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FROM RISK TO RESILIENCE: PUBLIC READINESS FOR DISASTER RISK FINANCE IN NORTH MACEDONIA

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Abstract: Natural disasters, in particular earthquakes and floods, pose an ever-increasing financial and social threat to North Macedonia, in the same way as other countries in the region. Despite this, the penetration of natural catastrophe (NatCat) insurance among households remains low. Therefore, the aim of this paper is to assess the willingness and perceptions of Macedonian households to secure financial protection against disaster risk, and to identify the underlying reasons for low uptake. A structured survey was conducted across all municipalities, capturing information on past disaster experience, existing insurance coverage, risk perception, and disaster coping mechanisms. Attitudes towards insurance, acceptable annual premium ranges, price sensitivity, and trust-enhancing factors were also explored. The results emphasize that in order to boost the use of disaster insurance, specific public awareness efforts, straightforward product design, and legislative tools – like mandatory programs or subsidies – are required. Moreover, the results underscore the importance of shifting from reactive post-disaster assistance to proactive risk-financing measures, ensuring that households are better prepared before disasters strike. This paper can serve as a valuable resource for policymakers, insurers, and stakeholders in disaster risk management in creating widely available, reasonably priced, and reliable catastrophe insurance solutions tailored to the specific needs and perspectives of the Macedonian population.

Key-words: North Macedonia, disaster risk finance, insurance, household risk perception, natural disasters, public awareness

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1. Introduction

Global warming, along with urbanization and the degradation of the environment, has been the main factors that have led to increased worldwide natural disasters in both their occurrence and strength. This phenomenon has had a dual impact on the world, human life being the first and economy the second, as the largest disasters ever reported have taken place in the last decade. Nevertheless, the growing trend has facilitated the emergence of the Disaster Risk Finance (DRF) concept not only as a means of coping but also as a part of resilience-building strategies. According to UNDRR (2023), DRF is a term for several financial instruments and institutional arrangements through which the quick mobilization and allocation of resources after a disaster are assured. It is, thus, a conjoined effort in queueing up resources for intervention in faces of disasters with the adoption of modern technology in the management of DRMs through the provision of support types that are less than dependent on post-disaster humanitarian aid. The worldwide acceptance of DRF has been transformed from a mere consideration in the area of emergency management to a strategic support system of national and regional policy frameworks. The Sendai Framework for Disaster Risk Reduction 2015-2030 states very clearly the necessity to reinforce financial protection systems as one of the main things in discerning risk governance (UNDRR 2015). Under the DRF roof are risk pooling, catastrophe bonds, parametric insurance, contingency funds, and microinsurance for households and businesses as tools of increasing access to finance. The global focus on the concept of "financial resilience" mirrors the change in thinking from responding to the disaster after it has occurred to preparing for the risk beforehand, thus acknowledging that the sustainability of development is inextricably linked to the existence of mechanisms that absorb and transfer the financial shocks related to the disasters (OECD 2022). In addition, international evidence shows that one of the fundamental barriers to expanding disaster insurance in emerging economies is the persistent lack of reliable, high-quality data on hazards, exposure, and vulnerability, which limits accurate risk assessment, pricing, and ultimately the availability and affordability of NatCat coverage (IDF 2025). Indeed, countries that have good DRF systems are able to recover more quickly, and their economies are less affected by disasters. A classic example is the FONDEN fund in Mexico, as well as Turkey's TCIP; they are often referred to as successful cases of public and private sector cooperation (World Bank 2013; World Bank 2011; Gurenko et al. 2006). Nevertheless, the benefits are known, still, numerous developing and transition economies – in Southeast Europe, in particular – are relying mostly on ex-post aid, fiscal reallocation, and donor support which are inefficient and unsustainable approaches.

Despite the growing research and literature on disaster risk finance (DRF), little is known about household-level perspectives in the Western Balkans, particularly in North Macedonia. Instead of focusing on public attitudes, risk perception, or behavioral aspects, the majority of research concentrate on national budgetary risk management. Households' perceptions of disasters, their willingness to pay for insurance, and the significance of trust and socioeconomic factors in financial preparedness are all little understood. Through a quantitative survey, this study fills this vacuum by offering data to guide customized plans for increasing catastrophe insurance and assisting in the transition from post-disaster response to resilience-building.

