ERASMUS UNIVERSITY ROTTERDAM

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Bachelor Thesis

[International Bachelor Economics and Business Economics]

How does financial literacy influence entrepreneurship in the Netherlands?

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1 Introduction

Entrepreneurship is an important contributor to productivity, job creation, and economic growth (Zoltan, 2006). Therefore, this is a highly relevant topic for all economies, whether developing or developed. Rumelt defined entrepreneurship as the creation of new ventures that entail an element of novelty (2005). This links with Schumpeter's theory of creative destruction which refers to the process of innovations disrupting an existing market and replacing the old (Reinert & Reinert, 2006). Hence, suggesting that successful entrepreneurial activity is not a simple task, as individuals must be able to develop a product or service which is new and an improvement to existing products. This raises the question, if entrepreneurship is greatly important for economic growth and development, what can countries do to boost entrepreneurship?

Governments can influence entrepreneurship by creating favorable general conditions for new businesses with the use of macroeconomic policies, business regulations, and competition policies. Monetary and fiscal policies, labor regulations and competition policies create and maintain a stable economic environment that is desirable for new businesses to grow. Alternatively, providing direct support through the use of financial aid, education and training can influence the entry and performance of entrepreneurs. This paper focuses on the educational aspect of direct support. Existing literature has produced mixed opinions on whether education positively or negatively impacts entrepreneurship, with some literature suggesting entrepreneurship can be taught while others claiming it cannot. Huber et al (2014) found a direct negative effect of entrepreneurship education on entrepreneurial intention. While Garavan & O′Cinneide (1994) concluded that educational programs were most effective when a specific target population is chosen, there is a balance in learning strategies, and additionally, there is a facilitator who can fulfill multiple roles. Having said this, this paper will focus specifically on the concept of financial literacy.

Financial literacy has a wide range of various definitions. The President's Advisory Council on Financial Literacy (PACFL) defines financial literacy as "the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being" (Hung et al, 2009). Financial literacy has become a popular topic as there is concern for low global financial literacy, and the socioeconomic consequences that may proceed. Brophy and Schulman (1992) suggests an increasing importance of financial theory in the success of entrepreneurs. Additionally, financial literacy has been seen to alter behavior in individuals, resulting in improved retirement planning as they grow older (Lusardi and

Mitchell, 2011). This paper investigates whether financial literacy will potentially have other influences on individual behavior, more specifically looking at whether it impacts the likelihood of an individual engaging in entrepreneurship. Therefore, the central question this paper aims to answer is the following:

Research question: To what extent does financial literacy influence the level of entrepreneurship in the Netherlands?

Majority of the papers which examine this relationship in a specific country look at developing countries in Africa, such as South Africa, Kenya, and Nigeria. Therefore, this paper extends current literature by examining the relationship between financial literacy and entrepreneurship in the Netherlands, a developed country. According to Lusardi (2019), financial literacy rates are found to have the greatest impact on the Dutch population with regard to making financial decisions. Therefore, the Netherlands is an interesting country to examine the impacts of financial literacy and this paper can be seen as academically relevant. Furthermore, this paper aims to provide insight to policymakers and managers with regards to whether it is effective for the Netherlands to reallocate some of its resources towards financial literacy education as a way to boost entrepreneurship in the economy. Additionally, suggesting specific groups to target where this relationship may be the strongest.

2 Literature Review

Financial literacy is growing in importance as it is linked with economic stability and development by ensuring individuals have a proper understanding of how to optimally utilize banking systems (Lusardi and Mitchell, 2014). As mentioned above, there is no consensus on the definition of financial literacy. Therefore, scholars, policymakers, financial experts, and consumer advocates have been using the term loosely to depict an individual's knowledge, skills, confidence, and motivation to efficiently manage money (Remund, 2010). Due to this, a wide range of varying conceptual definitions of financial literacy is present in the existing literature. Remund (2010) aims to dissect the various definitions and measurements of financial literacy and formulate a more precise, concise, and generally accepted definition which will allow more effective analysis and insights into the topic for future researchers. Remund concluded the following definition "Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions". PACFL's definition of financial literacy is provided above. According to

Huston (2010), financial literacy can be defined as measuring how well an individual can understand and use personal finance-related information. The difference between these three definitions is that PACFL and Remund include the aspect of longevity and planning for both the short and long run, while Huston does not. Lastly, the Organization for Economic Co-operation and Development (OECD) defines financial literacy as the knowledge, understanding of financial concepts and risks, as well as the risks, motivation, and confidence in applying this knowledge to make effective decisions in differing financial contexts, improving the financial well-being of individuals and society, and enabling participation in economic life (Lusardi, 2019). The OECD, Remund and PACFL have similar definitions and thus this paper will follow the definition of the OECD.

Due to the lack of clarity in the definition of financial literacy, the process of measuring financial literacy is difficult and there are various approaches to consider. Huston (2010) performed analysis and gained insights into the measurement of financial literacy by cross-examining 71 existing studies. From this analysis, Huston found there to be four similar content constructs that were relevant for a reliable measurement of financial literacy. These four content constructs include money basics, borrowing, investing, and protecting resources. Furthermore, roughly nine out of every ten studies did not include an indicator for whether an individual is considered financially literate, but rather provide a financial literacy score relative to other individuals. Lusardi has contributed an abundant amount of literature to the topic of financial literacy. Specifically, in 2004 Lusardi and Mitchell (2019) created the "Big Three" survey questions to formulate a simplified yet accurate measurement of individuals' financial literacy. This survey consists of only three questions aimed to cover three aspects of financial literacy, examining an individual's knowledge on interest rates, inflation rates, and risk diversification. Therefore accounting for three of the four content constructs identified by Huston (2010). The Big Three survey has been found to be a reliable approach to measure financial literacy, ensuring that the main aspects are accounted for. Additionally, due to its simplicity, it has been used on a global level, allowing for country comparisons. However, its simplicity also raises some issues as the accuracy of measurement can be questioned. According to Kim and Mueller (1978), an accepted approach is that each content construct should contain three to five items. Therefore, Lusardi does not meet this condition, yet the Big Three survey has been recognised internationally.

Similar to financial literacy, entrepreneurship does not have a consensus for its definition as well as its method of measurement. Gartner (1988) defines entrepreneurship as the creation of organizations, in other words creating a new venture where there was no business before. Schumpeter however, refers to

entrepreneurship as the creative activity of the innovator (Hagedoorn, 1996). This differs from Frank Knight's definition of entrepreneurship, who focused on the aspect of risk and uncertainty when defining entrepreneurs as individuals that create profitable opportunities in uncertain environments combined with elements of risk (Brouwer, 2002). Harvard Business School defines entrepreneurship as the pursuit of opportunity beyond resources controlled (Eisenmann, 2013). This definition suggests three elements that need to be in place for entrepreneurship to take place. Firstly, "pursuit" demonstrates the personality characteristics of the individual which depict motivation and drive. Secondly, "opportunity" refers to the skill to notice business opportunities to make profit. Lastly, "beyond resources controlled" refers to resource constraints faced, meaning that entrepreneurs don't have unlimited resources to begin their new venture. Therefore, we see a wide range of different definitions that all focus on certain aspects such as innovation, uncertainty, opportunity seeking and risk. Iverson, Jorgensen and Malchow-Moller (2007) suggest that entrepreneurship must be a multifaceted definition which accounts for different empirical measures in order to capture different aspects of entrepreneurship. Therefore, in this paper I will be using the Harvard Business School definition of entrepreneurship. Moreover, similarly to financial literacy, entrepreneurship is difficult to measure as it is a complex concept with various different aspects to consider. Having said this, what is the relationship between financial literacy and entrepreneurship? Does higher levels of financial literacy lead to increased entrepreneurship?

Existing literature suggests mixed results as both positive significant relationships as well as non-significant relationships are seen between financial literacy and entrepreneurship. Oseifuah (2010) concluded a positive relationship between the two variables in South Africa, and suggested that financial education would be beneficial for development of small, medium sized enterprises in South Africa. Similarly, Wise (2013) suggests that higher financial literacy rates leads to more financial statements being produced within firms, which results in a lower rate of failure for entrepreneurs. Additionally, Ćumurović and Walter Hyll (2018) demonstrate a greater probability of being self-employed when you are more financially literate. They also claim that since financial literacy is something that can be trained and acquired, financial literacy education could boost entrepreneurial activity.

Conversely, several studies indicate no relationship between entrepreneurial education and entrepreneurial skills and activity, therefore counteracting the previous studies conclusions. Oosterbeek, Praag, and Ljsselstein (2010) conducted a study where they examined the impact of an entrepreneurship education program on University students. In this study they found an insignificant relationship between the program and individuals entrepreneurship skills, while a negative effect on entrepreneurial motivation.

Furthermore, participants of a financial course did not portray higher financial literacy when examined 1-4 years after taking the course, compared to non-participants (Mandell and Klein, 2009). These two studies suggest that financial literacy cannot necessarily be taught and does not have the intended effect on financial behavior and entrepreneurial activity.

3 Hypotheses

Based on the existing literature mentioned above, a positive relationship between financial literacy and entrepreneurship is expected. Therefore, the following two hypotheses were formulated.

