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# DETERMINANTS OF PURCHASING CATASTROPHE INSURANCE BY COMMUNES – BEHAVIOURAL PERSPECTIVE

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**Abstract:** The paper examines whether Polish communes are willing to buy catastrophe insurance considering behavioural factors such as heuristics and biases. The core methods used in this contribution involve a survey among 348 Polish communes in 2020. The necessary empirical data of a qualitative nature was collected by a consortium of two research agencies, Biostat Research & Development Sp. z o.o. and Biostat Sp. z o.o. The research results supported the hypothesis that the levels of commune income do not have a decisive impact on decisions about the purchase of insurance against catastrophic losses by Polish communes, which allowed to emphasize the role of behavioural aspects of the decision-making process. The article extends the BDM area to municipalities.

**Keywords:** behavioural decision-making, catastrophic risk, catastrophe insurance, natural disasters, local government, risk management.

## 1. Introduction

Catastrophic losses occur more and more frequently, also in Poland, and increasingly generate property losses for households and local authorities. In accordance with the “Klimat Ryzyka” (Climate of Risk) analytical report prepared by Deloitte for

the Polish Insurance Association, exposure to this type of risk in Poland has increased sharply, in line with the value increase in the country's assets during the recent years. Forecasts that predict a further increase in the value of generated capital definitely point to the increasing importance of crisis management in protecting public property exposed to the risk of catastrophic losses caused by fires, floods and high winds.

Buying a catastrophe insurance means the transfer of risk to the insurance company and is one of the possible reactions to such risks. In Poland, one of the biggest floods in the country's history in 2010 generated PLN 19.4 bn losses, of which only PLN 1.7 bn was compensated by the insurance coverage (Maciążek, 2012). The phenomenon of the underinsurance of property against damage caused by natural disasters does not occur solely in Poland, as evidenced by numerous studies indicating the insufficient protection of private and public property, but also in other countries. The problem of the very low level of insured population is well-known in China (Kung & Chen 2012; Wang, 2010). Despite vast and numerous disasters in that country's history, it is estimated that only 1 out of 100 is insured. A frequently quoted, significant example from the American market is New Orleans, where at the time of the onset of Hurricane Katrina, only 40% of the population had adequate insurance coverage of their assets. This example is significant because as the area bears a high risk of similar phenomena, the expenditure related to the acquisition of insurance against catastrophic losses was subsidized by the federal Flooding and Flood Insurance Program (Insurance Information Institute 2005). According to the data presented by Munich RE, "back in the early 1980s, only around a quarter of the losses resulting from natural disasters were insured, even in highly developed industrialised countries. Even today, less than half of all losses are covered" (Munich Re, 2020). As indicated in the Topics Geo – Natural disasters 2017 Report (Munich Re, 2018b), in 2017 only 32% of losses caused by natural catastrophes in Europe were insured.

Research shows that only some local authorities purchase insurance policies, thus protecting themselves against the risk of natural disasters. The survey by Jastrzębska, Janowicz-Lomott, & Łyskawa (2014) demonstrated that among the 366 Polish communes (in Polish *gmina*) surveyed, only 32.5% declared that their risk management includes buying insurance policies, while 79.9% of them insured their property against fire and other acts of God in the 2010-2012 period. In view of the above, it seems extremely important to know the determinants for the decisions made by local authorities regarding the purchase of insurance against catastrophic losses. There is no doubt that the financial decisions made by local authorities, and thus also the decisions relating to property insurance, should take into account the legal, financial and organizational aspects. However, the investment decisions of communes are also affected by factors related to the decision-makers themselves, which emphasizes the role of behavioural factors in the decision-making process.

Disaster insurance is an extremely interesting issue and belongs to the group of insurances related to low-probability high-consequence events. Low-probability high-consequence events are very specific in terms of behavioural decision-making (BDM) under the risk. According to many behavioural studies, they are systematically misjudged (Faure & Bruggeman, 2008; Fischhoff, Slovic, Lichtenstein, & Read, 1978; Slovic, Finucane, Peters, & MacGregor, 2004) due to heuristics and biases. Among many reasons, one of the most common conclusions is that that people either highly underestimate such risk, or greatly overestimate it (Botzen & van den Bergh, 2012) which corresponds to Kahneman's and Tversky's prospect theory.