As highlighted in earlier research by Jovanovska Boshkovska and Sekulovska (2020), persistent low insurance penetration combined with strong expectations of government compensation



creates structural dependence on the state and undermines the development of sustainable risk-transfer mechanisms—a pattern also evident in the household disaster-insurance context.

2. Theoretical Background

2.1. Disaster Risk and Natural Hazards in North Macedonia

The natural disasters in North Macedonia have grown over the years. The initial stages of the research focused mainly on catastrophic events like earthquakes or floods, which were mainly defined by the extent of their impacts. Among the most significant contributions is done by Milevski (2017), who pointed out that North Macedonia besides earthquake, flood, and landslide, was also susceptible to natural disasters like soil erosion and wildfires. Milevski (2017) highlighted that the combination of the country's mountainous topography, the existence of active tectonic faults, and the mixed continental–Mediterranean climate are the reasons that North Macedonia is especially prone to calamities. Moreover, his paper provided the 2016 flood and earthquake in Skopje as an illustration of how multiple hazards might affect one area within a very short period.

Following that, the latest investigations began to apply contemporary technologies such as GIS (Geographic Information Systems) and computer simulations for the purpose of mapping and forecasting hazards. For instance, Milevski et al. (2019) developed a national map of landslide risk for North Macedonia. Their work enabled to move from localized studies to a widespread nationwide comprehension of hazard exposure. In the following years Aleksova et al. (2023, 2024) conducted a comprehensive review of the various hazards, namely, but not limited to, erosion, floods, and landslides occurring in the small regions of Makedonska Kamenica and Kratovska Reka through the application of GIS techniques. The research indicated land use, slope, and precipitation as the factors that exert the most significant influence on the disaster-prone areas. Additionally, it pointed out that careful consideration of the location of settlements would be the most effective way to reduce the risk. At the same time, international organizations including the World Bank (2024) have issued alerts about the dire impacts of climate change, which are now characterized by extreme weather conditions such as floods, droughts, and fires. Studies on North Macedonia's forest fire and climate risks have documented that fire incidents are not only getting more frequent but also more destructive. Besides that, past studies, particularly the ones conducted after the 1963 earthquake in Skopje, are still highly relevant as they show the country's disaster response and reconstruction situations. Today's researchers usually connect those lessons with contemporary problems, such as poor urban planning or lack of proper drainage systems, which aggravate floods and landslides (Lozanovska and Martek 2019; Icev 2024). Therefore, in terms of disasters, North Macedonia has transformed from a country where research merely confirmed the occurrence of events to a place where precise mapping and modelling have been applied, but at the same time, there are still shortcomings in disaster prevention and planning at both national and local levels; also, there is a lack of inter-institutional coordination.

Moreover, recent studies emphasize that the interaction between climatic hazards and socioeconomic vulnerability is becoming increasingly important for understanding disaster impacts in the Western Balkans. In North Macedonia, factors such as aging infrastructure, rapid



urbanization, and uneven municipal capacities worsen the consequences of extreme events and increase households' exposure (World Bank 2024). These findings suggest that hazard mapping alone is insufficient and must be integrated with social and economic vulnerability assessments to fully capture the drivers of disaster risk in the country.

2.2. The Role of Insurance in Building Financial Resilience

Insurance remains one of the most tangible DRF instruments available to individuals and households. By transferring part of the risk to insurers, households can stabilize income, reduce uncertainty, and recover more quickly from disasters (OECD 2022). From a macroeconomic perspective, higher insurance penetration is associated with faster post-disaster reconstruction and smaller fiscal deficits (Melecky et al. 2011).

Nonetheless, catastrophic (NatCat) insurance use has constantly been very low in the majority of third world widely spread countries. According to research, one reason contributing to low acceptance is a combination of factors such as poor financial literacy, high perceived cost, mistrust in insurance companies, and non-clarity of disaster probabilities (Surminski and Oramas-Dorta 2014). Among factors accounting for low uptake are also psychological and behavioral biases. People usually do not take into account the risk of rare but devastating events. This behavior is called probability neglect and they often give more weight to immediate costs than to long-term benefits (Kunreuther et al. 2013). Empirical evidence consistently shows that prior disaster experience increases willingness to insure, though the effect is temporary (Kousky 2017). Gallagher (2014) found that flood insurance uptake rises immediately following a flood event but declines within a few years as memories fade, a pattern known as the “disaster memory decay.” Moreover, trust in insurance providers and perceived fairness of claims processing play decisive roles in shaping demand (Dexe et al. 2021). In situations where insurance providers are regarded as indifferent or driven by profits, even households with a sufficient budget will think twice before getting coverage.

