



Exploring the link between financial literacy and business interruption insurance: evidence from Italian micro-enterprises

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Abstract

This article examines the relationship between financial literacy and business interruption (BI) insurance among Italian entrepreneurs. Following an increase in unexpected shocks, such as COVID-19 and geopolitical conflicts, a high level of BI risk is expected to persist, especially among small firms, which play a key role in the Italian economy. Using a Bank of Italy 2021 survey of 1998 non-financial firms with fewer than 10 employees, we show a significant positive association between the level of the entrepreneur's financial literacy and the purchase of BI insurance. Our results highlight the key role of financial literacy in shaping risk management strategies and are robust to different model specifications, also addressing endogeneity concerns.

Keywords Financial literacy · Business interruption insurance · Micro-entrepreneurs · Italy

Introduction

Entrepreneurship plays a crucial role in driving innovation and economic growth in today's dynamic and uncertain economic environment. The COVID-19 pandemic brought business interruption (BI) and business closure (BC) insurance into the spotlight, especially due to government-imposed lockdowns, which disrupted daily operations. The COVID-19 pandemic had a significant impact on various industries, including restaurants, hotels and retail outlets. This emphasises the importance of

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insurance coverage and government intervention in supporting affected businesses (Stahl 2023). Despite taking positive steps to diversify their business models and supply chains since the outbreak of COVID-19, companies worldwide are still facing significant disruptions due to various threats such as digitalisation, increasing energy prices, inflation, geopolitical and economic uncertainty, and climate change. It is crucial for businesses to adapt to these challenges and ensure the resilience of their operations. According to the Allianz Risk Barometer,¹ which reports on top business concerns and perceived business risks, high levels of disruption are expected to continue, with BI ranking as the second top risk in 2023 (cited by 34% of respondents).²

Many pandemic-related losses remained uninsured and most BI policies explicitly excluded, or were interpreted to exclude, pandemic-related disruptions. This has led to several disputes between insurance companies and clients (Schwarcz 2021; Gründl et al. 2021). However, although BI insurance was largely ineffective during the pandemic, the COVID-19 crisis sparked a lively debate among European regulators about extending coverage to pandemic-related risks. This has led to a renewed interest in insurance more generally. For instance, EIOPA (2021) outlines the heterogeneity of current policies and the necessity for insurance products that connect pandemic features to economic indicators, such as decreased business revenues and consumer spending. This renewed interest in insurance is particularly significant for Italy, where BI insurance was virtually unheard of before the pandemic.³ Following the COVID-19 crisis, there has been a significant increase in the number of small businesses willing to take out insurance, particularly for BI cover, as highlighted in a Deloitte report.⁴ Awareness of the importance of insurance has then been further emphasised by geopolitical shocks in the aftermath of the pandemic and an increase in the frequency of natural catastrophes (Swiss Re 2023). These events have highlighted the importance of shock absorption capacity.

BI insurance can be a valuable tool to protect companies from unforeseen events such as supply chain disruptions, accidents or economic downturns, in addition to pandemic shocks. However, despite the increasing incidence of BI claims, coverage remains underdeveloped. For example, according to the NAIC (2022), only 30–40% of small business owners are covered by BI insurance. This percentage is significantly smaller in Italy (around 3% according to the national association of insurance brokers).⁵

Previous studies (e.g. Finaldi Russo et al. 2022) suggest that improving the financial literacy of entrepreneurs can positively impact their ability to make sound financial decisions, ultimately fostering business resilience and growth. However, to the

¹ <https://commercial.allianz.com/news-and-insights/reports/allianz-risk-barometer.html#download>.

² They represent 2712 risk management experts from 94 countries.

³ <https://www.mimit.gov.it/it/notizie-stampa/il-ministro-interviene-all-assemblea-ania-2>.

⁴ https://www2.deloitte.com/content/dam/Deloitte/it/Documents/financial-services/Futuro-assicurazioni-PMI_Deloitte.pdf.

⁵ <https://www.insuranceup.it/it/scenari/effetto-covid-le-polizze-di-business-interruption-sono-piu-interessanti/>.



best of our knowledge, no previous research has examined the determinants of BI underwriting while considering the financial literacy of business owners.

The purpose of this study is to fill this gap by analysing the case of Italian entrepreneurs operating in micro, small and medium-sized enterprises (MSMEs), drawing data from the Bank of Italy 2021 survey on their financial literacy.

