THE ROLE OF PUBLIC PRIVATE PARTNERSHIP IN DEVELOPING CATASTROPHE INSURANCE MARKET*

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ABSTRACT

Natural and man made disasters cause severe human, physical and economic damage, both for the economy and for the population. There is a widespread perception that property insurance is the most efficient and economical way to protect against financial losses caused by natural disasters. Regardless of this fact, in many countries in the world, insurance against natural disasters is poorly developed, both on the supply side and on the demand side. The analysed trends in the coverage of damage from catastrophic risks on a global level in the period from 2000 to 2016 show that on average only 28.8% of the total damages were covered. Effective strategies for financing catastrophic risks must be tailored to the needs and capabilities of each country. For these reasons, the paper analyses various world experiences, taking into account countries with different degrees of development and systems (Australia, Austria, the UK, the Caribbean, China, Romania, Russia, the USA, Spain, France, Turkey and Romania). A special survey was conducted in North Macedonia, which was taken as a case study. The conclusions suggest that the insurance of catastrophic risks should be organized as compulsory insurance for households in urban areas. Regarding the risks, we consider that compulsory insurance should cover earthquake and flood, although at the individual level the consequences of the flood affect a relatively smaller population coverage. Making a legally binding solution must be well thought out in the segment of law enforcement. Regarding the operational aspects of implementing a legally binding solution, the principles of insurance should be used, and the world practice indicates that it is possible only with the involvement of the insurance companies.

Keywords: catastrophe risk, insurance, public private partnership.

JEL: G22, G32

1. INTRODUCTION

When disasters occur, countries with limited economic power often require assistance from international donor institutions or divert funds from other development projects to respond to the urgency of emerging needs. Although the importance of catastrophic risk financing is well known, markets for catastrophic risks are constrained by market imperfection which is a limiting factor for their expansion, especially in developing countries. The objective of the paper is to promote disaster risk financing as an integral part of country's economic policy and as an important part of forming a proactive and strategic framework for disaster risk management. The paper will also explore the form of public intervention in order to develop the catastrophic risk insurance market in the country.

2. BASIC PREMISES

Particular attention is paid to developing countries achieving development goals in cooperation with international financial institutions (IFIs) and the donor community. Although the experience of the World Bank and the IFIs in encouraging disaster risk financing strategies is relatively new, nevertheless, based on the effects achieved in different countries, Cummins and Mahul (2009) set out

* The paper was presented at the 6th International Scientific Conferences ICEI 2019, held in Tuzla and published in the Proceedings.

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the following five key principles for public intervention in the catastrophe risk insurance markets in developing countries:

- Promote catastrophe risk financing in the dialogue on disaster risk management with low- and middle-income countries.
- Enhance competitive catastrophe risk markets.
- Use risk-based price signals to encourage catastrophe risk management
- Limit public subsidy programs to those that minimize distortions of market price signals.
- Develop customized catastrophe insurance solutions.

The principles rely on the premises of public-private partnerships between the insurance sector, the state and international financial institutions. The background of this position lies in the market-enhancing theory (Lewis & Murdock, 1999) which recognizes that market failures can create suboptimal allocations of resources and that private sector coordination is not always effective. This view holds that public policy should facilitate the development of the private market, for instance, by improving information flows, but should not create permanent new government institutions to substitute for private solutions.

The most important conclusion from all the principles is that effective disaster risk financing strategies must be tailored to each country's needs and capabilities, and should rely on a combination of ex-ante and post-disaster financial instruments by stratifying disaster risk coverage. The first layer can be managed by setting up a reserve fund to cover small and recurring losses. Higher layers may be covered primarily with insurance to protect critical public funds, followed by reinsurance and the use of alternative risk transfer techniques such as CAT bonds.