In this context, the paper aims at analysing the behavioural drivers of decisions on the purchase of insurance against catastrophic losses as made by municipalities. The authors adopted the hypothesis that the levels of commune income do not have a decisive impact on decisions about the purchase of insurance against catastrophic losses by Polish communes – thus indicating the role of the behavioural aspects of the decision-making process. In order to identify the impact of income on the decisions analysed, the authors used the Gini index which represents the level of commune's tax income per capita. Empirical data were collected using the CAWI method by Biostat Research & Development Sp. z o. o. and Biostat Sp. z o. o. during the period from 1st August 2020 to 21st September 2020. The study covered 348 communes in Poland. The communes were sampled at random, but always observing the assumption that the local authorities surveyed must represent all four types of communes in Poland: rural, mixed urban-rural and urban (including independent cities). The analysis of reasons why the surveyed communes purchased insurance against catastrophic losses was made using the CART method.

## **2. Behavioural analysis of the decision-making process in the municipality – theoretical background**

The decision-making process under risk has been widely reviewed in literature. The groundbreaking point was the prospect theory of Kahneman and Tversky (1979) which became the basis of numerous studies concerning risk aversion. It can be applied to the viewpoint on low-probability high-consequence events risk, in which one of the significant examples is catastrophic risk. Many authors provided analysis of the behavioural factors which could affect the willingness to buy catastrophe insurance. The most common finding is that individuals either neglect the risk of natural catastrophe or overestimate it (Botzen & van den Bergh, 2012). As this risk is very often misjudged, researchers found that various heuristics and biases could have an impact on making the decision about buying such insurance (Table 1).

**Table 1.** The selected types of heuristics and biases affecting catastrophe insurance demand

Heuristics	Definition	Authors
Perception of risk of low frequency event	Individuals are either unconcerned or extremely risk averse whether to purchase insurance against low probability events	Slovic P., Finucane M.L., Peters E., MacGregor D.G. (2004), Fischhoff B., Slovic, P., Lichtenstein, S., Read S.J. (1978), Schade C., Kunreuther H., Koellinger P. (2011)
Loss aversion	Being more sensitive to outcomes considered as losses than gains	Botzen W.J.W., van den Bergh J.C.J.M. (2012), Tversky A., Kahneman D. (1979), Tversky A., Kahneman D. (1992)
Certainty effect for insurance decision	Individuals have a tendency to reduce probability from certain to probable	Tversky A., Kahneman D. (1979), Stewart R.E., Stewart B.D. (2001)
Reflection effect	When considering a risky choice, individuals are able to take more risk	Tversky A., Kahneman D. (1979)
Budgeting heuristics	With no capital, decision-makers may do not analyse the benefit-cost ratio of insurance	Kunreuther H., Heal G. (2012)
Representativeness heuristics	Experience with catastrophic loss is too low to even consider it	Botzen W.J.W., van den Bergh J.C.J.M. (2012), Viscusi W., Zeckhauser R. (2006), Viscusi W., Zeckhauser R. (2015), Buzatu C. (2013), Hertwig R., Barron G., Weber E., Erev I. (2004)
Excessive optimism heuristics	Tendency to overestimate the probability of good events	Tversky A., Kahneman D. (1979), Tomal M. (2019)
Subjective perception of risk	The willingness to purchase insurance is greater when the risk is considered subjectively than when it's based on region's characteristics (history of catastrophic events)	Botzen W.J.W., van den Bergh J.C.J.M. (2012), Viscusi W., Zeckhauser R. (2006), Viscusi W., Zeckhauser R. (2015),
Affection effect	Individuals estimate the risk higher if they are more attached to the risk subject	Hsee K., Kunreuther H. (2002), Rottenstreich Y., Hsee C.K. (2001)
The role of worry	The risk of low probability losses makes individuals to pay more for insurance when the probability is ambiguous rather than it's calculated	Schade C., Kunreuther H., Koellinger P. (2011), Horgath R.M., Kunreuther H. (1989)
Bounded rationality	The rational choice on buying the insurance is limited by the cost of information gathering and calculations	Kunreuther H. (2004), Buzatu C. (2013)
Habits	Buying insurance due to a habit based on previous insurance history	Jastrzębska M., Janowicz-Lomott, Łyskawa K. (2014)
Mimicry	Behaviour of buying insurance because others buy it	

Source: own study based on literature review.