To assess the impact of entrepreneurs' financial literacy on the promotion of insurance culture, we focus on the Italian context for three reasons. Firstly, SMEs are a key component of the national economy, accounting for 99.9% of all active businesses (i.e. 4.4 million)⁶ and generating approximately 80% of employment and 70% of gross value added (GVA).⁷ Secondly, Italy—after China—was the first country to face significant challenges in the early stages of the COVID-19 pandemic. Small businesses, which are particularly vulnerable to the effects of unexpected shocks, have been affected by repeated lockdowns, with heterogeneous effects for Italian SMEs that are different from previous crises. Due to the changes in the business landscape brought about by the increased use of digital services and smart working practices, Cerved (2020) estimates that the average turnover of SMEs fell by 11 percentage points. In addition, the COVID-19 pandemic turned out to be an unprecedented crisis that came on top of an incomplete recovery from the previous financial crisis and caused extensive damage to the Italian business landscape, with different impacts on different sectors. The extended period of economic challenges had a severe impact on the construction industry, and significantly affected the industry and services sectors. Finally, as reported by D'Alessio et al. (2021), Italy falls below international standards in terms of adult financial literacy. Specifically, despite improvements compared to the previous survey, Italy ranks 25th out of the 26 participating countries, with the worst contribution from financial behaviour, suggesting that there is ample room for improvement given national standing at the global level, but also the burden of taking action on a large scale, at both the cognitive and cultural levels. Furthermore, according to the OECD-INFE (2021), Italian entrepreneurs are at the bottom of the financial literacy ranking and well below the international average (Finaldi Russo et al. 2022). One of the most noteworthy aspects is the slight difference in financial literacy levels between households and entrepreneurs, despite the fact that the latter are also responsible for managing their firms.

In recent years, various financial literacy initiatives and educational programmes have been implemented to improve the financial decision-making skills of entrepreneurs. One such initiative is the survey of micro-enterprises conducted by the Bank of Italy and promoted by the International Network for Financial Education (OECD-INFE 2018). This survey provides rare and valuable data on the financial knowledge and behaviour of small businesses. The survey data allows us to investigate the correlation between financial literacy and the uptake of BI insurance. Our findings can offer valuable policy insights, as decision makers in financial institutions

⁶ Source: ISTAT and Eurostat.

⁷ Source: ISTAT and Eurostat.



and policymakers can customise their interventions to address the unique challenges faced by small firms.

Our paper contributes to two main streams of research. The first is related to firms' demand for insurance coverage, while the second is devoted to the relationship between financial literacy and financial behaviour.

The first research stream includes a limited number of papers, mostly focusing on listed firms, and investigating various issues such as the insurance needs of non-financial firms (e.g. Yamori 1999; Regan and Hur 2007), the determinants of firms' insurance demand (Hoyt and Khang 2000), and the impact of ownership structure and agency conflicts (Zou and Adams 2006). Only a handful of studies (e.g. Asai 2019) have focused on examining the insurance demand of SMEs, mainly due to data constraints. To our knowledge, none of these studies has focused specifically on BI insurance, the diffusion of which is a relatively recent phenomenon.

The second strand of research to which our paper is related concerns financial literacy, with a specific focus on entrepreneurs. Financial literacy, which refers to the understanding of basic financial concepts and skills, has been recognised as a key driver of sound financial decision making for individuals (e.g. Lusardi 2008, 2012; Arianti 2018; Raut 2020), while focus on entrepreneurs and firms (e.g. Eniola and Entebang 2016, 2017; Tuffour et al. 2022) is less frequent. However, the issue of financial literacy of entrepreneurs has received more attention in recent years (Anshika and Singla 2022), and SME financial literacy has been linked to performance, access to finance, innovation, risk attitude and entrepreneurship (Molina-Garcia et al. 2023). Previous studies suggest that, on average, financial literacy improves management practices—such as budgeting, reporting and credit management—and firm performance in terms of profitability and growth (Bruhn and Zia 2011; Siekei et al. 2013; Dahmen and Rodríguez 2014; Drexler et al. 2014; Eniola and Entebang 2017; Alperovych et al. 2023; Atandi 2021).

Overall, there is a notable absence of studies examining the connection between SME financial literacy and the adoption of BI coverage. The 2021 Bank of Italy survey⁸ gives us the opportunity to fill this gap and provide important evidence on the correlation between financial literacy and insurance adoption, with important policy implications for the stability of the Italian business landscape.