3. CHARACTERISTICS OF THE CATASTROPHIC RISKS INSURANCE MARKET WORLDWIDE

Setting the disaster risk financing is quite complex and has proven to be without one size fits all solution. Countries that have left the development of catastrophic risk insurance markets to market mechanisms, and have noticed certain success in developing catastrophic insurance markets, are almost without exception highly developed countries with a long insurance tradition and high insurance penetration rates (the UK, Australia and Austria) in the segment of voluntary household insurance (CCS, 2009; COAG, 2004; OECD, 2005). The main feature of this type of catastrophic insurance market is negative selection. This means that those being more exposed to the risks are the main insured in the system, which opens the circle of increasing premiums and thus narrowing the number of policyholders and consequently increasing the reluctance of insurance companies to offer coverage for certain risks in certain areas. This is also the reason for opening up a dialogue with governments to reach certain agreements such as in the UK and Austria where we constantly witness certain compromises with insurers in order to keep the offer open at affordable prices while asking the government to increase investment in risk prevention. The advantage for the countries in this group is that they have not undertaken any potential commitments related to disaster risk (re)insurance, but are very active in the field of prevention and ex-post financing of the consequences of catastrophic risks. Given the set-up of this type of system, the role of public-private partnerships cannot be discussed for the reason that the role of the state is minimal and it appears as an interested party only when defining certain broader frameworks of market functioning.

Countries that have a developed market for catastrophic risk insurance through the solidarity model as a state strategy (Spain and

France) have one major advantage with avoiding the negative selection because of the implicit mandatory feature of the programs, introduced through an additional mandatory premium at voluntary insurance (CCS, 2009; CCR, 2015). In this context, the example of Spain is more prudent because the state does not engage in reimbursement for non-insured citizens, *i.e.* there is no ex-post financing for individual cases or it is minimal, whereas in France this attitude is conditional on whether a disaster would be declared and published in an official newsletter. In addition, the Spanish system, which is considered to promote less solidarity than the French one, has a larger coverage of subject insurance (property, persons, cars), than the French one which has less coverage (property and liability). Both systems are successful, working with damage coefficients that allow for permanent accumulation, but the success must be seen in the broader context, which is that they are large (by population) and developed (by density and insurance penetration) markets, and are characterized by the fact that there is no dominant catastrophic risk in these countries, although this is especially true for Spain, while in France floods are a significant risk.

The case of the United States of America, especially the flood insurance system, is the most frequently criticized catastrophe insurance system for inadequate debt-generating premium rates (Lloyd's, 2011). Although the system is not set up on a solidarity basis, the consequences of inadequate regulation are ultimately borne by all federal taxpayers (GAO, 2011; Gurenko, 2007).

The latest generation of catastrophic risk insurance systems, such as those in Turkey and Romania, deserve special attention (TCIP, 2016; Gurenko, 2006; PAID, 2017). Both are similarly set up as compulsory independent insurances by overcoming the problem of negative selection, but in terms of subsidies between different risk exposures the Turkish model is preferred because premium rates are set according to risk. In addition, a turning point in the Turkish model is the successful implementation of the compulsory component introduced in 2012 when compulsory insurance was linked to the use of utilities (electricity and water) which contributed to a 20% penetration rate in 2012 to 43% in 2016. China and Russia are analysed as well, as large countries. The short conclusion is that there is no risk disaster risk financing scheme, and that the catastrophe risk insurance is purely commercially offered with very low penetration rates (OECD, 2015).

4. RESEARCH

In order to perceive the state of development of the insurance market in North Macedonia a research was conducted that included insurance companies and general public, using the combination of primary and secondary data.

The publicly available financial statements of insurance companies and Insurance Supervision Agency (ISA) statistical reports have been used for data on insurance companies and their participation in catastrophic risk insurance. In order to obtain information on the extent of catastrophic risk insurance coverage, ISA in 2011 adopted a by-law regulation and provided for a special reporting form (SP-8) within the framework of regular statistical reporting through which insurance companies report: (i) fire risks; (ii) an earthquake; (iii) floods, torrents and high waters and (iv) hail and ice. Table 1 provides an overview of the gross written premium (GWP) for earthquake and flood for the period 2012 to 2016 in absolute amounts and as a share of the property insurance premium, in all non-life insurance premiums and as a share of the total GWP.