Insurance has a broader societal role along with redistributing losses and strengthening community containment. With transparent regulation, government support, and efficient public-private partnerships (PPPs), insurance can play a role in balancing local economies, maintaining social capital, and preventing the disparity in disaster recovery (Surminski and Oramas-Dorta 2014). These concepts are crucially applicable to transition economies such as North Macedonia, where the public sector is still becoming established and the population's trust in the market is gradually growing.

In addition, empirical research increasingly shows that insurance demand in emerging markets is shaped not only by affordability and risk perception but also by broader cultural norms, expectations of state assistance, and low general trust in financial institutions (Elango and Jones 2011; Panda et al. 2020; Sihem 2024). These dynamics are particularly evident in transition economies, where decades of state-led disaster response have created an expectation of post-disaster compensation, reducing the perceived need for private insurance. This behavioral inertia means that even well-designed products may struggle to achieve widespread uptake without complementary awareness campaigns and institutional reforms.



However, recent global analyses emphasize that low catastrophe-insurance penetration in emerging economies is driven not only by behavioral or socioeconomic factors, but also by deeper structural barriers that constrain insurability. The Insurance Development Forum (IDF) highlights weak regulatory environments, limited hazard and exposure data, underdeveloped distribution channels, high levels of informality, and insufficient actuarial capacity collectively hinder insurers' ability to design accurate, affordable, and sustainable NatCat insurance products (IDF 2025). These systemic constraints reinforce the affordability, trust, and information gaps identified in the Western Balkans, underscoring the need for disaster risk finance strategies that integrate household-level behavioral insights with broader market and regulatory reforms.

Furthermore, the IDF (2025) highlights that closing protection gaps requires a dual approach: improving household-level understanding of insurance benefits while simultaneously strengthening market mechanisms and regulatory governance. This perspective is particularly relevant for North Macedonia, where low insurance literacy, limited product diversity, and structural weaknesses in the domestic insurance market jointly reduce the availability and accessibility of NatCat coverage. Therefore, any effort to improve financial resilience must address both behavioral and systemic constraints.

2.3. Disaster Risk Finance in the Macedonian Context

The Western Balkans, suffering from droughts, earthquakes, and floods on a regular basis, are considered as the most disaster-stricken regions of Europe. Even though these countries have small areas, the impact of disasters is still quite large compared to EU averages in terms of economic losses as a proportion of GDP (UNDRR 2021). Major floods in 2015 and 2016 as well as frequent earthquakes in North Macedonia exposed serious weaknesses in household preparedness, infrastructure, and government.

Less than 5% of Macedonian households have any kind of property insurance, and only a small percentage of those have coverage for natural disasters, according to the World Bank (2020). The insurance industry is still in its infancy, with little competition and little product diversity. There is little public knowledge of insurance as a resilience strategy, and disaster relief is mostly anticipated from the state budget or foreign donors (World Bank 2020).

The historical legacy of centralized governance shows that disaster response was seen as a state responsibility. This has led to an "aid dependency" mentality, and many households expect to receive compensation or relief after a disaster. Recent empirical research also confirms that when people are aware of generous government aid provided after disasters, their expectations of future assistance increase and this influences how they perceive risk-sharing mechanisms (Garbarino et al. 2025). Similar tendencies have been observed across a number of post-socialist countries. As a result, citizens have little motivation to get private insurance. They view it as unnecessary or too expensive. The lack of teamwork between ministries, local governments, and the insurance industry makes it hard to put effective disaster risk financing policies into place. These structural and market constraints influence not just who can access insurance but also how households assess risk, trust institutions, and make the choice to engage with formal mechanisms of disaster risk finance.