It has to be noted that presented heuristics and biases were applied to the decision-making process of individuals. Only the last two are connected with a commune's willingness to purchase catastrophe insurance. The heuristics consist in the habits of the decision-makers responsible for risk management who were buying such insurance in previous years and mimicry. The analysis of Jastrzębska, Janowicz-Lomott, Łyskawa (2014) shows that some communes imitate the insurance decision of other communes.

It should also be highlighted that concerning low-probability risk, the finding that limited experience with such losses can affect the willingness to purchase the insurance is often referred to in literature. Individuals do not perceive the risk as relevant if they have not experienced it in the past. The statistics concerning catastrophe insurance demand is the proof of these findings, as the number of new catastrophe insurance policies reaches its peak the year after the loss's occurrence (Gallagher, 2014). Insufficient information about catastrophic events could make decision-makers reluctant to take up the cost of its collection and calculation, which corresponds to the bounded rationality theory.

The behavioural factors presented in Table 1 were used to analyse and describe the decision-making process for buying catastrophe insurance by Polish communes surveyed for this paper.

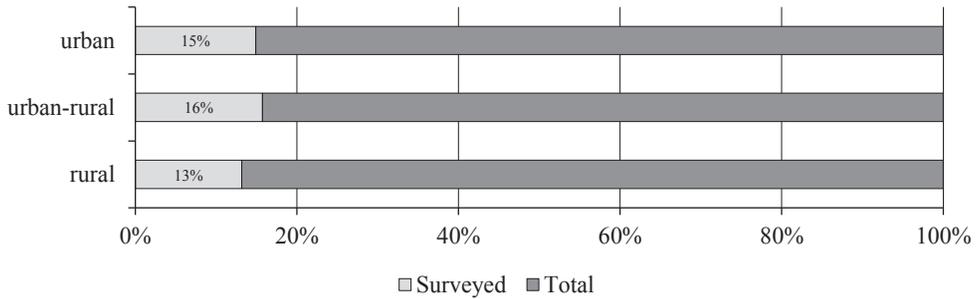
### 3. Methods

The essential empirical data were obtained based on a survey of 348 Polish communes in the period 1 Aug 2020 to 21 Sept 2020. The survey was originally sent to 2016 communes, and the response rate was 19%; 348 correctly completed questionnaires were accepted for further analysis. The communes were chosen randomly from the whole population of Polish communes of all types: rural, mixed urban-rural and urban (including independent cities). The questions were addressed to the communes' representatives or their delegates responsible for risk management, who take decisions connected to buying insurance for the commune.

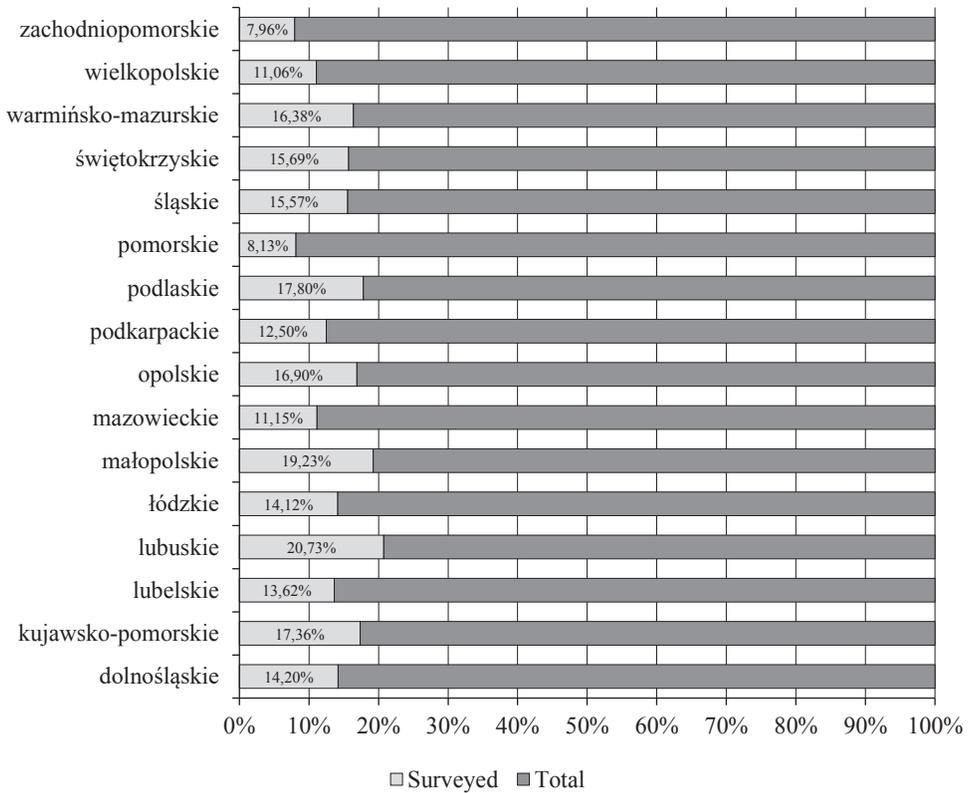
The survey sample represents 14% of the whole population of communes in Poland according to data from 1 Jan 2020. In the group of 348 communes, the research was carried out on 202 rural communes, 101 urban-rural communes and 45 urban communes (see Figure 1).

