Insurance demand and extreme events: Evidence from the Covid-19 pandemic

Abstract

Understanding how individuals change their financial behaviour in response to large-scale extreme events is increasingly important in a world facing rising systemic risks, from pandemics to climate change. The Covid-19 pandemic offers a unique opportunity to study such behavioural responses, particularly in relation to insurance demand. Our study analyses the effect of Covid-19 contraction on individuals' propensity to take out insurance, using representative survey data collected in Italy in 2021. We find that the direct experience of such an extreme event significantly increased the interest in purchasing insurance, and the magnitude of the effect rose with the severity of the event. Also, women exhibited greater sensitivity to the risky event, displaying increased insurance interest even at low event severity levels. Our results highlight how adverse external shocks can significantly influence insurance demand.

Keywords: Insurance demand; Extreme events; Covid-19.

JEL codes: G22, G52

Insurance demand and extreme events: Evidence from the Covid-19 pandemic

1. Introduction

Understanding the determinants of insurance demand is a central question in economic and financial research. While extensive literature has explored how risk perception affects financial decision-making (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992), little empirical evidence exists regarding how direct exposure to adverse external shocks influences insurance choices. Given the subjective nature of risk perception, individuals' willingness to purchase protection may be shaped by personal experiences, which can either reinforce precautionary actions or lead to a diminished sense of vulnerability over time (Deryugina, 2013; Bernile et al., 2017).

To address this gap, the present study focuses specifically on Covid-19 as an exemplary adverse extreme event, investigating how direct exposure to such a significant external shock reshapes insurance demand. We argue that experiencing severe external shocks, such as being directly hit by the pandemic, updates individuals' belief over the likelihood of uncertain and infrequently observed events and consequently strengthens their propensity to take out insurance. This aligns with behavioural finance theories on heuristics and cognitive bias (Tversky & Kahneman, 1982), which suggest that individuals can adjust their financial preferences in response to perceived threats (Kunreuther et al., 1978). While prior research has explored the effects of the exposure to natural disasters on financial behaviours (Gallagher, 2014; Bernile et al., 2017), there has been limited examination of how Covid-19 affected the insurance demand. Indeed, Qian (2021) and Chen et al. (2023) found a positive correlation between Covid-19 infections and insurance company revenues and purchases in China, but they focused on macroeconomic data without observing individual-level responses to the direct exposure to the extreme event. Therefore, these studies could not capture the impact of different event severity levels on insurance demand. The current study addresses these limitations by adopting a micro-level perspective and leveraging granular individual data.

To address our research question, we rely on nationally representative survey data gathered in 2021 by the Italian Financial Education Committee. Italy provides a relevant context to analyse how the exposure to a significant external event affected the insurance demand, as the country was among the earliest and hardest hit in Europe, with over 16 million confirmed cases and more than 160,000 Covid-related deaths recorded between 2020 and 2022 (ISTAT, 2022).

Our findings show that having experienced an extreme and risky event like the Covid-19 significantly increased individuals' propensity to take out insurance policies. Moreover, the effect was bigger for those who were exposed to more severe scenarios, as they showed an even higher interest in purchasing insurance. Also, women reacted more to the direct experience of the extreme event, as they showed a more pronounced interest in taking out insurance even in less severe cases.

Our contribution to the literature is threefold. First, we investigate how extreme events affect insurance choices leveraging the pandemic as an exogenous shock, hence going beyond the study of natural disasters (Yin et al., 2016; Kunreuther & Pauly, 2018; Lin, 2020). We also focus on the role played by the severity of the experience, expecting individuals facing more severe events to react more to the shock. Second, we extend the literature on insurance demand (Gallagher, 2014; Luciano et al., 2016; Pitthan & De Witte, 2021) by analysing the factors associated with the interest in purchasing insurance, using a nationally representative sample of Italian households. Third, we conduct a gender-based analysis to determine whether the behaviour following a shock significantly differs between men and women, in line with existing literature suggesting that financial risk perception and precautionary behaviour may vary by gender (Gandolfi & Miners, 1996; Outreville, 2014; Luciano et al., 2016).

The rest of the paper is structured as follows. Section 2 reviews the literature on insurance demand and behavioural responses. Section 3 outlines the methodology and Section 4 presents the empirical findings. Finally, Section 5 draws the conclusions and discusses the implications.

2. Literature Review

The literature on insurance demand is quite scarce and presents several unsolved puzzles (Pitthan & De Witte, 2021). As highlighted by Gomes et al. (2021) and Koijen & Yogo (2022), insurance is a field of research that has been relatively overlooked, where little is known about the determinants of heterogeneous households' insurance demand.

Central to this strand of research is the expected utility framework. Assuming the rationality of economic agents, Mossin (1968) modelled insurance demand through an expected utility function, embedding the concept of relative risk aversion developed by Pratt (1964) and Arrow (1965). According to this framework, if an increase in an individual's wealth leads to a more significant portion of wealth being allocated to risky assets, then the individual exhibits decreasing relative risk aversion; in other words, they become less risk averse. Therefore, insurance coverage is a function of wealth maximization given the probability of an expected future loss, with risk aversion being a central determinant of consumer choices. However, empirical evidence does not fully support the predictions of this theoretical framework. For instance, Greene's seminal work in 1963 did not find a significant relationship between individuals' risk attitudes and prior insurance uptake. His subsequent experimental study in 1964 further revealed no evidence that insurance purchasing behaviours could be predicted based on risk-taking behaviours (Greene, 1964). Similarly, Murray (1971, 1972) documented that individually assessed utility functions failed to predict insurance consumption decisions accurately. Additionally, Slovic et al. (1977) showed through laboratory experiments that individuals prefer to insure against events with a moderately high probability of causing a relatively small loss rather than against low-probability, high-loss events. This behaviour is contrary to the expected utility framework as it implies a convex utility function. Several empirical studies have confirmed these findings, which challenge traditional utility theory. Recently, Browne et al. (2015), using data from German insurers, demonstrated a lower demand for insurance against catastrophic events compared to bicycle theft coverage. Similarly, Botzen & van den Bergh (2012) documented

that a large proportion of homeowners in the Netherlands neglect the low probability of flooding and avoid purchasing insurance for this risk, even though climate change increases the likelihood of such events.

