEduc [1/0]		1.326***		1.277***		1.290***		1.298***
		(0.004)		(0.004)		(0.004)		(0.004)
LnDebt		1.032***		1.033***		1.037***		1.035***
		(0.000)		(0.000)		(0.000)		(0.000)
				Marginal effects				
FinLit [1/0]		0.133***		0.115***		0.107***		0.109***
		(0.001)		(0.001)		(0.001)		(0.001)
Age [18-67]		-0.001***		0.000***		0.002***		0.002***
		(0.000)		(0.000)		(0.000)		(0.000)
LnWealth		0.090***		0.087***		0.083***		0.077***
		(0.000)		(0.000)		(0.000)		(0.000)
Gender [1/0]		0.055***		0.042***		0.027***		0.020***
		(0.001)		(0.001)		(0.001)		(0.001)
Married [1/0]		-0.002***		-0.006***		-0.006***		0.001***
		(0.001)		(0.001)		(0.001)		(0.001)
No. Child <18		-0.016***		-0.011***		-0.004***		-0.001***
		(0.000)		(0.000)		(0.000)		(0.000)
ParentsEduc [1/0]		0.053***		0.047***		0.049***		0.050***
		(0.001)		(0.001)		(0.001)		(0.001)
LnDebt		0.006***		0.006***		0.007***		0.007***
		(0.000)		(0.000)		(0.000)		(0.000)
Obs.	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	0.175	0.186	0.178	0.186	0.176	0.183	0.175	0.181
Prob > chi2:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

In Table 3, FinLit is statistically significant at the 1% level for both specified models. The odds-ratio of FinLit is close to double for all years, everything else held constant. This indicates that financial literacy is positively correlated with the likelihood to participate in risky financial assets. This result is consistent with earlier findings of Guiso et al. (2008), van Rooij et al. (2011), Chu et al. (2017) & Cupák et al. (2020). The results are reasonable when considering that Calvet et al. (2009) and Jappeli & Padula (2013) finds that financially literate are better equipped to manage risky financial assets and achieve a higher return (Lusardi et al., 2017; Bianchi, 2018; Fagereng et al., 2019).

Age, number of children under 18 and marital status is slightly negatively correlated with the likelihood to participate. However, the difference is still significant at the 1%-level. Age has previously shown to influence participation, and our result coincides (Christelis et al., 2010). As reasoned in Ch. 3.1.3, an increase in household size plausibly deters an individual from participating. Our proxy for household size conforms with this reasoning (Calvet & Sodini, 2014). On the flip side, our coefficients on marital status shows an inverse correlation compared to earlier studies (Bertocchi et al., 2011). We have to emphasize the cultural and time period differences between our studies, as it may explain the difference in results.

The rest of our controls are positively correlated with the likelihood to participate and are statistically significant at the 1%-level. Men are more likely to participate, which Barber & Odean (2001) explains through overconfidence. Intergenerational transfers, in the context of knowledge, influences participation as suggested by Knüpfer et al. (2017). Our dummy on parents' higher education matches this notion.

Furthermore, with an odds-ratio close 1.6 for wealth, there is evidence for the findings of Guiso et al. (1996), Carrol (1997), Vissing-Jørgensen (2002) and Campbell (2006). Wealthier households accumulate more wealth through capital gains, and more notably, wealthier, larger and educated households are less prone to make financial mistakes (Calvet et al., 2009; Fagereng et al., 2019).

Given our reasoning for debt in Ch. 3.1.3, it could seem as if debt is inversely correlated to what one may expect. Considering the strict and regulated lending market in Norway, an individual gaining more debt has a corresponding increase in wealth (Fagereng et al., 2020). We find it plausible that the coefficient on debt is influenced by this element.

Finally, we would like to comment on the only model diagnostics available on the Microdata platform. Pseudo R^2 does not accurately reflect a reduction in error such as its OLS counterparty. However, the likelihood ratio test suggests that our model provides a significantly better fit to the data than a model with only the intercept (Stock & Watson, 2020, p. 471).

Turning to marginal effects, we compute the difference in likelihood between a financially literate and non-financially literate who is equal in all other observed parameters: age, wealth, gender, marital status, number of children, parents' education and debt. We repeat this calculation for all entities of our population and report the mean value of all these differences.

Table 3 shows that the mean marginal effect of financial literacy is 10-13%, which seems substantial. One exercise is to compare the relative magnitude of the variable to the other regressors of the model. Being financially literate is twice as impactful as that of the entity's parents having higher education. Furthermore, a one-unit increase in the natural log of wealth (equiv. to multiplying wealth by approx. 2,718) leads to an increased likelihood of participation by 9%. This implies that financial literacy is more effective than wealth at driving an entity to participate. Plausibly, it is a lot more resource-demanding for an entity to double their wealth compared to becoming financially literate. We consider the difference from this perspective to be economically significant.

4.1.2 Heterogeneity across wealth and age groups

Through this chapter, we present additional analysis with interaction terms, age- and wealth brackets. Subsequently we discuss the results. We extend the specification of equation (1),

(2) $$Pr(LikelihoodOfParticipate_i = 1) = \beta_0 + \beta\ FinLit_i + C_i'\delta_0 + \beta\ FinLit_i\ x\ Age_i + u_i$$

(3) $$Pr(LikelihoodOfParticipate_i = 1) = \beta_0 + \beta\ FinLit_i + C_i'\delta_0 + \beta\ FinLit_i\ x\ Wealth_i + u_i$$

Where "i" represents the index of the entity. C_i represents the battery of demographic characters where age and wealth now are categorical (Ch. 3.1.2), δ_0 represents the vector of coefficients that show the influence of the demographic characteristics. The interaction terms $\beta\ FinLit_i\ x\ Age_i$, $\beta\ FinLit_i\ x\ Wealth_i$ represent the interaction between FinLit and Age and Wealth respectively. u_i is the error term.

Table 4: Additional analysis - Age brackets

Estimated coefficients computed in odds-ratio. Column (1): baseline model including individual-level controls with age brackets (Ch. 3.1.3). Column (2): Extended with interaction terms for Financial Literacy jointly estimated. Baseline category omitted (DVT). The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. Standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Likelihood of participating	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit x Age [28-37]		1.021***		1.118***		1.118***		1.103***
		(0.024)		(0.024)		(0.023)		(0.024)
FinLit x Age [38-47]		0.893***		1.040***		0.983***		1.022***
		(0.021)		(0.022)		(0.020)		(0.021)
FinLit x Age [48-57]		0.879***		1.083***		1.076***		1.075***
		(0.020)		(0.023)		(0.022)		(0.023)
FinLit x Age [58-67]		1.001***		1.141***		1.143***		1.143***
		(0.025)		(0.027)		(0.026)		(0.029)
FinLit [1/0]	2.023***	2.137***	1.818***	1.688***	1.739***	1.643***	1.753***	1.646***
	(0.014)	(0.039)	(0.012)	(0.028)	(0.010)	(0.028)	(0.010)	(0.030)
Age [28-37]	0.863***	0.861***	0.932***	0.928***	1.040***	1.034***	1.109***	1.105***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Age [38-47]	0.827***	0.830***	1.019***	1.019***	1.229***	1.233***	1.318***	1.320***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)	(0.007)
Age [48-57]	0.771***	0.775***	1.024***	1.021***	1.301***	1.297***	1.440***	1.437***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)
Age [58-67]	0.759***	0.758***	1.026***	1.021***	1.389***	1.381***	1.580***	1.572***
	(0.004)	(0.004)	(0.006)	(0.006)	(0.008)	(0.008)	(0.009)	(0.009)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	0.186	0.186	0.186	0.186	0.184	0.184	0.182	0.182
Prob > chi2:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 4 introduces the age variable in brackets and interaction terms on financial literacy (eq. 2). The model still predicts that on average, financial literacy is positively correlated with the likelihood to participate. The interaction terms in column (2) allow us to observe the effect of financial literacy in each age bracket above the reference category. The effect is similar in magnitude on all age brackets, as the change in odds-ratios are minimal. Turning to the effect of age brackets over the reference category, they are positively correlated with the likelihood to participate for most years. While Fagereng et al. (2017) find that stock market participation is a decreasing function of age, our analysis mostly give support towards the findings of Catherine (2022). Interestingly, for year 2020, arguably influenced by the COVID-19 pandemic, the results give support for Fagereng et al. (2017).

Table 5: Additional analysis - Wealth brackets

Estimated coefficients computed in odds-ratio. Column (1): baseline model including individual-level controls with wealth brackets (Ch. 3.1.3). Column (2): Extended with interaction terms for Financial Literacy jointly estimated. Baseline category omitted (DVT). The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. Standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Likelihood of participating	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit x LnWealth [25,50)		0.940***		1.000***		0.948***		0.981***
		(0.022)		(0.025)		(0.023)		(0.024)
FinLit x LnWealth [50,75)		0.865***		0.975***		0.871***		0.921***
		(0.020)		(0.024)		(0.020)		(0.022)
FinLit x LnWealth [75,99)		0.937***		1.039***		0.939***		0.964***
		(0.022)		(0.025)		(0.022)		(0.023)
FinLit x LnWealth [99,100]		1.405***		1.117***		1.392***		1.294***
		(0.264)		(0.143)		(0.134)		(0.125)
FinLit [1/0]	1.987***	2.152***	1.789***	1.780***	1.709***	1.846***	1.736***	1.811***
	(0.014)	(0.042)	(0.012)	(0.038)	(0.010)	(0.039)	(0.010)	(0.039)
LnWealth in [25,50)	4.296***	4.301***	4.324***	4.324***	4.165***	4.170***	4.202***	4.202***
	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
LnWealth in [50,75)	7.495***	7.533***	7.339***	7.349***	6.808***	6.851***	6.420***	6.443***
	(0.033)	(0.033)	(0.033)	(0.033)	(0.031)	(0.032)	(0.029)	(0.030)
LnWealth in [75,99)	14.3***	14.3***	13.7***	13.7***	11.7***	11.7***	10.8***	10.8***
	(0.069)	(0.070)	(0.066)	(0.067)	(0.057)	(0.059)	(0.053)	(0.054)
LnWealth in [99,100]	186.9***	180.8***	131.7***	130.3***	98.5***	91.5***	89.5***	84.9***
	(8.873)	(8.900)	(4.974)	(5.177)	(3.398)	(3.443)	(3.117)	(3.226)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	0.173	0.173	0.175	0.175	0.173	0.173	0.169	0.169
Prob > chi2:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5 shows the implications of financial literacy in wealth percentiles (eq. 3). On average, financially literate still have a substantially positive correlation to participation, everything else held constant. The interaction terms in column (2) suggest a mildly U-shaped profile throughout the wealth distribution. The correlations are negative for the 25^{th} to 99^{th} percentile. This implies that the effect of financial literacy is less than for the reference category. We find it plausible that these entities are either constrained or pool liquidity for housing, which could be rational given the housing market and its relation to returns to wealth (Haliassos & Michaelides, 2003; Gomes & Michaelides, 2005; Fagereng et al., 2020; Kirkeby, J. & Nenov, T., 2023; Wold Getz et al., 2023). For the 1%-wealthiest, we find that the effect of financial literacy is notably positively correlated. This plausibly arise from the fact that they have access to a wider range of financial opportunities, where literacy itself becomes a more critical component.