As indicated in Figure 2, the analysed sample covers all 17 Polish voivodeships (from 7.96% to 20.73% of coverage depending on the specific voivodeship).

From all the surveyed communes, 226 (64.9%) declared that they have insurance against catastrophic loss, and 122 of them declared the opposite. To analyse the behavioural drivers of the decisions on the purchase of insurance against catastrophic losses as made by municipalities, the authors used the Classification and Regression Tree Method (C&RT). The tree was created using Statistica 13.0. The assumptions presented in Table 2. were used to build the tree.



**Fig. 1.** Share of the surveyed communes in the total number of communes by commune type  
Source: own study.



**Fig. 2.** Share of the surveyed communes in the total number of communes by voivodeship  
Source: own study.

The dependent variable shows if the respondent bought the catastrophe insurance or not and was coded as follows: 1 – the insurance is bought by the analysed commune or 0 – the insurance is not bought by the commune.

**Table 2.** The basic assumption used in CART algorithm

Specification	Assumptions
Costs of misclassification	Equal
Fit measures (partitioning rule)	Gini index
Stopping rule	If misclassification
Minimum number	50
Maximum number of the tree levels (depth)	30
Maximum number of nodes	20
Error estimation	10-fold test validation

Source: own study.

The independent variables were coded according to the answers to six questions, formulated accordingly to the literature studies concerning decision-making on buying insurance for low probability and high impact risk, with a focus on natural catastrophes such as floods or earthquakes.

The respondents gave their answers using the 5-point Likert scale coded as follows: 1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, 5 – strongly agree. The questions and the statistics for the answers grouped by the question are presented in Table 3.

**Table 3.** Share of responses to the survey questions

Share of responses to the survey questions (N = 348) [%]					
Indicate whether you agree with the following statements:	1	2	3	4	5
Q1. Government financial support in the event of catastrophic loss is sufficient	9.20	34.77	27.30	24.43	4.31
Q2. The catastrophic risk is too low and the price (premium) of the insurance is too high for such a security measure (insurance policy) to be profitable	11.21	30.17	18.39	31.03	9.20
Q3. The price (premium) of this kind of insurance is too high for our commune	5.75	20.98	28.45	33.62	11.21
Q4. The history of catastrophic losses in our commune makes us consider such insurance unnecessary	19.25	32.76	14.94	27.01	6.03
Q5. We continue the previous insurance policy of our predecessors instead of allocating resources to the continuous development of new Terms of Reference for insurance purchases	15.80	32.18	18.10	26.44	7.47
Q6. It is more likely to save on not buying such insurance than to suffer such loss and damage	21.26	35.34	24.14	16.09	3.16

Source: own study.

In Question 1 the respondents had to determine if government aid in cases of a catastrophic event is sufficient enough that they do not see the need for buying additional catastrophe insurance. The most frequent answer was '2' which means that the most of the respondents declared their disagreement with that statement. This question was meant to show if the commune prefers to not buy the insurance and rely entirely on government financial aid when the catastrophic loss occurs. One of the explanations why many individuals do not buy such insurance is their belief that someone else will cover the loss (e.g. government).

Question 2 takes into consideration risk aversion with an emphasis on the risk of a catastrophic event. The respondents had to determine if they estimate that the chance on their experiencing a catastrophic event in the future will exceed its loss higher than the insurance premium cost. The results enabled the authors to create a variable showing how the communes react to the possibility of such a loss and make decisions under risk. The intention of the authors was also to confront it with the findings of Kahneman and Tversky, that is individuals are more sensitive to outcomes framed as losses than as gains due to loss aversion. In the case of insurance, the gains are considered as savings related to not buying insurance. The surveyed population was quite divergent – around 40% respondents disagreed with the statement that the catastrophic risk is too low and the price (premium) of the insurance is too high for such a security measure (insurance policy) to be profitable and almost the same share agreed with it.