Since the expected utility framework failed to account for observed patterns in insurance demand, the literature has shifted toward behavioural and cognitive explanations to address these empirical discrepancies. Central to this body of work are the contributions of Kahneman and Tversky (1979) and Tversky and Kahneman (1992), who argued that people's decision-making is subject to several biases stemming from heuristics, which can lead to irrational choices. This relates to the well-known Prospect Theory (Kahneman & Tversky, 1979), which predicts that individuals evaluate their choices based on gains and losses from a reference point rather than the prospect's effect on total expected wealth, exhibiting a higher aversion for losses. Because losses are perceived more strongly than gains of the same magnitude, boundedly rational consumers might perceive pure protection insurance, such as term life insurance, as a risky investment because they could lose their premiums if a bad event does not occur within the specified term (Pitthan & De Witte, 2021). As a result, individuals susceptible to potential loss may choose not to purchase such an insurance. Instead, they may prefer a safer strategy to prepare for uncertain future events by increasing their precautionary savings (Hwang, 2021). Building on Kahneman and Tversky (1979, 1992), Schmidt (2016) used a Prospect Theory value function to investigate insurance demand. This model provides a theoretical explanation for why individuals are reluctant to insure against rare losses, even at subsidized premiums (Kunreuther & Pauly, 2004), while simultaneously opting for insurance against moderate risks at significantly higher loaded premiums.

The availability and representativeness heuristics, which refer to determining the probability of an event based on salient events or a limited sample of information, can lead individuals to overestimate the likelihood of an event occurring. These heuristics may help understand how individuals perceive risks. A study by Deryugina (2013), who analysed how individuals update their beliefs following

abnormal local temperature, found that people do not update their inferences in a Bayesian manner due to biases from availability and representativeness heuristics. Existing studies suggest that external shocks shape individuals' choices in complex ways. For example, Bernile et al. (2017) provided evidence that early-life exposure to natural disasters influences CEOs' behaviour: They found that moderate exposure was associated with riskier corporate policies, while experiencing extreme disaster fatalities led to greater caution in approaching corporate risk-taking. This perspective aligns with the broader conjecture that personal experiences of risky situations shape financial decision-making, particularly in response to unforeseen events. In this regard, further research has employed these heuristics to explain insurance demand during rare events and natural disasters. Gallagher (2014), using a dataset of large regional floods from 1980 to 2007 and flood insurance demand in the United States, demonstrated that after the occurrence of these extreme events, the demand for flood insurance increased in the affected areas but then quickly decayed to baseline levels. Similarly, Turner et al. (2014) found that people who experienced severe consequences of the 2010 flood in Pakistan demanded more insurance protection compared to those less affected. In an experimental setting, Yin et al. (2016) showed that, when individuals experience their first typhoon, the availability heuristic dominates their decision process, leading to an increase in insurance demand, which then wanes in the absence of further disasters. However, if more typhoons occur, the gambler's fallacy heuristic leads to a reduction in insurance purchases. Lin (2020) found that even personal experiences that do not lead to personal losses can affect financial decisions. Using a dataset of homeowners' earthquake insurance policies in California from 2005 to 2013, she provided evidence that minor earthquake shakings, which do not result in economic loss, can cause individuals to perceive a higher risk in the short term and seek protection by purchasing earthquake policies (Lin, 2020).

Using aggregated data, Qian (2021) investigated the unprecedented event of the pandemic and its impact on insurance consumption decisions. By employing data on confirmed Covid-19 cases in 241 Chinese cities, the author documented a positive and significant association between Covid-19

infections and insurance revenues, especially those linked to life and health products. Similarly, using city-level insurance purchases data from one online insurance platform in China, Chen et al. (2023) found an increase in the number of insurance purchases after the pandemic. Both latter studies adopted a broad-scale approach, focusing on aggregated data rather than individuals' behavioural patterns. As a result, they could not assess the effect of directly experiencing the extreme event, i.e. contracting the Covid-19, on personal insurance decisions, which is instead the aim of our research.

The existing literature on insurance demand has also highlighted the critical role of socio-demographic characteristics in explaining insurance choices. Age is commonly found to be negatively associated with insurance demand (Ferber & Lee, 1980; Bernheim, 1991; Gandolfi & Miners, 1996). While Gandolfi and Miners (1996) sustain that, as people age, their cumulative probability of living in the future decreases, implying a lower need for insurance protection, Luciano et al. (2016) argue that the decision to acquire a contract should be independent of age if policy premiums are reasonably priced at all stages of life. With respect to income, insurance consumption usually increases with household earnings. This positive relationship occurs because premiums become more affordable as income rises and, in the case of life insurance, because the policy provides protection against the loss of future income resulting from the death of the primary income earner (Browne & Kim, 1993). The evidence on gender is instead mixed. While Luciano et al. (2016) documented that women are less likely to be insured compared to men, even after controlling for several socioeconomic factors, Turner et al. (2014) found that female participants to their behavioural experiment were significantly more likely to choose insurance. Eling et al. (2021), instead, did not find any significant association between gender and insurance demand. As for education, individuals with a higher attainment tend to have a greater awareness of insurance needs, even though higher knowledge can lead to more risk-loving behaviours (Outreville, 2014). Other factors such as family size, marital status, and employment status can also influence insurance uptake (Eling et al., 2021; Bongini et al., 2023).

As initially argued, the role of an individual's risk aversion profile is widely debated in the insurance literature. Although utility theory predicts a positive relationship between risk aversion and insurance demand, empirical research by Giesbert et al. (2011) and Luciano et al. (2016) documented a negative relation, while Liebenberg et al. (2012) found no significant association. Eling et al. (2021), who investigated this nexus through survey data on 60,000 individuals from 14 countries in Europe, showed that risk propensity is positively associated with insurance ownership, especially for life insurance policies, as they are perceived as risky assets.