Wealth brackets over the reference category are strongly positively correlated with the likelihood to participate for all years, everything else held constant. This result is consistent with the literature on wealth. Less wealthy individuals may not have sufficient funds to invest (Carroll, 1997; Campbell, 2006; Fagereng et al., 2019). In addition, Vissing-Jørgensen (2002) and Campbell (2006) have shown that they may perceive the information and transaction costs as too costly and understand their own limitations. Turning to the 1%-wealthiest, the odds-ratio exceeds 100. However, one must recall that this does not imply a hundred-fold increase in probability. Conditioned on how Fagereng et al. (2019) find that the wealthy "save by holding", it seems plausible that they are more likely to hold risky financial assets. The pattern also matches Campbell (2006) and Calvet et al. (2009) findings of wealthier households making fewer financial mistakes.

4.1.3 Summary of findings

The hypothesis at question is that financial literacy is positively correlated with the likelihood to participate in risky financial assets (H1). On average, financial literacy is positively correlated with the likelihood to participate, and the coefficients are statistically significant at the 1%-level. Our contribution lies in studying the impact of financial literacy on the likelihood to participate in different age and wealth brackets. Prior literature has only investigated the relationship between asset allocation and age and wealth respectively. The interaction effect of financial literacy is similar in all age brackets. The effect of age on likelihood to participate is positively correlated, implying a mildly increasing pattern for most years. Considering the wealth distribution, the interaction terms suggest a U-shaped profile of financial literacy's impact on likelihood to participate. This implies that financial literacy is most impactful for the 0 to 25^{th} and 1%-wealthiest.

Wealth percentiles over the reference category are strongly positively correlated with the likelihood to participate in all years. The 1%-wealthiest remain the most likely to participate over the reference category with a remarkable difference. Ultimately, results from all model specifications provide support for Hypothesis 1. The difference is economically significant.

4.2 Allocation in risky financial assets – OLS regression

Hypothesis 2 is that financial literacy is positively correlated with allocation of total wealth in risky financial assets. The primary coefficient of interest is FinLit, and the dependent variable "Ln share of risky financial assets" expresses the share of total wealth allocated in risky financial assets.

4.2.1 Financial literacy and allocation in risky financial assets

This chapter presents the base case of our OLS regression. We then discuss the results and outline economic significance. The OLS regression is specified as follows,

(4) $$Ln\ share\ of\ risky\ financial\ assets = \beta_0 + \beta\ FinLit_i + C_i'\delta_0 + u_i$$

Where "i" represents the index of the entities. C_i represents the battery of demographic characters(Ch. 3.1.2), δ_0 represents the vector of coefficients that show the influence of the demographic characteristics and u_i is the error term.

Table 6: Financial literacy and allocation in risky financial assets

Estimated coefficients (OLS) on a conditional dataset, all entities hold > 0 in risky financial assets. Column (1): Baseline model controlling for age and wealth. Column (2): Additional individual-level controls (Ch. 3.1.3). The dependent variable is Ln Share of risky financial assets, a log-transformed continuous variable computed by dividing risky financial assets over total wealth for the entity (Ch. 3.1.3). White's heteroskedasticity-robust standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (Two-sided), respectively.

Ln Share of risky financial assets	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit [1/0]	0.510***	0.559***	0.439***	0.491***	0.563***	0.573***	0.543***	0.554***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Age_C [18-67]	0.017***	0.016***	0.023***	0.022***	0.023***	0.021***	0.023***	0.022***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$LnWealth_C$	-0.356***	-0.314***	-0.435***	-0.401***	-0.465***	-0.435***	-0.495***	-0.477***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Gender [1/0]		0.602***		0.573***		0.472***		0.486***
		(0.003)		(0.003)		(0.003)		(0.003)
Married [1/0]		0.071***		0.085***		0.079***		0.050***
		(0.004)		(0.004)		(0.004)		(0.004)
No. Child $<18_C$		-0.014***		0.010***		0.001		-0.014***
		(0.002)		(0.002)		(0.002)		(0.002)
ParentsEduc [1/0]		0.286***		0.219***		0.194***		0.223***
		(0.003)		(0.004)		(0.004)		(0.004)
$LnDebt_C$		-0.067***		-0.062***		-0.055***		-0.048***
		(0.000)		(0.000)		(0.000)		(0.000)
Obs.	1 587 369		1 449 358		1 354 111		1 334 568	
R^2 adj.	0.062	0.103	0.095	0.127	0.108	0.131	0.130	0.151

In Table 6, any coefficient for FinLit above zero implies that a one-unit increase in the FinLit variable, increases the share of total wealth allocated in risky financial assets, everything else held constant. FinLit is statistically significant at the 1%-level for both specified models and show that financial literacy is positively correlated with share of total wealth allocated in risky financial assets. This result is consistent with earlier findings of Khan et al. (2021) and Cupák (2020, 2022). When looking at studies on similar topics, the results of Calvet et al. (2007) and Cardak & Wilkins (2009) are comparable. They do not use a direct measure of financial literacy, but find that high school education is positively correlated with the share of risky assets. The substantial and statistically significant FinLit-coefficient at the 1%-level gives support for Bianchi (2018) in that literate make distinguishable choices regarding allocation.

Gender, age, marital status and parents' education is positively correlated with share of wealth allocated to risky financial assets. Barber & Odean (2001) found that men are more likely to participate, and our result suggest that men also allocate a greater share of wealth. The coefficient on age shows a correlation pattern similar to what Catherine (2022) finds. The linear specification in these models is arguably sparse, but suggests that age is increasingly positively correlated with share of risky assets. In Ch. 4.1.1 we found likelihood to participate to be negatively correlated with marital status. However, when studying the entities that actually participate, we find marital status to be positively correlated with the share of wealth allocated. Intergenerational transfers in the context of knowledge, as argued in Ch. 4.1.1, shows to impact allocation in risky financial assets.

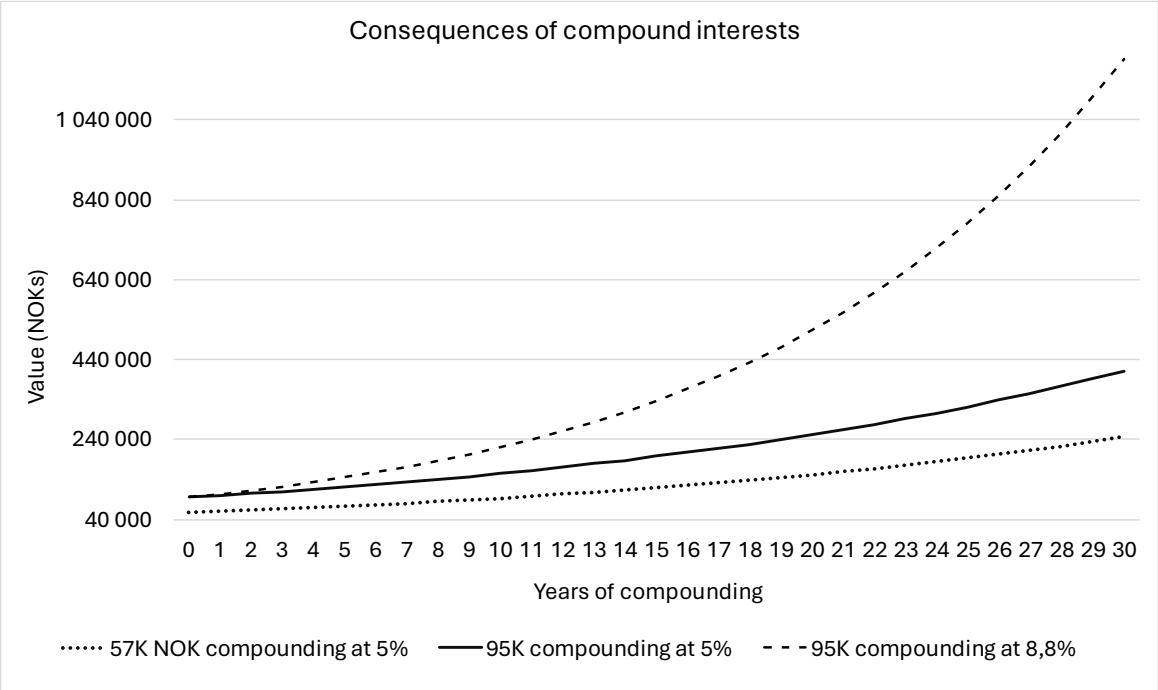
Wealth and debt are negatively correlated with allocation in risky financial assets, and the result must be addressed. Our suggestion given how wealth is specified, it is plausibly affected by the fact that several entities hold an "artificially" high ratio. This happens as some entities might have a tiny amount of risky financial assets and subsequently a tiny amount of total wealth, which creates questionable observation entries close to 1 that skews the variable. Similar literature show a similar behaviour for their measure of wealth without addressing it in detail (Calvet et al., 2007; Cardak & Wilkins, 2009; Cupák et al., 2020; Khan et al., 2021). The negative correlation of debt intuitively makes sense, as obtaining a greater share of debt in Norway forces the ratio downwards. This occurs as debt requires collateral, such as housing, that upon purchase is added to the entity's wealth (Fagereng et al., 2020). Finally, number of children tends to be negatively correlated, but reverts towards zero for one year, suggesting that it has little to no impact as it is no longer statistically significant. Our proxy for household size again conforms to the reasoning in Ch. 3.1.3 and Calvet & Sodini (2014).

Besides statistical significance, it is important to comment on economic significance. In Table 6, the dependent variable is log-transformed, and the relationship between the dependent variable and FinLit is log-linear. Formally, interpretation in terms of change can be calculated using the exponential function. A percentage change due to a change in the dummy variable from 0 to 1 may then be calculated by $\left(e^{\beta_{FinLit}} - 1\right) * 100$.

We apply this function to interpret our Column (1) results. Financially literate is associated with a roughly 66% higher ratio of risky financial assets to total wealth, compared to non-financially literate. Conditioned on a median entity holding 3,3mNOK of total wealth and 57.000 NOK in risky financial assets, the "median" ratio of risky financial assets is approximately 1,73%. For financially literate, this ratio increases by 66% resulting in a ratio of 2.88%.

Turning to the actual amounts, the median financially literate individual is expected to hold 94,922 NOK in risky financial assets, compared to 57.000 NOK for the non-literate counterparty. At first glance the difference might seem insignificant, but we argue it to be substantial in a comparison where both values compound at the same rate. With a greater "initial sum", financially literate leverage the power of compound interests to a greater extent, even if the growth rate is assumed to be identical. Given a scenario with a risk-free rate of 5%, an initial difference of 38K develops to a difference of 164K over a thirty-year horizon as shown in Figure 2, simply due to the difference in initial amounts exposed to compound interests.

Figure 2: Economic significance – Compounding values



Recalling that financially literate have a greater return on their risky financial assets, suggests that the real-life difference is even more daunting than an equal-return scenario. In Figure 2, we show the development if the financially literate is able to achieve an increased return over the non-literate. A rate similar to the 30-year annualized MSCI world index is a conservative assumption, but already shows the broader consequences of the difference in allocation (Campbell & Viceira, 2001; Campbell, 2006; Lusardi et al., 2017; Fagereng et al., 2019, 2020; Backtest by Curvo, n.d.).

4.2.2 Heterogeneity across wealth and age groups

We now present additional analysis with the use of interaction terms, age- and wealth brackets on the allocation in risky financial assets. We extend the specification of eq. 4,

(5) $$Ln\ share\ of\ risky\ financial\ assets = \beta_0 + \beta\ FinLit_i + C_i'\delta_0 + \beta\ FinLit_i\ x\ Age_i + u_i$$

(6) $$Ln\ share\ of\ risky\ financial\ assets = \beta_0 + \beta\ FinLit_i + C_i'\delta_0 + \ \beta\ FinLit_i\ x\ Wealth_i + u_i$$

Where "i" represents the index of the entity. C_i represents the battery of demographic characters where age and wealth now are categorical (Ch. 3.1.2), δ_0 represents the vector of coefficients that show the influence of the demographic characteristics. The interaction terms $\beta\ FinLit_i\ x\ Age_i$ and $\beta\ FinLit_i\ x\ Wealth_i$ represent the interaction between FinLit and Age and Wealth respectively. u_i is the error term.