Hypothesis 1: *An increase in financial literacy will increase the likelihood an individual is an entrepreneur.*

Individuals who obtain greater financial literacy exhibit tendencies to know where to invest, how to save, find profitable opportunities and utilize the banking system (Lusardi & Mitchell, 2014). Entrepreneurs must be creative in coming up with ideas, however they must also be smart and precise with how they conduct their business idea. Therefore, the ability to be financially intelligent and allocate your resources efficiently is just as important to become a successful entrepreneur. According to Wise, entrepreneurs who create consistent financial statements have a higher chance of survival as a new venture (2013). Hence, the first hypothesis predicts that an increase in financial literacy will increase the likelihood an individual is an entrepreneur.

Hypothesis 2: *The positive relationship between financial literacy and entrepreneurship will be stronger for men.*

Significant differences are present between the financial literacy levels between genders. Lusardi and Mitchell (2011) claim that women consistently score lower than men on financial literacy on a global level. This difference can be caused by a wide range of different factors including socioeconomic status, political regime in a country and additionally, it could be due to different characteristics between men and women. For instance, Zhao and Seibert (2006) examined the relationship between personality and entrepreneurship by comparing the big five personality dimensions between entrepreneurs and managers. Here they found significant differences in four dimensions, where entrepreneurs scored higher for conscientiousness and openness to experience, while lower on neuroticism and agreeableness. Weisberg,

DeYoung and Hirsh (2011) concluded that women scored higher than men for agreeableness and neuroticism on average. Therefore, by combining the findings present in these two papers, I expect there to be personality differences between men and women which may lead men to be more inclined to pursue entrepreneurship. Hence, explaining the formation of my second hypothesis.
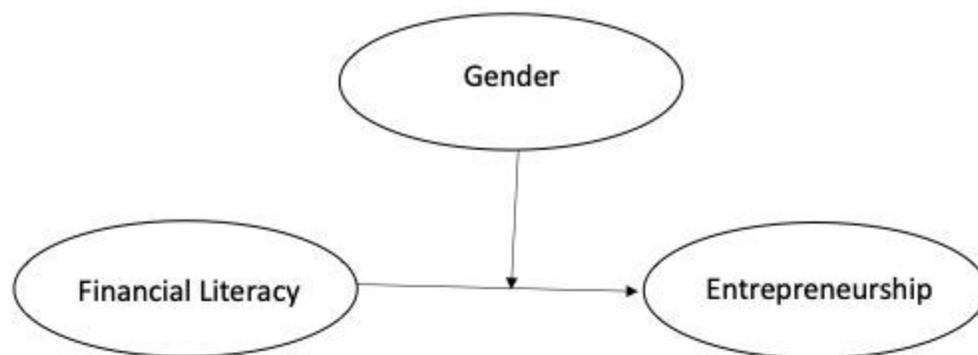
Figure 1. Conceptual Model

Figure 1 provides a visual representation of the model to be used for this study. The influence of financial literacy on entrepreneurship will be examined. Financial literacy acts as the independent variable, entrepreneurship as the dependent variable and gender as the moderating variable.

4 Data Collection

This study is based on three single wave survey datasets, collected from LISS Panel Data. The three survey datasets are titled: Financial Literacy, Entrepreneurship and Background Variables. LISS Panel Data consists of 5,000 Dutch households and roughly 7,500 Dutch individuals. It collaborates with Statistics Netherlands and provides a reliable Dutch population which can be used for conducting surveys. The survey questions are divided into constructs that are designed to represent relevant variables and are backed by existing literature.

4.1 Entrepreneurship Survey

The entrepreneurship survey is a single wave study conducted in 2018, where the survey is divided into four constructs which aim to represent an individual's propensity to be an entrepreneur. The first construct

contains one question regarding an individual's risk aversion and is based on a paper by Dohmen et al (2011), which studies how to best measure risk. According to Caliendo, Fossen, and Kritikos (2009), an individual's willingness to take risks is positively correlated with an individual's probability of becoming an entrepreneur. Therefore, this is an important construct to measure when estimating an individual's likelihood to become an entrepreneur.

The second construct follows the findings of Coleman and DeLeire (2003), and measures an individual's Locus of Control, which refers to the degree someone believes that rather than external forces, they themselves are in control of the outcomes in their lives. Coleman and DeLeire, conducted a study where they compared the Locus of Control in entrepreneurs and non-entrepreneurs. Their results concluded significant differences between the two groups in both internal locus of control as well as risk-propensity, where entrepreneurs scored higher for both variables. Therefore, considering an individual's locus of control is a vital aspect in determining the likelihood to engage in entrepreneurship.

The third construct is intrapreneurship, which refers to the act of entrepreneurship within an existing organization. Ireland, Hitt and Sirmon (2003) suggest that intrapreneurship is becoming of great importance for existing organizations to successfully innovate and adapt to quickly changing environments. They discuss how small entrepreneurial ventures are extremely effective at being creative and innovative to find opportunities for wealth, however they are not able to develop competitive advantages. For larger existing firms, it is the opposite. They have abundant resources to establish strong competitive advantages, however they lack the creativity to innovate. Therefore, intrapreneurship is a vital component of entrepreneurship. The intrapreneurship questions in the survey are based on Gawke, Gorgievski, and Bakker (2017) measurement of employee intrapreneurship, consisting of eight questions.

The last construct is support for innovation, which measures the extent to which an individual's innovative behavior is supported in the current organization they are in. Here, the questions look at whether the individual is working in an environment which encourages new ideas and creativity. This construct is adapted from Lukes and Stephan (2017), who found manager support to be the most important factor influencing employee innovation. These four constructs combine to formulate a measurement that represents an individual's propensity to engage in entrepreneurial activity (be an entrepreneur).

4.2 Financial Literacy Survey

The financial literacy survey was conducted in 2011 and consists of four scenario based questions. As mentioned earlier, in 2004, Lusardi and Mitchell designed the "Big Three" survey, which is aimed specifically at measuring an individual's financial literacy. The "Big Three" survey is recognised internationally and is a simplistic survey that consists of three basic financial questions, covering an individual's understanding of inflation, interest rates and risk diversification. The LISS Panel Data survey utilizes this Big Three survey within the four scenario based questions, therefore it can be seen as a reliable measure of financial literacy. The survey is based on four grounding principles: simplicity, relevance, brevity and capacity to differentiate (Lusardi, 2019). Simplicity ensures that the fundamental building blocks of decision making is measured in an intertemporal setting (Lusardi, 2019). Relevance states that the questions should relate to an individual's day to day financial decisions over a life cycle (Lusardi, 2019). Brevity ensures that there is an appropriately low number of questions which will allow for widespread adoption (Lusardi, 2019). Lastly, capacity to differentiate means that the questions must differentiate with regards to the financial knowledge in a way that allows for comparisons to be made across people (Lusardi, 2019).

4.3 Background Variables Survey

The background variables survey is answered by all LISS panel data participants and gathers background information such as age, income, occupation, urban residency, education, gender, and household structure for each participant. This survey is conducted on an annual basis where participants answer both categorical and open ended questions, depending on the variables. This survey is essential for my study in order to include control variables. Previous literature suggests financial literacy could be influenced by various factors such as education, age, education, urban residency, income, and gender. Age and income are open ended questions, while education, urban residency and gender are categorical. This survey is a longitudinal study, meaning that individuals respond on an annual basis ensuring the most recent and accurate values. If there are multiple individuals in the same household, one member is responsible for answering the questions for all members of the household.

4.4 Measuring Financial Literacy

Financial Literacy is measured based on four scenario based questions testing on several financial areas including interest rates, inflation and risk diversification. An individual's financial literacy score ranges from 0-4 and is dependent on how many of the four questions they answer correctly, zero meaning all answers were incorrect and four indicating all answers were correct.

Financial Literacy → 0/0 → 1/4 → 2/4 → 3/4 → 4/4

Measuring the Cronbach alpha score for this variable is not appropriate as the financial literacy score depends on how many of the four questions are answered correctly. Each question tests a different topic of financial literacy, therefore there should not necessarily be a clear relation between the questions.

4.5 Measuring Entrepreneurship

The entrepreneurship survey consists of seventeen questions, and is divided into four different constructs: risk aversion, locus of control, intrapreneurship and support for innovation. They survey consists of differing likert scales, therefore, each question was re-scaled to a standardized value using the formula by Preston and Colman (2000): (rating−1)/number of categories−1) × 100. By summing up all these values, a final entrepreneurship score was created for each individual. The entrepreneurship score represents an individual's propensity to be an entrepreneur, and has been standardized in a way where the entrepreneurship score of an individual ranges from 0-10. The support for innovation construct consists of eight questions, five of which were only to be answered if you had a manager at work. Therefore, the final entrepreneurship score of each individual does not include the score of these five managerial specific questions, in order to eliminate differences between the two groups.