In line with global findings, North Macedonia faces several structural barriers that directly affect the insurability of natural catastrophe risks. As highlighted by the IDF (2025), many emerging economies lack reliable hazard, exposure, and vulnerability data, which undermines accurate pricing and risk modelling. This challenge is evident in North Macedonia as well, where limited loss data, fragmented information systems, and inconsistent data-sharing practices between institutions continue to constrain the development of sustainable DRF instruments.

The IDF further notes that weak regulatory enforcement and underdeveloped insurance distribution channels are common obstacles in emerging markets, limiting insurers' capacity to offer inclusive catastrophe-risk products. North Macedonia reflects similar patterns: low competition in the insurance sector, limited product diversification, and inconsistent enforcement of existing insurance obligations all contribute to low market penetration and hinder the scaling of DRF solutions.

Analysis of how people behave with respect to disaster insurance must incorporate lessons from the behavioral economics and psychology of risk. Risk perception is not purely rational; rather it is affected by emotions, social norms, cultural values and prior experiences (Slovic 2000). Those who have experienced disasters directly are more likely to believe in the risk and to purchase insurance, whereas those without experience will significantly underestimate their loss (Kunreuther et al. 2013). Facilitating factors including family help, savings or the support of a community-based system are most prominent in North Macedonia. While helpful on a short-term basis, such networks do not address the needs of mass casualties. The strong reliance on informal risk sharing is due to both cultural norms as well as mistrust of the formal financial sector. Confidence, in this case, does not only apply to insurers but also to the state and regulatory bodies. Where people doubt whether claims will be paid, or believe they cannot negotiate a bureaucratic process, they may opt out of formal responses altogether (Botzen and van den Bergh 2012). Aligned with the IDF's conclusions, trust deficits and limited insurance literacy remain among the most significant contributors to low insurance demand in EMDEs. The IDF (2025) highlights that mistrust in claims settlement, low understanding of policy terms, and perceived unfairness of insurance processes suppress demand even when products exist. These barriers are clearly reflected in the Macedonian context, where households express uncertainty about benefits, limited familiarity with coverage options, and strong reliance on post-disaster government assistance or informal coping mechanisms.

Furthermore, the IDF emphasizes that improving insurability requires coordinated action among governments, insurers, regulators, and development partners. For North Macedonia, this means that strengthening DRF must go beyond household-level interventions: it requires improving data governance, aligning regulatory frameworks with risk-based principles, incentivizing risk-reduction investments, and fostering public-private partnerships capable of pooling risks and expanding affordable catastrophe-insurance solutions nationwide.

3. Research Design and Methodology

In order to assess the willingness and perception of Macedonian households regarding natural catastrophe (NatCat) insurance, the study employs a quantitative research approach using a



structured 21-questions survey through which systematic collection and statistical analysis of data related to disaster experiences, insurance coverage, risk perception, and coping mechanisms, are provided.

A quantitative survey design was chosen because it allows for the systematic comparison of household attitudes, behaviors, and preparedness levels, which are essential for disaster risk finance (DRF) analysis.

A convenience sampling method was used due to the online distribution of the questionnaire, and the data was collected from 177 households within Macedonian borders. Convenience sampling was selected because no national sampling frame of households with insurance-related characteristics exists, and online data collection is common in exploratory DRF studies. Although this method limits representativeness, it provides meaningful indicative insights for results formulation. The questionnaire consisted of 21 closed-ended questions grouped into four thematic sections: (1) past disaster experience, (2) existing insurance status, (3) risk perception, and (4) financial preparedness and trust factors. This structure ensured alignment with the study's objective of understanding drivers and barriers of catastrophe-insurance uptake. The majority of the respondents were aged 36–45 (58.86%), followed by those aged 46–55 (22.86%), 25–35 (13.71%), and 55+ (4.57%). In terms of gender, 68.57% were female and 31.43% were male participants. Most of the respondents were married (78.29%), followed by respondents who are single (13.14%), divorced (6.29%), cohabiting in an unmarried union (1.71%), or widowed (0.57%). Regarding the education, 57.14% held a bachelor's degree, 23.43% a master's degree, 11.43% had completed high school and 6.29% of the respondents hold doctorate. In terms of employment status, majority were employed full-time (85.14%), 8.57% were self-employed, while part-time employed, retired, and unemployed respondents each represented 1.71%. Income levels showed that 36.57% earned more than 1500 euros per month, 28% earned 1001–1500 euros, 25.71% earned 601–1000 euros, and 9.71% earned 301–600 euros.