Table 7: Additional analysis - Age brackets

Estimated coefficients (OLS) on a conditional dataset, all entities hold > 0 in risky financial assets. Column (1): Baseline model including individual-level controls with age brackets. Column (2): Extended with interaction terms for Financial Literacy jointly estimated. Baseline category omitted (DVT). The dependent variable is Ln Share of risky financial assets, a log-transformed continuous variable, computed by dividing risky financial assets over total wealth for the entity (Ch. 3.1.3). White's heteroskedasticity-robust standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (Two-sided), respectively.

Ln Share of risky financial assets	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit x Age [28-37]		0.236***		0.285***		0.529***		0.521***
		(0.020)		(0.022)		(0.023)		(0.025)
FinLit x Age [38-47]		0.332***		0.401***		0.708***		0.654***
		(0.021)		(0.022)		(0.023)		(0.025)
FinLit x Age [48-57]		0.319***		0.424***		0.755***		0.696***
		(0.020)		(0.022)		(0.023)		(0.025)
FinLit x Age [58-67]		0.391***		0.500***		0.892***		0.795***
		(0.022)		(0.024)		(0.025)		(0.027)
FinLit [1/0]	0.560***	0.278***	0.489***	0.126***	0.568***	-0.106***	0.554***	-0.068***
	(0.006)	(0.017)	(0.006)	(0.018)	(0.006)	(0.020)	(0.006)	(0.022)
Age [28-37]	-0.364***	-0.375***	-0.323***	-0.335***	-0.331***	-0.349***	-0.295***	-0.313***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Age [38-47]	-0.033***	-0.053***	0.097***	0.075***	0.086***	0.048***	0.115***	0.083***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
Age [48-57]	0.265***	0.246***	0.457***	0.432***	0.444***	0.398***	0.461***	0.423***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Age [58-67]	0.359***	0.336***	0.567***	0.538***	0.528***	0.471***	0.548***	0.502***
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	1 587 369		1 449 358		1 354 111		1 334 568	
R^2 adj.	0.108	0.108	0.133	0.133	0.136	0.137	0.156	0.156

Table 7 present a model for additional analysis of financial literacy effect on allocation in risky financial assets, conditional on the different age brackets (eq. 5). FinLit is positively correlated with allocation in risky financial assets at the 1%-level for all years of column (1), everything else held constant. In column (2), we find a slight negative correlation for 2014 and 2011. This is not necessarily unexpected behaviour given macro- and market conditions, such as the Norwegian oil crisis and financial crisis (Malmendier & Nagel, 2011). We encourage further investigation into this dynamic.

Considering the effect of financial literacy in each age bracket, we find a trend that is similar in pattern to what Catherine (2022) finds. Financial literacy's impact on allocation increases as the age brackets contains older individuals, over the reference category. This seems intuitive given the life-cycle argument and how a potential budget constraint, or necessity to pool wealth for housing plausibly tapers off. When housing is purchased, they revert to risky financial assets as they allow for generous return on smaller holdings of wealth that remain liquid.

The age brackets show the effect of age on allocation in risky financial assets over the reference category. Age 28 to 47 allocate less than the reference category, however the trend to allocate less consistently lifts as the bracket contains older individuals. This coincides with Campbell (2006) and Fagereng et al. (2019) & Fagereng et al. (2020) who finds that some individuals may not have sufficient funds to invest in the stock market, A reason we find to be particularly plausible in these parts of the life cycle (family, housing, etc.). Interestingly, this implies that the necessary consumption-smoothing effect seems to be attainable through different means (Haliassos & Michaelides, 2003; Gomes & Michaelides, 2005).

Table 8: Additional analysis - Wealth brackets

Estimated coefficients (OLS) on a conditional dataset, all entities hold > 0 in risky financial assets. Column (1): Baseline model including individual-level controls with wealth brackets. Column (2): Extended with interaction terms for Financial Literacy jointly estimated. Baseline category omitted (DVT). The dependent variable is Ln Share of risky financial assets, a log-transformed continuous variable, computed by dividing risky financial assets over total wealth for the entity (Ch. 3.1.3). White's heteroskedasticity-robust standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (Two-sided), respectively.

Ln Share of risky financial assets	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit x LnWealth [25,50)		0.152***		0.145***		0.189***		0.239***
		(0.018)		(0.019)		(0.018)		(0.018)
FinLit x LnWealth [50,75)		0.115***		0.097***		0.181***		0.208***
		(0.017)		(0.018)		(0.017)		(0.017)
FinLit x LnWealth [75,99)		0.063***		0.085***		0.335***		0.337***
		(0.017)		(0.018)		(0.017)		(0.017)
FinLit x LnWealth [99,100]		-0.273***		-0.089***		0.242***		0.208***
		(0.031)		(0.034)		(0.030)		(0.030)
FinLit [1/0]	0.426***	0.348***	0.352***	0.267***	0.363***	0.145***	0.340***	0.104***
	(0.005)	(0.014)	(0.006)	(0.015)	(0.005)	(0.014)	(0.005)	(0.014)
LnWealth in [25,50)	-1.746***	-1.754***	-1.837***	-1.844***	-1.900***	-1.910***	-2.161***	-2.174***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
LnWealth in [50,75)	-1.650***	-1.658***	-1.792***	-1.798***	-1.883***	-1.891***	-2.220***	-2.230***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
LnWealth in [75,99)	-1.166***	-1.168***	-1.324***	-1.328***	-1.335***	-1.370***	-1.680***	-1.712***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)
LnWealth in [99,100]	1.365***	1.433***	1.222***	1.251***	1.195***	1.172***	0.887***	0.882***
	(0.012)	(0.014)	(0.014)	(0.016)	(0.014)	(0.019)	(0.015)	(0.019)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	1 587 369		1 449 358		1 354 111		1 334 568	
R^2 adj.	0.169	0.169	0.181	0.181	0.186	0.187	0.219	0.219

In Table 8, we present the analysis of financial literacy's effect on allocation in risky financial assets conditional on different wealth percentiles (eq. 6). On average, financial literacy is positively correlated with allocation in risky financial assets, everything else held constant. The effect is statistically significant at the 1%-level. The implications are consistent with our previous findings.

The interaction terms in column (2) show that financial literacy is notably large for the less wealthy in years 2020 and 2017. As wealth increases, financial literacy diminishes in effect over the reference category even turning to a negative correlation. We find it plausible that wealthier individuals more often reach this wealth through inheritance and that the wealth itself is not the only thing being handed down. Most likely, the individual's pass-along knowledge related to how such a wealth should be responsibly managed. This implies that they gain their "financial literacy" at a different intersection than the ones we are measuring in our data. This could be an endogeneity concern, discussed in Ch. 4.4. Second, we find it plausible that wealthier individuals more often professionalize the management of their wealth. It is then the literacy of their management team which matters. The results become less evident in 2014 and 2011, however as reasoned earlier in this chapter, the results have to be interpreted with respect to the financial market conditions of the time.

The wealth percentiles show the effect of wealth on allocation in risky financial assets over the reference category. As wealth increases over the reference category, we find a diminishing negative correlation with allocation. The top one percentile deviates significantly with a substantial and positive correlation with allocation. These results rallies with literature that finds wealth to be a significant contributor to participation. This could be either due to the necessity of "chasing good deal", or the fact that the traditional costs of entry disappears (Haliassos & Michaelides, 2003; Gomes & Michaelides, 2005; Campbell, 2006; Calvet et al., 2009; Fagereng et al., 2019). Finally, in line with our results, Jappelli & Padula (2015) find that exposure to stock-risk tends to be higher for the wealthy.

4.2.3 Summary of findings

Chapter 4.2 discusses hypothesis 2, whether financial literacy is positively correlated with the share of total wealth allocated in risky financial assets. On average, financial literacy is positively correlated with allocation in risky financial assets, and the coefficients are statistically significant at the 1%-level. We contribute by studying the impact of financial literacy on allocation in risky financial assets with a more accurate measure. Furthermore, we study this effect in different age and wealth brackets. The effect of financial literacy is similar in all age brackets, with a slightly increasing pattern over the reference category as the brackets contains older individuals. Age brackets show that the effect of age on allocation in risky financial assets is less in those years of the life cycle associated with the establishment phase. The effect of financial literacy in wealth percentiles, as shown by the interaction terms, express that the wealthier gain financial literacy through different intersections than the ones we measure. The effect of financial literacy in the low-wealth groups is large, which suggests targeted financial education for these to be beneficial. The percentile brackets show that as wealth accumulates, there is a diminishing negative correlation with allocation over the reference category. The top one percentile is particularly special as they correlate positively and strongly with allocation, which implies that their behaviour is totally different from the rest. In terms of Goodness-of-fit, wealth (Table 8) offers the most notable increase in R^2-adj. over the base case (Table 6). Age (Table 7) only offers a miniscule gain. This suggests that wealth is more important to explain allocation in risky financial assets.

The results provide statistical support for hypothesis 2, even under the additional analysis specifications. Additionally, we have reasoned that the results are economically significant through the initial deposit effect.

4.3 Robustness check

Robustness checks are deemed essential in modern literature to ensure reliability and validity of the model and their subsequent results. The aim is to test whether the coefficients are sensitive to different model specifications, estimation methods and subsets of data. The idea is that one may verify whether the conclusions drawn are directly related to the effect of interest, and not a result of general assumptions or methods applied to the model. However, caution must be exercised in their interpretation, as they do not function as a true panacea-solution to write of all concerns. At worst, they may act as a novel approach at data-dredging (Lu & White, 2014).

In this chapter, we present four robustness checks aiming to clarify four individual questions. First, we introduce lagged terms on vital variables to see whether the regressions hold when we control for past investment behaviour. Second, we show that both components of our measure on financial literacy, EduLit and ProfLit, have significant correlation on likelihood and allocation in risky financial assets. Third, we investigate whether financial literacy offers a correlation in excess to that of higher education and occupations typically requiring an equal-length education. Fourth, we test our models on a subsample of our population, to show that financial literacy still correlates on allocation and participation.

4.3.1 Controlling for past participation and allocation in risky financial assets

Past behaviour in risky financial assets may be a strong predictor of current behaviour. By including lagged terms of both dependent variables, we take one step towards addressing the possible influence of serial correlation. In logistic regression, the coefficients must be interpreted under the assumption that the entity did not participate the previous year. For OLS, the coefficients represent the difference from the previous year's level of allocation. We re-specify (eq. 1) and (eq. 4) as follows,

(7) $$Pr(Likelihood\ of\ participating_i = 1) = \beta_0 + \beta\ FinLit_i + \beta\ Participation_{i\,t-1} + C_i'\delta_0 + u_i$$

(8) $$LnShareOfRiskyFinancialAssets = \beta_0 + \beta\ FinLit_i + \beta\ LnShareOfRiskyFinancialAssets_{i\,t-1} + C_i'\delta_0 + u_i$$

Where "i" represents the index of the entities. $\beta\ LnShareOfRiskyFinancialAssets_{i\,t-1}$ and $\beta\ Participation_{i\,t-1}$ represents the lagged term of their respective dependent variable. C_i represents the battery of demographic characters (Ch. 3.1.2), δ_0 represents the vector of coefficients that show the influence of the demographic characteristics and u_i is the error term.