In Question 3, the communes were asked to determine how strongly they agree with statement that the catastrophe insurance premium is too high for their budget's constraints - without a relation to the perceived risk. This was meant to show the strength of the impact of budgeting heuristics on the decision-making process and their willingness to purchase the insurance. As Kunreuther and Heal (2012) point out, in the case of insurance these heuristics refer to a situation in which the decision-maker does not have the financial ability to purchase the insurance and therefore does not analyse the economic efficiency of purchasing this product. One-third of the surveyed population indicated that they agree with the statement from Question 3, and an additional 11.2% strongly agreed.

In Question 4, the respondents were asked to assess the impact of the historic natural loss events on the willingness to buy catastrophe insurance. As existing research shows, in cases of low probability and high impact risk, the history of previous events can be read differently and burdened with many biases. These misperceptions include not considering the risk as it is too rare, and does not correspond to the experience of a decision-maker or making a decision according to only the immediate examples which come to mind (availability heuristics). Over half of respondents (52%) stated that they disagreed and one-third of them agreed with the statement.

The responses to Question 5 represent almost the same division – the question concerned the continuation of the previously created insurance strategy instead of creating new terms of reference every year. The authors wanted to analyse how status

quo bias could impact on making decisions about a constant search for better insurance solutions, but at the cost of greater expenditure on searching for information and analysing it.

Question 6 regards (similarly to Question 2) risk aversion, but in this case, communes had to assess their attitude to the claim that it is more likely to save on not buying such insurance than to suffer such loss and damage. That was to confront the responses to Question 2 and review them from the certainty effect and optimism bias point of view; 56.61% of respondents stated their disagreement with the statement that the possible savings of not buying catastrophe insurance are more probable than suffering such loss in the future.

On the basis of the presented questions, explanatory variables were created. To build the tree using the CART method, an economic variable was also added to the behavioural variables (Table 4).

**Table 4.** Predictors’ description

X1	Assumption that someone else will cover the loss
X2	Assumption that the price of insurance is too high in relation to the risk of such low probability
X3	Assumption that budget constraints limit the community to such an extent that it does not even consider purchasing catastrophe insurance
X4	Subjective perception of risk
X5	Buying catastrophe insurance based on a habit
X6	Willingness to buy catastrophe insurance in the view of hyperbolic discount
X7	Tax revenue <i>per capita</i>

Source: own study.

The last independent variable was based on “G-index” measurement. The index shows tax revenue *per capita* for individual commune. The lowest value for the surveyed population was PLN 563.86 and the highest, PLN 10 145.42. Based on “G-index” values, five classes were created according to respective percentiles (Table 5.)

**Table 5.** “G-index” distribution for the surveyed sample

Class	Percentiles	Amount (PLN)
1 <sup>st</sup> class	(0.8-1>	(1 837.47-10 145.42>
2 <sup>nd</sup> class	(0.6-0.8>	(1 477.80-1 837.47>
3 <sup>rd</sup> class	(0.4-0.6>	(1 192.76-1 477.80>
4 <sup>th</sup> class	(0.2-0.4>	(970.56-1 192.76>
5 <sup>th</sup> class	<0.0-0.2>	<563.86-970.56>

Source: own study.

Thanks to the introduction of the income-based variable to the analysis, the authors could compare the impact of behavioural variables on the purchase of catastrophe insurance by municipalities with the impact of the economic variable.

### 4. Results of the CART algorithm and discussion

The CART model (Classification and Regression Trees) was used to examine the behavioural determinants influencing the decision to purchase insurance against catastrophic losses by communes. The analysis was carried out using the statistical package StatSoft Statistica 13.0.

The tree shown in Figure 3 was indicated as the best of the six trees obtained as a result of the CART method. It is characterized by five split nodes and six terminal nodes.