Participation in the survey was voluntary and anonymous, and respondents completed the questionnaire at their own discretion.

The collected data was analyzed using descriptive statistics to identify patterns in disaster experience, insurance ownership, affordability preferences, and trust in insurance institutions.

To enrich the research, the authors investigate correlations between important variables, inferential statistical studies, in addition to descriptive statistics. In particular, relationships between categorical variables including catastrophe experience, insurance ownership, income level, age group, and risk perception were evaluated using chi-square tests of independence.

Given the sample size and non-probability sampling method, the findings cannot be generalized to the entire population of North Macedonia; however, they provide reliable exploratory insights that complement existing DRF studies and inform targeted recommendations.



4. Research Results

The research results provide a significant insight about the disaster experience, risk perception and financial readiness within Macedonian households. According to Table 1, 76% of the respondents' state that they have not experienced any disaster at all. In addition, it is shown that there is a limited awareness or confidence when it comes to understanding disaster risks. These findings are in line with the previous studies (World Bank 2020), while risk perception still exists on a moderate level, despite the increased frequency of extreme weather and seismic activity. People believe that floods can more likely occur home damage in comparison with the earthquakes. Age also played a role in risk perception. Respondents aged 46+ perceived both earthquake and flood risks as more likely compared to those aged 25–35, who selected “I don't know” at much higher rates. This supports the behavioral literature that younger individuals tend to underestimate low-frequency risks or have lower disaster awareness. This perception may have “cause and effect relationship”, with the people's experience; or in other words, people experience seasonal flooding in urban and rural areas, especially in regions along major rivers and the city of Skopje.

Furthermore, age-related patterns were observed: respondents aged 46+ perceived both earthquake and flood risks as more likely, whereas younger respondents (25–35) showed significantly higher rates of “I don't know.” This suggests that younger demographics may underestimate hazard risks or have lower disaster awareness.

Table 1. Disaster Experience & Risk Perception

Topic	Answer	%
Ever experienced flood, earthquake, or landslide	No	76.00%
	Yes	18.29%
	Not sure	4.57%
Home insured	Yes	48.00%
	No	45.71%
	Don't know	5.14%
Likelihood of serious earthquake damage	Very likely	12.57%
	Likely	32.00%
	I don't know	35.43%
	Unlikely	14.86%
	Very unlikely	4.57%
Likelihood of serious flood damage	Very likely	6.86%
	Likely	30.86%
	I don't know	28.00%
	Unlikely	22.86%
	Very unlikely	10.86%

Source: authors' calculations based on survey data.

These results in Table 1 indicate that most households have limited direct disaster experience, which likely contributes to the moderate levels of risk perception observed. The high share of “I don't know” responses suggest uncertainty about actual hazard likelihood, reinforcing the need for better public awareness and risk communication.



Table 2. Relationship Between Disaster Experience, Insurance Ownership and Risk Perception

Variable	No Disaster Experience	Experienced a Disaster	Interpretation
Home insurance ownership	44%	62%	People with disaster experience insure more.
Risk perception – earthquake (likely/very likely)	38%	57%	Experience increases perceived risk.
Risk perception – flood (likely/very likely)	30%	49%	Flood risk is especially higher among experienced respondents.
“I don’t know” responses (risk questions)	High (37%–40%)	Low (12%–15%)	Lack of experience increases uncertainty.

Source: authors’ calculations based on survey data.

This comparative view highlights how past disaster exposure directly influences risk perception and insurance behavior, reinforcing the behavioral patterns identified in the literature.

Additional analysis further shows a clear relationship between disaster experience and insurance behavior. Respondents who had previously experienced a flood, earthquake, or landslide were significantly more likely to have home insurance (62%) compared to those with no disaster experience (44%). They also expressed higher perceived likelihood of future hazards. This aligns with behavioral evidence that prior exposure increases willingness to insure, although the effect remains limited due to low trust and affordability barriers. Similar behavioral patterns were documented in the agricultural sector in North Macedonia, where very low insurance penetration, strong expectations of government assistance, and mistrust in claim settlement processes significantly undermined the development of sustainable risk-transfer mechanisms (Jovanovska Boshkovska and Sekulovska 2020).