Table 1. *Share of earthquake and flood premium in the structure of the GWP in the period 2012 to 2016 (000 denars)*

Year		Property GWP	Non-life GWP	Total GWP
2012		1,393.087	6.415,488	7,013,622
2013		1,315,627	6,464,042	7,193,501
2014		1,379,199	6,742,404	7,630,733
2015		1,641,334	7,178,720	8,279,711
2016		1,555,075	7,429,950	8,721,620
	Earthquarke	% Property	& Non-life	% Total GWP
2012	126,090	9.05&	1.97%	1,80%
2013	85,340	6.49%	1.32%	1,19%
2014	63,185	4.58%	0.94%	0,83%
2015	120,109	7.32%	1,67%	1.,45%
2016	103,953	6.68%	1,40%	1,19%
	Flood	% Property	% Non-life	% Total GWP
2012	33,158	2.38%	0.52%	0.47%
2013	57,974	4.41%	0.90%	0.81%
2014	38,021	2.76%	0.56%	0.50%
2015	65,276	3.98%	0.91%	0.79%
2016	77,240	4.97%	1.04%	0.89%

Source: Authors' own work

From this overview, we can conclude that the earthquake premium was highest in 2012, and then declined in absolute terms and in real terms in all the mentioned categories. The trend in the floods is different, *i.e.* there is a steady upward trend with more than doubling in the period.

If we analyse the trend by the number of contracts concluded with earthquake and flood coverage (Table 2), we come to a different conclusion. The number of policies concluded involving earthquake risk at the end of 2016 was 667% higher than in 2011, which only leads to the conclusion that the average policy premium was significantly reduced. The number of concluded policies that include flood risk in the analysed period closely followed the development of the GWP.

From this analysis, we can conclude that catastrophic risk insurance in the country registeredsmall developments in the analysed period, providing a very low level of protection against catastrophic events.

In order to see possible steps for further development of the market through the prism of insurance companies, we used the data collected through a questionnaire. The questi-

Table 2. *Number of insurance contracts*

Year	Total	Earthquake	% Total	Flood	%Total
2012	1,023,983	1,346	0.13%	27,478	2.70%
2013	1,065,816	1,233	0.12%	,27,971	2.60%
2014	1,135,156	2,812	0.25%	32,049	2.80%
2015	1,135,156	4,831	0.43%	34,210	3.00%
2016	1,292,749	8,979	0.69%	44,240	3.40%

Source: Authors' own work

onnaire for insurance companies consisted of 10 questions with different types of answers (multiple answer option, one answer option, the Likert scale with a numerical rating scale of 1 to 5, and one open question). The survey was conducted using a tool available to users online. The questionnaire, or link to the questionnaire, was distributed via email to the CEOs of all 11 non-life insurance companies licenced to operate in the country. The response rate was 100%.

The general public questionnaire on perceptions of the impact of catastrophic risks and the techniques to deal with the consequences they bring, due to the inability and irrationality to investigate the entire population, was conducted through a sample survey. This method is also called the method of selection or representative study. The questionnaire was answered by 253 respondents, highlighting the fact that the limitation of this approach is that the sample may not be representative enough to allow generalization of the conclusions.

The data was collected through a questionnaire developed following the Kunreuther model (1977) and Slovic *et al*. (1977), who found that insurance purchase decisions consist of three stages: first, awareness of the dangers and their potential for damages; second, considering insurance as a disaster management mechanism; third, the collection and processing of insurance information. The design of the questionnaires was adapted from the research conducted by Wang *et al*. (2012) and considers the following three categories: first, hazard awareness and disaster experience; second, experience with insurance and insurance thinking as a disaster management mechanism; third, the acceptance of insurance and the willingness to pay. The questionnaire consisted of 14 questions with different types of answers (multiple answers, one answer and two open-ended questions). The survey was conducted using a tool available to users online. The questionnaire or link to the questionnaire was distributed in different ways, using target groups by sending the link to the questionnaire via email, as well as by using announcements with a call to participate in social network research (Facebook and LinkedIn).

4.1. Insurance companies' data result

All insurance companies in the Republic of North Macedonia, answering the question which catastrophic risks are covered by their insurance products, stated that they offer flood and earthquake coverage, while other risks are covered by a smaller number of companies (Figure 1).

When asked how they have developed their insurance products, insurance companies had three options with multiple choices. From the options offered, six companies chose one, three companies chose two, and two companies