Cronbach alpha provides an internal consistency estimate of a test, and results in a score ranging between 0 and 1 (Brown, 2002). Internal consistency provides insight into the extent to which all the items in a test measure the same concept or construct and is important to prove validity within a study (Tavakol & Dennick, 2011). In other words, it is a test to examine the extent to which a set of questions are reliable in order to measure a certain concept, which in this case is entrepreneurship. In total, there were 4 constructs and 17 different questions which were used to estimate entrepreneurship. The Cronbach alpha score for these 17 questions is 0.84. According to Cortina (1993), the acceptable score is above 0.7 and hence, the constructs and questions used to estimate entrepreneurship can be seen as reliable. Tavakol and Dennick (2011) however suggest to additionally perform a cronbach alpha test on each construct of a concept, in case the number of questions is too large. Therefore, I have performed this test on the three of the four constructs that form entrepreneurship, which include: locus of control, intrapreneurship and support for innovation. Risk is the fourth construct, however cannot be tested as it only includes one question. The resulting cronbach alpha scores for the three constructs are 0.74, 0.93 and 0.75, respectively. Therefore, it

can be seen that the cronbach alpha scores measured on both the three individual constructs, as well as entrepreneurship as a whole are reliable.

4.6 Sample Population

In order to combine the three surveys into one usable dataset, only individuals who answered all the surveys fully are included. The financial literacy survey was conducted in 2011 while the entrepreneurship survey in 2018. However, the mean age of the respondents in 2011 was 41 years of age, and it is assumed that an individual's financial literacy level will not vary greatly between the ages of 41(2011) and 48(2018). After removing individuals who did not answer all the relevant questions used in my study, these three surveys provide a large and reliable sample of the Dutch population consisting of 1,027 individuals.

Table 1. Summary of descriptive statistics for IV and DV variables in the dataset.

Variable	Mean	Min	Max	Std. Dev.	Observations
Financial Literacy	2.44	0	4	1.05	1,027
Entrepreneurship	5.02	1.19	10	1.43	1,027

Note: This Table provides a summary of the descriptive statistics for the independent and dependent variable in the sample population.

Table 2. The mean values of Background variables for the of LISS panel except the individuals in my sample population

Variable	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs
	Subset Sample			**Rest of the Panel**		
Age	41.71	10.98	1,027	39.56	22.46	10,488
Income(Log)	7.63	2.71	1,027	7.46	0.84	6,646
Urban Residency	3.08	1.27	1,027	2.95	1.27	10,424
Education	4.11	1.31	1,027	4.36	2.38	10,485
Gross_Income	2,547.81	1,464.27	1,027	1,669.79	5,025.23	9,859

Note: This Table indicates the descriptive statistics for the remaining relevant variables in the sample population(subset sample) and the remaining individuals in LISS panel data that were not included(rest of the

panel). Providing the descriptive statistics on both allows for comparisons to be made and conclusions on whether the subset sample is a valid representation of the entire LISS panel population.

Table 1 and 2 present the descriptive statistics for all the relevant variables in the dataset. The average financial literacy level is 2.44 out of 4, whilst the average entrepreneurship level is 5.02 out of 10. Based on Table 2, the average individual in the dataset embodies the following characteristics: 41 years of age, obtained secondary vocational education(MBO), lives in a moderately urban area, and lastly has an income of 2,547(Euro). However, due to *Gross_Income* containing individuals with gross income of 13,000 whilst the mean value is 2,574.81, the variable is transformed into a logarithmic variable in order to reduce any potential skewness in the data caused by outliers. Therefore, the variable *Income* is generated to represent the gross personal monthly income as a logarithm and has a mean value of 7.63. This is the variable which will be used when referring to the individual's income.

Table 2 indicates the mean background variables of the individuals included in the study(*subset sample*) as well as the remaining individuals in the LISS panel population that were not included in the study(*rest of the panel*). This is due to the fact that only individuals that answered both surveys were included. From Table 2, we can see that the average background values of individuals chosen for my study do not differ greatly from the rest of the LISS population. However, in Appendix 16, a t-test is performed in order to compare the difference in means of our two populations and determine whether they are significantly different. Based on the t-test, there is a statistically significant difference between the mean values of the subset sample and the rest of the panel for all descriptive variables. Therefore, my subset sample population does not precisely represent the rest of the LISS panel population. Potential reasons for this are mentioned in the discussion section.

4.7 Control variables and how they were measured

Table 3 below outlines each control variable selected and provides an explanation as to how it was measured.

Table 3. Control variables and their measurement

Control Variable	Measurement
Age	Participants input their date of birth
Income	Individuals can input their gross monthly income. If not provided, LISS

	estimates this value based on the participants answers to various other income questions with categorical answers.
Education	Participants have 7 categorical options to indicate what their highest level of education is. 1) Primary School… 7) University degree
Urban Residency	Participants choose the urban residency which best indicates their current place of residence. Urban residency is defined as the population density per km2. The categorical options include(5 levels): 1) not urban (<500 individuals per km2) 2) slightly urban (between 500 to 1,000 individuals per km2) 3) moderately urban (between 1,000 to 1,500 individuals per km2) 4) very urban (between 1,500 to 2,000 individuals per km2) 5) extremely urban (2,500 individuals or more per km2)

Note: This Table mentions each control variable used and how they were measured in the survey data.

4.8 Mean Values of IV and DV based on Gender

Table 4. Mean values of financial literacy for men and women

	Men	**Women**
Financial Literacy	2.70	2.15
Entrepreneurship	5.19	4.83
Observations	538	495

Note: This Table indicates the difference of the mean values for the independent and dependent variable when separating the sample population based on gender.

Table 4 represents the mean values of financial literacy and entrepreneurship for men and women in my sample population. The reason for this is to highlight the existence of a gender gap for both financial literacy and entrepreneurship, supporting the claim of Lusardi (2011) and creating a foundation for my second hypothesis. As can be seen in Table 4, men have a substantially higher financial literacy level, as well as propensity to be entrepreneurs when compared to women. Men have a financial literacy score of 2.70 out of 4 and 5.19 out of 10 for entrepreneurship. Whilst for women these scores are 2.15 and 4.83, respectively.

5 Methodology

5.1 Cross-Sectional Regression

The surveys used are single wave studies rather than longitudinal studies, meaning that an analysis can only be made on individuals over a specific period of time. Due to this, a cross-sectional analysis is appropriate, rather than a panel data analysis. Financial literacy and entrepreneurship are variables which are difficult to measure and can be subject to measurement error. Therefore, it is suitable to use robust and reliable survey data from LISS panel data where the questions are designed specifically for these topics and are additionally backed up by existing literature. Furthermore, in order to produce reliable conclusions, it is necessary to have a sample which is large and representative. Larger sample sizes are desirable as they provide a more representative sample, and improves the accuracy of the mean values by reducing the impact of potential outlier. This will ensure an increase in the power of the study, ensuring more reliable results and conclusions. Therefore, an OLS regression is appropriate to examine the relationship between financial literacy and entrepreneurship.

Firstly, a comparison of means analysis will be conducted in order to understand the general relationship between the two variables. Following this, multiple OLS regressions will be performed to further investigate the relationship between financial literacy and entrepreneurship. The background variables survey is used to control for observables such as age, education, income and urban residence. These are variables which aim to control for the observable differences between individuals with varying financial literacy levels, as well as propensity to engage in entrepreneurship. Including too many control variables can lead to "noise" in the model, resulting in an unrealistic estimation. Using multi-linear regression, will typically not be able to account for all observable and unobservable factors, hence leading to omitted variable bias(OVB) and violating the conditional independence assumption(CIA). However, since this paper is examining whether there is an association between these two variables, finding correlations is adequate and there is no need to find causality. Therefore, this paper attempts to build a foundation for further research by indicating reliable conclusions regarding the associations between these two variables, allowing for additional studies to examine for causality. Moreover, Lusardi and Mitchell (2011) find that women are consistently scoring lower than men on financial literacy on a global level. Therefore, gender will be used as a moderator for this regression, examining the relationship between financial literacy and entrepreneurship while accounting for the interaction term between financial literacy and gender.

5.2 Control variables and why they are included

In this section I discuss the control variables included in the OLS regressions and why they were chosen. Control variables should be included if they correlate with both the independent and dependent variable. Additionally, it must be ensured that mechanisms and colliders are not included, meaning that variables which are created by the independent variable and goes on to affect the dependent variable should not be included. Moreover, variables that are a consequence of the independent variable and dependent variable should not be included either. Therefore, the control variables included are: age, income, education and urban residency. Older individuals have had more time to become both financially literate and entrepreneurs, therefore including age is important as it controls for differences that might be prevalent between individuals. Education is important to consider as individuals with higher education would have had more opportunities to learn financial concepts and improve their financial literacy. Furthermore, individuals with higher income would have the resources to try and become entrepreneurs without being victim to the same level of stress as individuals who are worse off financially. Lastly, urban residency is important as individuals living in urban areas might have differing exposure to business opportunities and financial concepts when compared to those living in rural areas. The control variables selected have been used in previous literature when studying associations of financial literacy (Garg & Singh, 2018).

Analyzing the correlations of each control variable will allow us to understand the potential positive or negative impact each control variable has on our results. Appendix 1 indicates a positive relationship between age and financial literacy, while Appendix 2 illustrates a clear negative relationship between age and entrepreneurship. Therefore, as age increases, financial literacy increases with it while entrepreneurship decreases. This means when age is considered as a control variable, the original relationship between financial literacy and entrepreneurship will increase as a result.