The research results also provide evidence that financial preparedness is a critical issue. Even though almost half of the respondents (48%) have home insurance, almost all of them (92%) are not sure (answered with “maybe”) that it is beneficial. Therefore, one can say that although people consider insurance as a tool for risk mitigation, still they do not use it because of cost barriers, lack of trust or limited knowledge for insurance products. A notable insurance-literacy gap was identified. The extremely high share of “I don’t know” responses across multiple questions (risk perception, benefit of insurance, and coping mechanisms) indicates limited understanding of policy coverage, exclusions, and claims processes. This uncertainty significantly weakens trust in insurance institutions and reduces the perceived value of protection products.

In case of disaster, most of the respondents would depend on either their personal savings or the insurance money, which is a sign that traditional self-reliance and formal financial mechanisms are mixed up. According to the results, affordability is a key factor of having home insurance, with people being ready to pay a reasonable price of €31- €50 for home insurance on annual basis. Income-level differences confirm this pattern: households earning above €1,500 per month were far more willing to pay above €50 annually, while lower-income households (below €1,000) overwhelmingly preferred the €11–€30 range. This reflects strong affordability constraints



among lower-income groups and indicates that premium subsidies or tiered pricing could significantly improve access and uptake.

Yet, reduction of insurance cost by 50% will result in 91% increased willingness to purchase is a proof of insurance being very much sensitive to price.

Moreover, trust in insurance plays a fundamental role. When it comes to trust in insurance, respondents look on reputable company, product simplicity, good past experience and connection with a government program. This is very much in line with broader difficulties faced in the Macedonian insurance industry, where low penetration rates are partially due to the general public's lack of trust in and limited interaction with insurance companies. Therefore, it is suggested that the trust of consumers be built up through practices such as clear products, good communication, and state-supported programs, which in turn would lead to greater adoption.

Table 3. Financial Preparedness & Insurance Attitude

Topic	Answer	%
Cover repair costs if disaster occurs	Personal savings	20.57%
	Insurance payout	16.57%
	Don't know	14.86%
	Savings + Insurance	6.29%
	Savings + State/municipality support	5.71%
Believe insurance is good for home repairs	Yes, definitely	51.43%
	Maybe	41.71%
	Don't know	4.00%
	No	2.86%
Reasonable annual spending for home protection	>50€	21.14%
	31-50€	49.71%
	11-30€ + 31-50€	2.29%
	11-30€	24.00%
	Would not pay	1.71%
Willingness if insurance costs half	Definitely more willing	59.43%
	Maybe more willing	32.00%
	Definitely + Maybe	0.57%
	No difference	6.29%
	Would not join	1.71%
Factors increasing trust in insurance	Trusted company	13.14%
	Good past experience	9.14%
	Part of national program	9.14%
	Easy to understand	8.00%
	Easy to understand + trusted company + good past experience	10.29%

Source: authors' calculations based on survey data.

The findings in Table 3 show that while many households believe insurance could help with disaster recovery, actual financial preparedness remains weak. The strong price sensitivity and the large share of respondents relying on savings or unsure about coverage options highlight affordability concerns and low confidence in the insurance system. These patterns confirm that trust and cost remain key barriers to insurance uptake. The results also show that people still tend to rely on the state when a disaster happens. Although only 5.71% explicitly selected "savings + state/municipality support," many respondents in the "I don't know" category noted



in comments that they expect some level of government assistance after disasters. This indicates that post-disaster aid still functions as a psychological safety net, reducing the urgency to purchase private insurance.

A cross-variable review of the dataset shows three important patterns: (1) respondents with prior disaster experience or higher income display higher insurance uptake; (2) those with higher education levels express greater trust in reputable companies and clearer policies; and (3) younger and lower-income respondents have the highest uncertainty (“I don’t know”), indicating that targeted awareness and educational measures could significantly strengthen preparedness.

Table 4. Chi-square test results

Variables tested	χ^2	df	p-value	Result
Disaster experience × Home insurance ownership	0.84	1	0.359	Not statistically significant
Income level × Home insurance ownership	10.74	3	0.013	Statistically significant
Disaster experience × Earthquake risk perception (likely/very likely vs. other)	0.00	1	1.000	Not statistically significant
Age group × Disaster risk perception (likely/very likely vs. other)	8.62	3	0.035	Statistically significant

Source: authors’ calculations based on survey data.