3. Data and Estimation Strategy

Our study draws on data from the survey commissioned by the Italian Financial Education Committee and administered by the research institute BVA-Doxa between May and June 2021. The dataset includes responses from 5,011 individuals selected through stratified sampling to reflect the national population. Respondents were identified as either the primary decision-makers for their household's finances or the most informed members regarding economic matters. Quotas were applied for gender, age, and geographic distribution, and post-stratification weights were used to ensure representativeness across key socio-demographic indicators such as age, region, education, income, and employment status (Comitato Edufin, 2021).

In our sample, we define an individual as interested in purchasing insurance through the variable *InsuranceDemand*, which is a dichotomous one. This variable is constructed based on individuals' responses to the following survey question: "Since the beginning of the pandemic (March 2020), have you and/or your partner consulted a financial advisor, bank, or other intermediary to evaluate the purchase of insurance policies?". Respondents who selected the option "Yes, to consider purchasing insurance policies" were assigned a value of 1, while those who did not select this option were assigned a value of 0. To construct the indicator of direct experience with the extreme event, we first create a variable that captures whether the respondent or a member of his/her household contracted

the Covid-19, regardless of its severity. Subsequently, to enhance the granularity of the analysis, additional survey questions were utilized to distinguish the Covid-19 cases by gravity. In particular, respondents were asked whether they or a household member had contracted Covid-19 and, if so, whether they had been hospitalized or admitted to intensive care[1]. This categorization allows us to analyse whether the severity of the risky experience influenced the interest in insurance subscription in a differentiated manner.

To investigate the determinants of insurance demand in relation to the extreme event of Covid-19 contraction, we estimate a probit regression model. We hypothesize that having been hit by this rare extreme event is positively associated with the propensity to purchase insurance. The model takes the following functional form:

$$InsuranceDemand_i = \beta_0 + \beta_1 X_i + \beta_2 Covid_i + \varepsilon_i$$

where the subscript i is the individual identifier and ε_i is the error term. X_i is a set of control variables, including gender, age and age squared, levels of education, income quartiles, and geographical areas. $Covid_i$ captures whether the respondent or another household member contracted the Covid-19.

As mentioned previously, to further explore the role of extremely adverse shocks, we construct additional indicators to distinguish the severity of the risk event, ranging from *ModerateCovid* to *CriticalCovid*, based on respondents' self-reported classification of the seriousness of the event[2]:

[1] Based on respondents' answers, we constructed three binary variables to capture different levels of Covid-19 severity. *ModerateCovid* identifies the households who contracted the virus, for whom the infection did not require the hospitalization. *SevereCovid* and *CriticalCovid* capture more serious health outcomes, with values of 1 assigned in case of hospitalizations or intensive care due to the infection, respectively. The variable *Covid* equals 1 if the respondent reported one of the three cases discussed above.

[2] The exact phrasing of the survey items employed in creating our variables can be found in the Appendix, and the complete questionnaire is accessible at: https://www.comitatoeducazionefinanziaria.gov.it/export/sites/sitopef/modules/quaderni_ricerca/Questionario-Edufin-2021.docx

$$InsuranceDemand_i = \beta_0 + \beta_1 X_i + \beta_2 ModerateCovid_i + \beta_3 SevereCovid_i + \beta_4 CriticalCovid_i + \varepsilon_i$$

To enhance the explanatory power of our model, we estimate an extended version that incorporates two additional explanatory variables: *RiskPropensity* and *InsuranceExperience.* In line with the literature, we expect a significant association between willingness to take financial risks and interest in insurance policy (Luciano et al., 2016; Eling et al., 2021). Furthermore, existing studies suggest that having a previous experience with insurance policies raises the likelihood of additional coverage (Robinson et al., 2021). Hence, we estimate the following probit regression model[3]:

$$InsuranceDemand_i = \beta_0 + \beta_1 X_i + \beta_2 ModerateCovid_i + \beta_3 SevereCovid_i + \beta_4 CriticalCovid_i + \beta_5 RiskPropensity_i + \beta_6 InsuranceExperience_i + \varepsilon_i$$

where X_i includes the same control variables as the baseline model. *RiskPropensity* is derived from a survey question where respondents rated their risk tolerance on a scale from 1 to 10, where 1 indicates complete risk aversion and 10 means high-risk tolerance. We define *RiskPropensity* as a binary variable, assigning a value of 1 to individuals who reported a score greater than the median value of 4 and 0 otherwise.[4] Additionally, we include *InsuranceExperience*, which is a dichotomous variable taking value 1 for individuals who held a life insurance policy before the Covid-19 emergency[5].

Subsequently, we further refine the model by introducing three additional explanatory variables related to households' portfolio composition: *Homeownership*, *RiskFreeAsset* and *RiskyAsset*. The variables indicating the ownership of the household's primary residence, risk-free or risky assets

[3] Notably, in this specification, the general Covid-19 variable is no longer included, as the focus shifts entirely to the role of illness severity in shaping insurance demand.

[4] The precise wording of the question is as follows: "When thinking about your financial decisions, including financial investments, how much risk are you willing to take? Please indicate your answer on a scale from 1 to 10, where 1 means 'not at all risk-averse' and 10 means 'very risk-averse.'

[5] Respondents were asked about their ownership of various financial products prior to the pandemic.

allow us to explore whether being more familiar with financial markets opportunities is associated with higher potential insurance demand, as suggested by Luciano et al. (2016). We therefore estimate the following model:

$$InsuranceDemand_i = \beta_0 + \beta_1 X_i + \beta_2 ModerateCovid_i + \beta_3 SevereCovid_i + \beta_4 CriticalCovid_i + \beta_5 RiskPropensity_i + \beta_6 InsuranceExperience_i + \beta_7 Homeownership_i + \beta_8 RiskFreeAsset_i + \beta_9 RiskyAsset_i + \varepsilon_i$$

where X_i includes the same control variables of the baseline regression. *Homeownership* is a dummy variable equal to 1 if the respondents own their home, either outright or through a mortgage, and 0 otherwise. *RiskFreeAsset* is a binary variable that takes a value of 1 if respondents reported holding only risk-free assets, like savings accounts or government bonds, while *RiskyAsset* takes a value of 1 if respondents reported holding private bonds, stocks, mutual funds, ETFs, sustainable finance products, pension funds, or cryptocurrencies. In line with the study by Luciano et al. (2016) and Eling et al. (2021), we hypothesize that individuals who are homeowners and hold risky assets are more familiar with investments, either in the form of real estate or financial instruments, may also be more inclined to take out insurance policies.