Appendix 3-6 shows us that education and income have a positive relationship with both the independent/dependent variables. This means that as an individual's education and income level increases, their financial literacy and entrepreneurship levels increase simultaneously. Therefore, by controlling for these two variables, the original relationship between the independent/dependent variable will be reduced.

Appendix 7 and 8 demonstrate the relationship between Urban residency and the independent/dependent variable. Here, we see that there is a volatile and unclear correlation between urban residency and the two variables. Therefore, the outcome by controlling for urban residency is not predictable using these Figures.

6 Results

6.1 Difference in means comparison

Before considering the relevant control variables and moderating variables, the mean Entrepreneurship and 95% confidence interval at each level of financial literacy is compared and represented below in Figure 2. From Figure 2, it is evident that the mean entrepreneurship decreases slightly between financial literacy level 0 to 1, however proceeds to increase rapidly for all financial literacy level's between 1 to 4. Therefore, indicating that there is a clear positive relationship between financial literacy and an individual's level of entrepreneurship. The 95% confidence interval bars indicate that at a financial literacy level of 0, there is a wider parameter between the intervals, when compared to the other financial literacy levels. Hence, indicating a wider variety of entrepreneurship scores for individuals at financial literacy level 0. The most narrow and precise parameters are at financial literacy level 2 and 3, suggesting the most precise mean values.

Figure 2. Mean Entrepreneurship for each level of financial literacy.

95% confidence intervals
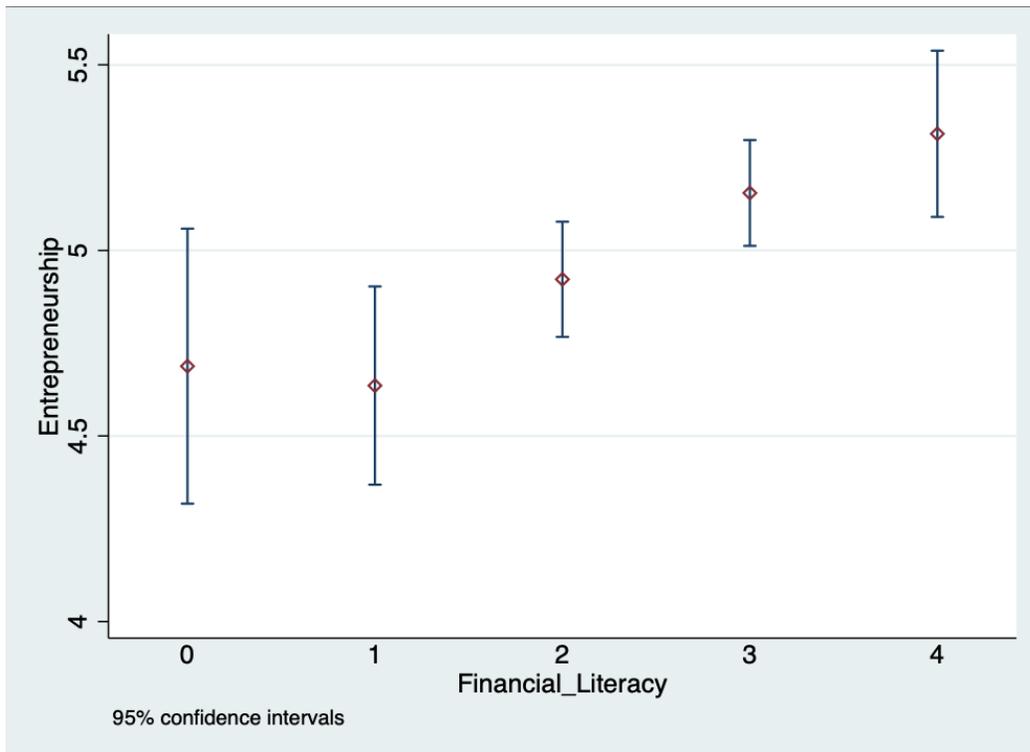
Note: Figure 2 represents the mean values of entrepreneurship at each financial literacy rate as well as includes the 95% confidence intervals for each mean.

6.2 OLS Regression between financial literacy and entrepreneurship

An OLS regression was performed in order to test for hypothesis 1. The regression equation is shown below:

$$Entrepreneurship = \beta_0 + \beta_1 Financial\_Literacy + \epsilon \qquad (1)$$

From equation (1), we see entrepreneurship as the dependent variable, β_0 representing the constant, β_1 indicating the coefficient of financial literacy and lastly, ϵ representing the error term.

Table 5. Regression results of financial literacy on entrepreneurship

Entrepreneurship	(1)	(2)
Financial Literacy	0.198***	
	(0.042)	
1		-0.052
		(0.232)
2		0.234
		(0.208)
3		0.467*
		(0.206)
4		0.626**
		(0.224)
Constant	4.535***	4.688***
Observations	1,027	1,027

Note: Table 5 indicates the OLS regression results for two separate models. Model (1) represents the initial relationship between financial literacy and entrepreneurship when not considering any control variables. While model (2) indicates the OLS regression results for each level of financial literacy on entrepreneurship. The * signs represent the statistical significance of each coefficient. (*** $p<= 0.001$, **$p<= 0.01$, *$p<= 0.05$)

In the first regression in Table 5 (1), financial literacy as a whole is regressed on entrepreneurship. Here, we see that financial literacy has a positive coefficient of 0.198 and is furthermore statistically significant with a P-value of 0. In the second regression (2), we see the coefficients of each financial literacy level on entrepreneurship. In this column, it is evident that each financial literacy level has a positive coefficient

except financial literacy level 1. Additionally, the coefficients increase significantly with each financial literacy level. Financial literacy level 1 has a negative coefficient of -0.052, while financial literacy level 2 has positive coefficient of 0.234. However, neither financial literacy level is significant. Financial literacy level 3 and 4 on the other hand have substantially higher positive coefficients of 0.714 and 0.821, respectively. Additionally, both of these coefficients are highly significant with a P-value of 0. Using column (2), we see that as an individual's financial literacy level increases, the effect size this has on the individual's entrepreneurship increases significantly as well. Therefore, Table 3 corresponds directly with the positive relationship present in Figure 2, however, several issues are present with the current model. Firsty, the R-Squared value is 0.0224, meaning that only 2.24% of the relationship between the two variables is explained by the model. Secondly, a significant conclusion cannot yet be concluded due to OVB occurring, meaning there can be other variables causing entrepreneurship to increase rather than solely financial literacy. Hence, in order to reduce OVB, control variables and moderators need to be considered when examining the correlation between the two variables.

6.3 OLS Regression with control variables

Following the previous regression, a new OLS regression is conducted however now considering control variables. The regression equation is the following:

$$Entrepreneurship = \beta_0 + \beta_1 Financial\_Literacy + \beta_2 Income + \beta_3 Education +$$
$$\beta_4 UrbanResidency + \beta_5 Age + \epsilon \qquad (2)$$

Table 6 provides the regression results for five separate models, where in each model a new control variable is included. This shows the relationship between the independent variable and the dependent variable when additional control variables are considered. All variables are treated as continuous, as Robitzsch (2020) suggests that ordinal items can be treated as continuous as long as there is a natural progression between responses. The control variable education consists of a categorical response from 1-7, however there is a clear natural progression where 1 is the lowest form of education and 7 is the highest, and therefore education is treated as continuous.

In Table 6, it is evident that the coefficient of financial literacy reduced significantly from 0.198 in the first regression (1) to 0.142 in the last regression (5) when all control variables are considered. Majority of the variables included in the model have a positive coefficient, except for age and urban residency which have a negative coefficient. However, in the final regression (5), urban residency and education are not significant whilst financial literacy, age and income are highly significant. The new coefficient provides a

more realistic and reliable correlation between financial literacy and entrepreneurship as the rest of the variables are held constant throughout the regression. The model suggests that as financial literacy increases by 1, an individual's entrepreneurship level increases by 0.142 rather than 0.198 as was initially estimated in column (1). Moreover, the R-squared value has increased to 0.0776, meaning that 7.76% of the relationship between the two variables is explained by the model. In order to test for heteroskedasticity, a Breusch-Pagan test was implemented on this regression. This resulted in a Chi-Square statistic of 15.17 with 5 degrees of freedom, and additionally a p-value of 0.0096. Since this p-value is less than the 5% significance level, the null hypothesis of homoscedasticity is rejected, and it is assumed that heteroskedasticity is present in the data. This violates the OLS regression assumption that all residuals are extracted from a population with constant variance, and hence reduces the reliability and accuracy of the model. Therefore, the regression in column (5), results in a positive and highly significant relationship between financial literacy and entrepreneurship. However, the presence of heteroskedasticity as well as the low R-squared score contributes to a reduction in accuracy, hence **hypothesis 1 is rejected.**

Table 6. Relationship between Financial Literacy and Entrepreneurship with control variables