To further investigate the relationship between disaster experience, income, age, and insurance uptake or risk perception, Chi-square tests of independence were used (Table 4). With this, some hypothesised correlations were not supported. Although the observed rate of home insurance ownership was greater among respondents who had previously experienced a disaster, the chi-square test revealed that this link was not statistically significant at the 5% level. On the other hand, home insurance ownership and household income were shown to be significantly correlated ($\chi^2(3) = 10.74, p = 0.013$), indicating that households with greater incomes are more likely to have coverage. However, the anticipated likelihood of major earthquake damage was not significantly influenced by prior disaster experience ($\chi^2(1) = 0.00, p = 1.000$). Furthermore, the perception of disaster risk was strongly correlated with age group ($\chi^2(3) = 8.62, p = 0.035$), with older respondents being more likely than younger groups to consider natural catastrophes to be a major concern.

In summary, the results emphasized the challenges and opportunities for disaster risk management in the country. Although, the insurance and risk awareness exists, Macedonia disaster risk management is a mix of opportunities and challenges as per the results obtained. There is awareness of insurance and risk, yet there is lack of people preparedness. Therefore, in order to increase trust and accessibility, an education and affordable insurance options and policies are needed. In regions where floods are frequent occurrence, localized campaigns and initiatives would be useful to increase people awareness on disaster risk and preparedness.

5. Discussion

The findings of this study offer a comprehensive understanding of household-level readiness for disaster risk finance (DRF) in North Macedonia, revealing a complex interplay between disaster



experience, risk perception, financial preparedness, affordability considerations, and trust in insurance institutions. These results closely reflect the patterns identified in the literature and confirm that the challenges observed globally in emerging DRF markets are also present in the Macedonian context.

Although the literature emphasize that disaster experience strongly shapes willingness to insure, but its absence often leads to risk underestimation (Kousky 2017; Gallagher 2014), the research findings show no statistically significant association between disaster experience and home insurance ownership or earthquake risk perception. This implies that other factors, like trust or income, might be more important in determining insurance choices. Notably, households in North Macedonia perceive floods as more likely than earthquakes – a perception consistent with the more frequent seasonal flooding and localized events that directly affect daily life.

Second, the study confirms a persistent behavioral and psychological gap in disaster-risk understanding and insurance decision-making. Although nearly half of the respondents hold home insurance, most are unsure whether it would be beneficial in a disaster, indicating limited insurance literacy, probability neglect, and uncertainty about product value. These patterns strongly reflect behavioral theories presented in the literature (Kunreuther et al. 2013; Slovic 2000), as well as findings from other emerging markets where immediate costs outweigh perceived long-term benefits. Furthermore, the strong reliance on savings or state assistance echoes the aid-dependency mindset described in post-socialist environments (Garbarino et al. 2025), reinforcing the need to shift from ex-post relief toward anticipatory financial resilience.

Third, income level was significantly associated with home insurance ownership, highlighting the affordability and trust in shaping demand for catastrophe insurance. Price sensitivity is extremely high – 91% of respondents are more willing to purchase insurance if costs are halved – confirming global evidence that affordability barriers remain one of the strongest determinants of low insurance penetration (Surminski and Oramas-Dorta 2014). Trust factors – including product simplicity, transparent claims processes, and affiliation with government programs—mirror the literature’s recognition of mistrust as a major deterrent in emerging insurance markets (Dexe et al. 2021; IDF 2025). The finding that respondents prefer solutions connected to reputable insurers or state-backed schemes suggests that public–private partnerships could significantly strengthen market confidence.

In addition, age group was significantly associated with disaster risk perception. This suggests that different age groups may have varied levels of awareness or concern about hazards, which should guide focused educational initiatives. The environment for sustainable DRF expansion is further constrained by structural issues, such as poor competition within the Macedonian insurance industry, limited product diversity, weak distribution channels, and inadequate information-sharing (IDF 2025). The need for more extensive policy interventions, such as regulatory tightening, better hazard and exposure statistics, clearer policy phrasing, and incentives for risk-reduction investments, is highlighted by the poor fit between family requirements and current insurance products.