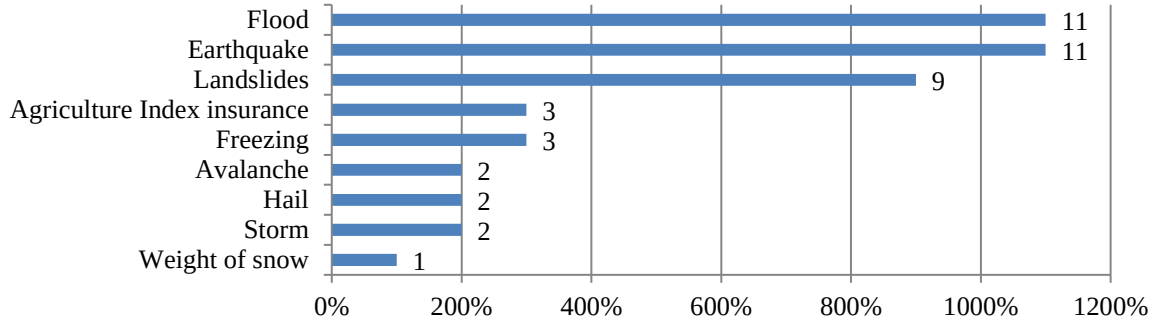

Figure 1. *Insurance against catastrophic risks offered in the domestic market*

Source: Author's own work

chose to use all the offered options in developing their insurance products. Most of them (eight) independently developed their insurance product, while six out of nine insurance companies belonging to insurance groups developed a product within the group. Four insurance companies, on the other hand, have adopted the products developed through the state-owned project Europe Re.

When asked if they were satisfied with the level of sales of insurance products that cover catastrophic risks, 72.7% of the companies responded that they were moderately satisfied, while the rest were less satsfied. Our view is that this low penetration rate of catastrophic insurance sales indicates that the companies have either given too strong answers or their sales targets are too low. In both cases, the answer is not in favour of sales development.

In order to assess their perception, the insurance companies were asked to assess their level of development of the national awareness of catastrophic risks consequences and the reduction of their effects through insurance. Some 91% or 10 companies considered the level of development as underdeveloped. This attitude of the companies is correlated with the current level of development and penetration rate in the insurance market.

One of the key questions for the insurance companies in the research was whether they believe that the state should somehow be involved in the creation of insurance products for catastrophic risks. Some 36% of the insurance companies believe that the state should not be involved in the creation of insurance products for catastrophic risks, and that they should be left to the mechanisms of supply and demand.

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In contrast, 64% of the insurance companies believe that the state should offer a unified catastrophe insurance product, which is an encouraging signal in the context of promoting public-private partnerships between the state and the insurance sector. Some 37% believe that this product should be sold through all insurance companies for some intermediary fee, with the option to retain some of the risk within the insurance capacity, while 27% consider that product should be sold through the companies for insurance that will join voluntarily (Figure 2).

From a survey conducted in the general public, we came to the conclusion that the citizens feel they are most exposed to earthquake and flood risks. Having in mind that the penetration rate

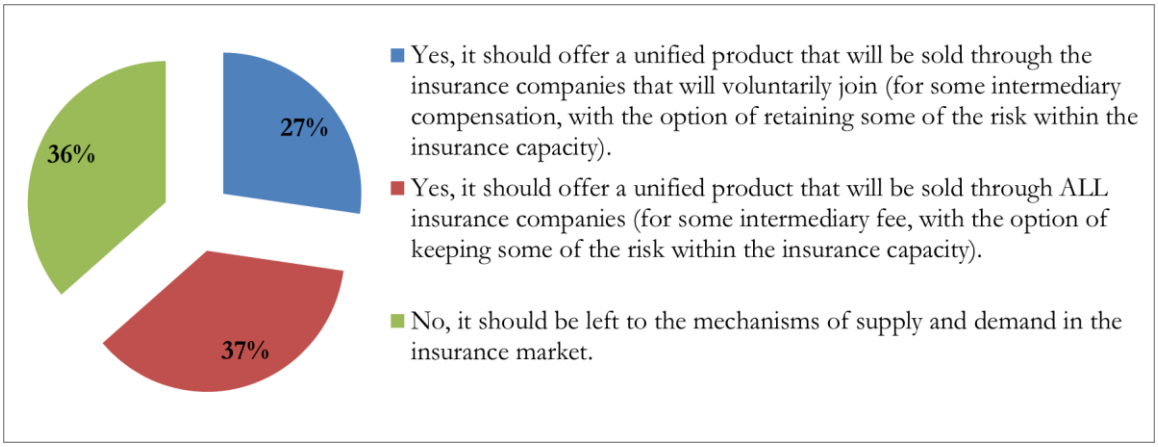

Figure 2. *State involvement in the creation of catastrophic insurance products*

Source: Author's own work

of these two catastrophic risks is still very low in the country, we asked the insurance companies whether they consider that the insurance of these two catastrophic risks should be compulsory for the citizens. Answering this question, 46% of the insurance companies stated that they do not support the concept of compulsory insurance. In contrast, the majority (56%) favour compulsory insurance, with 18% favouring compulsory earthquake insurance, while 36% favour compulsory insurance in addition to earthquake and flood insurance (Figure 3). No company has stated that there should be only compulsory flood insurance.