The most important predictor from all those included in the classification tree was the X4 variable; 181 of the communes strongly disagreed and disagreed (terminal

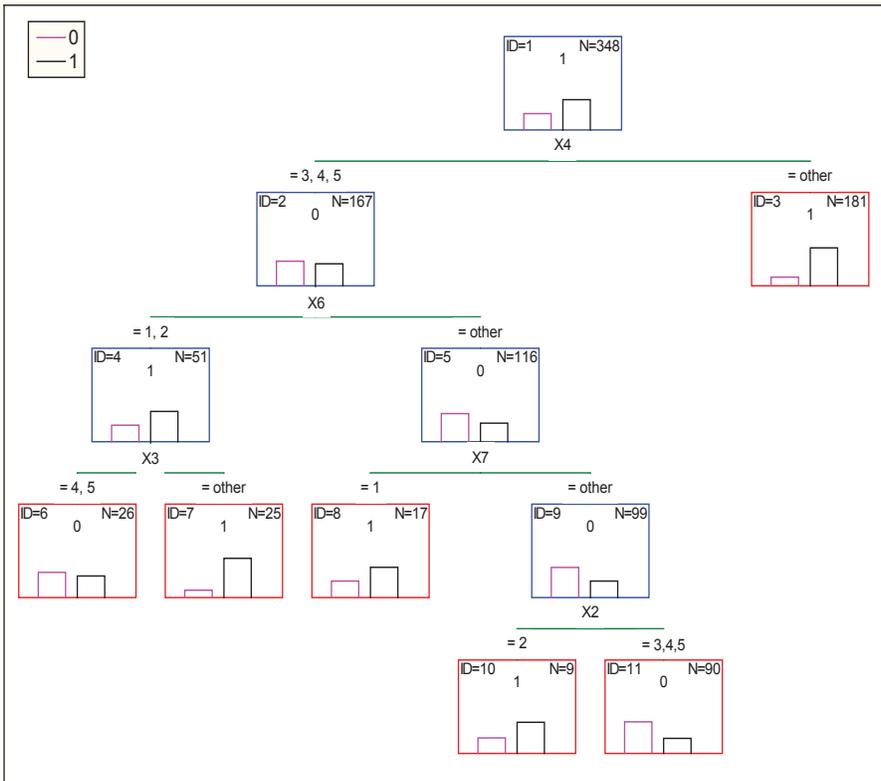


Fig. 3. Classification tree

Source: own study.

node with ID = 3) with the statement that the history of natural disasters in the commune makes them think that such insurance is not important. This group was nearly homogeneous – only 34 of these communes stated that they did not bought catastrophe insurance. The analysis of the responses given by those surveyed required taking into account the actual history of the occurrence of natural disasters in a given locality. According to the information obtained from the 181 surveyed respondents, 108 of them had experienced such an event in the last 5 years, whereas the other 73 communes had not. In line with behavioural decision-making theory, both of these cases require separate interpretation.

The main heuristics which can explain the decision made by mentioned 108 communes is the representativeness heuristic bias. In those that experienced catastrophic damage, such bias made them suppose that the probability of a similar loss occurrence in the future is greater.

The decision-making mechanism in the group of the other 73 communes can be explained by the Bayesian updating of their flood risk, which comes down to the observation that the willingness to pay depends not only on the catastrophic loss probability but also on the prior convictions. According to Botzen and van den Bergh (2012), this means that the objective risk derived from geographical characteristics influences the willingness to pay for insurance to a lesser extent.

It should be emphasized that the group of 167 communes (belonging to the node with ID = 2), which agreed with the claim that the history of damage in the commune makes them perceive this insurance as unnecessary, was not homogenous. The first variable dividing this community into two further groups is X6, Willingness to buy catastrophe insurance in the view of hyperbolic discount. Two classes were distinguished on the basis of this criterion. The first one ( $N = 51$ ) concerns the communes which do not agree with the statement that it is more certain to save on not buying such insurance than to suffer such loss and damage. The price of insurance plays an important role for them.

Half of these communes admitted that the price of such insurance is too high for them to pay (26 communes; terminal node with ID = 6). For 14 in this class, this was an incentive to refrain from buying insurance. The theory of perspective (Tversky & Kahnemann, 1979), which shows the phenomenon of aversion to losses, can be used to explain the decisions of the other 12. The authors found that individuals are more sensitive to results that are considered losses than profits. It can therefore be assumed that the decision-makers in these communes focused more on possible losses caused by natural disasters than on potential profits (no expenditure on insurance premiums). In the case of 25 communes (belonging to the terminal node with ID = 7), which considered the price as not excessive, the vast majority (84%) purchased such insurance.