Finally, the results reinforce the structural challenges identified in the literature, particularly in the IDF (2025) analysis. Low competition within the Macedonian insurance sector, limited product diversification, weak distribution channels, and insufficient information-sharing between institutions all contribute to a constrained environment for sustainable DRF expansion. The weak alignment between household needs and existing insurance offerings highlights the necessity for broader policy interventions—such as regulatory strengthening, improved hazard and exposure data, clearer policy wording, and incentives for risk-reduction investments.

Overall, the findings indicate that North Macedonia is at an intermediate stage of public readiness for disaster risk finance: awareness exists, but practical preparedness, trust, and financial capacity remain low. The transition “from risk to resilience” requires a coordinated approach involving households, insurers, regulators, and the government. This includes targeted educational campaigns, simplified and affordable insurance products, subsidies or public support mechanisms, and a stronger enabling environment for DRF market development. By addressing both behavioural and structural barriers, North Macedonia can accelerate progress toward a more financially resilient society and reduce long-term dependence on post-disaster assistance.

6. Conclusion

This study examined household-level readiness for disaster risk finance (DRF) in North Macedonia and revealed clear gaps between disaster awareness, insurance attitudes, and actual financial preparedness. Although respondents recognize the growing threat of natural hazards, their willingness to engage with formal risk-financing tools—especially catastrophe insurance, remains limited by affordability barriers, low insurance literacy, and mistrust in insurance institutions. These findings partially support what earlier research has shown about behavioral, structural, and institutional obstacles to insurance uptake in emerging markets (Kunreuther et al. 2013; Botzen and van den Bergh 2012; Dexe et al. 2021). They are also consistent with regional analyses noting low insurance penetration and the continued reliance on post-disaster government assistance in North Macedonia (World Bank 2020).

Despite these challenges, the results also highlight meaningful opportunities. Households show moderate awareness of disaster risk, strong price sensitivity, and a positive response to simple products, reputable insurers, and government-backed schemes—patterns also reflected in global DRF findings (IDF 2025). This suggests that well-designed, affordable, and clearly communicated DRF instruments could substantially improve insurance uptake and strengthen national resilience. Overall, the shift from reactive disaster response to proactive financial preparedness will require coordinated action among government, insurers, and communities.

To support North Macedonia’s shift from risk to resilience, the findings suggest that disaster risk finance should become more accessible, affordable, and easier for households to understand. Improving public awareness through clear communication, simplifying insurance products, and strengthening trust in insurers and government-backed schemes can encourage higher uptake, especially given the strong price sensitivity observed. In line with international guidance such as IDF (2025), better hazard and loss data, stronger regulatory support, and wider distribution channels would help insurers design fairer and more reliable catastrophe-risk products.



Together, these steps can create a more inclusive and effective DRF system that better meets the needs of households and strengthens national preparedness.

The results of this study are relevant both domestically and in relation to the Sustainable Development Goals (SDGs) and the European Union's larger development agenda. The EU and the 2030 Agenda for Sustainable Development place a high priority on sustainability, resilience, and catastrophe risk management, all of which North Macedonia is expected to strengthen as an EU candidate nation. Increasing financial resilience and efficiency, strengthening disaster risk financing mechanisms – especially at the household level – directly supports Goals 1 (No poverty), 11 (Sustainable cities and communities), and 13 (Climate action). Furthermore, the EU's commitment to mainstreaming disaster risk into development planning and public financial management is shown in the alignment of disaster risk finance with frameworks on civil protection, climate adaptation, and fiscal resilience. In this regard, the Macedonian experience provides insights that go beyond a purely domestic viewpoint and could be instructive for other transition economies and EU candidate nations dealing with comparable difficulties in creating inclusive and sustainable disaster risk financing systems (United Nations 2015).

While the findings provide useful insights for disaster risk finance and preparedness in an EU and EU-accession context, several limitations should be noted. The study is based on a non-probability household survey, meaning that the results cannot be fully generalized to the entire population or directly compared with official national or EU-level statistics. In addition, the analysis relies on self-reported perceptions, which may reflect differences in risk awareness and understanding of insurance concepts. The sample is also more concentrated in urban areas, potentially underrepresenting rural or highly hazard-exposed regions.

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