Table 9: Controlling for past participation and allocation

Panel A: Estimated coefficient in odds-ratios. The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. The model is equal to column (2) in Table 3, extended with a lagged term on participation in risky financial assets. **Panel B:** Estimated coefficients (OLS) on a conditional dataset, all entities hold > 0 in risky financial assets. The dependent variable is Ln Share of risky financial assets, a log-transformed continuous variable, computed by dividing risky financial assets over total wealth for the entity (Ch. 3.1.3). The model is equal to column (2) in Table 6, extended with a lagged term of the entity's share in risky financial assets. Standard errors and White's heteroskedasticity-robust standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

	2020	**2017**	**2014**	**2011**
	Panel A: Controlling for the lagged participation in risky financial assets			
FinLit [1/0]	1.596***	1.470***	1.350***	1.320***
	(0.018)	(0.017)	(0.015)	(0.015)
$Participation_{T-1}$	168.338***	176.927***	180.670***	145.968***
	(0.980)	(0.969)	(0.976)	(0.746)
Base controls	Y	Y	Y	Y
Obs.	2 813 780	2 790 720	2 736 942	2 663 591
Pseudo R^2	0.656	0.680	0.686	0.666
Prob > chi2:	0.000	0.000	0.000	0.000
	Panel B: Controlling for the lagged share of risky financial assets			
FinLit [1/0]	0.359***	0.291***	0.306***	0.284***
	(0.004)	(0.004)	(0.004)	(0.004)
$LnShareOfRiskyAssets_{T-1}$	0.554***	0.595***	0.612***	0.638***
	(0.001)	(0.001)	(0.001)	(0.001)
Base controls	Y	Y	Y	Y
Obs.	1 587 369	1 449 358	1 354 111	1 334 568
R^2 adj.	0.429	0.494	0.521	0.543

In Table 9 we modify the Logit and OLS-models previously presented in this chapter to include a lagged term. The results are as expected. Clearly, what happened the period ahead has great influence on what happens in the current period. However, the effect of financial literacy persists. We conclude that the results are robust even when accounting for previous behaviour. The persistence highlights that financial literacy is a stable influence that correlates with behaviour across time.

4.3.2 Decomposing financial literacy from education and occupation

Thus far, FinLit has been positively correlated with participation and allocation in risky financial assets. In this robustness check, we decompose the FinLit variable to its two constituent components, EduLit and ProfLit. Through this approach, we may validate that both occupation and education correlates equally. We re-specify (eq. 1) and (eq. 4) as follows,

(9) $$Pr(Likelihood\ of\ participating_i = 1) = \beta_0 + \beta\ EduLit_i + C_i'\delta_0 + u_i$$

(10) $$Pr(Likelihood\ of\ participating_i = 1) = \beta_0 + \beta\ ProfLit_i + C_i'\delta_0 + u_i$$

(11) $$Ln\ share\ of\ risky\ financial\ assets = \beta_0 + \beta\ EduLit_i + C_i'\delta_0 + u_i$$

(12) $$Ln\ share\ of\ risky\ financial\ assets = \beta_0 + \beta\ ProfLit_i + C_i'\delta_0 + u_i$$

Where "i" represents the index of the entities. C_i represents the battery of demographic characters (Ch. 3.1.2), δ_0 represents the vector of coefficients that show the influence of the demographic characteristics and u_i is the error term.

Table 10: Decomposing financial literacy

Column (1) specified with the EduLit variable independently. Column (2) specified with the ProfLit variable independently. Controls: individual-level controls (Ch. 3.1.3). Standard errors and White's heteroskedasticity-robust standard errors reported in parenthesis. We use ***, ** and * to denote significance at the 1%, 5% and the 10% level (two-sided), respectively. **Panel A:** Estimated coefficient in odds-ratios. The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. **Panel B:** Estimated coefficients (OLS) on a conditional dataset, all entities hold > 0 in risky financial assets. The dependent variable is Ln Share of risky financial assets, a log-transformed continuous variable, computed by dividing risky financial assets over total wealth for the entity.

	2020		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
	Panel A: Likelihood of participating in risky financial assets							
EduLit	1.985***		1.744***		1.689***		1.763***	
	(0.018)		(0.015)		(0.015)		(0.017)	
ProfLit		2.078***		1.882***		1.773***		1.770***
		(0.017)		(0.015)		(0.011)		(0.012)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	1.985	2.079	1.745	1.883	1.690	1.773	1.763	1.771
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Panel B: Asset allocation in risky financial assets							
EduLit	0.640***		0.596***		0.559***		0.583***	
	(0.008)		(0.008)		(0.000)		(0.001)	
ProfLit		0.494***		0.413***		0.573***		0.538***
		(0.007)		(0.007)		(0.006)		(0.007)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	1 549 949		1 449 358		1 354 111		1 334 568	
R^2 adj.	0.101	0.100	0.126	0.125	0.127	0.130	0.147	0.149

In Table 10, we re-specify the column (2) version of Table 3 and Table 6. The results show that EduLit and ProfLit are statistically significant variables. Both means positively correlate with participation and allocation in risky financial assets, which ultimately validate the use of the combined FinLit variable in our models.

4.3.3 Controlling for higher education and occupation

Calvet et al. (2007), Cardak & Wilkins (2009), Jappeli & Padula (2015) and Cupák (2020) all control for various levels of education in their models. They suggest that education is an important predictor of risky financial asset participation and allocation. Figure 1 provides additional evidence. It is for this reason important to ensure that financial literacy yields the entity "something more" than what is achieved on average by same-length educations and occupations typically requiring a same-length education. In Table 11, we show re-specified models of Table 3 and 6. We re-specify (eq. 1) and (eq. 4) as follows,

(13) $$Pr(Likelihood\ of\ participating_i = 1) = \beta_0 + \beta\ HigherEduProf_i + C_i'\delta_0 + u_i$$

(14) $$Pr(Likelihood\ of\ participating_i = 1) = \beta_0 + \beta\ HigherNonFinLit_i + C_i'\delta_0 + u_i$$

(15) $$Ln\ share\ of\ risky\ financial\ assets = \beta_0 + \beta\ HigherEduProf_i + C_i'\delta_0 + u_i$$

(16) $$Ln\ share\ of\ risky\ financial\ assets = \beta_0 + \beta\ HigherNonFinLit_i + C_i'\delta_0 + u_i$$

Where "i" represents the index of the entities. C_i represents the battery of demographic characters (Ch. 3.1.2), δ_0 represents the vector of coefficients that show the influence of the demographic characteristics and u_i is the error term.

In Table 12 we estimate the column (2) version of Table 3 and 6 onto a subsample of their respective original population. We remove all entities who do not hold a higher education or occupation which requires an equal-length education. These regressions should be assumed as stricter.

Table 11: Controlling for higher education and occupation

Column (1) specified with the HigherEduProf variable independently. Column (2) specified with the HigherNonFinLit variable independently. Controls: individual-level controls (Ch. 3.1.3). Standard errors and White's heteroskedasticity-robust standard errors reported in parenthesis. We use ***, ** and * to denote significance at the 1%, 5% and the 10% level (two-sided), respectively. **Panel A:** Estimated coefficient in odds-ratios. The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. **Panel B:** Estimated coefficients (OLS) on a conditional dataset, all entities hold > 0 in risky financial assets. The dependent variable is Ln Share of risky financial assets, a log-transformed continuous variable, computed by dividing risky financial assets over total wealth for the entity.

	2020		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
	Panel A: Likelihood of participating in risky financial assets							
HigherEduProf	1.362***		1.241***		1.138***		1.156***	
	(0.004)		(0.004)		(0.003)		(0.004)	
HigherNonFinLit		1.165***		1.082***		1.013***		1.034***
		(0.003)		(0.003)		(0.003)		(0.003)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	1.363	1.165	1.241	1.082	1.139	1.014	1.157	1.035
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Panel B: Asset allocation in risky financial assets							
HigherEduProf	0.322***		0.255***		0.072***		0.079***	
	(0.004)		(0.004)		(0.004)		(0.004)	
HigherNonFinLit		0.107***		0.074***		-0.096***		-0.084***
		(0.003)		(0.003)		(0.004)		(0.004)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
	1 587 369		1 449 358		1 354 111		1 334 568	
R^2 adj.	0.102	0.098	0.126	0.123	0.124	0.124	0.145	0.145

The results of Table 11 when compared to the FinLit variable in Table 3 and 6 confirm that financial literacy is a superior contributor. Financial literacy correlates more with participation and allocation than that yielded on average by a same-length education and occupation typically requiring a same-length education. This validates that Financial Literacy is a unique trait that offers the entity "something more" than that of other educations.

Table 12: Subsample analysis

Total unconditional population: All entities hold higher education or occupation typically requiring an education of equal length. Controls: individual-level controls (Ch. 3.1.3). Standard errors and White's heteroskedasticity-robust standard errors reported in parenthesis. We use ***, ** and * to denote significance at the 1%, 5% and the 10% level (two-sided), respectively. **Panel A:** Estimated coefficient in odds-ratios. The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. **Panel B:** Estimated coefficients (OLS) on a conditional dataset, all entities hold > 0 in risky financial assets. The dependent variable is Ln Share of risky financial assets, a log-transformed continuous variable, computed by dividing risky financial assets over total wealth for the entity.

	2020	**2017**	**2014**	**2011**
	Panel A: Likelihood of participating in risky financial assets			
FinLit	1.838***	1.708***	1.564***	1.575***
	(0.013)	(0.012)	(0.011)	(0.012)
Base controls	Y	Y	Y	Y
	1 392 861	1 331 600	941 236	867 014
Pseudo R^2	0.135	0.141	0.144	0.141
Prob > chi2	0.000	0.000	0.000	0.000
	Panel B: Asset allocation in risky financial assets			
FinLit	0.461***	0.411***	0.490***	0.494***
	(0.006)	(0.012)	(0.007)	(0.007)
Base controls	Y	Y	Y	Y
Obs.	947 768	840 033	564 017	526 989
R^2 adj.	0.076	0.086	0.088	0.102

We re-estimate the column (2) regressions from Table 3 (eq. 1) and Table 6 (eq. 4) on a subsample. The results show that even in this stricter sample, FinLit is statistically significant at the 1%-level. The correlations do not weaken substantially from the original population, this reaffirms that financial literacy offers the entity something more than what equal-length educations and occupations yield on average. Furthermore, the correlations remain at levels which are still economically significant.

4.4 Limitations: Reliability, validity and causality.

Reliability concerns in econometric design typically pertain to the model's stability across different samples, ensuring consistent results as long as the underlying assumptions are not violated (Stock & Watson, 2020, pp. 397–407, 715–748). We address stability by defining our population in subsets that we validate one another. Further, we alter specifications with interaction terms and more comprehensive sets of controls allowing for non-linearity. The persisting correlations and statistical significance provides an indication of the reliability in our thesis.

We have to address the underlying assumptions. Literature suggests that peer effects influence participation (Brown et al., 2008; Kaustia & Knüpfer, 2012). This could bias the SEs, making results appear more statistically significant than they actually are (Cunningham, 2024, Chapter 2.27). We believe the individual-level dependencies to be less of a concern given our sample size and the findings of Kaustia et al. (2023). The obvious solutions would be to opt for cluster-robust SEs. Unfortunately, Microdata.no did not offer granular enough data, that would allow us to properly implement it.

Validity regards to what extent the models accurately capture the true effect they are set out to capture. Any good model is a parsimonious approach to reality, which comes with limitations in determining a true causal relationship (Reiss, 2013, pp. 119–141; Cunningham, 2024, Chapter 1.2). Touching on internal validity, one question is whether the observed correlations are genuinely reflective of a causal relationship. We build internal validity by including a battery of control variables that literature has shown to be vital determinants of participation and allocation in risky financial assets (Ch. 3.1.3). However, one can never be entirely certain that the model is free from omitted variable bias (OVB) (Stock & Watson, 2020, pp. 211–214).