Entrepreneurship	(1)	(2)	(3)	(4)	(5)
Financial Literacy	0.198***	0.158***	0.140**	0.141**	0.142***
	(0.042)	(0.044)	(0.045)	(0.045)	(0.044)
Income		0.206***	0.168**	0.172*	0.378***
		(0.061)	(0.064)	(0.064)	(0.073)
Education			0.072*	0.075*	0.037
			(0.037)	(0.037)	(0.036)
Urban Residency				-0.028	-0.038
				(0.035)	(0.034)
Age					-0.030***
					(0.004)
Constant	4.535***	3.058***	3.095***	3.146***	2.987***
Observations	1,027	1,027	1,027	1,027	1,027

*Note: This Table indicates the OLS regression results for financial literacy on entrepreneurship when considering control variables. Model (1) begins with no control variables and with each model a new control variable is included. The * signs represent the statistical significance of each coefficient (*** $p <= 0.001$, **$p <= 0.01$, *$p <= 0.05$)*

6.4 OLS Regression based on different age categories

As seen earlier in Table 6, control variable age was highly significant in the final regression model. Therefore, Table 7 is produced in order to further investigate this relationship by breaking down age into four age categories 16-29, 30-44, 45-59 and 60-70 which separates the relationship into 4 separate regressions. Table 7 indicates that as we move from the younger age groups to the older, the effect size of financial literacy on entrepreneurship decreases significantly. Initially, at age group 16-29, financial literacy has a positive and significant coefficient of 0.255 on entrepreneurship. This coefficient declines rapidly when moving to the following age group of 30-44, where there is a positive yet insignificant coefficient of 0.084. The coefficient further declines to 0.040 in the 45-59 age group and lastly 0.010 in the 60-70 age group. Therefore, the effect size of financial literacy on an individual's entrepreneurship score is strongest for younger individuals falling between the age category 16-29.

Table 7. Relationship between Financial Literacy and Entrepreneurship when considering control variables for individuals of different age groups

Entrepreneurship	Age 16 - 29	Age 30 - 44	Age 45-59	Age 60-70
Financial Literacy	0.255**	0.084	0.040	0.010
	(0.096)	(0.078)	(0.069)	(0.321)
Income	-0.391	0.817***	0.644***	0.547
	(0.130)	(0.175)	(0.048)	(0.249)
Education	0.062	0.088	0.029	-0.542*
	(0.113)	(0.063)	(0.048)	(0.146)
Urban Residency	0.035	-0.055	-0.068	-0.136
	(0.081)	(0.058)	(0.047)	(0.138)
Constant	4.793	-1.759	-0.134	2.972
Observations	173	382	464	8

Note: This Table indicates the OLS regression results for financial literacy on entrepreneurship when considering control variables and additionally separating the sample population by age groups. The sample population has been divided into four age categories 16-29, 30-44, 45-59 and 60-70. The * signs represent the statistical significance of each coefficient. (*** $p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.05$)

6.5 OLS Regression with control variables and gender as the moderator

In order to test our second hypothesis regarding the relationship between financial literacy and entrepreneurship with gender as the moderating variable, we perform an additional OLS regression. The regression equation is the following:

$$Entrepreneurship = \beta_0 + \beta_1 Gender + \beta_2 Financial\_Literacy + \beta_3 GenderFinancial\_Literacy + \beta_4 Income +$$
$$\beta_5 Education + \beta_6 UrbanResidency + \beta_7 Age + \epsilon \qquad (3)$$

Table 8 below indicates the regression results for financial literacy on entrepreneurship when considering control variables and moderating for gender. Using Table 8, Table 9 is produced to highlight the difference in coefficients between males and females for each level of financial literacy and accounts for the interaction term between financial literacy and gender. From doing this, we see that the coefficient for financial literacy is higher in males for all financial literacy levels, except financial literacy level 2. The highest difference in coefficient size between males and females is present in financial literacy level 0, where the difference is 0.502275, while the lowest difference is present in financial literacy level 4 and a difference of 0.160243. Therefore, indicating that the effect size of financial literacy is stronger for men on all financial literacy levels excluding 2. Having said this, each finding except income and age were insignificant with a p-value greater than 0.05.

Table 8. Relationship between financial literacy and entrepreneurship when considering control variables and using Gender as a moderator.

	Coefficient	P-value
Financial Literacy		
1	.022396	0.931
2	.4280696	0.070
3	.4093149	0.089
4	.523932	0.080
Gender (Male)	.5022562	0.205
Financial Literacy*Gender(Interaction Term)		
1#Male	-.1092659	0.825

2#Male	-.5880709	0.167
3#Male	-.2775122	0.506
4#Male	-.3420281	0.460
Income	.3364824	0.000***
Age	-.0282975	0.000***
Education	.0507228	0.177
Urban Residency	-.0341085	0.321
Constant	3.080325	0.000***
Observations	1,027	

Note: This Table presents the OLS regression results for when control variables are included and additionally, gender is used as a moderating variable. The * signs represent the statistical significance of each coefficient. (*** p<= 0.001, **p<= 0.01 , *p<= 0.05)

Table 9. Results of regression using control and gender as the moderating variable (Differences in coefficients based on Gender)

Financial Literacy	**Male**	**Female**	**Difference**
0	3.5826	3.080325	0.502275
1	3.4957	3.102721	0.392979
2	3.4226	3.5083946	-0.0857946
3	3.7144	3.4896774	0.2247226
4	3.7645	3.604257	0.160243
Observations	1,027		

Note: This Table indicates the differences in coefficients calculated in Table 8 between men and women at each financial literacy level.

6.6 OLS Regression with control variables and moderator for different age groups

Further analysis is made with this relationship by dividing the categories into different age groups and performing the same regression for each financial literacy level on entrepreneurship while using gender as the moderator. Therefore, Table 10 and appendix 9-15 were constructed. From this, it is evident that when

considering gender as a moderator, the strongest effect size for males and females is in the age category 16-29. The strongest effect size for males within this age group is seen at financial literacy level 3 with a value of 7.088, while for females at financial literacy level 4 with a value of 6.54. Moreover, the largest difference in coefficients between males and females is 1.173, and is present for this age group at financial literacy level 3. Table 10 indicates that the relationship between financial literacy and entrepreneurship for the age group 16-29 is stronger for males than females at every financial literacy level except financial literacy level 2.

Table 10. Relationship between financial literacy and entrepreneurship when considering control variables and using Gender as a moderator for Age 16-29

Financial Literacy	Male	Female	Difference
0	6.282231	5.231554	1.050677
1	7.0712093	5.9219507	1.1492586
2	6.042447	6.471771	-0.429324
3	7.0875417	5.914765	1.1727767
4	6.8757001	6.535188	0.3405121
Observations	173		

Note: This Table focuses solely on age category 16-29 and indicates the differences in coefficients calculated in Appendix 12 between men and women at each financial literacy level for this age group.

Appendix 9 and 10 represent the age groups 30-44 and 45-59, where we see that females have a higher coefficient than males in the majority of the financial literacy levels. However, most coefficients found in Table 8-10 as well as appendix 9-12 were insignificant (P-value > 0.05), and hence **hypothesis 2 is rejected.**

7 Discussion

There are several limitations present in this which can be useful for future researchers to consider. Firstly, the use of cross sectional data limits the type of analysis able to be performed. It was only possible to establish associations when working with cross sectional data, and hence causality cannot be established. Therefore, an ideal research strategy would include a panel dataset which allows researchers to analyze these two variables over an extended period of time. Furthermore, more in depth analysis can be made as different statistical approaches can be utilized such as difference-in-difference etc. A panel dataset would allow for causality to be established which is far more relevant and significant than an association.

Secondly, the time difference between when the individuals took each survey was a limitation. Individuals took the financial literacy survey in 2011 and the entrepreneurship survey in 2018. Therefore, my study essentially examines the relationship between each individual's financial literacy level in 2011 and how it influences their propensity for entrepreneurship in 2018. This means that it is possible that financial literacy scores differed between 2011 and 2018. However, the mean age of individuals answering the financial literacy survey in 2011 was 41, and therefore my paper is based on the assumption that financial literacy does not vary greatly between the ages 41 and 48. Hence, the accuracy of the analysis is slightly reduced due to the potential variation in financial literacy between 2011 and 2018.

The third limitation is that the measurement of entrepreneurship is very difficult. My study is based on a survey which measures an individual's propensity to become an entrepreneur based on characteristics such as risk aversion, locus of control, intrapreneurship and support for innovation. However, as mentioned in my methodology, there were certain questions which were only to be answered if you had a manager. All participants did not have a manager and therefore I could not include these questions when computing my entrepreneurship score as this would lead to differences in my sample population. Therefore, my measurement of entrepreneurship is susceptible to inaccuracy as not all questions were considered. Furthermore, due to the lack of solidarity with the definition and measurement of entrepreneurship, there is no proven quantifiable method of measuring how likely someone is to engage in entrepreneurship. Hence, the reliability of such a measure will always have the potential for some inaccuracies. Additionally, the dependent variable measured is a propensity score rather than a binary variable indicating whether someone is or should be an entrepreneur. This identifies an area for problem as individuals can have a high propensity to be an entrepreneur and still not become an entrepreneur. This means that even though financial literacy is shown to increase the likelihood of someone engaging in

entrepreneurship, it is not possible to determine whether they do or not actually become entrepreneurs with the current approach of measuring.