only one insurance company (17%) prefered the concept of full coverage with compulsory insurance, while five insurance companies (83%) considered the form of partial compulsory insurance to be more acceptable, whereby under the concept of micro insurance, the insured amount should be set as a percentage of the maximum possible damage and with it the insured will be obliged to pay a lower premium. On the other hand, insuring the rest until full coverage will be a voluntary decision of the insured.

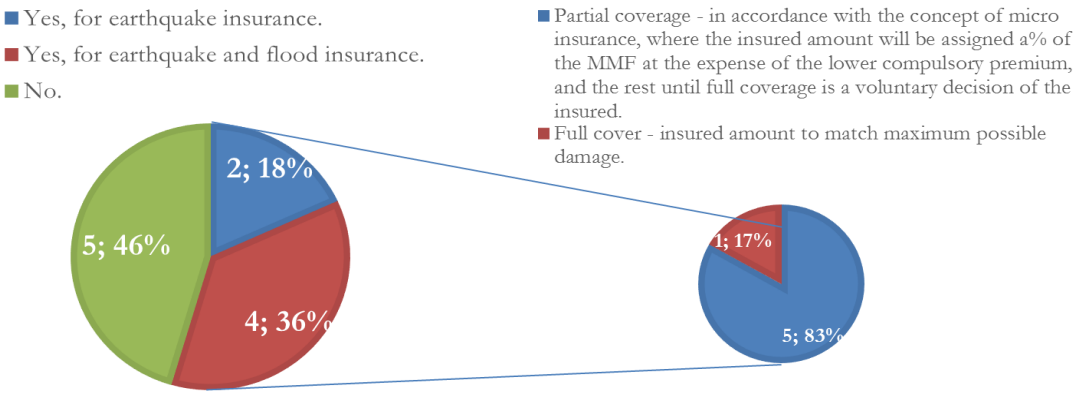

Figure 3. *Voluntary versus compulsory insurance*

Source: Author's own work

In addition to the previous question for those who chose compulsory insurance as an option, they were offered the option to choose between full or partial coverage. In this segment,

In order to find out the context of the economic policy of compulsory insurance, we asked the insurance companies whether they consider that the establishment of a certain type of

compulsory insurance scheme should be followed by a simultaneous measure to exclude the state from ex-post indemnifying the uninsured citizens. Although when asking this question we thought that the insurance companies would respond to such a measure with a consensus, given the fact that the existence of ex-post state intervention may be disincentive for insurers, 27.27% of the companies believe that compulsory insurance should not be associated with a restriction on indemnifying uninsured citizens.

In order to conclude the research on the reasons for the low penetration of catastrophic risk insurance in the country, the insurance companies had the possibility of multiple response from the list of offered reasons. Most insurance companies attributed great attention to the insufficient awareness to the advantages offered by catastrophic risks insurance (72.7%) and insufficient awareness of the damages that can cause catastrophic risks (63.6%). Equally important was the expectation that the state will be involved in ex-post financing (63.6%). On the other hand, they gave less importance to the premium level and to the role of distribution channels which are the factors rated as very important for higher sales in the theoretical elaboration of the problem.

A major operational problem in processing catastrophic risks claims is that a high number of insureds may be affected at once. Depending on the extent of the consequences, the reporting of damage may be a problem, but an even greater problem is the process of assessing the damage caused by the insurance company, as it is expected to have limited human and material resources to handle it within 14 days, a time limit provided in the Article 975 of the Law on Obligations (Official Gazette of the Republic of Macedonia No. 18/2001, 4/2002, 5/2003, 84/2008, 81/2009, 161/2009 and 123/2013). Insurance companies have different views on this issue, although most believe that the deadline for disaster insurance should basically be longer than 14 days. Some of them consider that this deadline should be up to 30 days (36.4%), longer than 30 days (9.1%), up to 60 days (18.2%) and longer than 90 days (18.2%).