The remainder of the article proceeds as follows. The next section describes the methodology and data sources used in the analysis. The subsequent section then presents the empirical findings and their implications, along with robustness checks. The final section briefly concludes with the main takeaways and suggestions for future research in this critical area of study.

⁸ Publicly available at: <https://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/alfabetizzazione-imprese/index.html?com.dotmarketing.htmlpage.language=1>.



Research design

The identification strategy employed in this study is based on a cross-sectional analysis aimed at investigating the relationship between the level of financial literacy and the use of BI insurance among Italian entrepreneurs of MSMEs.

The sample consists of 1998 Italian non-financial enterprises with less than 10 employees, as well as targeted owners of micro-enterprises and managers with financial decision-making responsibilities. The survey employed a multi-stage sampling technique to select eligible entrepreneurs, ensuring representativeness in terms of economic sector and geographical area. It was conducted from March to May 2021 using the Computer-Assisted Web Interviewing (CAWI) methodology, after the spread of the COVID crisis, providing important information on the ability of entrepreneurs to adapt quickly to new circumstances. The questionnaire, developed by OECD-INFE (2021), assesses the financial literacy of small businesses and includes sections on business characteristics, financial products, planning, attitudes, education, demographics and the impact of the pandemic.

The dependent variable in our analysis is the usage of BI insurance, underwritten by Italian entrepreneurs. To measure this variable (identified by question QP4_18), respondents were asked whether they had purchased BI insurance to protect their enterprises from potential disruptions. Responses were coded as a binary variable, which is equal to 1 in the case of BI insurance coverage and 0 if respondents answer either 'Refused', 'Don't know' or 'No'. Comparing BI with other insurance coverages considered in the survey (i.e. property, life and liability insurance), it appears to be both the least known and the least used, as shown in Fig. 1.

Our main variable of interest is the level of financial literacy of the entrepreneurs. Financial literacy is a multidimensional construct, encompassing various aspects of financial knowledge and skills. According to the definition by OECD-INFE (2018), financial literacy is measured as a combination of financial knowledge, behaviour and attitude. To measure financial knowledge, the survey employed a set of questions aimed at assessing entrepreneurs' understanding of basic financial concepts related to business, such as the meaning of dividends and inflation, the relationships between equity and ownership, between risk and return, and between interest payments and the duration of a loan. The other two components include financial behaviour (measured by nine questions) and financial attitudes (measured by three questions). The former is calculated as the number of 'financially savvy' behaviours (i.e. actively saving money, paying bills on time, planning future expenses). The latter is calculated as the sum of three correct answers to questions that provide information on individual attitudes towards saving, in particular retirement saving, in the long term. The exact wording of all questions and the corresponding answers are shown in Table 1.

Following D'Ignazio et al. (2022), we decide to combine a weighted financial literacy score, assigning equal significance to each of the three components (knowledge, behaviour, attitudes). To ensure equal weighting, we standardise the score of each component to a range between 0 and 1 (dividing the number of correct answers



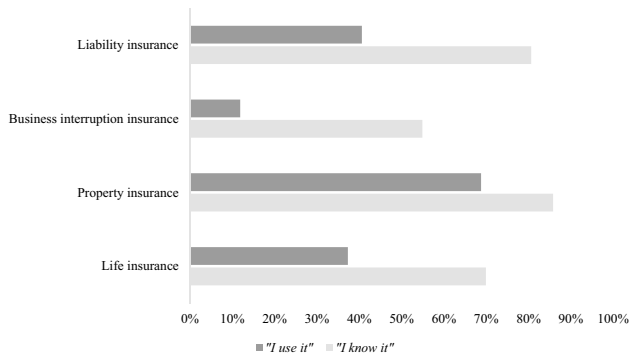


Fig. 1 Exploring knowledge and use of insurance among Italian entrepreneurs. This figure shows the percentage of respondents who are familiar with insurance products. Specifically, the light grey bars show the percentage of entrepreneurs who have heard of the four types of insurance coverage. Meanwhile, the dark grey bars show the percentage of entrepreneurs who use them. The data source is the survey on financial literacy and digitalisation of Italian micro-enterprises, conducted by the Bank of Italy in 2021 (publicly available at <https://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/alfabetizzazione-imprese/index.html?com.dotmarketing.htmlpage.language=1>)

by the number of questions) before aggregating them. This approach yields a comprehensive financial literacy score ranging from 0 to 3.