Finally, we introduce a gender-based analysis to examine whether men and women exhibit different behaviours when considering insurance purchase decisions. This heterogeneity analysis is motivated by existing literature suggesting that risk perception and financial decision-making may vary systematically by gender, potentially influencing insurance demand (Gandolfi & Miners, 1996; Outreville, 2014; Luciano et al., 2016). To formally assess these differences, we estimate the same regression model separately for the male and female subsamples. This analysis allows us to compare how the determinants of insurance purchasing operate across gender groups while keeping the model specification unchanged compared to the previous one.

Table 1, presented in appendix, reports the descriptive statistics for the socio-demographic characteristics and the variables of interest. Regarding the insurance demand, 8% of respondents reported having consulted a financial intermediary for insurance-related purposes, indicating a willingness to explore insurance policies after the pandemic. In terms of exposure to the extreme event, 18% of respondents reported they or another household member contracted the Covid-19. More specifically, 13% of households experienced mild symptoms without requiring hospitalization, 2% were hospitalized, and 3% also required the intensive care treatment. The sample is predominantly made up of men (63%), while the age distribution appears well-balanced across different ranges.

4. Results

The results from the first regression models are reported in Table 2, in the Appendix. The initial specification in column (1) only includes demographic and socio-economic characteristics as control variables. The relationship between age and interest in insurance policies after the pandemic appears to be non-linear. As expected from prior literature, the coefficient on age is negative and statistically significant, indicating that interest tends to decrease with age (Ferber & Lee, 1980; Bernheim, 1991; Gandolfi & Miners, 1996). However, the positive and weakly significant coefficient on age squared suggests that, while insurance participation tends to decline with age, this trend may reverse among the oldest individuals, implying a U-shaped relationship. (Bongini et al., 2023). Education, conversely, exhibits a positive association, significantly increasing the probability of seeking insurance, corroborating Outreville's (2014) evidence. The presence of children emerges as a strong predictor, consistent with Bongini et al. (2023), confirming that individuals with dependents are more likely to seek insurance as a precautionary financial measure. Building upon this baseline, in column (2), the inclusion of income does not substantially alter the results. Differently from what Browne and Kim (1993) found, the quartile coefficients are not statistically significant, suggesting that income alone is not a primary determinant when controlling for other socioeconomic factors. In column (3),

the coefficient on the direct experience with the Covid-19 is positive and statistically significant at the 1% level, supporting our primary hypothesis that exposure to an extreme event changes individuals' risk perceptions of its likelihood, which in turn increases the interest in an insurance protection solution. More broadly, these results align with the existing literature about how experiencing adverse negative shocks can influence decision-making and insurance demand (Gallagher, 2014; Turner et al., 2014; Yin et al., 2016). To refine the analysis further, the fourth specification replaces the general Covid-19 exposure variable with more detailed measures of the risk severity of the event, distinguishing between moderate cases, sever cases involving hospitalizations, and critical cases leading to intensive care admissions. The results reported in column (4) indicate that all three levels of severity are positively associated with potential insurance demand, with the coefficients increasing in magnitude as the gravity of the event rises. In other words, those who were affected by severe and critical Covid-19 showed an even higher interest in purchasing insurance.

In Table 3, we consider the effect of two additional explanatory variables: *RiskPropensity* and *InsuranceExperience*. In line with the empirical literature (Luciano et al., 2016, Eling et al., 2021), results in column (2) of Table 3 indicate that being more risk tolerant is positively associated with being interested in insurance policies, meaning that those comfortable with financial risk may also perceive insurance as a strategic financial tool. The third column of Table 3 shows a positive and significant coefficient on *InsuranceExperience*, indicating that individuals with previous exposure to insurance products are more likely to consider purchasing additional coverage. Most importantly, the inclusion of these variables related to risk attitudes and past insurance experience leaves the effect of the extreme event unchanged. Indeed, we still observe that all three levels of severity of the event are positively associated with potential insurance demand, with the coefficient magnitudes increasing with the gravity of the event.

Table 4 reports the estimates that take into account also the familiarity with financial investments, either in the form of real estate or financial instruments (Luciano et al., 2016; Eling at al., 2021;

Outreville 2014). The results in column (1) show a positive, but only marginally significant coefficient on homeownership. In column (2) of Table 4, we included the ownership of risk-free and risky assets. The results show that holding risky assets is positively and significantly associated with potential insurance demand, while the risk-free investment does not play any role. These findings are consistent with those of Outreville (2014), Luciano et al. (2016), and Eling et al. (2021), who report a positive association between individuals' familiarity with financial market opportunities and their interest in insurance policies. As in Table 3, the inclusion of these variables leaves the positive relationship between Covid-19 exposure and insurance demand unchanged, underscoring the robustness of our finding even when accounting for previous financial investments.

Finally, Table 5 shows how the interest in purchasing insurance differs by gender, highlighting distinct behaviours between men and women. While column (1) of Table 5 reports the estimates for the full sample, in columns (2) and (3) several differences emerge between the female and male subsamples. Higher education is a stronger predictor of potential insurance demand for women, showing a significant positive correlation, suggesting that higher educational attainments may play a more central role in shaping their insurance decisions. The presence of children remains a significant driver of insurance demand for both genders, corroborating the hypothesis that caregiving responsibilities increase the perceived need for insurance protection (Bongini et al., 2023). Notably, the severity of the extreme event plays a stronger role in influencing potential insurance demand for women compared to men, with the coefficients on severe and critical Covid-19 being statistically significant for the woman subsample only. This suggests that women may be more responsive to direct shocks in terms of precautionary financial behaviour, aligning with previous literature indicating that women are more likely to be susceptible to the availability heuristic (Yin et al., 2016), i.e., decision-making is conditioned from past recent experiences (Kahneman & Tversky, 1982).