4.2. Public research data results

In the first part, for the answers to the question of what are the most common catastrophic risks that threaten the area in which you live, the first two places, with a significant difference from the others, are reserved for earthquake (83.9%) and flood (79.24%), which corresponds to the real situation of exposure to risks in the Republic of North Macedonia.

When asked what was the most destructive disaster you have experienced in your area in the past 10 years, the public identified the consequences of flood risk (44.07%), followed by earthquake (35.17%), and by the consequences of other risks. In this segment, we must take into account that the particular advantage given to the flood is due to the fact that the memory of the floods in Skopje in August 2016 is still fresh, especially since the majority of the respondents are from the Skopje region (66.5%). Only a small proportion of the respondents (6.78%) reported that they did not face disastrous risks in the designated period.

The last part of this segment was about the consequences left on the respondents' dwelling. Most of them responded that their dwellings did not sustain any damage (56.8%), while the rest stated that their dwellings suffered varying degrees of damage. None of the respondents experienced a complete demolition of the dwelling as a result of some catastrophic risk.

The second part of the questionnaire aimed to examine the experience of the respondents with insurance and to understand the opinion of the insurance as a disaster management

mechanism. Of particular importance for the survey is that 63.6% of the respondents have had previous experience in purchasing property insurance. Although the question related to an experience they have never had in the past and cannot be linked to official property insurance statistics that is significantly lower, this data is encouraging because the public recognizes and has experience with property insurance, which is particularly important as a basis for further development of catastrophic risk insurance.

In terms of how the respondents perceived insurance as a disaster management mechanism, 66.9% thought that insurance is very important in dealing with catastrophic risks, 30.9% thought its importance was relatively important, and 2.1% of the respondents thought that this has no effect.

Regarding who should take the main responsibility and assume the burden of catastrophic damages, 66.5% of the respondents thought that this should be compensated through the insurance companies indicating a positive perception of insurance as a mechanism for dealing with catastrophic risks. Then, 28.4% were of the opinion that reimbursement should be the task of the state administration (25% for the central government and 3.4% for municipalities), while 5.1% thought that it should be an individual responsibility that corresponds to the concept of self-insurance.

When it comes to the question which economic policy measures the central government should take to reduce the disaster consequences that are most acceptable to you, the respondent were offered multiple answers. The respondents believe that the Government should invest in improving disaster management capacities (46.6%) and should provide subsidies for catastrophic risks insurance (35.2%). A smaller proportion of the respondents (12.5%) believe that the Government should directly engage in providing ex-post compensation.

In the third part of the questionnaire devoted to the acceptance and willingness of the respondents to buy catastrophic insurance coverage, when aksed whether they would buy catastrophic insurance if it was subsidized by the state, 89% of the respondents stated that they are prepared to do so.

We can point out that the most complex and controversial was the question of what is the acceptable price for the respondents for annual insurance with catastrophic risks covered for a 50 m2 dwelling. The respondents were given an explanation that they would receive MKD 1,589,400 (≈ EUR 30,496) in case of complete destruction of the dwelling, an amount derived

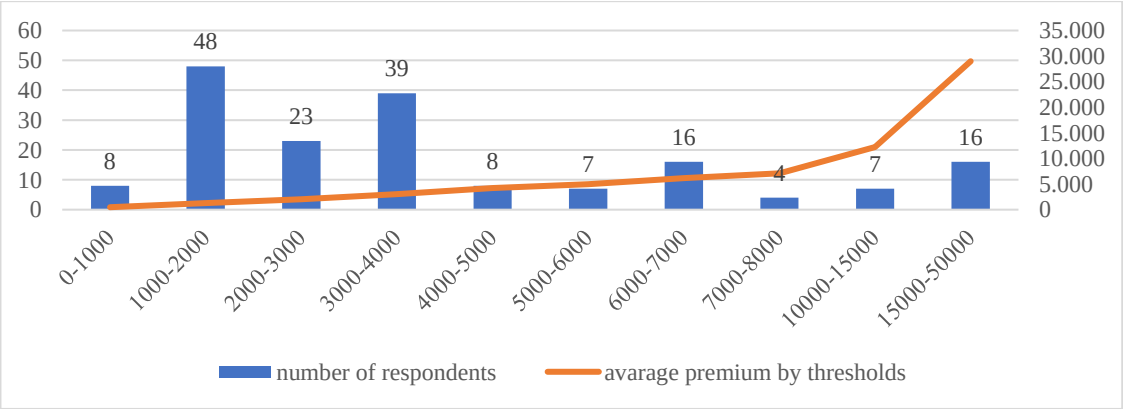

Figure 4: *Affordable premium for catastrophic risk insurance at thresholds of 1,000 denars vs. number of respondents*

Source: Author's own work

from the data of the State Statistical Office, where the national average for construction cost per 1 m^2 of living space is 37,510 denars (≈ EUR 610) in 2016 (excluding building land, including VAT).