Another question of internal validity is errors in variables (Stock & Watson, 2020, pp. 333–335). Financial Literacy is hard to pin down and observe directly. As we review in Ch. 2, the literature typically relies on surveys and indices. We decide to capture financial literacy with the help of logical assumptions. Given the international connection in higher education, the individuals we observe are plausibly financially literate to an extent that is recognizable internationally. Similarly, financial occupations operate within global markets, making it essential for employers to hire candidates that are financially literate in a widely accepted sense.

The flipside is that entities accumulate other skills on their journey of accruing financial literacy, which is challenging to control for. Still, we emphasize that our measure is more accurate than those relying on a dummy for high school education, surveys and indices.

Turning to external validity, our population is unique as it is the full, unabridged population of Norway. This allow us to confidently claim that the correlations are valid for Norway. Nonetheless, literature has found that great caution must be exercised when generalizing cross borders and cultures. Macroeconomic- and financial market conditions, policies and culture has shown to greatly influence asset allocation (Badarinza et al., 2016; Campbell, 2006; Kaustia et al., 2023; Lusardi & Mitchell, 2023).

Causal inference refers to the ability to claim that X causes Y without the presence of endogeneity. Endogeneity refers to the issue when any dependent variable is correlated with the error term (Stock & Watson, 2020, p. 428). This may happen due to reverse-causality, omitted variable bias, measurement error or self-selection (Wooldridge, 2012, p. 255; Stock & Watson, 2020, pp. 338, 343, 352). Our models provide valuable insight in the relationships between financial literacy and participation and allocation in risky financial assets. Still, there are issues that hinders us from establishing causality in any of our results. OLS and Logit effectively estimate correlations if their assumptions hold, but do not control for any form of endogeneity beyond what is addressed through appropriate specification (Cunningham, 2024, Chapter 1.2-1.3).

Returning to OVB, we have not controlled for behavioral-finance characteristics such as risk aversion, present bias, etc. This could bias our estimates. We have covered measurement error as part of our discussion on internal validity. Reverse causality is also of concern, as entities may very well become financially literate through informal methods, which are hard to measure. Self-selection is another issue. It is plausible that entities who take interest in financial assets "self-select" into an education or occupation deeming them financially literate. At that point, the observed correlations would be influenced by this interest in risky assets, making it impossible to observe the purely causal effect of financial literacy.

Nevertheless, our analyses provide the first step towards documenting the strongly correlated relationship between financial literacy and participation and allocation in risky financial assets. For future research, we encourage researchers to look into the endogenous choice of financial literacy to explore the potential causal relation with the use of quasi-experimental techniques (Stock & Watson, 2020, pp. 474–476, 490–503).

5 Conclusion & Implications

5.1 Conclusion

Using cross-sectional administrative data from Norway, we find support for both of our hypothesises. In line with our expectations regarding Hypothesis 1, we find that financial literacy positively correlates with the likelihood to participate in risky financial assets. The correlation is statistically and economically significant. Age is correlated with the likelihood to participate, however, financial literacy correlates homogenously and significantly in all age brackets. Our results on wealth display a U-shaped profile of the correlation of financial literacy and the likelihood to participate in different wealth percentiles. While the 25th to 99th percentiles correlate negatively, the 1%-wealthiest have a notably positive correlation with wealth over the reference category.

In context of hypothesis 2, we find that financial literacy is positively correlated with the share of total wealth allocated in risky financial assets. The correlation is statistically and economically significant. Financial literacy's correlation on allocation increases as the age brackets contains older individuals, over the reference category. There is no clear pattern with respect to financial literacy's correlation on allocation in different wealth percentiles. However, most recent datapoints suggest a diminishing positive correlation between financial literacy and allocation until the 99th percentile, where the correlation turns negative. We encourage research into the difference observed in earlier years, as we can only speculate about the underlying reasons.

The robustness checks confirm the resilience of our findings in four key areas: controlling for past investment behaviour, validating our combined financial literacy measure, highlighting the unique advantage of financial literacy over other higher educations and occupations, and maintaining strong correlations in subsample analysis. Our thesis provides the first step towards documenting the correlated relationship between financial literacy and participation in risky financial assets, but do not imply any causation.

5.2 Implications

Turning to the implications of our results, we believe that financial literacy must be considered carefully in several areas of society. From a policy perspective, it is beyond a reasonable doubt that financial literacy is a factor in the question of wealth inequality and returns to wealth. It is reasonable to think that policies should be enacted to ensure that the wealth distribution may benefit more equally from the opportunities found in financial literacy and risky financial assets. When not feasible, one still must consider how a policy might contribute to increased wealth inequality due to the presence of financial literacy.

From the perspective of the educational sector, our results advocate for integrating fundamental financial education in school curricula at early levels. By embedding financial literacy early, one may equip future generations with the necessary skills to make informed and correct financial decisions, potentially increasing their participation in financial markets. In turn, this could contribute to balance the wealth distribution. In addition, the individuals may harvest several other benefits accrued to financial literacy, such as being able to distinguish usury financial opportunities from those truly value-enhancing.

Finally, in the academic field, we contribute to the gap in literature on financial literacy's influence on allocation in risky financial assets. We corroborate on the current literature investigating financial literacy's impact on the likelihood to participate in risky financial assets. Furthermore, we conduct initial investigations of how financial literacy interacts with factors shown in literature to be particularly important. Still, the true causal effect remains to be determined. Once compute power and more micro data becomes available, we encourage the academic field to investigate further through quasi-experiments and panel-regression.

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Appendices

Appendix A: Descriptive statistics, yearly.

Table 1 show aggregated descriptive statistics for both our unconditional and conditional populations. As stated in Ch. 3.1.1, we offer detailed descriptive statistics on a yearly level for both populations.

For all following tables, Panel A: demographic characteristics. Panel B: wealth distribution. Panel C: income flow. Panel D: asset participation. The fractions display the proportion of the population holding the respective asset class (Panel D).

Table A-1: Descriptive statistics – Unconditional population 2020

Unconditional population 2020	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
			Panel A: Demographics				
Age [18-67]	41.64	14.27	18.00	29.00	42.00	54.00	66.00
Gender [1/0]	51 %	0.50	0.00	0.00	1.00	1.00	1.00
Married [1/0]	35 %	0.48	0.00	0.00	0.00	1.00	1.00
Household size	2.76	1.33	1.00	2.00	3.00	4.00	6.00
No. children <18	0.65	0.94	0.00	0.00	0.00	1.00	3.00
Parents educ [1/0]	32 %	0.47	0.00	0.00	0.00	1.00	1.00
Resident status [1/0]	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	6 %	0.23	0.00	0.00	0.00	0.00	1.00
Business prof [1/0] (a)	4 %	0.19	0.00	0.00	0.00	0.00	1.00
Business educ [1/0] (b)	3 %	0.17	0.00	0.00	0.00	0.00	1.00
			Panel B: Wealth components (NOK 1000s)				
Fin. Wealth (1) = (1a) + (1b)	544	1 319	0	37	146	440	9 760
Safe assets (1a)	253	446	0	23	92	271	2 780
Risky fin. Assets (1b)	275	1 070	0	0	5	77	8 440
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	2 424	2 726	0	1	2 030	3 660	13 800
Primary housing (2a)	1 571	1 731	0	0	1 380	2 580	7 570
Secondary housing (2b)	163	649	0	0	0	0	4 110
Taxable real capital (2c)	674	883	0	1	482	889	5 110
Total wealth (3) = (1) + (2)	3 015	3 569	0	194	2 330	4 210	20 900
Total Debt (4)	1 088	1 457	0	15	358	1 790	6 920
Net Wealth (5) = (3) - (4)	1 920	3 169	-2 390	1	911	2 890	18 100
			Panel C: Income components (NOK 1000s)				
Income from profession (a)	424	353	0	79	437	628	1 620
Income from safe assets (b)	2	5	0	0	0	2	33
Income from risky fin. Assets (c)	6	25	0	0	0	1	194
Net income forest/agri/fish/catch (d)	17	95	-14	0	0	0	725
Net fix. Prop. Gains (e)	-5	42	-356	0	0	0	66
Interest payments on debt	29	40	0	0	12	46	202
Total income (a) + (b) + (c) + (d) + (e)	451	376	-1	111	452	644	1 890
			Panel D: Participation rates				
Fraction with safe assets [1/0]	100 %						
Fraction with risky financial assets [1/0]	56 %						
Fraction with forest/agri/fish/catch [1/0]	8 %						
Fraction with primary housing [1/0]	58 %						
Fraction with secondary housing [1/0]	8 %						
Fraction with some debt [1/0]	82 %						
Fraction with student debt [1/0]	30 %						
Safe assets / total wealth	32 %	0.40	0.00	0.02	0.09	0.73	1.00
Risky financial assets / total wealth	7 %	0.16	0.00	0.00	0.00	0.04	0.87
Prim. Housing / total wealth	38 %	0.34	0.00	0.00	0.46	0.73	0.80
Sec. Housing / total wealth	2 %	0.09	0.00	0.00	0.00	0.00	0.50
Fix.prop etc. / total wealth	20 %	0.20	0.00	0.01	0.19	0.24	0.96
Leverage, all debt / total wealth	810 %	45.47	0.00	0.01	0.36	0.95	397.00
Ratio, interest p. on debt / all debt	5 %	0.16	0.00	0.00	0.02	0.03	1.39
Observations				2 813 780			

Table A-2: Descriptive statistics – Unconditional population 2017

Unconditional population 2017	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
			Panel A: Demographics				
Age [18-67]	41.57	14.18	18.00	29.00	42.00	54.00	66.00
Gender [1/0]	51 %	0.50	0.00	0.00	1.00	1.00	1.00
Married [1/0]	38 %	0.48	0.00	0.00	0.00	1.00	1.00
Household size	2.81	1.34	1.00	2.00	3.00	4.00	6.00
No. children <18	0.68	0.95	0.00	0.00	0.00	1.00	3.00
Parents educ [1/0]	30 %	0.46	0.00	0.00	0.00	1.00	1.00
Resident status [1/0]	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	6 %	0.23	0.00	0.00	0.00	0.00	1.00
Business prof [1/0] (a)	4 %	0.19	0.00	0.00	0.00	0.00	1.00
Business educ [1/0] (b)	3 %	0.17	0.00	0.00	0.00	0.00	1.00
			Panel B: Wealth components (NOK 1000s)				
Fin. Wealth (1) = (1a) + (1b)	439	1 075	0	28	109	346	7 880
Safe assets (1a)	217	401	0	19	71	223	2 510
Risky fin. Assets (1b)	207	831	0	0	1	49	6 550
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	2 240	2 561	0	0	1 840	3 400	13 000
Primary housing (2a)	1 462	1 641	0	0	1 250	2 420	7 210
Secondary housing (2b)	149	598	0	0	0	0	3 820
Taxable real capital (2c)	614	829	0	0	426	806	4 820
Total wealth (3) = (1) + (2)	2 721	3 234	0	137	2 090	3 850	18 500
Total Debt (4)	981	1 340	0	15	313	1 590	6 470
Net Wealth (5) = (3) - (4)	1 734	2 858	-2 290	-3	800	2 660	15 900
			Panel C: Income components (NOK 1000s)				
Income from profession (a)	387	322	0	72	398	573	1 490
Income from safe assets (b)	2	5	0	0	0	2	31
Income from risky fin. Assets (c)	5	23	0	0	0	0	179
Net income forest/agri/fish/catch (d)	18	94	-15	0	0	0	690
Net fix. Prop. Gains (e)	-5	36	-301	0	0	0	58
Interest payments on debt	29	39	0	0	11	45	199
Total income (a) + (b) + (c) + (d) + (e)	413	343	-1	104	414	589	1 730
			Panel D: Participation rates				
Fraction with safe assets [1/0]	100 %						
Fraction with risky financial assets [1/0]	52 %						
Fraction with forest/agri/fish/catch [1/0]	9 %						
Fraction with primary housing [1/0]	57 %						
Fraction with secondary housing [1/0]	8 %						
Fraction with some debt [1/0]	83 %						
Fraction with student debt [1/0]	29 %						
Safe assets / total wealth	34 %	0.41	0.00	0.02	0.08	0.88	1.00
Risky financial assets / total wealth	6 %	0.16	0.00	0.00	0.00	0.03	0.86
Prim. Housing / total wealth	38 %	0.35	0.00	0.00	0.46	0.75	0.80
Sec. Housing / total wealth	2 %	0.09	0.00	0.00	0.00	0.00	0.50
Fix.prop etc. / total wealth	19 %	0.19	0.00	0.00	0.19	0.22	0.96
Leverage, all debt / total wealth	958 %	53.15	0.00	0.01	0.35	1.00	463.00
Ratio, interest p. on debt / all debt	5 %	0.15	0.00	0.00	0.02	0.04	1.27
Observations				2 790 720			