5. Conclusions

The literature on insurance demand documents that being exposed to natural disasters and suffering their consequences exerts an influence on individuals' insurance underwriting (Yin et al., 2016; Kunreuther & Pauly, 2018; Lin, 2020). In this study, we contribute to this strand of the literature investigating whether experiencing a rare extreme event like the Covid-19 significantly increased individuals' propensity to purchase insurance. To do so, we analyse survey data collected in 2021 from a representative sample of Italian households and exploit different event severity levels. We find a positive and significant association between having directly experienced the extreme event and the interest in taking out insurance policies. Strikingly, the magnitude of this association depends on the intensity of the event experienced by individuals and their households: those who were affected by severe and critical Covid-19 showed higher interest in purchasing insurance. These results are robust to several specifications, i.e., they do not change even after controlling for risk propensity, previous insurance experience, and different types of households' financial investments. A possible explanation is that individuals hit by such a shock develop a greater awareness of risky events and insurance needs. Moreover, a separate analysis by gender highlights a heterogeneity in the reaction to the event, with men being more interested in insurance policies only when they experienced the most severe scenario.

Being able to capture the potential demand that arises in the heat of the moment, when a risky event occurs, is crucial both for the population seeking better protection and the insurance companies looking to meet this potential demand. On average, only a small portion of the population is insured (IVASS, 2023), however, our estimates showed that individuals' awareness and willingness to consider purchasing insurance policies increase significantly when they are directly affected by risky events, not only natural catastrophes, in proportion to the severity of the occurrence itself. While prevention is undoubtedly preferable, the saying "better late than never" also holds true. For this

reason, insurance companies should be ready to responsibly take action when major risky events occur, to launch broad information and awareness campaigns, supported by transparent sales strategy. Financial intermediaries and policymakers could strategically exploit and anticipate greater insurance demand in times of uncertainty or when adverse events occur. Our findings underscore the increasing attention that insurance companies receive from the market, as providers of protection during periods of heightened uncertainty. This perspective has critical implications in a world facing increasingly frequent systemic risks, such as pandemics and climate change, where anticipating behavioural shifts can help shape more effective public and private strategies. From a policy standpoint, the heterogeneity we observe, especially across gender and individual profiles, suggests the value of tailoring insurance solutions to diverse segments of the population. Public institutions and market actors alike can benefit from integrating behavioural insights to promote more effective and responsive insurance models.

We acknowledge that this analysis has certain limitations that future research could address. A primary limitation concerns the survey-based methodology employed to collect data. Since our findings rely on self-reported information, the data may be susceptible to respondent biases or inaccuracies. Moreover, we evaluate the effect of Covid-19 on insurance demand in the short term because of data availability. However, it would be interesting to investigate whether this effect persists in the long term or whether the interest in purchasing insurance eventually converges back to its initial level, as observed by Yin et al. (2016) and Lin (2020) in the context of insurance for natural disasters. Finally, we used Covid-19 as a case study to explore the general link between adverse events and insurance demand. However, future research could extend the methodological approach applied in our study to assess the impact of other emerging critical events, such as those related to climate change, currently at the centre of international debate.

References

Armantier, O., Foncel, J., & Treich, N. (2023). Insurance and portfolio decisions: Two sides of the same coin? *Journal of Financial Economics*, 148(3), 201–219. https://doi.org/10.1016/j.jfineco.2023.03.003

Arrow, K.J. (1965) Aspects of the Theory of Risk Bearing. *Helsinki: Academic Publishers*.

Bernheim, B. D. (1991). How strong are bequest motives? Evidence based on estimates of the demand for life insurance and annuities. *Journal of political Economy*, 99(5), 899-927. https://doi.org/10.1086/261783

Bernile, G., Bhagwat, V., & Rau, P. R. (2017). What doesn't kill you will only make you more risk-loving: Early-life disasters and CEO behavior. *The Journal of Finance*, 72(1), 167-206. https://doi.org/10.1111/jofi.12432

Bongini, P., Cucinelli, D., & Soana, M. G. (2023). Insurance holdings: Does individual insurance literacy matter? *Finance Research Letters*, 58, 104511. https://doi.org/10.1016/j.frl.2023.104511

Botzen, W. J. W., & van den Bergh, J. C. J. M. (2012). Risk attitudes to low-probability climate change risks: WTP for flood insurance. *Journal of Economic Behavior & Organization*, 82(1), 151–166. https://doi.org/10.1016/j.jebo.2012.01.005

Browne, M. J., & Kim, K. (1993). An International Analysis of Life Insurance Demand. *The Journal of Risk and Insurance*, 60(4), 616–634. https://doi.org/10.2307/253382

Browne, M. J., Knoller, C., & Richter, A. (2015). Behavioral bias and the demand for bicycle and flood insurance. *Journal of Risk and Uncertainty*, 50(2), 141–160. https://doi.org/10.1007/s11166-015-9212-9

Chen, S., Lin, Z., Wang, X., & Xu, X. (2023). Pandemic and insurance purchase: How do people respond to unprecedented risk and uncertainty? *China Economic Review*, 79, 101946. https://doi.org/10.1016/j.chieco.2023.101946

Comitato Edufin. Rapporto EDUFIN 2021: L'educazione finanziaria come anticorpo alla vulnerabilità economica. https://www.comitatoeducazionefinanziaria.gov.it/modules/edufin_2021/2021_Rapporto-Edufin-2021.pdf

Deryugina, T. (2013). How do people update? The effects of local weather fluctuations on beliefs about global warming. Climatic Change, 118(2), 397–416. https://doi.org/10.1007/s10584-012-0615-1