Most of the respondents (74.58%) gave their proposal for an acceptable premium, but most of them had significant differences, starting with prices ranging from 300 to 50,000 denars. If we analyse the data collected without further clustering, the average premium is MKD 5,547, but with a large standard deviation of MKD 8,390.77. To this end, the proposed premiums were grouped by thresholds of 1,000 denars in order to see where the largest grouping of respondents is (Figure 4).

Having in mind the average premiums on the insurance market, we consider that the proposed premium amounts of over 10,000 denars for which 23 respondents stated that they are too large, *i.e.* indicate an unrealistic perception of the insurance market. When their impact is subtracted, the average premium is MKD 2,788 with a more acceptable standard deviation of MKD 1,774.

In order to compare views on the amount of the premium with the actual market prices, we requested non-binding insurance quotes that include earthquake and flood risk from four insurance companies. The annual insurance premium ranged from 2,500 to 6,000 denars. The differences were in the insured amount ranging from MKD 1.2 to 1.5 million, risk coverage and franchise. This leads to the conclusion that 2/3 of the respondents who made a proposal for an acceptable premium had correct expectations for the insurance price.

The answer to the two main reasons why respondents are not ready to buy insurance for catastrophic risks was found in the distrust of insurance companies and fear that they will not be reimbursed (48.7%) as well as in their perception that they lack knowledge about insurance (32.2%). Also, there was a large proportion of the respondents who think they cannot afford a premium (30.1%). Only a part of the respondents (7.2%) had no restrictions to buy or already have catastrophic risk insurance. The survey was completed by 236 respondents with unequal regional representation. The respondents camefrom different age structures, with dominant participation in the age groups of 25 to 45 (74.2%). Most of the respondents (94.92%) stated that they have their own income.

5. CONCLUSIONS AND RECOMMENDATIONS

Risk exposure data of the Republic of North Macedonia shows that the consequences are greatest from floods and earthquakes, followed by the impacts of other climate factors. The impact of these two major risks was also identified in the public survey, while the research on farmers, appropriate to the nature of the activity, identified the impact of drought and hail. Despite the identified risks and the awareness that they are present and can cause consequences, disaster risk insurance is minimally used, with a very low share of 1 to 2% in the total GDP.

All insurance companies in the domestic market offer catastrophic risks insurance, without exception for earthquake and flood. Insurance companies believe that national awareness of the consequences of catastrophic risks and the reduction of their consequences through insurance is low and consider these to be the main factors of insufficient demand, compounded by the expectation that the government will intervene in the event of a disaster.

Most companies believe that the state should enter the insurance market by offering a unified catastrophe insurance product and are in favour of some form of compulsory insurance that should be followed by state measures that will not undermine insurance, that is, the public should receive the signal that they must consider insurance as the only mechanism to protect their own property.

Regarding the solution in the Law on Obligations, our view is that the issue of insurance after a catastrophic event should be related to systemic solutions that already exist in the country. One mechanism is to link the prolongation of the fulfilment of the obligation to pay compensation with the declaration of a natural disaster by the Government of the Republic of

North Macedonia. If so determined, insurance companies will have a defined deadline for postponing the payment of compensation, but must at the same time be prepared that the objective deadline for claims cannot depend on their human and material readiness to deal with them.

The public recognizes, without exception, the major catastrophic risks, even though the majority of the respondents did not experience a catastrophic event with total consequences on their property. Also, the majority are of the view that liability should be personal, *i.e.* reimbursement should be sought through insurance mechanisms. About 50% have realistic expectations for the price of insurance, but the factors that discourage them to buy insurance in the first place is distrust towards insurance companies and then price.

The main conclusion is that the current situation is unsatisfactory for all stakeholders and that a different solution is needed to deal with the consequences of catastrophic risks.

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