Moreover, the inclusion of inappropriate control variables is always a possibility. For instance, one of my control variables is education, however it could be argued that financial literacy is too closely related to education and therefore is not perfectly suitable as a control variable. Adding additional control variables however would require merging more datasets, which would have a significant impact on the sample size. This suggests the likelihood that not all relevant control variables were accounted for, resulting in OVB and a violation of CIA as it is not always possible to attain all the necessary data required.

Furthermore, the intention was to conduct analysis on a population which represents the Dutch population to the most accurate extent and provide statistical evidence for Dutch policy makers and managers to use in their decisions. However, the mean values of my descriptive statistics for my sample population were found to be significantly different from the mean values of the rest of the panel(Appendix 16). This could be due to the fact that I only included individuals that answered all questions in the survey, removing a portion of participants. For instance, a large portion of respondents for the entire LISS panel population did not enter their income levels and subsequently this reduced my sample population to an extent. This could be due to the presence of individuals below the age of 16 who do not yet have an income, or perhaps certain individuals do not feel safe to provide their income. Therefore, suggesting the potential for inherent differences between the individuals who are included in my subset sample compared to those who were not. This is a limitation for my study in terms of accuracy and generalizability.

Lastly, due to the nature of my independent variable, financial literacy, there can be reliability problems regarding the randomisation of assignment. Financial literacy is not a variable that can be randomly assigned to individuals and participants, but rather something that is more innate. Therefore, it influences reliability as there is no clear control group, and additionally it allows there to be countless potential variables that should be controlled for however I may have not included in my study. For instance, an individual's socioeconomic status and family background influences their financial literacy level and its dimensions (Garg & Singh, 2018). Therefore, a potential other confounding factorUsing an independent variable where there is the possibility of random assignment is immensely useful with regards to eliminating confounding variables and improving the accuracy of your study.

8 Conclusions

This paper examines the relationship between financial literacy and entrepreneurship in the Netherlands. With the use of the LISS panel datasets, three surveys were merged based on a personal ID, resulting in 1,027 individuals studied. By doing this, I was able to analyze the extent to which financial literacy impacts an individual's propensity to be an entrepreneur. Two hypotheses were developed based on the mentioned relationship. The hypotheses were tested using cross sectional analysis, with the use of several regressions and a moderating variable.

Hypothesis 1 stated that there is a positive relationship between financial literacy and entrepreneurship. A multi-linear regression resulted in a positive coefficient of 0.142 for financial literacy on entrepreneurship, where the coefficient was statistically significant with a p-value of 0.001, therefore hypothesis 1 could not be rejected. Having said this, due to OVB and violation of the CIA, we cannot assume any causal validity. However, since this paper focuses solely on establishing correlations between these two variables, we can conclude that there is a positive association between financial literacy and entrepreneurship. For further analysis, our sample population was separated into four age categories and the same regression was run as previously for hypothesis 1. These regressions were interesting to examine as there was a clear difference in effect size of financial literacy on entrepreneurship at different ages. The strongest coefficient for financial literacy was for the age group 16-29, where a statistically significant coefficient of 0.255 was measured. This coefficient decreases steadily at each following age group. A Breusch-Pagan test was conducted, indicating that heteroskedasticity is present in my data, and hence impacting the accuracy and reliability. Furthermore, the R-squared value was 0.0776, suggesting a low explanatory value of the model and additionally the presence of OVB. Therefore, **hypothesis 1 was rejected.**

Hypothesis 2 suggested that the positive relationship between financial literacy and entrepreneurship would be stronger for men than for women. Therefore, the OLS regression used for hypothesis 1 was repeated, however with gender as the moderating variable. From this, it was evident that men scored a higher coefficient than women for all financial literacy levels except financial literacy level 2. This analysis was further dissected by comparing the same age groups as identified during hypothesis 1. Once again, the strongest coefficients for both men and women were present in the youngest age group 16-29. In this age group, the relationship between financial literacy and entrepreneurship is stronger for men than women at each financial literacy level, except level 2. However, when examining the older age groups,

the relationship between financial literacy and entrepreneurship was stronger for women than men at the majority of the financial literacy levels. Therefore, this analysis has allowed us to find the age category with the strongest effect size, as well as the gender with the strongest effect size. Having said this, the coefficients were insignificant (p-value > 0.05) and furthermore, the issue of heteroskedasticity still exists. Hence, **hypothesis 2 was rejected.**

To conclude, financial literacy has a statistically significant and strong positive relationship with entrepreneurship in the Netherlands. Furthermore, the effect size of financial literacy on entrepreneurship is strongest for individuals aged between 16-29 and additionally, stronger for men than women. This means that a clear target group is identified for this relationship as I have narrowed down both the age group and the gender within the age group in which has the strongest effect size. However, the majority of the effect sizes when considering gender as the moderator were not statistically significant. Moreover, heteroskedasticity as well as OVB is present for all models, and hence, both hypothesis 1 and 2 were rejected.

9 Recommendations for policy makers and managers

This paper's analysis has significant results which can be beneficial for policy makers and managers who are aiming to increase entrepreneurship in their sector. Firstly, even though I could not establish causality, a strong and highly significant relationship was evident between financial literacy and entrepreneurship when controlling for the main observable variables. This identifies a reliable correlation between these two variables, which can be highly relevant for policy makers and managers as it provides evidence that increasing the population's financial literacy can potentially increase the propensity of the Dutch population to engage in entrepreneurship. This can act as evidence for policy makers to alter their strategy by increasing investment and resource allocation into improving financial literacy within the Netherlands as a potential source for entrepreneurship. Furthemore for managers, intrapreneurship is a key source of development and innovation for a business and hence, they can perhaps consider evaluating employees' financial literacy, or simply ensuring the provision of financial literacy training for their employees.

Secondly, analysis based on the different age groups provided significant results for policy makers and managers as a clear target population was determined. The relationship between financial literacy and entrepreneurship was by far the strongest for individuals aged between 16 and 29. This means that policy makers could potentially target this age group for financial literacy training in order to boost

entrepreneurship. Bongini et al (2018) suggests not to select specific target groups based on solely one variable such as age or gender, but rather adding additional variables such as income level or educational level. When moderating the relationship with the use of gender on the strongest age category 16-29, it was seen that men scored a higher coefficient than women for each financial literacy level except level 2. Furthermore, the mean financial literacy level of women in my dataset is 2.13 while for men 2.70. Therefore, this paper encourages Dutch policy makers to ensure effective financial literacy educational programs for Dutch females aged between 16-29. Similarly for managers who wish to increase intrapreneurship within their firms, providing effective financial literacy training to women aged between 16-29 will see great improvements and build a bridge between this gender gap.

For future researchers, this paper sheds light on several important factors. Firstly, there is a strong positive association between financial literacy and entrepreneurship in the Netherlands. Secondly, there is a clear gender gap with regards to financial literacy in the Netherlands as on average women are less financially literate than men. Thus providing important insight for future researchers to further investigate these gender gaps and find effective solutions. This paper is useful for future researchers as it provides a clear correlation between the two variables through using a reliable and appropriate method, and furthermore, contributes insight into a specific target group for this relationship.

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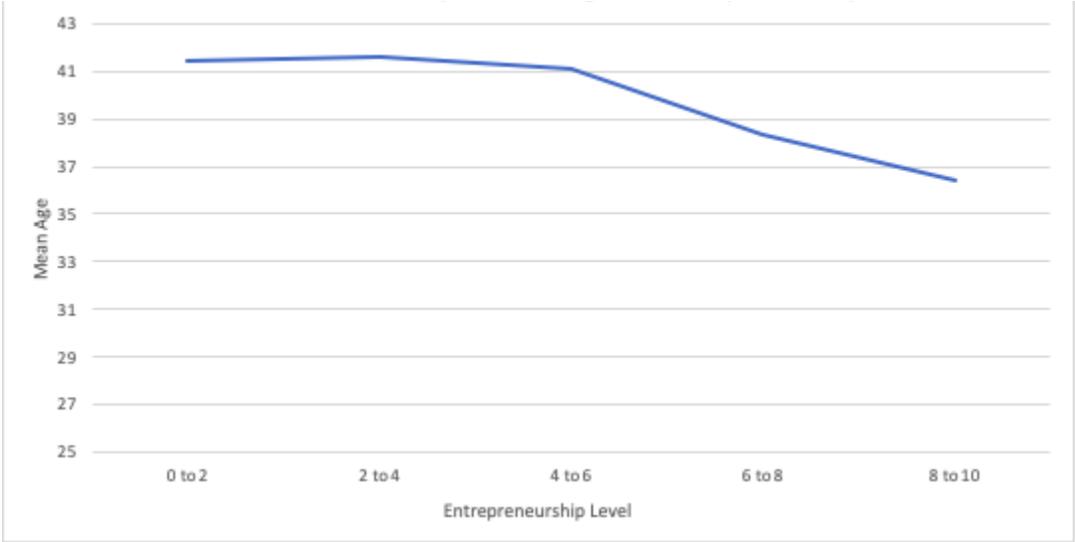
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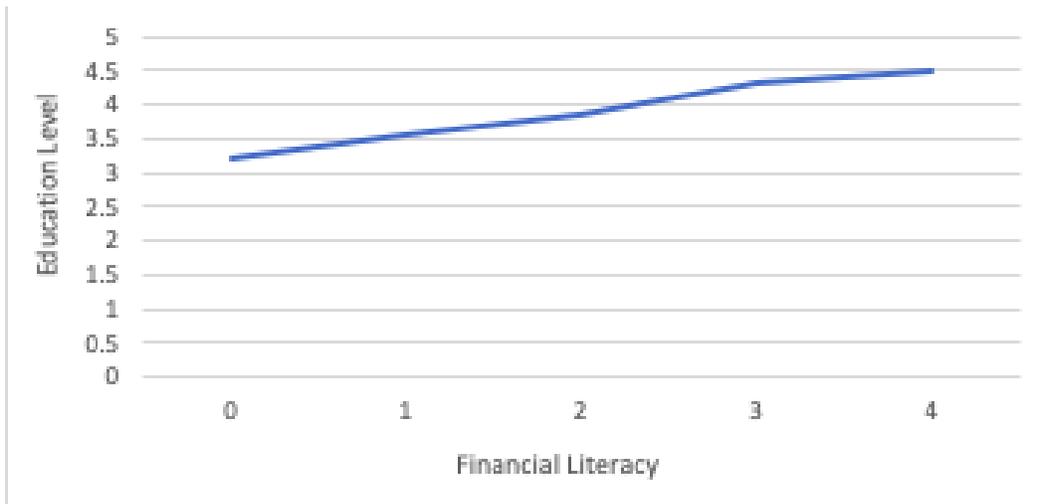
11 Appendix