Table A-3: Descriptive statistics – Unconditional population 2014

Unconditional population 2014	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
			Panel A: Demographics				
Age [18-67]	41.34	13.94	18.00	29.00	42.00	53.00	66.00
Gender [1/0]	51 %	0.50	0.00	0.00	1.00	1.00	1.00
Married [1/0]	39 %	0.49	0.00	0.00	0.00	1.00	1.00
Household size	2.84	1.34	1.00	2.00	3.00	4.00	6.00
No. children <18	0.72	0.99	0.00	0.00	0.00	1.00	4.00
Parents educ [1/0]	27 %	0.44	0.00	0.00	0.00	1.00	1.00
Resident status [1/0]	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	7 %	0.26	0.00	0.00	0.00	0.00	1.00
Business prof [1/0] (a)	6 %	0.23	0.00	0.00	0.00	0.00	1.00
Business educ [1/0] (b)	3 %	0.16	0.00	0.00	0.00	0.00	1.00
			Panel B: Wealth components (NOK 1000s)				
Fin. Wealth (1) = (1a) + (1b)	349	816	0	23	88	284	5 830
Safe assets (1a)	191	358	0	15	60	192	2 240
Risky fin. Assets (1b)	145	579	0	0	0	35	4 550
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	1 812	2 021	0	0	1 530	2 840	9 760
Primary housing (2a)	1 186	1 350	0	0	1 000	2 020	5 810
Secondary housing (2b)	129	506	0	0	0	0	3 140
Taxable real capital (2c)	485	598	0	0	361	682	3 270
Total wealth (3) = (1) + (2)	2 188	2 502	0	108	1 730	3 190	13 800
Total Debt (4)	860	1 172	0	14	282	1 410	5 740
Net Wealth (5) = (3) - (4)	1 323	2 196	-2 290	-12	596	2 140	11 500
			Panel C: Income components (NOK 1000s)				
Income from profession (a)	365	304	0	75	372	534	1 420
Income from safe assets (b)	5	10	0	0	1	5	65
Income from risky fin. Assets (c)	4	20	0	0	0	0	157
Net income forest/agri/fish/catch (d)	18	90	-17	0	0	0	649
Net fix. Prop. Gains (e)	-4	30	-250	0	0	0	56
Interest payments on debt	34	46	0	0	12	54	227
Total income (a) + (b) + (c) + (d) + (e)	393	324	0	109	389	554	1 650
			Panel D: Participation rates				
Fraction with safe assets [1/0]	100 %						
Fraction with risky financial assets [1/0]	49 %						
Fraction with forest/agri/fish/catch [1/0]	9 %						
Fraction with primary housing [1/0]	55 %						
Fraction with secondary housing [1/0]	8 %						
Fraction with some debt [1/0]	83 %						
Fraction with student debt [1/0]	27 %						
Safe assets / total wealth	35 %	0.41	0.00	0.02	0.09	0.90	1.00
Risky financial assets / total wealth	6 %	0.15	0.00	0.00	0.00	0.02	0.85
Prim. Housing / total wealth	37 %	0.35	0.00	0.00	0.42	0.74	0.80
Sec. Housing / total wealth	3 %	0.11	0.00	0.00	0.00	0.00	0.60
Fix.prop etc. / total wealth	19 %	0.20	0.00	0.00	0.19	0.23	0.97
Leverage, all debt / total wealth	1303 %	76.41	0.00	0.02	0.38	1.06	677.00
Ratio, interest p. on debt / all debt	7 %	0.20	0.00	0.00	0.04	0.05	1.74
Observations				2 736 942			

Table A-4: Descriptive statistics – Unconditional population 2011

Unconditional population 2011	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
			Panel A: Demographics				
Age [18-67]	40.81	13.54	18.00	29.00	41.00	52.00	65.00
Gender [1/0]	52 %	0.50	0.00	0.00	1.00	1.00	1.00
Married [1/0]	41 %	0.49	0.00	0.00	0.00	1.00	1.00
Household size	2.96	1.40	1.00	2.00	3.00	4.00	6.00
No. children <18	0.77	1.01	0.00	0.00	0.00	1.00	4.00
Parents educ [1/0]	25 %	0.43	0.00	0.00	0.00	1.00	1.00
Resident status [1/0]	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	7 %	0.25	0.00	0.00	0.00	0.00	1.00
Business prof [1/0] (a)	5 %	0.23	0.00	0.00	0.00	0.00	1.00
Business educ [1/0] (b)	2 %	0.15	0.00	0.00	0.00	0.00	1.00
			Panel B: Wealth components (NOK 1000s)				
Fin. Wealth (1) = (1a) + (1b)	281	664	0	17	68	225	4 740
Safe assets (1a)	154	300	0	11	46	149	1 900
Risky fin. Assets (1b)	116	455	0	0	0	30	3 570
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	1523	1 734	0	0	1 240	2 430	8 230
Primary housing (2a)	1007	1 196	0	0	742	1 740	5 170
Secondary housing (2b)	106	428	0	0	0	0	2 690
Taxable real capital (2c)	398	477	0	0	300	584	2 510
Total wealth (3) = (1) + (2)	1825	2 118	0	78	1 410	2 710	11 500
Total Debt (4)	732	1 003	0	11	243	1 190	4 920
Net Wealth (5) = (3) - (4)	1088	1 863	-2 070	-23	430	1 810	9 560
			Panel C: Income components (NOK 1000s)				
Income from profession (a)	325	270	0	68	331	478	1 270
Income from safe assets (b)	4	9	0	0	1	3	60
Income from risky fin. Assets (c)	3	14	0	0	0	0	113
Net income forest/agri/fish/catch (d)	19	91	-26	0	0	0	638
Net fix. Prop. Gains (e)	-4	28	-235	0	0	0	23
Interest payments on debt	29	39	0	0	10	46	194
Total income (a) + (b) + (c) + (d) + (e)	352	287	0	103	349	495	1 460
			Panel D: Participation rates				
Fraction with safe assets [1/0]	100 %						
Fraction with risky financial assets [1/0]	50 %						
Fraction with forest/agri/fish/catch [1/0]	10 %						
Fraction with primary housing [1/0]	53 %						
Fraction with secondary housing [1/0]	8 %						
Fraction with some debt [1/0]	83 %						
Fraction with student debt [1/0]	27 %						
Safe assets / total wealth	35 %	0.41	0.00	0.02	0.09	0.89	1.00
Risky financial assets / total wealth	6 %	0.16	0.00	0.00	0.00	0.02	0.87
Prim. Housing / total wealth	36 %	0.35	0.00	0.00	0.35	0.74	0.80
Sec. Housing / total wealth	3 %	0.12	0.00	0.00	0.00	0.00	0.69
Fix.prop etc. / total wealth	20 %	0.21	0.00	0.00	0.19	0.23	0.98
Leverage, all debt / total wealth	1702 %	101.83	0.00	0.01	0.38	1.14	907.00
Ratio, interest p. on debt / all debt	6 %	0.17	0.00	0.00	0.04	0.05	1.50
Observations				2 663 591			

Table A-5: Descriptive statistics – Conditional population 2020

Conditional population 2020	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
			Panel A: Demographics				
Age [18-67]	43.44	13.46	19.00	32.00	44.00	55.00	66.00
Gender [1/0]	55 %	0.50	0.00	0.00	1.00	1.00	1.00
Married [1/0]	40 %	0.49	0.00	0.00	0.00	1.00	1.00
Household size	2.73	1.31	1.00	2.00	3.00	4.00	6.00
No. children <18	0.67	0.95	0.00	0.00	0.00	1.00	3.00
Parents educ [1/0]	35 %	0.48	0.00	0.00	0.00	1.00	1.00
Resident status [1/0]	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	8 %	0.28	0.00	0.00	0.00	0.00	1.00
Business prof [1/0] (a)	6 %	0.23	0.00	0.00	0.00	0.00	1.00
Business educ [1/0] (b)	5 %	0.21	0.00	0.00	0.00	0.00	1.00
			Panel B: Wealth components (NOK 1000s)				
Fin. Wealth (1) = (1a) + (1b)	921	2 232	4	99	275	714	16 700
Safe assets (1a)	324	541	0	42	134	348	3 360
Risky fin. Assets (1b)	577	1 978	0	15	57	248	15 300
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	3 270	3 036	0	1 170	2 810	4 430	16 400
Primary housing (2a)	2 068	1 827	0	0	1 960	3 050	8 390
Secondary housing (2b)	253	853	0	0	0	0	5 060
Taxable real capital (2c)	932	1 066	0	343	668	1 110	6 300
Total wealth (3) = (1) + (2)	4 247	4 486	10	1 680	3 290	5 280	28 600
Total Debt (4)	1 437	1 652	0	88	898	2 270	8 000
Net Wealth (5) = (3) - (4)	2 798	4 143	-2580	237	1 800	3 790	25 400
			Panel C: Income components (NOK 1000s)				
Income from profession (a)	516	381	0	215	521	708	1 860
Income from safe assets (b)	3	6	0	0	1	3	43
Income from risky fin. Assets (c)	10	41	0	0	0	2	306
Net income forest/agri/fish/catch (d)	29	137	-34	0	0	0	963
Net fix. Prop. Gains (e)	-13	89	-711	0	0	0	141
Interest payments on debt	37	44	0	2	25	56	232
Total income (a) + (b) + (c) + (d) + (e)	557	418	-84	275	538	734	2 310
			Panel D: Participation rates				
Fraction with safe assets [1/0]	100 %						
Fraction with risky financial assets [1/0]	100 %						
Fraction with forest/agri/fish/catch [1/0]	11 %						
Fraction with primary housing [1/0]	72 %						
Fraction with secondary housing [1/0]	11 %						
Fraction with some debt [1/0]	87 %						
Fraction with student debt [1/0]	31 %						
Safe assets / total wealth	18 %	0.27	0.00	0.02	0.05	0.19	0.99
Risky financial assets / total wealth	12 %	0.21	0.00	0.01	0.03	0.13	0.93
Prim. Housing / total wealth	45 %	0.32	0.00	0.00	0.60	0.73	0.80
Sec. Housing / total wealth	3 %	0.10	0.00	0.00	0.00	0.00	0.50
Fix.prop etc. / total wealth	21 %	0.15	0.00	0.16	0.20	0.24	0.86
Leverage, all debt / total wealth	90 %	2.59	0.00	0.04	0.35	0.73	21.30
Ratio, interest p. on debt / all debt	4 %	0.11	0.00	0.01	0.02	0.03	0.95
Observations				1 587 369			