Furthermore, to ensure the robustness of our analysis and isolate the relationship between financial literacy and BI insurance adoption, we incorporate several control variables. These include gender, age, education, firm location, negative impact from COVID, sector, recourse to advice for risk evaluation, and owning an online banking account. All the variables are defined in Table 2, while Table 3 reports the main descriptive statistics of all variables included in the baseline model. In terms of personal characteristics, the sample consists mainly of male entrepreneurs (71%) based in northern Italy (48%), with an average age of 50 years and a high school education (86%).

Results

The results of our baseline model are reported in Table 4 and show that the level of financial literacy is positively related to the use of BI insurance. The first column of Table 4 suggests that a unit increase in the overall measure of financial literacy is associated with a 4.5% increase in the probability of using BI insurance (with the estimated coefficient being statistically significant at the 1% level). Looking at the three separate measures of financial literacy, with the specifications reported in the last three columns of Table 4, we obtain similar evidence, with the most relevant effect in terms of both statistical significance and economic magnitude coming from the financial behaviour component.

Looking at the control variables, entrepreneurs based in the north of Italy are more likely to have BI coverage than those based in the south, while there are no significant differences across economic activities. Age, gender and level of education



Table 1 How to measure financial literacy

Financial literacy component	Question code	Question (in bold) and alternative answers	Respective answer (one or more) considered correct
Financial knowledge	QK7_1	Dividends are part of what a business pays to a bank to repay a loan. (1) True; (0) False; (− 97) Don't know; (− 99) Refused.	0
	QK7_2	When a company obtains equity from an investor it gives the investor part of the ownership of the company. (1) True; (0) False; (− 97) Don't know; (− 99) Refused.	1
	QK7_3	If a financial investment offers the chance to make a lot of money it is likely that there is also a chance to lose a lot of money. (1) True; (0) False; (− 97) Don't know; (− 99) Refused.	1
	QK7_4	High inflation means that the cost of living is increasing rapidly. (1) True; (0) False; (− 97) Don't know; (− 99) Refused.	1
	QK7_5	A 15-year loan typically requires higher monthly payments than a 30-year loan, but the total interest paid over the life of the loan will be less. (1) True; (0) False; (− 97) Don't know; (− 99) Refused.	1
Financial behaviour	QP2	You mentioned that you have a current or savings account for your business. Can you tell me which of these statements best represents your situation? (1) I use the same account for both my household and business finances; (2) I have separate accounts for my household and for my business, but I find it quite difficult to manage household and business finances separately; (3) I manage strictly separate accounts for my household and for my business; (− 97) Don't know; (− 98) Not applicable (does not have an account); (− 99) Refused.	3
	QP5	Which of the following statements best describes how you made your most recent choice about a financial product or service for the business (e.g. current account, business loan, insurance policy, etc.)? (1) I considered several options from different financial providers before making my decision; (2) I considered the various options from one financial provider; (3) I didn't consider any other options at all; (4) I looked around but there were no other options to consider; (− 97) Don't know; (− 98) Not applicable (no product indicated in QP5); (− 99) Refused.	1 or 4





Table 1 (continued)

Financial literacy component	Question code	Question (in bold) and alternative answers	Respective answer (one or more) considered correct
QM3	QM3	How do you keep track of the financial records of the business? (1) In electronic format (e.g. MS Excel or dedicated software); (2) In paper form (e.g. noting them in a notebook; keeping receipts and invoices); (3) I keep track of financial records in my head; (4) Someone else does it for me (e.g. an accountant); (5) In another way; (6) I do not usually keep track; (– 97) Don't know; (– 99) Refused.	1 or 2 or 4 or 5
		Have you thought about how you will fund your own retirement or maintain yourself when you will no longer work due to old age? (1) Yes; (0) No/Not yet; (– 97) Don't know; (– 99) Refused.	
		Imagine that tomorrow you discover that most of the equipment that you need to operate the business has been stolen (it could be computers, vehicles or other equipment). Which one of these statements best represents what you would do? (1) I would use money that my business has set aside for emergencies; (2) I would claim insurance on all or part of the equipment; (3) I would take a loan to buy new equipment; (4) I would use some personal or household funds; (5) I would ask family members or friends to lend me money or equipment; (6) I would stop my business temporarily or for good; (7) I don't know, I have never thought about how I would cope; (8) Other: specify [register what]; (– 97) Don't know; (– 99) Refused.	
QM7	QM7_1	I keep secure data and information about the business. (1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree; (– 97) Don't know; (– 99) Refused.	3 or 4
		I compare the cost of different sources of finance for the business. (1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree; (– 97) Don't know; (– 99) Refused.	
		I forecast the profitability of the business regularly. (1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree; (– 97) Don't know; (– 99) Refused.	
		I adjust my planning according to the changes in economic factors. (1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree; (– 97) Don't know; (– 99) Refused.	