Eling, M., Ghavibazoo, O., & Hanewald, K. (2021). Willingness to take financial risks and insurance holdings: A European survey. *Journal of Behavioral and Experimental Economics*, 95, 101781. https://doi.org/10.1016/j.socec.2021.101781

Ferber, R., & Lee, L. C. (1980). Acquisition and accumulation of life insurance in early married life. *Journal of Risk and Insurance*, 713-734. https://doi.org/10.2307/252292

Gallagher, J. (2014). Learning about an Infrequent Event: Evidence from Flood Insurance Take-Up in the United States. *American Economic Journal: Applied Economics*, 6(3), 206–233. https://doi.org/10.1257/app.6.3.206

Gandolfi, A. S., & Miners, L. (1996). Gender-Based Differences in Life Insurance Ownership. *The Journal of Risk and Insurance*, 63(4), 683. https://doi.org/10.2307/253478

Giesbert, L., Steiner, S., & Bendig, M. (2011). Participation in Micro Life Insurance and the Use of Other Financial Services in Ghana. *Journal of Risk and Insurance*, 78(1), 7–35. https://doi.org/10.1111/j.1539-6975.2010.01405.x

Gomes, F., Haliassos, M., & Ramadorai, T. (2021). Household Finance. *Journal of Economic Literature*, 59(3), 919–1000. https://doi.org/10.1257/jel.20201461

Greene, M. R. (1963). Attitudes toward Risk and a Theory of Insurance Consumption. *The Journal of Insurance*, 30(2), 165–182. https://doi.org/10.2307/250418

Greene, M. R. (1964). «Insurance Mindedness». Implications for Insurance Theory. *The Journal of Risk and Insurance*, 31(1), 27–38. https://doi.org/10.2307/251206

Hwang, I. D. (2021). Prospect theory and insurance demand: Empirical evidence on the role of loss aversion. *Journal of Behavioral and Experimental Economics*, 95, 101764. https://doi.org/10.1016/j.socec.2021.101764

Istituto Nazionale di Statistica (ISTAT). (2022). *Annual report 2022 – Summary*. Rome: Istituto Nazionale di Statistica. https://www.istat.it/wp-content/uploads/2022/09/Annual-Report-2022_Summary.pdf

IVASS – Istituto per la Vigilanza sulle Assicurazioni. (2024). Relazione sull'attività svolta nel 2023. Rome. https://www.ivass.it/pubblicazioni-e-statistiche/pubblicazioni/relazione-annuale/2024/Relazione_annuale_2023.pdf

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263–291. https://doi.org/10.2307/1914185

Koijen, R. S. J., & Yogo, M. (2022). New Perspectives on Insurance. *The Review of Financial Studies*, 35(12), 5275–5286. https://doi.org/10.1093/rfs/hhac063

Kunreuther, H. C., Ginsberg, R., Miller, L., Sagi, P., Slovic, P., Borkan, B., & Katz, N., (1978). Disaster Insurance protection: public policy Lessons. *New York: John Wiley*.

Kunreuther, H., & Pauly, M. (2004). Neglecting Disaster: Why Don't People Insure Against Large Losses? *Journal of Risk and Uncertainty*, 28(1), 5–21.

Kunreuther, H., & Pauly, M. V. (2018). Dynamic Insurance Decision-Making for Rare Events: The Role of Emotions. *The Geneva Papers on Risk and Insurance - Issues and Practice*, *43*(2), 335–355. https://doi.org/10.1057/s41288-017-0068-x

Lanciano, E., Previati, D., Ricci, O., & Stentella Lopes, F. S. (2024). Gender differences and measurement error in financial literacy. *Journal of Behavioral and Experimental Finance*, 41, 100896. https://doi.org/10.1016/j.jbef.2024.100896

Liebenberg, A. P., Carson, J. M., & Dumm, R. E. (2012). A Dynamic Analysis of the Demand for Life Insurance. *Journal of Risk and Insurance*, 79(3), 619–644. https://doi.org/10.1111/j.1539-6975.2011.01454.x

Lin, X. (2020). Feeling Is Believing? Evidence From Earthquake Shaking Experience and Insurance Demand. *The Journal of Risk and Insurance*, 87(2), 351–380. https://doi.org/10.1111/jori.12291

Luciano, E., Outreville, J. F., & Rossi, M. (2016). Life Insurance Ownership by Italian Households: A Gender-Based Differences Analysis. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 41(3), 468–490. https://doi.org/10.1057/gpp.2016.7

Mossin, J. (1968). Aspects of Rational Insurance Purchasing. *Journal of Political Economy*, 76(4), 553–568.

Murray, M. L. (1971). A Deductible Selection Model. Development and Application. *The Journal of Risk and Insurance*, 38(3), 423–436. https://doi.org/10.2307/251404

Murray, M. L. (1972). Empirical Utility Functions and Insurance Consumption Decisions. *The Journal of Risk and Insurance*, 39(1), 31–41. https://doi.org/10.2307/251649

Outreville, J. F. (2014). Risk Aversion, Risk Behavior, and Demand for Insurance: A Survey. *Journal of Insurance Issues*, 37(2), 158–186.