To sum up the conclusions referring to terminal nodes with ID = 6 and ID = 7, it should be emphasized that the perception of price by a given commune is shown

both through the prism of the subjective assessment of the profitability of purchase of this insurance by a given commune, and its budgetary constraints.

Further analysis of the tree in this figure shows that most of the 116 communes which agree, or are neutral regarding the statement that it is more likely to save on not buying such insurance than to suffer such loss and damage (node with ID = 5), did not buy the catastrophe insurance. According to the behavioural decision-making concept, the cause of such behavior can be found in the tendency to ignore events with a probability that is below a certain threshold level (Browne, Knoller, & Richter, 2015). The threshold for these communes was income. It should be emphasized that among those communes which had the highest value of G-index, the vast majority (64.7%) purchased insurance. This group of communes includes those whose tax revenues per capita range from PLN 1 837.47 to PLN 10 145.42 (i.e. class 1 with 0.8-1 percentile). The importance of income for the decision to purchase insurance is underlined by Kunreuther's considerations (2012), who emphasized that affordability is the simplest explanation as to why decision-makers may fail to invest in protection. Budget constraints mean that any benefit-cost analysis could be groundless.

Representativeness and availability heuristics could be a reason why other communes did not buy catastrophe insurance. Based on studies about the perception of low-frequency risk, a common finding is that individuals assign lesser importance to rare events because they do not experience them regularly (Hertwig, Barron, Weber, & Erev, 2004) and therefore cannot refer to the negative consequences associated with such situations (Buzatu, 2013).

In the case of 99 communes with lower tax income per capita (node with ID = 9), the decision to purchase catastrophe insurance was influenced by the perception of price in the context of risk (X2). It should be stressed that the variable X2 is a predictor of a purely behavioural nature, which was used to analyse the perception of risk in relation to the insurance price in isolation from the budgetary constraints of a given commune. The acceptance of the insurance price was determined solely by the level of the probability of natural damage occurrence. The lower the perceived probability of the occurrence of such an event, the lower the price of the catastrophe insurance accepted by the commune.

Only 9 out of the 99 municipalities (belonging to terminal node with ID = 10) disagreed with the view that the risk of disaster is too low and the price of the insurance (premium) is too high to make such protection (insurance policy) profitable. It should be emphasized that the leaf with ID 10 concerns less than 5% of the surveyed population and therefore is not subject to analysis and interpretation.

The remaining 90 municipalities (belonging to the terminal node with ID = 11) mostly did not buy catastrophe insurance (67.8%). This behaviour may be explained by the excessive optimism that characterizes decision-makers in municipalities, which leads these communes to refrain from purchasing insurance. The importance of this heuristics in the context of investment decisions made by local government units is emphasized, among others, by the Tomal study (2019).

What is more, it should be noted that the comparison of the answers to Questions Q2 and Q3 shows that four communes from the analysed node did not agree with the statement contained in the latter: The price of such insurance is too high for our municipality. Therefore it can be concluded that the price is not too high for these communes in the context of budget constraints. However, after changing the context against which the price is shown, another response was obtained. When comparing the price with the low probability of a catastrophic event, these municipalities considered it too high. In behavioural finance, this phenomenon is referred to as framing. In line with the prospect theory (Tversky & Kahneman, 1979), decision-framing occurs when different ways of presentation, different images and descriptions of the same problem lead to different results.

It should also be emphasized that all the communes this leaf gave a consistent answer in Questions 2 and 6 – in both cases they considered that the risk of disaster is too low to justify the need to buy insurance.

## 5. Conclusion

To sum up the results obtained, it should be noted that the following factors have the greatest impact on the purchase of catastrophe insurance:

- risk perception in view of its probability due to the availability heuristics,
- willingness to buy catastrophe insurance in the view of the cumulative prospect theory and the excessive optimism heuristics.

The results of the research showed that the following determinants were also important: assumption that budget constraints limit the commune to even consider buying the insurance and tax revenue per capita.

In this paper the authors adopted the hypothesis that the levels of commune income do not have a decisive impact on the decisions about the purchase of insurance against catastrophic losses by Polish communes. The analysis of the decision to purchase catastrophe insurance in the 348 surveyed municipalities in Poland supports this hypothesis. The results of the research underline the role of the behavioural aspects of the decision-making process, also pointing out the existing role of budget constraints.