Table 1 (continued)

Financial literacy component	Question code	Question (in bold) and alternative answers	Respective answer (one or more) considered correct
Financial attitude	QK2_1	I set long financial goals for the business and strive to achieve them. (1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree; (– 97) Don't know; (– 99) Refused.	3 or 4
	QK2_2	I am confident to approach banks and external investors to obtain business finance. (1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree; (– 97) Don't know; (– 99) Refused.	3 or 4
	QK2_4	I prefer to follow my instinct rather than make detailed financial plans for my business. (1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree; (– 97) Don't know; (– 99) Refused.	1 or 2

This table shows the questions that were developed by OECD-INFE (available at <https://www.oecd.org/financial/education/2020-survey-to-measure-msme-financial-literacy.pdf>). The first column shows the components of financial literacy. The second column shows each variable, which is associated with a code for reference purposes. The third column shows each question (in bold) and the corresponding responses. Finally, the fourth column shows which answers are considered correct for the purposes of calculating scores



Table 2 Variable description

Variable	Description	Question code
BI insurance	BI insurance is a dummy variable equal to 1 if respondent uses an insurance coverage against business interruption; and 0 if respondents answer either 'Refused', 'Don't know' or 'No'	QP4_18
Financial literacy	Financial literacy is the sum of the three weighted components, which are financial knowledge, financial behaviour, and financial attitude, respectively	See Table 1
Financial knowledge	Financial knowledge proxies a set of questions aimed at assessing entrepreneurs' understanding of basic financial concepts related to business, such as the meaning of dividends and inflation, the relationships between equity and ownership, between risk and return, between interest payments and duration of a loan	See Table 1
Financial behaviour	Financial behaviour is calculated as the number of 'financially savvy' behaviours (i.e. actively saving money, paying bills on time, planning future expenses)	See Table 1
Financial attitude	Financial attitude is calculated as the sum of three correct answers to questions that provide information on individual attitudes towards saving, in particular retirement saving, in the long term	See Table 1
Male	Male is a dummy variable which is equal to 1 if entrepreneur is male, and 0 if female	QD1
Age	Age represents the age of entrepreneur. Where no value is available, it is derived from mean value of its age class	QD2, QD3
High school	High school is a dummy variable equal to 1 if entrepreneur holds at least a high school diploma; and 0 otherwise (i.e. if respondents answer either 'Lower secondary school or middle school', 'Primary school', 'No formal education' or 'Refused')	QD4
North	North is a dummy variable equal to 1 if entrepreneur is located in north regions (i.e. 'NE', 'NO'); and 0 if entrepreneur is located in other regions (i.e. 'CE', 'SU', 'IS')	AREA_GEO...
Centre	Centre is a dummy variable equal to 1 if entrepreneur is located in centre regions (i.e. 'CE'); and 0 if entrepreneur is located in other regions (i.e. 'NE', 'NO', 'SU', 'IS')	AREA_GEO...
COVID impact	COVID impact is a binary variable equal to 1 when entrepreneur declares his/her business to be negatively affected by COVID-19 crisis (i.e. either 'Large decrease' or 'Decrease'); and 0 if respondents answer either 'Quite unchanged', 'Increase', 'Large increase' or 'Refused'	QX6_1
Primary	Primary is a dummy variable equal to 1 when business refers to 'Agriculture, forestry, and fishing'; and 0 if respondents answer either 'Manufacturing', 'Construction and real estate', 'Wholesale and retail trade', 'Transportation, shipping, storage', 'Accommodation, food and beverage services', 'Other personal services such as education, beauty, repairs, laundry', 'Information and communication', 'Business services such as legal, accounting, advertising, cleaning', 'Other', 'Don't know' or 'Refused'	QC8

Table 2 (continued)