Pitthan, F., & De Witte, K. (2021). Puzzles of insurance demand and its biases: A survey on the role of behavioural biases and financial literacy on insurance demand. *Journal of Behavioral and Experimental Finance*, 30, 100471. https://doi.org/10.1016/j.jbef.2021.100471

Pratt, J. W. (1964). Risk Aversion in the Small and in the Large. *Econometrica*, 32(1/2), 122–136. https://doi.org/10.2307/1913738

Qian, X. (2021). The impact of COVID-19 pandemic on insurance demand: The case of China. *The European Journal of Health Economics*, 22(7), 1017–1024. https://doi.org/10.1007/s10198-021-01344-7

Robinson, P. J., Botzen, W. J. W., Kunreuther, H., & Chaudhry, S. J. (2021). Default options and insurance demand. *Journal of Economic Behavior & Organization*, 183, 39–56. https://doi.org/10.1016/j.jebo.2020.12.017

Schmidt, U. (2016). Insurance Demand Under Prospect Theory: A Graphical Analysis. *Journal of Risk and Insurance*, 83(1), 77–89. https://doi.org/10.1111/jori.12098

Slovic, P., Fischhoff, B., Lichtenstein, S., Corrigan, B., & Combs, B. (1977). Preference for Insuring against Probable Small Losses: Insurance Implications. *The Journal of Risk and Insurance*, 44(2), 237–258. https://doi.org/10.2307/252136

Turner, G., Said, F., & Afzal, U. (2014). Microinsurance Demand After a Rare Flood Event: Evidence From a Field Experiment in Pakistan. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 39(2), 201–223. https://doi.org/10.1057/gpp.2014.8

Tversky, A, & Kahneman, D. (1982). Judgment under uncertainty: Heuristics and biases. In *Judgment under uncertainty: Heuristics and biases*, 3–22. Cambridge, UK: Cambridge University Press.

Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, 5(4), 297–323. https://doi.org/10.1007/BF00122574

Wang, H., Zhang, D., Guariglia, A., & Fan, G.-Z. (2021). 'Growing out of the growing pain': Financial literacy and life insurance demand in China. *Pacific-Basin Finance Journal*, 66, 101459. https://doi.org/10.1016/j.pacfin.2020.101459

Yin, H., Chen, J., Kunreuther, H., & Michel-Kerjan, E. (2016). Availability Heuristic and Gambler's Fallacy over Time in a Natural Disaster Insurance Choice Setting. SSRN Scholarly Paper 2798371. https://doi.org/10.2139/ssrn.2798371

Appendix

Table 1 Summary Statistics

	(1) mean	sd	min	max
Interested in insurance	0.08	0.27	0.00	1.00
Affected by Covid-19	0.19	0.39	0.00	1.00
Moderate Covid-19	0.13	0.34	0.00	1.00
Severe Covid-19	0.02	0.15	0.00	1.00
Critical Covid-19	0.03	0.18	0.00	1.00
Female	0.37	0.48	0.00	1.00
North	0.46	0.50	0.00	1.00
Centre	0.20	0.40	0.00	1.00
South	0.34	0.47	0.00	1.00
Age	52.70	13.57	18.00	89.00
Age2	2961.14	1454.77	324.00	7921.00
Elementary School or less	0.45	0.50	0.00	1.00
High School	0.37	0.48	0.00	1.00
Degree	0.19	0.39	0.00	1.00
Income, 1st quartile	0.26	0.44	0.00	1.00
Income, 2nd quartile	0.19	0.39	0.00	1.00
Income, 3rd quartile	0.31	0.46	0.00	1.00
Income, 4th quartile	0.24	0.43	0.00	1.00
Having children	0.50	0.50	0.00	1.00
Insurance Experience	0.09	0.28	0.00	1.00
Home Ownership	0.82	0.39	0.00	1.00
Risk Propensity	0.45	0.50	0.00	1.00
Risk Free Asset	0.14	0.35	0.00	1.00
Risky Asset	0.19	0.40	0.00	1.00
Observations	5011			

Note: The number of observations is 5011 for all the variables. All figures are sample-weighted. To classify respondents based on household income, we divided them into four quartiles according to their self-reported monthly net income. The first quartile includes households earning €1,264 or less, while the second quartile consists of those with an income between €1,265 and €1,549. The third quartile covers households earning between €1,550 and €2,454, and the fourth quartile includes those with an income above €2,455.

Table 2 Multivariate regression model of being interested in insurance policies: the role of the extreme event of Covid-19.

VARIABLES	(1) Interested in insurance	(2) Interested in insurance	(3) Interested in insurance	(4) Interested in insurance
Affected by Covid-19			0.065***	
			(0.011)	
Moderate Covid-19				0.042***
				(0.014)
Severe Covid-19				0.089***
				(0.027)
Critical Covid-19				0.115***
				(0.019)
Female	-0.014	-0.014	-0.016	-0.015
	(0.011)	(0.011)	(0.011)	(0.011)
North	0.020	0.020	0.016	0.017
	(0.013)	(0.013)	(0.013)	(0.013)
Centre	-0.005	-0.005	-0.004	-0.002
	(0.014)	(0.014)	(0.014)	(0.014)
Age	-0.009***	-0.009***	-0.008***	-0.008**
	(0.003)	(0.003)	(0.003)	(0.003)
Age2	0.000*	0.000*	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
High School	0.028**	0.028**	0.029**	0.026**
	(0.013)	(0.013)	(0.013)	(0.013)
Degree	0.040***	0.040***	0.041***	0.038***
	(0.013)	(0.014)	(0.013)	(0.013)
Having children	0.059***	0.059***	0.050***	0.046***
	(0.012)	(0.012)	(0.012)	(0.012)
Income, 2nd quartile		-0.022	-0.021	-0.019
		(0.015)	(0.016)	(0.015)
Income, 3rd quartile		0.005	0.010	0.014
		(0.015)	(0.015)	(0.015)
Income, 4th quartile		-0.003	0.002	0.004
		(0.016)	(0.016)	(0.016)
Observations	5,011	5,011	5,011	5,011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3 Multivariate regression model of being interested in insurance policies: the role of behavioural and experiential factors.