In light of the current research carried out in Polish communes on the purchase of financial instruments reducing risk related to local government tasks, especially in cases of catastrophic risk, the most focused analysis on the subject was „Zarządzanie ryzykiem w działalności jednostek samorządu terytorialnego ze szczególnym uwzględnieniem ryzyka katastroficznego” (Jastrzębska et al., 2014).

Based on its findings, the most important reasons for buying catastrophe insurance for Polish communes were: their conviction about the effectiveness of insurance protection (67.5%), the fact that it is required by legal regulations (30.1%), a habit resulting from previously binding actions (15.3%), good price offer of the insurance programme for the commune (11.2% of indications), high indemnity

(9.3%), as well as mimicking the actions of other communes (4.4%). It is worth noting that the results include two determinants of a behavioural nature, i.e. the habit resulting from previous activities and the mimicry of other municipalities. This approach to the decision to purchase the insurance can be justified by the low level of risk aversion by decision-makers. It should be emphasized that in the presented survey only one-third bought catastrophe insurance for communal property.

The results of the research conducted by those authors differ from the results obtained in this study. In this paper, the majority of those surveyed showed that there is no low level of risk aversion in the context of the analysed problem, hence the vast majority, 226 communes (64.9%), bought catastrophe insurance. The aversion to risk for those who decide to take out catastrophe insurance in the surveyed localities help to determine Questions 2 and 6. In these questions the respondents were to refer to the following statements: "The catastrophic risk is too low and the price (premium) of the insurance is too high for such a security measure (insurance policy) to be profitable" and "It is more likely to save on not buying such insurance than to suffer such loss and damage". The answers provided prove that, contrary to the research conducted by Jastrzębska, Janowicz-Lomott, Łyskawa (2014), the majority of the surveyed persons responsible for making decisions on purchasing catastrophe insurance in the surveyed communes do not show a low level aversion to risk.

The aim of this research was an analysis of the behavioural drivers of decisions on the purchase of insurance against catastrophic losses made by communes, thus this work contributes to fill the knowledge gap in the BDM area, since there are few such analyses concerning local government. The results obtained forward the current discussion about the factors which affect the willingness to buy catastrophe insurance, which are especially interesting as they concern low probability and high impact risk. On the one hand, they are characterized by the low probability of occurrence, based on the history of such events in the commune, and on the other hand, by the high value of possible losses. The high value of potential losses can have a wide range of effects on local government, the local community and also on the country – providing financial aid to communes which have not been protected against catastrophic risk.

The limitations of this research can be found in the limited survey sample, as well as in the focus on the selected aspects of the decision-making process of purchasing insurance by communes.

The element of the analysis which is worth further examination is the group of communes, but also introducing new variables into the analysis, both behavioural and others. The analyses of the surveyed aspects by specific types of communes may also be interesting, as well as the identification of the positions of people who make decisions about buying catastrophe insurance at local government level. The research conducted in this article shows that there is a great diversity in this area. It is known, in communes the decision about purchasing catastrophe insurance can be made by a specific cell created for risk-management purposes or simply by the commune's executives (Tworek, 2017).

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## DETERMINANTY NABYWANIA UBEZPIECZEŃ KATASTROFICZNYCH PRZEZ GMINY – PERSPEKTYWA BEHAWIORALNA

**Streszczenie:** W artykule zbadano, czy polskie gminy nabywają ubezpieczenie katastroficzne pod względem czynników behawioralnych, takich jak heurystyki czy uprzedzenia decydentów. Główne metody, jakie zostały zastosowane, to: ankieta przeprowadzona metodą CAWI na próbie 348 polskich gmin w okresie od 1.08.2020 r. do 21.09.2020 r., metoda CART oraz analiza literatury przedmiotu. Niezbędne dane empiryczne zostały zebrane przez konsorcjum dwóch agencji badawczych: Biostat Research & Development Sp. z o.o. oraz Biostat Sp. z o.o. Wyniki badań potwierdziły hipotezę, że dochody gminy nie są najistotniejszym kryterium przy podejmowaniu decyzji o zakupie takiego ubezpieczenia, co pozwoliło na podkreślenie wagi czynników o charakterze behawioralnym.

**Słowa kluczowe:** behavioural decision-making, ryzyko katastroficzne, ubezpieczenia katastroficzne, katastrofy naturalne, samorząd terytorialny, zarządzanie ryzykiem.