Variable	Description	Question code
Secondary	Secondary is a dummy variable equal to 1 when business refers to 'Manufacturing'; and 0 if respondents answer either 'Agriculture, forestry, and fishing', 'Construction and real estate', 'Transportation, shipping, storage', 'Accommodation, food and beverage services', 'Other personal services such as education, beauty, repairs, laundry', 'Information and communication', 'Business services such as legal, accounting, advertising, cleaning', 'Other', 'Don't know' or 'Refused'	QC8
Insurance advice	Insurance advice is a dummy variable equal to 1 if entrepreneur receives advisory in terms of risk evaluation to firm's exposure; and 0 if respondents answer either 'No', 'Don't know', 'Not applicable' or 'Refused'	QM2_6
Online account	Online account is a dummy variable equal to 1 if entrepreneur has at least a banking account with an online bank (without physical branches) or accessible only through a mobile app; and 0 if respondents answer to both questions with 'No', 'Don't know' or 'Refused'	QP1_2, QP1_3

This table shows variable descriptions. The first column reports variable names. In the second, all the variables are clearly defined. Finally, the question codes to which the variables refer are quoted in the third column



Table 3 Summary statistics

	Obs	Mean	SD	Min	p25	p50	p75	Max
BI insurance	1998	0.1181	0.3228	0.0000	0.0000	0.0000	0.0000	1.0000
Financial literacy	1998	2.1506	0.5703	0.0000	1.8222	2.2444	2.5556	3.0000
Financial knowledge	1998	0.7204	0.2704	0.0000	0.6000	0.8000	1.0000	1.0000
Financial behaviour	1998	0.7847	0.1879	0.0000	0.6667	0.7778	0.8889	1.0000
Financial attitude	1998	0.6455	0.3109	0.0000	0.3333	0.6667	1.0000	1.0000
Male	1998	0.7142	0.4519	0.0000	0.0000	1.0000	1.0000	1.0000
Age	1998	50.0158	11.5961	21.0000	42.0000	50.0000	58.0000	95.0000
High school	1998	0.8624	0.3446	0.0000	1.0000	1.0000	1.0000	1.0000
North	1998	0.4785	0.4997	0.0000	0.0000	0.0000	1.0000	1.0000
Centre	1998	0.2182	0.4131	0.0000	0.0000	0.0000	0.0000	1.0000
COVID impact	1998	0.5951	0.4910	0.0000	0.0000	1.0000	1.0000	1.0000
Primary	1998	0.0741	0.2620	0.0000	0.0000	0.0000	0.0000	1.0000
Secondary	1998	0.0706	0.2562	0.0000	0.0000	0.0000	0.0000	1.0000
Insurance advice	1998	0.2477	0.4318	0.0000	0.0000	0.0000	0.0000	1.0000
Online account	1998	0.1166	0.3210	0.0000	0.0000	0.0000	0.0000	1.0000

This table shows the summary statistics for the sample composed of 1998 non-financial Italian firms with less than 10 employees. All the variables are described in Table 2

also do not produce relevant differences, which are probably already captured by our measures of financial literacy. It is worth noting that entrepreneurs with an online banking account and who take insurance advice are more likely to have this coverage, which is evidence of the positive impact of digitalisation and professional advice.

However, as pointed out by Lusardi and Mitchell (2014), and given the cross-sectional nature of our data, it is important to consider potential endogeneity issues arising from measurement error, reverse causality or omitted variables in any study that addresses the relationship between financial literacy and economic behaviour. First, the measurement error issue is a long-standing challenge in the field of financial literacy, which has been extensively discussed by Lusardi and Mitchell (2014). Their discussion emphasises that any particular set of financial literacy measures serves only as a proxy for the actual knowledge that individuals need to optimise their financial behaviour. Second, there may be unobservable characteristics that affect both financial literacy and insurance decisions (i.e. cognitive ability) that are not controlled for in our model. Finally, there is also the possibility of reverse causality, but we believe it is unlikely that insurance coverage increases financial literacy rather than the other way around. Therefore, following previous studies (e.g. Van Rooij et al. 2011), we use an instrumental variable (IV) approach to deal with endogeneity concerns and attempt to isolate the causal effect of financial literacy on BI insurance.

Using a two-stage least squares (2SLS) regression approach, we define two distinct instrumental variables, namely family experience and training. Following Alesie et al. (2011), we consider that the financial experience of parents may affect the