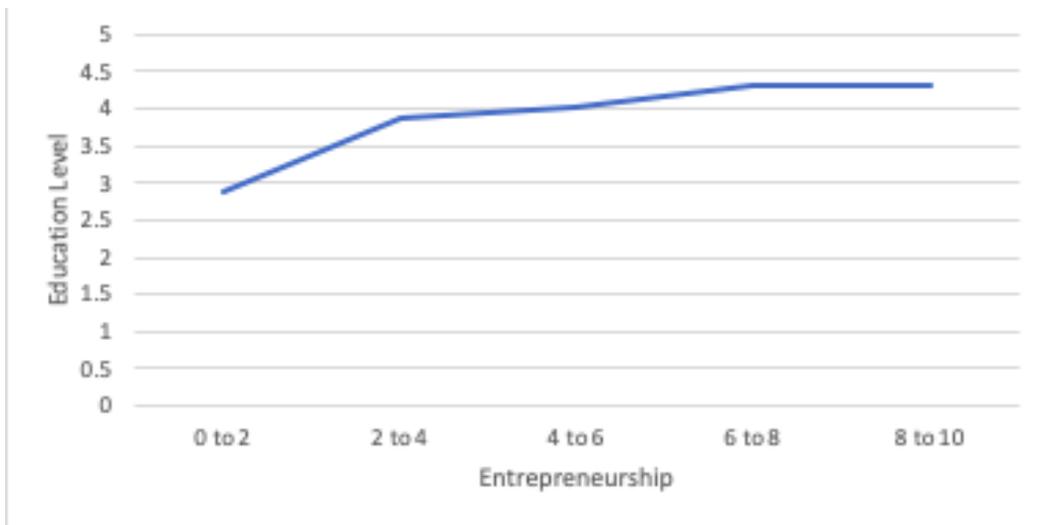*Appendix 1. Relationship between Age and Financial Literacy*
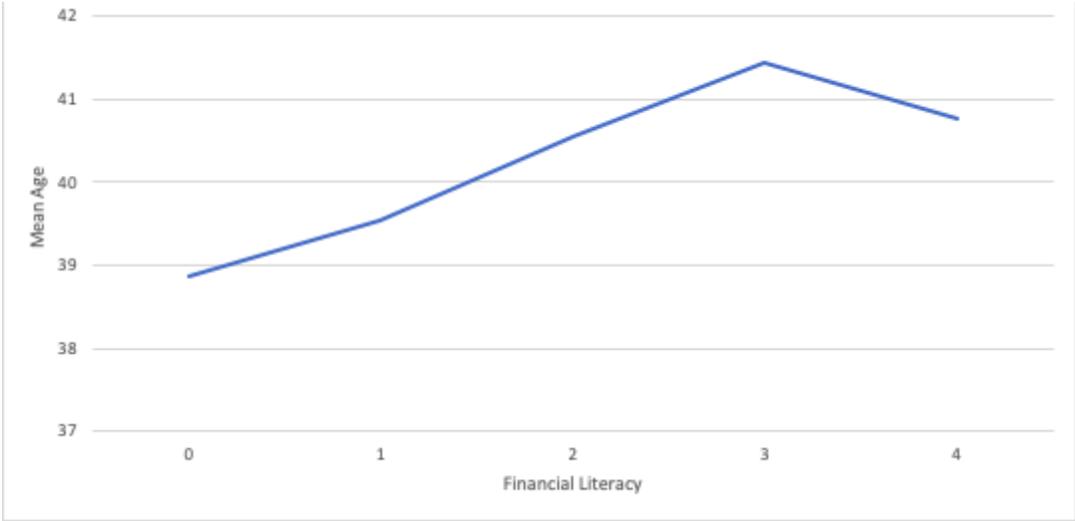
Appendix 2. Relationship between Age and Entrepreneurship

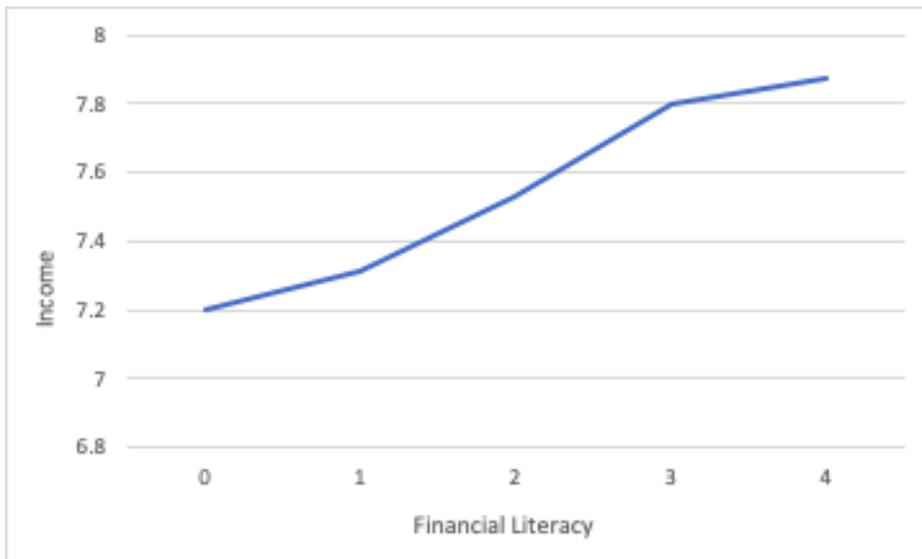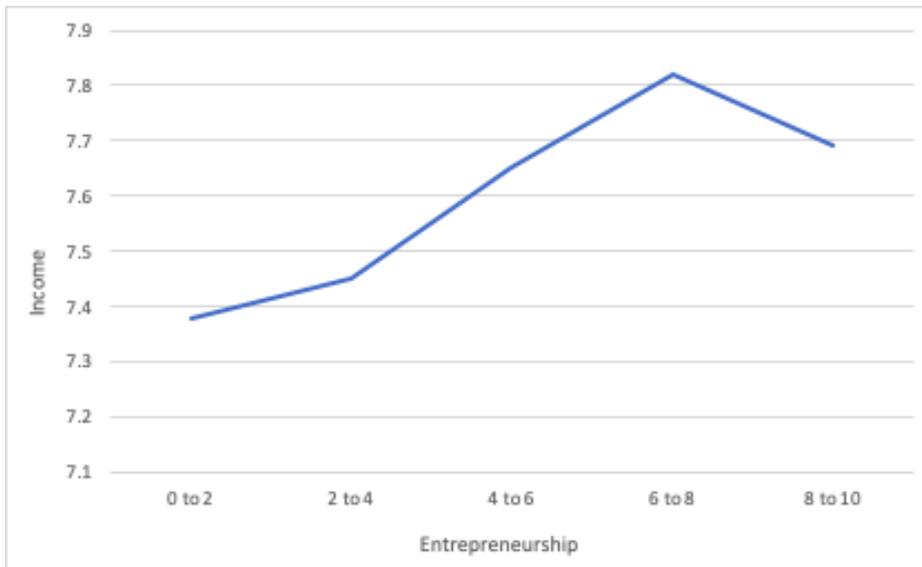*Appendix 3. Relationship between Education and Financial Literacy*