Table A-6: Descriptive statistics – Conditional population 2017

Conditional population 2017	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
			Panel A: Demographics				
Age [18-67]	44.12	13.15	19.00	33.00	45.00	55.00	66.00
Gender [1/0]	55 %	0.50	0.00	0.00	1.00	1.00	1.00
Married [1/0]	43 %	0.50	0.00	0.00	0.00	1.00	1.00
Household size	2.77	1.32	1.00	2.00	3.00	4.00	6.00
No. children <18	0.70	0.96	0.00	0.00	0.00	1.00	3.00
Parents educ [1/0]	31 %	0.46	0.00	0.00	0.00	1.00	1.00
Resident status [1/0]	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	8 %	0.28	0.00	0.00	0.00	0.00	1.00
Business prof [1/0] (a)	6 %	0.23	0.00	0.00	0.00	0.00	1.00
Business educ [1/0] (b)	4 %	0.20	0.00	0.00	0.00	0.00	1.00
			Panel B: Wealth components (NOK 1000s)				
Fin. Wealth (1) = (1a) + (1b)	796	1 925	4	79	224	614	14 300
Safe assets (1a)	292	510	0	34	110	305	3 170
Risky fin. Assets (1b)	486	1 679	0	12	44	197	13 000
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	3 146	2 899	0	1 260	2 670	4 240	15 700
Primary housing (2a)	1 992	1 750	0	0	1 880	2 920	8 120
Secondary housing (2b)	244	816	0	0	0	0	4 840
Taxable real capital (2c)	893	1 033	0	333	625	1 050	6 120
Total wealth (3) = (1) + (2)	3 995	4 130	9	1 640	3 090	4 980	26 000
Total Debt (4)	1 338	1 558	0	82	843	2 080	7 730
Net Wealth (5) = (3) - (4)	2 645	3 785	-2 540	249	1 760	3 620	22 700
			Panel C: Income components (NOK 1000s)				
Income from profession (a)	476	353	0	200	479	652	1740
Income from safe assets (b)	3	6	0	0	1	3	43
Income from risky fin. Assets (c)	10	39	0	0	0	2	296
Net income forest/agri/fish/catch (d)	32	138	-39	0	0	0	924
Net fix. Prop. Gains (e)	-13	86	-679	0	0	0	132
Interest payments on debt	37	44	0	2	25	56	232
Total income (a) + (b) + (c) + (d) + (e)	518	388	-93	267	498	679	2160
			Panel D: Participation rates				
Fraction with safe assets [1/0]	100 %						
Fraction with risky financial assets [1/0]	100 %						
Fraction with forest/agri/fish/catch [1/0]	13 %						
Fraction with primary housing [1/0]	73 %						
Fraction with secondary housing [1/0]	11 %						
Fraction with some debt [1/0]	89 %						
Fraction with student debt [1/0]	27 %						
Safe assets / total wealth	17 %	0.27	0.00	0.01	0.05	0.17	0.99
Risky financial assets / total wealth	12 %	0.21	0.00	0.01	0.02	0.12	0.94
Prim. Housing / total wealth	47 %	0.32	0.00	0.00	0.63	0.75	0.80
Sec. Housing / total wealth	3 %	0.10	0.00	0.00	0.00	0.00	0.50
Fix.prop etc. / total wealth	21 %	0.16	0.00	0.16	0.20	0.23	0.87
Leverage, all debt / total wealth	94 %	2.84	0.00	0.04	0.33	0.71	23.30
Ratio, interest p. on debt / all debt	4 %	0.11	0.00	0.02	0.03	0.03	0.94
Observations				1 449 358			

Table A-7: Descriptive statistics – Conditional population 2014

Conditional population 2014	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
				Panel A: Demographics			
Age [18-67]	44.35	12.76	18.00	34.00	45.00	55.00	66.00
Gender [1/0]	55 %	0.50	0.00	0.00	1.00	1.00	1.00
Married [1/0]	46 %	0.50	0.00	0.00	0.00	1.00	1.00
Household size	2.80	1.33	1.00	2.00	3.00	4.00	6.00
No. children <18	0.74	0.98	0.00	0.00	0.00	1.00	3.00
Parents educ [1/0]	29 %	0.45	0.00	0.00	0.00	1.00	1.00
Resident status [1/0]	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	11 %	0.31	0.00	0.00	0.00	0.00	1.00
Business prof [1/0] (a)	9 %	0.28	0.00	0.00	0.00	0.00	1.00
Business educ [1/0] (b)	4 %	0.19	0.00	0.00	0.00	0.00	1.00
				Panel B: Wealth components (NOK 1000s)			
Fin. Wealth (1) = (1a) + (1b)	640	1 453	3	67	189	526	10 500
Safe assets (1a)	267	469	0	29	96	275	2 880
Risky fin. Assets (1b)	357	1 202	0	11	36	151	9 160
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	2 567	2 244	0	1 070	2 260	3 500	11 800
Primary housing (2a)	1 630	1 436	0	0	1 570	2 450	6 530
Secondary housing (2b)	211	689	0	0	0	0	4 000
Taxable real capital (2c)	712	728	0	293	542	890	4 180
Total wealth (3) = (1) + (2)	3 242	3 139	8	1 410	2 610	4 090	19 300
Total Debt (4)	1 186	1 379	0	77	767	1 810	7 020
Net Wealth (5) = (3) - (4)	2 044	2 865	-2 560	199	1 430	2 930	16 300
				Panel C: Income components (NOK 1000s)			
Income from profession (a)	450	338	0	191	447	612	1 680
Income from safe assets (b)	7	14	0	0	2	7	89
Income from risky fin. Assets (c)	9	36	0	0	0	1	267
Net income forest/agri/fish/catch (d)	33	136	-42	0	0	0	885
Net fix. Prop. Gains (e)	-10	71	-550	0	0	0	130
Interest payments on debt	46	53	0	3	31	69	271
Total income (a) + (b) + (c) + (d) + (e)	497	370	-54	267	470	645	2 070
				Panel D: Participation rates			
Fraction with safe assets [1/0]	100 %						
Fraction with risky financial assets [1/0]	100 %						
Fraction with forest/agri/fish/catch [1/0]	14 %						
Fraction with primary housing [1/0]	71 %						
Fraction with secondary housing [1/0]	12 %						
Fraction with some debt [1/0]	89 %						
Fraction with student debt [1/0]	24 %						
Safe assets / total wealth	17 %	0.27	0.00	0.01	0.05	0.18	0.99
Risky financial assets / total wealth	11 %	0.20	0.00	0.01	0.02	0.11	0.94
Prim. Housing / total wealth	46 %	0.32	0.00	0.00	0.62	0.75	0.80
Sec. Housing / total wealth	4 %	0.12	0.00	0.00	0.00	0.00	0.60
Fix.prop etc. / total wealth	22 %	0.16	0.00	0.16	0.20	0.24	0.90
Leverage, all debt / total wealth	107 %	3.44	0.00	0.05	0.34	0.73	28.10
Ratio, interest p. on debt / all debt	6 %	0.16	0.00	0.02	0.04	0.05	1.43
Observations				1 354 111			

Table A-8: Descriptive statistics – Conditional population 2011

Conditional population 2011	Mean	Std.Dev.	P1	P25	Median P50	P75	P99
			Panel A: Demographics				
Age [18-67]	43.90	12.37	19.00	35.00	44.00	54.00	66.00
Gender (1/0)	55 %	0.50	0.00	0.00	1.00	1.00	1.00
Married (1/0)	48 %	0.50	0.00	0.00	0.00	1.00	1.00
Household size	2.92	1.38	1.00	2.00	3.00	4.00	6.00
No. children <18	0.79	1.02	0.00	0.00	0.00	2.00	4.00
Parents educ (1/0)	26 %	0.44	0.00	0.00	0.00	1.00	1.00
Resident status (1/0)	100 %	0.00	1.00	1.00	1.00	1.00	1.00
Financial literacy [1/0] (a) ∪ (b)	10 %	0.31	0.00	0.00	0.00	0.00	1.00
Business prof (1/0) (a)	8 %	0.28	0.00	0.00	0.00	0.00	1.00
Business educ (1/0) (b)	4 %	0.19	0.00	0.00	0.00	0.00	1.00
			Panel B: Wealth components (NOK 1000s)				
Fin. Wealth (1) = (1a) + (1b)	514	1 167	2	52	150	424	8 450
Safe assets (1a)	219	398	0	22	75	219	2 470
Risky fin. Assets (1b)	281	937	0	9	30	123	7 170
Non-Fin. Wealth (2) = (2a) + (2b) + (2c)	2 145	1 922	0	628	1 900	2 990	9 830
Primary housing (2a)	1 382	1 290	0	0	1 310	2 120	5 830
Secondary housing (2b)	170	577	0	0	0	0	3 390
Taxable real capital (2c)	580	571	0	224	461	756	3 190
Total wealth (3) = (1) + (2)	2 688	2 631	6	1 040	2 180	3 470	15 900
Total Debt (4)	1 000	1 180	0	58	612	1 550	6 030
Net Wealth (5) = (3) - (4)	1 678	2 403	-2 290	123	1 170	2 470	13 500
			Panel C: Income components (NOK 1000s)				
Income from profession (a)	397	301	0	161	396	542	1 490
Income from safe assets (b)	6	13	0	0	2	5	85
Income from risky fin. Assets (c)	6	26	0	0	0	0	199
Net income forest/agri/fish/catch (d)	34	136	-52	0	0	0	865
Net fix. Prop. Gains (e)	-11	63	-500	0	0	0	66
Interest payments on debt	39	45	0	2	25	59	232
Total income (a) + (b) + (c) + (d) + (e)	441	327	-51	238	418	571	1 820
			Panel D: Participation rates				
Fraction with safe assets	100 %						
Fraction with risky financial assets	100 %						
Fraction with forest/agri/fish/catch	16 %						
Fraction with primary housing	68 %						
Fraction with secondary housing	11 %						
Fraction with some debt	88 %						
Fraction with student debt	24 %						
Safe assets / total wealth	18 %	0.27	0.00	0.01	0.05	0.20	0.99
Risky financial assets / total wealth	12 %	0.21	0.00	0.01	0.02	0.12	0.95
Prim. Housing / total wealth	44 %	0.33	0.00	0.00	0.60	0.75	0.80
Sec. Housing / total wealth	4 %	0.14	0.00	0.00	0.00	0.00	0.68
Fix.prop etc. / total wealth	22 %	0.17	0.00	0.16	0.20	0.24	0.92
Leverage, all debt / total wealth	135 %	4.75	0.00	0.04	0.34	0.76	38.40
Ratio, interest p. on debt / all debt	6 %	0.13	0.00	0.02	0.04	0.05	1.18
Observations				1 334 564			

Appendix B: Education and occupational listings

The codes presented in Table B-1 includes all educations and occupations used to define our dummies: FinLit, EduLit, ProfLit and HigherEduProf (Statistics Norway, n.d.-a, n.d.-b).