Table 4 Baseline models

Variable	(1) BI insurance	(2) BI insurance	(3) BI insurance	(4) BI insurance
Financial literacy	0.0454*** (0.0115)			
Financial knowledge		0.0544** (0.0231)		
Financial behaviour			0.1842*** (0.0348)	
Financial attitude				0.0409* (0.0223)
Male	0.0244 (0.0152)	0.0264* (0.0152)	0.0229 (0.0152)	0.0262* (0.0152)
Age	– 0.0004 (0.0006)	– 0.0003 (0.0006)	– 0.0003 (0.0006)	– 0.0002 (0.0006)
High school	0.0031 (0.0201)	0.0084 (0.0202)	0.0035 (0.0201)	0.0116 (0.0201)
North	0.0537*** (0.0166)	0.0578*** (0.0165)	0.0484*** (0.0166)	0.0567*** (0.0165)
Centre	0.0027 (0.0181)	0.0039 (0.0182)	0.0012 (0.0181)	0.0038 (0.0182)
COVID impact	– 0.0159 (0.0150)	– 0.0192 (0.0149)	– 0.0151 (0.0149)	– 0.0184 (0.0150)
Primary	0.0482 (0.0323)	0.0470 (0.0325)	0.0544* (0.0324)	0.0450 (0.0324)
Secondary	0.0136 (0.0274)	0.0109 (0.0273)	0.0138 (0.0273)	0.0107 (0.0273)
Insurance advice	0.0740*** (0.0193)	0.0812*** (0.0191)	0.0705*** (0.0193)	0.0805*** (0.0190)
Online account	0.0703*** (0.0260)	0.0704*** (0.0261)	0.0671*** (0.0258)	0.0713*** (0.0261)
Constant	– 0.0297 (0.0480)	0.0201 (0.0441)	– 0.0766 (0.0504)	0.0249 (0.0449)
Observations	1998	1998	1998	1998
R ²	0.0361	0.0322	0.0408	0.0317

This table presents the OLS regression results on the relation between financial literacy and usage of BI insurance. Financial literacy is proxied by both an overall measure and three weighted components (i.e. financial knowledge, financial behaviour and financial attitude). Robust standard errors are in parentheses

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively

level of financial literacy of the entrepreneur and is a sufficiently exogenous instrument, as it is not under his/her control. Specifically, since we are interested in the level of financial literacy related to running a business, we consider the experience



of parents as entrepreneurs and construct a dummy variable (family experience) that equals 1 if the respondent has at least one parent who currently owns or has owned a business in the past. The second variable follows the idea of instrumenting financial literacy with information on how much of the education received was devoted to business issues, as suggested by Van Rooij et al. (2012). Given our business perspective, we define training as a dummy variable indicating whether the entrepreneur has ever received training in personal or business finance.

In the first stage of the 2SLS model, we regress financial literacy on family experience and training, as well as the other control variables included in our baseline model. The corresponding first-stage results, reported in the first column of Table 5, show significant positive coefficients for both family experience and training (F -test = 38.33), which are consistent with our expectation that entrepreneurs who have business parents and attended finance training are more financially literate. In the second stage, we use the first-stage fitted value for financial literacy and estimate again the baseline model. As shown in the second column of Table 5, the coefficient on the fitted value for financial literacy remains positive and statistically significant at the 1% level, and it is also larger in magnitude, as is usually the case (Lusardi and Mitchell 2014), suggesting that the positive association between entrepreneurs' financial literacy and usage of BI insurance holds after controlling for endogeneity.

In line with the ideas of Finaldi Russo et al. (2022), our results suggest that strengthening the financial literacy of micro-entrepreneurs can have a positive impact on their ability to make better financial decisions and ultimately on the resilience and growth of their businesses.

Moreover, to increase the robustness of our analysis, in the first column of Table 6 we included an additional variable to explore the possibility that the decision to take out BI insurance is influenced more by the individual propensity of the entrepreneur to behave prudently than by a higher level of financial literacy. In particular, we consider the purchase of life insurance (identified by question QP4_19), through a binary variable, which is equal to 1 in the case of life insurance coverage, and 0 if respondents answer either 'Refused', 'Don't know' or 'No'. By controlling for this additional life insurance variable, the estimated coefficient of association between the overall financial literacy measure and the probability of using BI insurance decreases in magnitude, but remains economically relevant and statistically significant at the 1% level. Finally, as a further robustness check, we test the stability of our results by estimating our baseline model with alternative specifications, which are usually adopted to take into account the binary nature of the dependent variable. Instead of using a linear probability model, we use a logit model in the second column of Table 6 to understand whether financial literacy affects the probability of taking out BI insurance. The estimated coefficient related to the overall measure of financial literacy is positive and statistically significant at the 1% level ($p < 0.01$), confirming that, controlling for other variables in the model, an increase in financial literacy is associated with an increase in the likelihood of a firm taking out BI insurance. In the third column of Table 6, we apply a probit model and obtain very similar results.