VARIABLES	(1) Interested in insurance	(2) Interested in insurance	(3) Interested in insurance
Moderate Covid-19	0.042***	0.038***	0.037***
	(0.014)	(0.014)	(0.014)
Severe Covid-19	0.089***	0.077***	0.071***
	(0.027)	(0.026)	(0.026)
Critical Covid-19	0.115***	0.095***	0.088***
	(0.019)	(0.019)	(0.019)
Female	-0.015	-0.008	-0.007
	(0.011)	(0.011)	(0.011)
North	0.017	0.018	0.018
	(0.013)	(0.012)	(0.012)
Centre	-0.002	-0.003	-0.003
	(0.014)	(0.014)	(0.014)
Age	-0.008**	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)
Age2	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)
High School	0.026**	0.025*	0.026*
	(0.013)	(0.013)	(0.013)
Degree	0.038***	0.034**	0.034***
	(0.013)	(0.013)	(0.013)
Having children	0.046***	0.041***	0.042***
	(0.012)	(0.012)	(0.012)
Income, 2nd quartile	-0.019	-0.016	-0.017
	(0.015)	(0.015)	(0.015)
Income, 3rd quartile	0.014	0.011	0.009
	(0.015)	(0.015)	(0.015)
Income, 4th quartile	0.004	-0.002	-0.006
	(0.016)	(0.015)	(0.015)
Risk Propensity		0.052***	0.052***
		(0.011)	(0.011)
Insurance Experience			0.063***
			(0.017)
Observations	5,011	5,011	5,011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4 Multivariate regression model of being interested in insurance policies: the role of financial investments.

VARIABLES	(1) Interested in insurance	(2) Interested in insurance
Moderate Covid-19	0.037***	0.035***
	(0.014)	(0.013)
Severe Covid-19	0.070***	0.067***
	(0.026)	(0.026)
Critical Covid-19	0.086***	0.079***
	(0.019)	(0.019)
Female	-0.007	-0.006
	(0.011)	(0.010)
North	0.018	0.018
	(0.012)	(0.012)
Centre	-0.003	-0.004
	(0.014)	(0.013)
Age	-0.007**	-0.007**
	(0.003)	(0.003)
Age2	0.000*	0.000
	(0.000)	(0.000)
High School	0.025*	0.025*
	(0.013)	(0.013)
Degree	0.033**	0.032**
	(0.013)	(0.013)
Having children	0.041***	0.040***
	(0.011)	(0.011)
Income, 2nd quartile	-0.020	-0.018
	(0.015)	(0.015)
Income, 3rd quartile	0.005	0.007
	(0.015)	(0.015)
Income, 4th quartile	-0.010	-0.009
	(0.015)	(0.015)
Risk Propensity	0.051***	0.048***
	(0.011)	(0.011)
Insurance Experience	0.062***	0.046***
	(0.017)	(0.018)
Home Ownership	0.025*	0.024*
	(0.014)	(0.014)
Risky Asset		0.027**
		(0.013)
Risk Free Asset		-0.000
		(0.015)
Observations	5,011	5,011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 Multivariate regression model of being interested in insurance policies: the role of gender.

VARIABLES	(1) Full sample Interested in insurance	(2) Men Interested in insurance	(3) Women Interested in insurance
Moderate Covid-19	0.035***	0.018	0.054***
	(0.013)	(0.017)	(0.020)
Severe Covid-19	0.067***	0.037	0.113***
	(0.026)	(0.038)	(0.034)
Critical Covid-19	0.079***	0.090***	0.060**
	(0.019)	(0.026)	(0.026)
Female	-0.006		
	(0.010)		
North	0.018	0.031**	-0.005
	(0.012)	(0.015)	(0.018)
Centre	-0.004	0.006	-0.019
	(0.013)	(0.017)	(0.020)
Age	-0.007**	-0.006	-0.007*
	(0.003)	(0.004)	(0.004)
Age2	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
High School	0.025*	0.017	0.048**
	(0.013)	(0.015)	(0.021)
Degree	0.032**	0.014	0.064***
	(0.013)	(0.016)	(0.020)
Having children	0.040***	0.032**	0.050***
	(0.011)	(0.014)	(0.016)
Income, 2nd quartile	-0.018	-0.038*	-0.001
	(0.015)	(0.020)	(0.020)
Income, 3rd quartile	0.007	-0.002	0.015
	(0.015)	(0.019)	(0.020)
Income, 4th quartile	-0.009	-0.002	-0.030
	(0.015)	(0.020)	(0.020)
Risk Propensity	0.048***	0.038**	0.059***
	(0.011)	(0.015)	(0.014)
Insurance Experience	0.046***	0.042**	0.042
	(0.018)	(0.021)	(0.027)
Home Ownership	0.024*	0.029	0.016
	(0.014)	(0.019)	(0.019)
Risky Asset	0.027**	0.030*	0.023
	(0.013)	(0.016)	(0.017)
Risk Free Asset	-0.000	-0.009	0.018
	(0.015)	(0.019)	(0.021)
Observations	5,011	3,094	1,917

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Questionnaire

Interested in insurance

Q.57 Since the beginning of the pandemic (March 2020), have you and/or your partner consulted a financial advisor, bank, or other intermediary? [multiple answers allowed]

- Yes, to obtain financing
- Yes, to consider investments
- Yes, to evaluate the purchase of insurance policies
- Yes, to evaluate the purchase of pension funds
- Yes, for other reasons
- No, we did not consult a financial advisor, bank, or other intermediary

Covid-19

Q.61 Finally, just for classification purposes, we ask you if anyone in your household...

- has contracted the Covid-19? Yes, I personally | other person | no one
- (if yes) have he/she been hospitalised for Covid-19? Yes, I personally | other person | no one
- (if yes) have he/she been in intensive care for Covid-19? Yes, I personally | other person | no one

Risk propensity

Q.29 When thinking about your financial decisions, including financial investments, how much risk are you willing to take? (Please indicate your answer on a scale from 1 to 10, where 1 means 'not at all risk-averse' and 10 means 'very risk-averse').

Insurance experience – Risky assets – Risk-free assets

Q.24 Which of these financial/pension/insurance instruments did you own before the Covid-19 emergency?

1) Savings accounts
2) Government bonds
3) Private bonds
4) Capital shares or equities
5) Sustainable finance products
6) Mutual funds
7) ETFs (Exchange Traded Funds)
8) Life insurance policies
9) Pension funds
10) Cryptocurrencies

Home Ownership

Q.4 The dwelling where you live is:

a) Owned with a mortgage
b) Fully owned
c) Rented
d) Other (right of use, etc.)