Table B-1: List of educations and occupations

Education codes					
#	Code	Name	#	Code	Name
1	734101	Cand.oecon. degree	41	741108	Master of Business Administration (MBA), 1½ year
2	734102	Cand.polit. degree, social economics	42	741109	Master of Business Administration (MBA), one-year
3	734103	Master degree, social economics, two-year	43	741110	Master of International Business, 1½ year
4	734104	Master degree, social economics, five-year	44	741120	Master degree, economics and resource management in forestry and agriculture, two-year
5	734105	Master of Science, social economics, two-year	45	741121	Master degree, economics and administration, two-year
6	734199	Economics, unspecified, graduate level	46	741902	Master degree, marine insurance and risk management, 1½-year
7	734902	Graduate studies for business and economics degree graduates, social economics	47	634101	Exam. oecon. degree, part 2
8	734903	Mag.art. degree, social economics	48	634102	Economics, undergraduate level
9	734905	Social economics, graduate level	49	634103	Bachelor degree, social economics, three-year
10	734999	Economics, other, unspecified, graduate level	50	634104	Bachelor degree, social economics and data science, three-year
11	741102	Cand.merc. degree, administration	51	641101	Bachelor of Business Administration in Banking (finance)
12	741103	Cand.merc. degree, business administration	52	641102	Associate in Banking (finance)
13	741104	Cand.merc. degree, business and administration	53	641103	Business development, one-year supplement
14	741105	Business and economics programme, Community of European Management Schools (CEMS) Master's Degree	54	641104	Business administration, undergraduate level
15	741106	Financial analyst, certification course	55	641105	Diploma thesis, Business administration
16	741112	Master of Science, business administration, two-year	56	641116	College degree, business and computer science, three-year
17	741116	Master of Science, business administration, one-year	57	641119	College degree in engineering, practical economics and management, three-year
18	741118	Auditing exam, postgraduate level, 1½-year	58	641127	Degree in auditing, higher level, one-year
19	741125	Business and economics graduate/Master degree, economics and administration, two-year	59	641130	Accounting programme, three-year
20	741129	Master degree, financial economics, two-year	60	641131	Business and economics degree, four-year
21	741130	Master degree, accounting and graduate public accounting studies, two-year	61	641132	Tax auditor programme, part 1
22	741131	Master of Science, economics and business administration, two-year	62	641133	Tax auditor programme, part 2
23	741133	Business and economics graduate/Master degree, economics and administration, five-year	63	641141	Bachelor degree, economics and administration, three-year
24	741135	Master of Business Administration (MBA), two-year	64	641142	Bachelor degree, accounting and auditing, three-year
25	749999	Business and administration, other, unspecified, graduate level	65	641143	Bachelor degree, public administration and management, three-year
26	841101	Dr.oecon.degree (social economics), business economics	66	641144	Bachelor degree, agricultural economics and business development, three-year
27	841102	Ph.d. degree, business economics	67	641145	Bachelor degree, fishery economics, three-year
28	841104	Dr.philos. degree, business economics and management	68	641146	Bachelor degree, economics and business development in forestry and agriculture, three-year
29	841105	Ph.d. degree, business economics and management	69	641147	Bachelor degree, business management/economics, three-year
30	841199	Business and administration, unspecified, postgraduate education	70	641149	Bachelor of Business Administration, three-year
31	841999	Business and administration, other, unspecified, postgraduate education	71	641150	Bachelor degree, banking and finance, three-year
32	849901	Dr.oecon. degree, business administration	72	641151	Bachelor degree, economics and informatics, three-year
33	849902	Lic. Norwegian School of Economics and Business Administration (NHH), business administration	73	641158	Master of Business Administration (MBA), one-year
34	849903	Dr.ing. degree, business administration	74	641165	Bachelor degree, business administration, three-year
35	849904	Ph.d. degree, business studies	75	641999	Business and administration, other, unspecified, undergraduate level
36	849999	Business and administration, other, unspecified, postgraduate education	76	642203	Degree in marketing, four-year
37	734904	Master of Science, environmental and development economics, two-year	77	649910	Cand.mag. degree, business and administration
38	734906	Master degree, environmental and development economics, two-year	78	741115	Graduate engineering degree, business and administration
39	734907	Master degree, development and resource economics, two-year	79	741123	Master degree, business management/economics, two-year
40	741107	Graduate studies for business and economics degree graduates, unspecified	80	741101	Administration and management, two years of supplementary education for university and college graduates
Occupation codes after 2015			**Occupation codes before 2015**		
1	1211	Finance managers	20	P1112	Senior managers: public administration
2	1346	Financial and insurance services branch managers	21	P1120	Executive officers
3	2120	Mathematicians, actuaries and statisticians	22	P2120	mathematicians, statisticians, etc.
4	2411	Accountants	23	P3311	Finance brokers
5	2412	Financial and investment advisers	24	P2411	Auditors, accountants.
6	2413	Financial analysts	25	P241X	Financial advisors
7	2631	Economics	26	P3312	CSR: Loans & Credit.
8	2632	Sociologists, anthropologists and related professionals	27	P3313	Accountants
9	3311	Securities and finance dealers and brokers	28	P3315	Appraisers
10	3312	Credit and loans officers	29	P3321	Insurance brokers
11	1311	Agricultural and forestry production managers	30	P3323	Purchasers
12	132	Manufacturing, mining, construction and distribution managers	31	P3324	Trade & shipping-brokers
13	3313	Accounting associate professionals	32	P3334	Real estate brokers & managers
14	3321	Insurance representatives	33	P3339	Other business-catering occupations
15	3324	Trade brokers	34	P4211	CSR: Banking & postal
16	3352	Government tax and excise officials	35	P431X	Accountants etc.
17	4311	Accounting and bookkeeping clerks	36	P12XX	Managers in administrative, sales & research depts.
18	4312	Statistical, finance and insurance clerks	37	P13XX	Managers of production & service depts.
19	4313	Payroll clerks			

Appendix C: Probit models

In our thesis we have presented and interpreted logistic regressions. However, we have included the Probit equivalent model for the logit models in Table 3-5.

Table C-1: Financial literacy and participation in risky financial assets

Column (1): baseline model controlling for age and wealth. Column (2): additional individual-level controls (Ch. 3.1.3). The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. The marginal effects are computed through the method d(y)/d(x)) over all possible values of x. The value reported is the mean-value of all marginal effects computed. Standard Errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Likelihood of participating	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit [1/0]	0.433***	0.410***	0.379***	0.355***	0.377***	0.333***	0.380***	0.335***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Age [18-76]	-0.006***	-0.004***	-0.002***	0.001***	0.002***	0.005***	0.005***	0.007***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LnWealth	0.300***	0.284***	0.288***	0.270***	0.275***	0.254***	0.258***	0.239***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender [1/0]		0.175***		0.133***		0.085***		0.063***
		(0.002)		(0.002)		(0.002)		(0.002)
Married [1/0]		-0.005**		-0.018***		-0.018***		0.005**
		(0.002)		(0.002)		(0.002)		(0.002)
No. Child <18		-0.048***		-0.032***		-0.009***		-0.001
		(0.001)		(0.001)		(0.001)		(0.001)
ParentsEduc [1/0]		0.167***		0.145***		0.151***		0.154***
		(0.002)		(0.002)		(0.002)		(0.002)
LnDebt		0.019***		0.020***		0.022***		0.021***
		(0.000)		(0.000)		(0.000)		(0.000)
				Marginal effects				
FinLit [1/0]		0.130***		0.114***		0.107***		0.108***
		(0.001)		(0.001)		(0.001)		(0.001)
Age [18-76]		-0.001***		0.000***		0.002***		0.002***
		(0.000)		(0.000)		(0.000)		(0.000)
LnWealth		0.090***		0.087***		0.082***		0.077***
		(0.000)		(0.000)		(0.000)		(0.000)
Gender [1/0]		0.055***		0.043***		0.027***		0.020***
		(0.001)		(0.001)		(0.001)		(0.001)
Married [1/0]		-0.002**		-0.006***		-0.006***		0.002**
		(0.001)		(0.001)		(0.001)		(0.001)
No. Child <18		-0.015***		-0.010***		-0.003***		0.000
		(0.000)		(0.000)		(0.000)		(0.000)
ParentsEduc [1/0]		0.053***		0.046***		0.048***		0.05***
		(0.001)		(0.001)		(0.001)		(0.001)
LnDebt		0.006***		0.006***		0.007***		0.007***
		(0.000)		(0.000)		(0.000)		(0.000)
Obs.	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	0.175	0.186	0.177	0.186	0.176	0.183	0.175	0.182
Prob > chi2:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table C-2: Additional analysis – Age brackets

Column (1): baseline model including individual-level controls with age brackets (Ch. 3.1.3). Column (2): Extended with interaction terms for Financial Literacy jointly estimated. Baseline category omitted (DVT). The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. Standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Likelihood of participating	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit x Age [28-37]		-0.010		0.059***		0.067***		0.057***
		(0.013)		(0.013)		(0.013)		(0.013)
FinLit x Age [38-47]		-0.089***		0.009		-0.017		0.004
		(0.013)		(0.013)		(0.012)		(0.013)
FinLit x Age [48-57]		-0.095***		0.032***		0.034***		0.031**
		(0.013)		(0.012)		(0.012)		(0.013)
FinLit x Age [58-67]		-0.019		0.064***		0.069***		0.065***
		(0.014)		(0.014)		(0.014)		(0.015)
FinLit [1/0]	0.411***	0.462***	0.355***	0.322***	0.332***	0.303***	0.334***	0.304***
	(0.004)	(0.011)	(0.004)	(0.010)	(0.003)	(0.010)	(0.003)	(0.011)
Age [28-37]	-0.074***	-0.075***	-0.031***	-0.034***	0.031***	0.027***	0.069***	0.066***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Age [38-47]	-0.099***	-0.096***	0.023***	0.024***	0.132***	0.134***	0.173***	0.174***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Age [48-57]	-0.140***	-0.136***	0.027***	0.026***	0.169***	0.167***	0.227***	0.226***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Age [58-67]	-0.150***	-0.149***	0.028***	0.026***	0.208***	0.205***	0.284***	0.281***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	0.186	0.186	0.186	0.186	0.184	0.184	0.182	0.182
Prob > chi2:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table C-3: Additional analysis – Wealth brackets

Column (1): baseline model including individual-level controls with wealth brackets (Ch. 3.1.3). Column (2): Extended with interaction terms for Financial Literacy jointly estimated. Baseline category omitted (DVT). The dependent variable is Likelihood of participating [1/0], whether the entity holds any value > 0 in risky financial assets. Standard errors reported in parenthesis. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Likelihood of participating	**2020**		**2017**		**2014**		**2011**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
FinLit x LnWealth [25,50)		-0.029**		0.029*		0.007		0.024
		(0.015)		(0.015)		(0.015)		(0.015)
FinLit x LnWealth [50,75)		-0.094***		0.002		-0.056***		-0.025*
		(0.014)		(0.015)		(0.014)		(0.015)
FinLit x LnWealth [75,99)		-0.081***		0.013		-0.032**		-0.019
		(0.014)		(0.014)		(0.014)		(0.014)
FinLit x LnWealth [99,100]		-0.055		-0.060		0.042		0.013
		(0.068)		(0.052)		(0.040)		(0.041)
FinLit [1/0]	0.398***	0.461***	0.343***	0.331***	0.318***	0.346***	0.327***	0.337***
	(0.004)	(0.012)	(0.004)	(0.013)	(0.003)	(0.013)	(0.003)	(0.013)
LnWealth in [25,50)	0.888***	0.888***	0.877***	0.876***	0.844***	0.844***	0.854***	0.852***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
LnWealth in [50,75)	1.233***	1.236***	1.209***	1.209***	1.155***	1.158***	1.122***	1.123***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LnWealth in [75,99)	1.612***	1.615***	1.584***	1.584***	1.486***	1.487***	1.438***	1.439***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LnWealth in [99,100]	2.836***	2.837***	2.704***	2.711***	2.562***	2.549***	2.507***	2.503***
	(0.019)	(0.020)	(0.016)	(0.017)	(0.015)	(0.017)	(0.015)	(0.017)
Base controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	2 813 780		2 790 720		2 736 942		2 663 591	
Pseudo R^2	0.173	0.173	0.174	0.174	0.172	0.172	0.169	0.169
Prob > chi2:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000