Table 5 Robustness test to address potential endogeneity concerns – instrumental variable approach

Variable	(1) First stage Financial literacy	(2) Second stage BI insurance
Family experience	0.0840*** (0.0245)	
Training	0.2125*** (0.0257)	
Financial literacy		0.2408*** (0.0775)
Male	0.0489* (0.0271)	0.0125 (0.0169)
Age	0.0039*** (0.0012)	– 0.0010 (0.0007)
High school	0.2271*** (0.0389)	– 0.0475 (0.0296)
North	0.0796*** (0.0280)	0.0340* (0.0183)
Centre	0.0228 (0.0351)	– 0.0045 (0.0191)
COVID impact	– 0.0926*** (0.0244)	0.0036 (0.0178)
Primary	– 0.0903** (0.0452)	0.0595* (0.0320)
Secondary	– 0.1122** (0.0480)	0.0329 (0.0309)
Insurance advice	0.2130*** (0.0246)	0.0293 (0.0262)
Online account	– 0.0053 (0.0363)	0.0691*** (0.0268)
Constant	1.6049*** (0.0786)	– 0.3575*** (0.1376)
Observations	1998	1998
F-statistics	38.33	

This table presents the results of 2SLS regressions. The instrumental variables used in the first-stage regression are the entrepreneurial experience of parents (family experience) and attendance of either business or personal finance courses (training). Financial literacy indicates the overall weighted measure derived from financial knowledge, financial behaviour and financial attitude. Robust standard errors are in parentheses

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively

Table 6 Robustness test with additional controls and alternative models

Variable	(1) BI insurance	(2) BI insurance	(3) BI insurance
Financial literacy	0.0303*** (0.0113)	0.5497*** (0.1490)	0.2886*** (0.0758)
Male	0.0197 (0.0149)	0.2453 (0.1635)	0.1306 (0.0853)
Age	− 0.0001 (0.0006)	− 0.0047 (0.0063)	− 0.0023 (0.0033)
High school	0.0103 (0.0198)	0.0147 (0.2206)	0.0051 (0.1148)
North	0.0390** (0.0163)	0.5371*** (0.1743)	0.2833*** (0.0903)
Centre	− 0.0029 (0.0179)	0.0290 (0.2223)	0.0185 (0.1130)
COVID impact	− 0.0110 (0.0148)	− 0.1560 (0.1440)	− 0.0814 (0.0761)
Primary	0.0352 (0.0328)	0.3870 (0.2545)	0.2119 (0.1369)
Secondary	0.0105 (0.0270)	0.1385 (0.2671)	0.0509 (0.1425)
Insurance advice	0.0614*** (0.0187)	0.6277*** (0.1512)	0.3456*** (0.0819)
Online account	0.0653** (0.0257)	0.6019*** (0.1953)	0.3239*** (0.1068)
Life insurance	0.1234*** (0.0160)		
Constant	− 0.0512 (0.0472)	− 3.7112*** (0.5317)	− 2.0790*** (0.2727)
Observations	1998	1998	1998

This table presents the results of alternative models of the relationship between financial literacy measures and the use of BI insurance, as well as the inclusion of additional control. Specifically, the first column shows the results of the baseline model using an OLS model with an additional control (i.e. life insurance). The second and third columns report the results using alternative specifications, which are logit and probit models, respectively. Robust standard errors are in parentheses

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively

Final remarks

This study presents observations regarding the significant association between financial literacy and BI insurance among Italian MSMEs. Our findings provide strong evidence of the positive role that financial education can play in improving risk



management strategies, thereby increasing firms' resilience to unforeseen events.

These findings have relevant policy implications, as spreading the culture of risk and protection remains a strategic issue in Italy, especially for SMEs, which are still underinsured for many operational risks (Gallo et al. 2022) and are run by entrepreneurs with an average low level of financial literacy (Finaldi Russo et al. 2022). Not only is underinsurance widespread and financial literacy low, but there is evidence that specific insurance literacy is even lower than general financial literacy (Cesari and D'Aurizio 2021). This is particularly worrying as the economic and social value of insurance is becoming increasingly important in the face of current global challenges, particularly those related to climate, geopolitical and economic uncertainty, which cannot be fully addressed by ex post government intervention. We hope that the lessons learned from this research can help promote a more informed and resilient approach to managing business risk, to the benefit of individual businesses and the economy as a whole in an increasingly unpredictable world.

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Data Availability All the data used in our empirical analysis are available on the Banca d'Italia website, as explained in footnote 8.

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