Appendix 4. Relationship between Education and Entrepreneurship
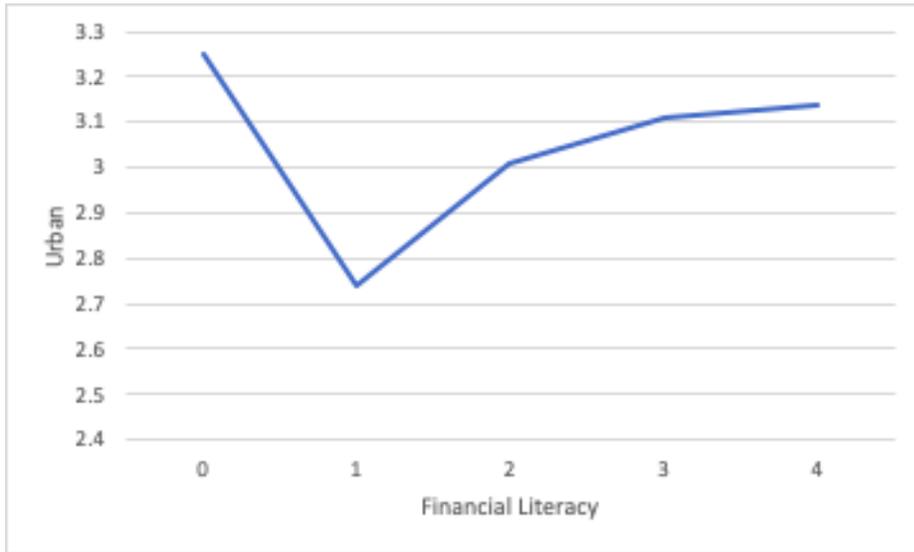
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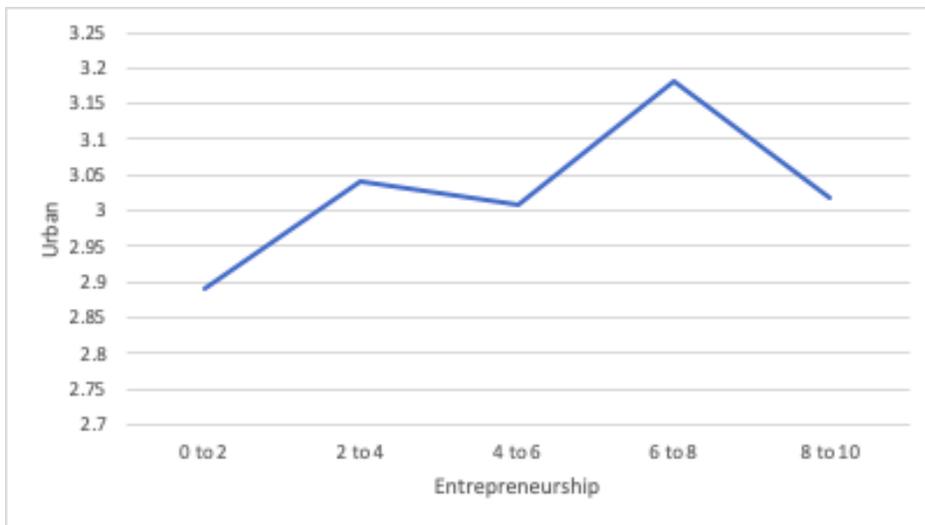

Appendix 6. Relationship between Income and Entrepreneurship

Appendix 7. Relationship between Urban Residency and Financial Literacy

Appendix 8. Relationship between Urban Residency and Entrepreneurship

Appendix 9. Difference between coefficients for financial literacy when using gender as a moderator for Age 30-44

Financial Literacy	Male	Female	Difference
0	-1.4556405	-1.067411	-0.3882295
1	-1.3073091	-1.8256903	0.5183812
2	-1.6617781	-1.1198323	-0.5419458
3	-1.3127241	-1.020496	-0.2922281
4	-1.35354	-1.0546975	-0.2988425
Observations	382		

Note: This Table focuses solely on the age category 30-44 and indicates the differences in coefficients calculated in Appendix 13 between men and women at each financial literacy level for this age group.

Appendix 10. Difference between coefficients for financial literacy when using gender as a moderator for Age 45-59

Financial Literacy	Male	Female	Difference
0	1.723757	0.730734	0.993023
1	0.330287	0.709308	-0.379021
2	0.786255	0.894281	-0.108026
3	0.8629468	0.8714678	-0.008521
4	0.9014035	0.9301685	-0.028765
Observations	464		

Note: This Table focuses solely on the age category 45-59 and indicates the differences in coefficients calculated in Appendix 14 between men and women at each financial literacy level for this age group.

Appendix 11. Difference between coefficients for financial literacy when using gender as a moderator for Age 60-70

Financial Literacy	Male	Female	Difference
0	45.05251	30.99001	14.0625
1	23.54998	9.48748	14.0625
2	37.456864	23.394364	14.0625
3	33.52122	19.45872	14.0625
4	45.05251	30.99001	14.0625
Observations	8		

Note: This Table focuses solely on the age category 60-70 and indicates the differences in coefficients calculated in Appendix 15 between men and women at each financial literacy level for this age group.

Appendix 12. *Relationship between financial literacy and entrepreneurship when considering control variables and using Gender as a moderator for age 16-29*

	Coefficient	P-value
Financial Literacy		
1	0.6903967	0.200
2	1.240217	0.009***
3	0.683211	0.186
4	1.303634	0.049***
Gender (Male)	1.050677	0.173
Financial Literacy*Gender(Interaction Term)		
1#Male	0.0985816	0.917
2#Male	-1.480001	0.090
3#Male	0.1220997	0.888
4#Male	-0.7101649	0.470
Income	0.2052802	0.202

	Coefficient	P-value
Age	-0.1341646	0.006***
Education	0.1585673	0.161
Urban	0.056261	0.472
Constant	5.231554	0.000***
Observations	173	

*Note: This Table presents the OLS regression results for age category 16-29 when control variables are included and additionally, gender is used as a moderating variable. The * signs represent the statistical significance of each coefficient. (*** p<= 0.001, **p<= 0.01 , *p<= 0.05)*

Appendix 13. *Relationship between financial literacy and entrepreneurship when considering control variables and using Gender as a moderator for age 30-44*

	Coefficient	P-value
Financial Literacy		
1	-0.7582793	0.030***
2	-0.0524213	0.848
3	0.046915	0.888
4	0.0127135	0.977
Gender (Male)	-0.3882295	0.345
Financial Literacy*Gender(Interaction Term)		
1#Male	0.9066107	0.143
2#Male	-0.1537163	0.743
3#Male	0.0960014	0.844
4#Male	0.089387	0.877
Income	0.9757246	0.000***

	Coefficient	P-value
Age	-0.0319698	0.056
Education	0.0454561	0.488
Urban Residency	-0.083577	0.151
Constant	-1.067411	0.482
Observations	382	

*Note: This Table presents the OLS regression results for age category 30-44 when control variables are included and additionally, gender is used as a moderating variable. The * signs represent the statistical significance of each coefficient. (*** p<= 0.001, **p<= 0.01 , *p<= 0.05)*

Appendix 14. *Relationship between financial literacy and entrepreneurship when considering control variables and using Gender as a moderator for age 45-59*

	Coefficient	P-value
Financial Literacy		
1	-0.021426	0.964
2	0.163547	0.720
3	0.1407338	0.755
4	0.1994345	0.697
Gender (Male)	0.993023	0.211
Financial Literacy*Gender(Interaction Term)		
1#Male	-1.372044	0.137
2#Male	-1.101049	0.181
3#Male	-1.001544	0.214
4#Male	-1.021788	0.232

Income	0.6947838	0.000
Age	-0.0242881	0.108
Education	0.0237295	0.622
Urban	-0.0711201	0.142
Constant	0.730734	0.522
Observations	464	

Note: This Table presents the OLS regression results for age category 45-59 when control variables are included and additionally, gender is used as a moderating variable.

Appendix 15. Relationship between financial literacy and entrepreneurship when considering control variables and using Gender as a moderator for age 60-70

	Coefficient	**P-value**
Financial Literacy		
1	-21.50253	-
2	-7.595646	-
3	-11.53129	-
4	-	-
Gender (Male)	14.0625	-
Financial Literacy*Gender(Interaction Term)		
1#Male	0	-
2#Male	0	-
3#Male	0	-
4#Male	0	-
Income	-10.81632	-

Age	0.7851754	-
Education	2.67914	-
Urban Residency	0	-
Constant	30.99001	-
Observations	8	

Note: This Table presents the OLS regression results for age category 60-70 when control variables are included and additionally, gender is used as a moderating variable.

Appendix 16. T-test for subset sample population and the rest of the panel

Variable	T-score	Null Hypothesis	P-value
Age	-3.0247	Ha: Diff ≠0	0.0025
Income	-6.1399	Ha: Diff ≠0	0.0000
Urban Residency	-3.2706	Ha: Diff ≠0	0.0011
Education	3.3930	Ha: Diff ≠0	0.0007

*Note: This Table indicates the results of a t-test in order to determine statistical differences between the mean values of my subset sample population and the rest of the LISS panel. The observations for each variable can be seen in Table 4. The * signs represent the statistical significance of each coefficient. (*** $p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.05$)*